

Poster sessions

British Society of Paediatric Dentistry Poster Prize Session – PZ01

PZ01.01

Investigation of care staff attitudes regarding oral care provision for dependent children and young people prior to implementation of a toothbrushing programme

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Background: Chailey Heritage Foundation (CHF) is a pioneering UK charity which educates and cares for children and young adults with complex physical disabilities and health needs. Chailey Heritage Residential offers flexible care packages for children and young people aged 3–19 years old. Futures@Chailey Heritage, for 19–25 year olds, is where young disabled adults are helped to develop life skills.

Aim: To investigate care staff attitudes regarding oral care provision and to introduce a new tooth brushing programme using non-foaming toothpaste and suction for patients with severe eating and drinking difficulties (Eating and Drinking Ability Classification System Level V).

Design: Assessment of attitudes towards oral care provision was gathered from staff involved in caring for children and young people at CHF. The brushing programme was introduced to develop a standardised programme of oral care for patients with swallowing difficulties (EDACS V), using non foaming toothpaste and a protocol which encourages suction during brushing.

Results: 82% of staff felt that oral care was a high priority and the majority did not find toothbrushing unpleasant. A number of challenges were identified including lack of time (50%), lack of child co-operation (94%) and in some cases lack of training and confidence. Over 66% felt that the use of non-foaming toothpaste and suction would be useful.

Conclusions: Staff at CHF face a number of challenges in delivering good oral care. It is likely that a programme utilising improved training, non-foaming toothpaste, suction and an individual oral care plan would benefit the children at CHF.

PZ01.02

The effect of different oral care treatments on the demineralisation of hypomineralised enamel

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Objectives: The objective of this study was to investigate the effect of six different putative protective treatments on the inhibition of demineralisation of hypomineralised enamel *in vitro*.

Methods: 126 enamel specimens measuring 2 × 2 × 3 mm were prepared from human first molars exhibiting MIH (seven groups, *n* = 18). The samples were initially immersed in a slurry (1 : 3 toothpaste : deionised water) of 1450 ppm NaF (groups: G1–

G3), or 5000 ppm NaF (groups: G4–G6). The seventh group (G7) was control (no treatment). Then, the slabs were demineralised by stirring for 10 s five separate times in fresh 200 mL aliquots of citric acid, 0.3% w/v, pH3.20. A 60-min gap was left between demineralisations/treatment as well as rinsed where slabs incubated into artificial saliva. Then, samples were treated as follow (slurries): 1450 ppm NaF toothpaste (G1), 1450 ppm NaF toothpaste with casein phosphopeptide-amorphous calcium phosphate fluoride (CPP-ACPF) gel (G2), 1450 ppm NaF toothpaste with CPP-ACPF gel and 22,500 ppm NaF varnish (G3); 5000 ppm NaF toothpaste (G4), 5000 ppm NaF toothpaste with CPP-ACPF gel (G5), 5000 ppm NaF toothpaste with CPP-ACPF gel and 22,500 ppm NaF varnish (G6). Nanohardness of enamel was measured at baseline and after cycling using atomic force microscopy.

Results: All specimens showed reduction in enamel hardness after cycling. The percentage of enamel hardness reduction (% change ± SD) was G1: 30.11 ± 18.28, G2: 19.18 ± 10.19, G3: 9.71 ± 23.13, G4: 18.20 ± 21.54, G5: 4.08 ± 19.95, G6: 6.80 ± 23.67, G7: 34.45 ± 16.63 (ANOVA, *P* < 0.05).

Conclusion: The groups with highest fluoride exposure (G3, G5, G6) exhibited less demineralisation of hypomineralised enamel than other treatments. No treatment regime was able to inhibit demineralisation completely.

PZ01.03

Lifecourse determinants of dental caries in three year old children: a feasibility data linkage study

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Background: Birth cohorts, such as Born in Bradford (BiB), provide an opportunity to study the influence of environmental factors acting in pregnancy, birth and infancy on the development of caries in later years. Dental epidemiology surveys (DES) are undertaken annually in Bradford for different age groups using a standardised and robust methodology as part of the national dental epidemiology programme.

Aim: To explore through data linkage whether caries at 3 years old is associated with birthweight in a cohort of Bradford children.

Design: Parents of children consented to participate in DES had the additional option of consenting for data linkage where their child was also part of BiB. Data linkage, following establish protocols, was undertaken using each child's unique NHS number. Associations between caries (dmft) and the following variables were investigated: birthweight, ethnicity, gestation, gender, parity, maternal education, deprivation and maternal language. Simple descriptive and exploratory statistical analysis was undertaken.

Results: From the sample of 152 children examined for the DES in Bradford, 69 parents consented for data linkage. Only 36 children had actually participated in BiB as well. Six children had caries (dmft >0). There were no statistical associations between any variable and caries.

Conclusions: Data linkage and analysis was successfully undertaken between the DES and BiB data sets, with data safely transferred. Almost half the parents who consented for data linkage, inaccurately thought their child was also part of BiB. Alternative approaches need to be explored to accurately recruit children participating in both annual DES and BiB.

PZ01.04

Customised soft bite guards for paediatric special care patients

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Introduction: Cohorts and individuals within the special care population can often suffer considerable self-inflicted trauma to oral hard and soft tissues. Conditions such as Lesch-Nyhan syndrome and Congenital insensitivity to pain have been implicated, amongst others. It is the responsibility of the Dental team to limit oral trauma and damage caused by the dentition for these patients. One method commonly employed is the use of a soft bite guard. No gold standard design has yet been recognised, with various constructions advocated in the literature.

Case reports: We present two designs commonly used at Birmingham Dental Hospital. The appliance designs were derived from input from both clinicians and dental technicians. Our first design was made to provide protection to the peri-oral and oral soft tissues. Our second design intended to limit the effect of severe bruxism and resultant attrition. Conventional splint designs are generally not adequate as in many special care patients they can pose a choking or ingestion risk. The two designs presented have been found to be well tolerated, safe and can be fabricated with standard materials with only minimal modifications to conventional methods.

Comments: Dentists may be called upon to advise on or manage special care patients with self inflicted trauma of the oral tissues, or elsewhere, caused by the dentition. The two designs specified have proven to be both safe and well tolerated by special care patients in our hospital.

PZ01.05

Management of dental caries in children in an NGO-run hospital in Cambodia

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Background: Angkor Hospital for Children (AHC) is an NGO-run hospital in Siem Reap, Cambodia with a dental department that runs 5 days per week and provides dental treatment to over 70 children per day. With the average Cambodian child surviving on less than US\$1 per day and with no state-funded healthcare system, the need for dental treatment is very high.

Aim: To observe and experience the management of dental caries in paediatric patients at Angkor Hospital for Children in Cambodia and to report on the materials and operative techniques used.

Design: A 2 week volunteer placement took place at AHC dental department. Paediatric patients were seen by undergraduate dental students and treated under the supervision of hospital dentists.

Results: Knowledge and language barriers led to difficulties obtaining a history. Carious teeth were restored using the limited materials available at AHC and restorative treatment was largely restricted to hand-mixed GIC filings. Restorative techniques were kept very quick and simple, as recommended by the hospital dentists. A large proportion of carious teeth, both deciduous and permanent, were unrestorable and were extracted under local anaesthetic.

Conclusions: A lack of acclimatisation and a non-existent referral system makes management of pre-cooperative paediatric patients in Cambodia extremely difficult. The absence of a state-funded healthcare system in Cambodia combined with a high level of poverty results in a large proportion of patients presenting in pain with an immediate need for dental treatment.

PZ01.06

Pre-operative documentation of sleep disordered breathing (SDB) status for children undergoing dental general anaesthesia (DGA)

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Background: Sleep disordered breathing (SDB) affects up to 20% of children and includes snoring, obstructive hypo-ventilation and obstructive sleep apnoea. Associations with adeno-tonsillar hypertrophy, obesity and increased GA risk are known. This may necessitate inpatient management and close monitoring in the post-operative period. SDB status enquiry was not routine in our pre-operative assessment for day case DGA, sometimes resulting in cancellation of procedures on the day of admission.

Aim: To assess whether dentists are routinely enquiring about the presence of SDB pre-operatively for children planned for DGA.

Method: The dental records of 50 child patients attending for DGA were selected and assessed for evidence of enquiry regarding SDB.

Results: 90% of the sample were healthy children (10% asthmatic). No documentation of active enquiry regarding SDB was found in 95% of the sample. Only 1 child had documented evidence of being asked about sleep apnoea and adeno-tonsillar problems. One child had undergone tonsillectomy previously with a history of 'breathing problems' prior to this. One child's procedure was cancelled on the day by the anaesthetist due to tonsillitis. Interestingly, this child had suffered multiple previous bouts of tonsillitis and was pending tonsillectomy procedure - neither of which had been documented in the original medical history.

Conclusions: The majority of dentists failed to document SDB enquiries during assessment for DGA. This led to alteration of the medical history form to include SDB to help identify potentially high risk patients, maximise safe delivery of DGA and prevent unnecessary short-notice cancellation of procedures.

British Society of Paediatric Dentistry Dental Care Professional Poster Prize Session – PZ02

PZ02.01

Audit of frequency and type of splints already placed on patients that attend with a dental trauma to paediatric dentistry casualty

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Background: Within our department the preferred splinting approach for trauma patients is the use of orthodontic brackets and wire. Local teaching is provided for regional Max Fax DCT 3 but it is unclear if the teaching is being put into practice in the clinical setting.

Aim: To find out if orthodontic splints were being placed for patients with dental trauma outside of the department. Gold standard: 100% of cases should have orthodontic brackets and wire splints.

Design: Data were collected for 4 months, August - November 2014. Data included the injury sustained; date of trauma; whether the patient attended somewhere else prior to our department and the type of splint placed if applicable.

Results: Fifty-three patients attended our children's casualty clinic with a dental trauma over the audit period. Of those, 35 had attended somewhere else for initial management and 10 had a splint in place. All of the splints were composite and wire and seven of the patients had their splints removed and replaced with an orthodontic splint on our casualty clinic.

Conclusions: In the audit period, despite training being given to Max Fax staff, the gold standard was not met. The impact of this is that patients attending our department are frequently having their splints removed and replaced within days of their trauma which can often be traumatic for them. A re-audit is planned for February - May 2015 to assess whether intensive training has resulted in a change in practice.

PZ02.02

Kinder wide smiles

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Background: The Barwon Region is a large diverse regional/rural area of Victoria, Australia. Some areas are situated approximately 100 km or more from the nearest public or private dental clinic and include many low socioeconomic areas. Many Kindergarten children in the Barwon region of Victoria have required emergency dental appointments or treatment under general anaesthesia.

Aim: Our aim was to improve access to dental services for children in the region by utilising a preventive dental approach.

Design: An outreach service was developed for children (aged 3–5 years) in early learning centres named Kinder Wide Smiles during 2013. Sixty centres throughout the Geelong (44) and Colac-Otway (16) region were visited. Participant Information and Consent forms for dental examinations and fluoride application were distributed to parents/guardians. Children received three dental check-ups during the year and fluoride application (0.25 mL/tooth) with Duraphat® (Colgate-Palmolive Pty. Ltd.) for white spot lesions.

Results: During 2013, 2326 children attended dental examinations which represents 65.9% of children enrolled at these settings. During Visit 1, Duraphat® was applied to the teeth of 723 Kindergarten children. Two-hundred and fifty eight referrals were made at Visit 1 and 28% of these patients attended their appointments. A further 147 were referred for dental appointments at Visit 2 with 14% attending appointments. Preliminary analysis of tooth surfaces shows that timely intervention resulted in 98.9% of surfaces remaining constant or improved (Visits 1–3).

Conclusions: The program has been extended to school aged children (5–6 years) in the Barwon Region of Victoria, Australia in 2014 and 2015.

PZ02.03

Dental morbidity among early childhood children left without parents' care and children living with parents in Moscow

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Against the background of significant success in learning etiology, pathogenesis and treatment early childhood caries remains a complex problem. Medical care of children left without parents care requires special attention of society and state. That's why dental assistance is one of important medical and social problems in dentistry.

Aim: To evaluate dynamics of caries affection among the children who left without parents' care and among the children living with parents.

Methods: Clinical investigation of 133 children who live without parents care in special institutions was carried out in Moscow. And 478 children living with parents. Decayed, missing and filling (DMFT) were employed. Criteria for caries recording followed WHO standards. Groups of children aged 1, 2, 3 year respectively were investigated.

Results: The prevalence of dental caries among children aged 2 year was 23.8%; among children aged 3 year 51.3%; among children aged 4 year 39%; among children aged 5 year 25%. And among children living with parents aged 1 year was 7.07%; among children aged 2 year was 26.63%; among children aged 3 year was 53.33%. The average DMFT index among children aged 2 year was 0.7; among children aged 3 year 2.6. And among children living with parents aged 1 year was 0.32; among children aged 2 year was 1.25; among children aged 3 year was 2.83.

Conclusion: The prevalence of dental caries and the average DMFT index among children who live without parents care and children living with parents shows necessity of dental treatment.

PZ02.04**Preventive care offered to an adolescent accessing public oral health services in NSW Australia**A. V. MASOE¹, A. S. BLINKHORN², J. TAYLOR¹ & F. A. BLINKHORN¹¹Faculty of Health and Medicine, School of Health Sciences, Oral Health Discipline, The University of Newcastle, Ourimbah, NSW, Australia; ²Faculty of Dentistry, University of Sydney, Sydney, NSW, Australia

Background: Adolescents are at risk of dental caries and periodontal disease due to poor toothbrushing and dietary behaviour. These oral health problems may be moderated by providing individuals with preventive care and advice. In New South Wales (NSW) Dental Therapists and Oral Health Therapists (Therapists) working in the public health system may assist this vulnerable group by offering free dental care and advice on preventing oral diseases.

Aim: To investigate factors that influence Therapists plan preventive oral health care for adolescents attending NSW Public Oral Health Services.

Design: A cross-sectional postal survey using two clinical vignettes were used to record the preventive care treatment plans offered by Therapists working across all 16 NSW Local Health Districts. Data were tabulated and Chi square statistics were used in the analysis.

Results: 117 Therapists returned questionnaires giving a 64.6% response rate. The participants highlighted the importance of offering oral hygiene instruction (97.0%); dietary advice (95.0%) and topical fluoride applications (74.0%). Recommended home use products included fluoride toothpaste 5000 ppmF (59.0%) and casein phosphopeptide amorphous phosphates plus fluoride (CPP-ACPF) paste (57%). Over 50% offered fissure sealants. Most respondents (88%) would utilise Motivational Interviewing strategies for a patient with dental caries concerns, however, only 63% would use this technique for a patient in pain ($P < 0.001$).

Conclusion: Considerable variations were noted in Therapists recommendations for stabilising and managing oral disease, suggesting a need for Clinical Directors to consider providing additional professional education to Therapists on the scientific basis and clinical prevention techniques for preventing dental diseases.

PZ02.05**Overview of a volunteer student placement oral health promotion project: saving smiles in Soe, Australia**

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Background: Volunteering in professions has increased markedly over the last few years, both for health graduates and as part of undergraduate training programs. Since 2009 final year Bachelor of Oral Health students from the University of Newcastle have volunteered as part of an annual medical and dental visit to Soe, West Timor, Indonesia. The proposal was presented as a valuable learning experience for the students and the opportunity to provide a much needed service to the local community.

Aim: To develop and implement an ongoing health promotion project that improved the oral health outcomes for school age children in Soe.

Design: A local primary school in Soe was selected as the local partner school. Baseline data was collected in 2009, and updated each year. After discussion with several stakeholders it was decided that the project would include a fluoride varnish program and development of 'key' oral health messages and resources. The first student placement commenced in 2010.

Results: 2009 data revealed an overall high rate of tooth decay and poor oral hygiene with 83% of 5–6 year old children requiring some form of dental treatment. The total number of assessments to date is 1078. Of significance is the increase in children assessed as plaque free, from 3% ($n = 215$) in 2009 to 60% in 2013 ($n = 324$).

Conclusions: Initial results demonstrate the oral health benefits of an ongoing preventive program. Further studies will determine the long term impact of the project.

PZ02.06**Topical fluoride postcode lottery; who's the winner?**C. BOWER¹, V. WILSON¹, L. MCCLEAN¹, T. BROOMHEAD², Z. MARSHMAN² & H. ZAITOUN¹¹Paediatric Dentistry, Charles Clifford Dental Services, Sheffield, UK; ²School of Clinical Dentistry, University of Sheffield, Sheffield, UK

Background: Topical fluoride is an evidence-based preventive measure which should be applied regularly as per national guidelines. Children in areas of high deprivation are in greatest need of this simple intervention.

Aim: This service evaluation determined the proportion of children, referred for a hospital new patient assessment, who have had topical fluoride applied by their general dental practitioner. The deprivation scores of the referring practice locations were also analysed.

Design: A piloted data collection tool was used to capture data from 100 consecutive new patients. Parents were questioned regarding their child's attendance history and how often topical fluoride had been applied. Referral letters were reviewed to determine whether the dentist had previously applied topical fluoride. Practice postcodes were recorded to determine the corresponding Index of Multiple Deprivation.

Results: Of the 100 participants, aged 2–17 (mean = 7.6 years), 92% were regular attenders. 56% ($n = 56/100$) reported having topical fluoride applied. This was only applied 6-monthly in 25% ($n = 14/56$) and 3-monthly in 17.5% ($n = 10/56$). 19% ($n = 11/56$) had reportedly had more than one application but 37.5% ($n = 21/56$) only recalled one previous application. 81% of patients were deemed high caries risk. Nearly half (46%) were from the most deprived areas of England.

Conclusion: While some dental practices are providing fluoride varnish for their young patients, this does not appear to be as frequently as indicated by national guidelines and the caries risk status of the child. Practices in areas of high deprivation should be further supported to increase the frequency of application.

PZ02.07**Children's views on fluoride varnish application by extended-duty dental nurses in a non-dental setting**A. L. WICKENS¹, A. ALJAFARI² & M. T. HOSEY²¹Paediatric Dentistry, King's College Hospital, London, UK;²Paediatric Dentistry, King's College London, London, UK

Background: Fluoride varnish application outside the dental clinic has become an established part of many oral-health promotion programmes. Evidence on various aspects of its use is abundant. However, very few investigated the children's perspective.

Aim: to assess satisfaction of high caries-risk children with Fluoride varnish application by Extended-Duty Dental Nurses in non-dental setting.

Methods: A cross-sectional study involving 4–10 year-old children attending a medical pre-assessment clinic prior to dental extractions under General Anaesthesia (GA). The primary outcome measure was child's satisfaction with Fluoride varnish on a

100 mm Visual Analogue Scale (VAS). The Secondary outcome measures were: 1) Child's qualitative feedback. 2) Parent's familiarity with fluoride varnish at baseline and 3 months after.

Results: 105 children received Fluoride varnish application, including 59 boys and 46 girls from various ethnicities. Their average age was 6.5 years [Range = 4–10]. Children gave the treatment an average rating of 62 out of a 100 [Range = 0–100, SD = 40]. They described the process as 'easy', however, some said that they found it 'disgusting' or 'sticky' and suggested different flavours. Only 39% of parents were familiar with the treatment before the study. Fifty nine parents were available after 3 months and 78% of them indicated they are now familiar with Fluoride varnish.

Conclusion: Children find fluoride varnish application marginally acceptable. However, new flavours and changes in texture might improve the experience. In addition, high caries-risk families were not familiar with Fluoride varnish despite being already referred for GA. Efforts to educate parents and achieve wider treatment delivery are needed.

PZ02.08

Management of carious primary incisors in preschool children based on ICCMS philosophy

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Background: ICCMS (international caries classification and management system) is a health outcomes focused system that aims to maintain health and preserve tooth structure. It involves staging the carious lesion and assessing the caries risk to provide personalised patient management. Early childhood caries usually affects the primary incisors. Limited patient co-operation and aesthetic concerns can complicate treatment planning-often requiring general anesthetic extractions

Aim: To follow the outcome of caries progression in primary incisors managed using the ICCMS philosophy

Design: 41 children under the age of 5 with asymptomatic caries in upper primary incisors under the care of dental therapist (LB) were planned for follow up. Teeth scored as initial or moderate active carious lesions were included. Caries risk was scored as low moderate or high based on other carious teeth within the dentition, continued use of a nighttime bottle/breast feeding. All received fluoride varnish application and preventive advice at visit 1 and followed every 3 months.

Results: 41 children with 144 carious teeth were included. All 41 were reviewed at 3 months, 24 at 6 months, and 16 at 1 year. 7 teeth progressed from initial to moderate active carious lesions. 20 teeth were restored and two children required GA extractions.

Risk factors for caries progression were other carious teeth within the dentition and continued night-time feeding

Conclusion: ICCMS was a useful tool for a tooth preserving approach to the management of carious primary incisors in children with limited co-operation who may otherwise require GA extractions.

PZ02.09

Paediatric dentistry oral and intravenous sedation service evaluation: how are we doing?

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Introduction: At King's College Hospital both intravenous (IV) and oral (OS) midazolam sedation have been used in the Paediatric Department since 2006/7.

The aim is to provide a high quality, efficient, specialised service of conscious dental sedation to alleviate anxiety. This should also reduce dental treatment under general anaesthetic.

A retrospective Service Evaluation was carried out to improve the quality of services and safeguarding high standards of care in accordance with the Standardise Quality Assurance Assessment Document, 2011.

Aim: To evaluate sedation service to children receiving dental treatment under OS and IV sedation and assess parent's satisfaction.

Methods: The records of all patients having received midazolam sedation in 2014 were examined. Data collected included age, gender, type of sedation, dental treatment, waiting time for appointments from assessment and number of completed/repeated. Details of significant events, untoward incidents and complaints were explored.

A questionnaire was sent to estimate parent's overall experience and satisfaction.

Results: In 2014, 308 patients were booked, but 136 girls and 124 boys had dental treatment with sedation (IV / OS). Mean ages 3.7 (OS) and 13.2 years (IV). Mean waiting time, 4.5 weeks (OS) and 5.7 weeks (IV). Twenty five children were emergencies seen on the same day. In only six children sedation failed. No untoward incidents or complaints were reported. Overall, most parents were satisfied with the service provided, some found information unclear, areas which need improvement.

Conclusions: Oral and IV sedation are safe methods of conscious sedation and parents were pleased with the service.

Morita Prize Entries (Research Posters) – PZ-03

PZ03.01

Abstract withdrawn

PZ03.02

Ectodermal dysplasia with anodontia in childhood: a case report with 3-year follow-up

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Introduction: Ectodermal dysplasia (ED) comprises a complex group of inherited conditions related to abnormalities in ectodermal and, occasionally, mesoderm structures. Hypohidrotic ED, the most common, mainly expresses dental variations, disorders in sweat glands, hair and palmoplantar hyperkeratosis. In children oral rehabilitation of these conditions has usually involved confection of total or partial dentures during growing period and subsequent fixed rehabilitation.

Case report: 4-year girl with hypohidrotic ED, presenting anodontia of the temporary teeth and only an atypical tooth germ in the upper jaw. In addition to systemic manifestations, marked atrophic ridges due to lack of alveolar and reduced basal bone, was diagnosed. The imaging examination confirmed the absence of permanent germs, anticipating anodontia also in succeeding dentition. Treatment consisted in surgical removal of atypical retained tooth germ and placement of total removable prosthesis.

Comments: Despite inherent difficulties related to maxillary atrophy, total absence of proper mastication skills, phonetic disturbance and very small age, it was possible to provide a functional and esthetical rehabilitation creating a totally unique morphological and physiological experience. Currently, there is no consensus on the ideal age to begin oral rehabilitation being widely accepted that its early planning is extremely beneficial given the psychological, social, physiological and functional features. However, early placement of removable prosthesis in children is associated to significant need for periodic adjustments subsequently to growth, but also to innumerable difficulties related to retention and stability. A sustained fixed solution with dental implants placed in early age and specific positions will be our next step.

PZ03.03

Antibacterial and mechanical properties of a novel dental composite

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Background: The major reason for restoration failure in dentistry is secondary caries resulting from bacteria penetration through micro gaps at restoration edges. The generation of novel materi-

als that reduce bacterial colonization and induce healthy dental tissue formation could prevent restoration failure.

Aim: To fabricate a dental composite with bioactive and antibacterial properties and evaluate its bond strength and its effect on biofilm formation and cultured bacteria viability.

Design: A new silver (Ag)-doped bioactive glass (BG) was incorporated into flowable resin composite in different concentrations (5, 10, 15 wt.%) to form the new material Ag-BGCOMP. Biofilm was cultivated on resin samples (four groups, three experimental, one control) fixed and evaluated with scanning electron microscopy (SEM), while the viability of the biofilm bacteria and the ratio between live/dead bacteria was assessed with confocal laser scanning microscopy (CLSM). The total bond strength was examined using the microtensile test method.

Results: The Ag-BGCOMP showed a significant inhibition of the biofilm formation. A reduction between live/dead *S. mutans* was also observed. The total bond strength showed no statistically significant difference between Ag-BGCOMP and control material.

Conclusion: The new Ag-BGCOMP showed *in vitro* higher antibacterial properties than a control dental composite without any deterioration of its mechanical properties. Its enhanced antibacterial properties, combined with additional bioactive features presented elsewhere, may reduce secondary caries and induce remineralization, respectively, around composite restorations in the clinical setting.

PZ03.04

Dental care course and oral quality of life in patients with rare diseases

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Background: Poor research data exists on dental care course and quality of life in children and young adults with rare oral diseases. An ongoing French-German research project in Strasbourg (France), Heidelberg (Germany) and Freiburg (Germany) aims to describe the situation of the target group and to develop recommendations for the improvement of medical health care.

Aim of this contribution is to give information about the feasibility an investigation by questionnaires and to present first results.

Methods: We developed a two-tailed questionnaire addressing

- 1) parents of children/ young adults up to the age of 21 years with questions concerning experiences with dentists and dental clinics and
- 2) children and/or their parents (depending on the patient's age) to gather information of oral life quality (adapted versions of CPQ-G11-14, ECOHIS and OHIP).

Results: The application to the target group was feasible. Limitations were the responsiveness of parents in a proxy situation of intellectually disabled children and young adults and the heterogeneity of the small rare diseases groups. A consolidation with larger study groups is necessary.

PZ03.05

Association between maternal psychosocial factor and early childhood caries (ECC) among preschool children of Bangalore city

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Background: The relationship between psychosocial factors and ECC might be influenced by stress which can be defined as adjustable demands placed on the individual or their internal biological responses. It is likely that maternal psychological stress and related conditions affect parenting behaviours which in turn can increase a child's risk to ECC.

Aim: The aim of this case control study was to determine the association between maternal stress levels and ECC.

Design: 121 cases and 121 controls were selected from various child care facilities across Bangalore. Cases were defined as the mothers of those preschool children who satisfied the clinical diagnostic criteria of severe ECC. Mothers of completely caries free children were selected as controls. The cases and controls were matched according to the age and gender. The stress level of the mother was assessed using Parenting Stress Index. This index depicts mean parental distress, parent-child dysfunctional interaction and mean difficult child scores between cases and controls.

Results: Parenting stress index comparison between cases and controls showed that mean scores were found to be slightly higher among cases in all the three parameters. However the mean parental distress scores were significant. This index showed the risk of ECC associated with increased 1.64 times with maternal stress levels. Though the association was statistically significant ($P < 0.05$), but the odds ratio was not found to be significant.

Conclusions: It can be concluded maternal stress levels do have a significant association with early childhood caries.

PZ03.06

Induced artificial bone marrow cells from dental pulp cells of primary tooth using a natural compound

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Background: Tissue stem cells including dental pulp stem cells are useful for regenerative medicine. However, the number of cells is limited.

Aim: The aim of this study was to identify the compound to induce dental pulp stem cells from differentiated cells, and to examine the multipotency of induced dental pulp stem cells.

Design: A total of 12,000 compounds approved by Food and Drug Administration (FDA) were added into the culture of dental pulp cells from human primary tooth. After 2 days culture, stem cell marker Oct3/4 expression was examined. A compound induced Oct3/4 was one of the candidates to induce artificial dental pulp stem cells. To examine the multipotency, compound treated cells were transplanted into immunodeficient mouse to investigate bone formation.

Results: A compound from edible conch induced Oct3/4 positive dental pulp cells from differentiated cells of human primary tooth. After transplantation of the compound induced Oct3/4 positive dental pulp cells with hydroxyapatite (HA) into immunodeficient mouse, cells absorbed HA and formed bone tissue with bone marrow. Further, hCD11b positive monocyte and granulocyte were observed in the mouse peripheral blood indicating that functional peripheral cells from human dental pulp cells were formed using a natural compound treatment.

Conclusions: We established the method to form artificial dental pulp cells and bone marrow cells using a single natural compound. It may have a possibility of application for not only bone regeneration but also hematopoietic stem cell transplantation for leukemia patients without any immune-suppressing drug and a risk of graft vs host disease.

PZ03.07

Prevalence of molar-incisor hypomineralization (MIH) in groups of children in national schools in Selangor, Malaysia

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Aim: To investigate the prevalence of MIH in 7–9 year old children in three national schools in Hulu Langat, Selangor in terms of socio-demographic factors such as age, gender as well as severity and extent of lesion.

Methods: A cross-sectional study with a representative sample was used. Schoolchildren ranging from 7–9 years-of-age were examined by a single calibrated investigator using the 2003 criteria by the European Academy of Paediatric Dentistry. Data analysis was performed with the P -value set at 0.05 using SPSS version 22.

Results: A total of 483 children participated in this study and 27 (5.6%) were diagnosed with MIH. Males ($N = 15$; 51.6%) were affected more than females ($N = 12$; 48.4%). All of the lesions were mild in severity and demarcated creamy white opacities were the most frequent. The 9 year old age group had the greatest number of cases diagnosed ($N = 15$; 39.1%). A large number of Malays (89.4%) were diagnosed but comparisons between the

ethnic groups could be made accurately as Malay students formed the majority in the included schools.

Conclusion: The prevalence of MIH in this study was found to be lower than other studies done in the region such as India (9.2%) and Singapore (12.5%). This study can be used as a basis for other MIH prevalence studies in other states in Malaysia and be tailored to represent the population ethnic ratio in the country.

PZ03.08

Cytotoxicity of accelerated mineral trioxide aggregate on stem cells from human dental pulp

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Aim: MTA is used widely in endodontic therapy as a pulp-capping material, root-end filling material and perforation-repair material. Although MTA has many favorable properties, it has some disadvantages. One of the major disadvantages of the material is its long setting time, which, in turn, necessitates multiple visits by the patients. The aim of this study was to evaluate the cytotoxicity of accelerated-set MTA on stem cells from human dental pulp.

Methods: MTA was prepared by mixing MTA with various additives which tested include distilled water, 15 wt% disodium hydrogen phosphate (Na₂HPO₄), K-Y Jelly, 5 wt% and 10 wt% calcium chloride (CaCl₂). Human dental pulp stem cells were seeded into 96-well plates at 2 × 10³ cells per well and incubated with MTA for 24 h, 3 and 7 days. Cell viability was evaluated by MTS assay.

Results: According to MTS results on the 1st, 3rd and 7th days, statistically significant difference was found (*P* < 0.05) between the experimental materials and the control group. MTA mixed with K-Y Jelly in all groups showed the lowest cell viability at all-time points (*P* < 0.05). The cell viability of MTA mixed with distilled water, 5 wt% CaCl₂, 10 wt% CaCl₂ and Na₂HPO₄ increased significantly through time.

Conclusions: This *in vitro* study, distilled water mixed MTA, 5 wt% and 10 wt% CaCl₂ mixed MTA and Na₂HPO₄ mixed MTA were biocompatible with dental pulp stem cells. Further *in vitro* and *in vivo* investigations are required to prove the clinical applications of MTA mixed with the various additives.

PZ03.09

DNAs (did not attend) in the dental paediatric clinic: how are they managed and can we improve?

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Background: A previous service evaluation revealed inconsistencies in the management of paediatric DNAs at Liverpool University Dental Hospital (LUDH). Hence, in order to improve and standardise the management of non-attendance, a local DNA process was developed in association with the hospital Safeguarding team.

Aim: To identify if non-attending children are managed in accordance with the DNA process.

Design: A retrospective audit of children who DNA their dental appointment at LUDH in October 2013 was carried out. A data collection sheet was used to collect information relating to the DNA process, including follow-up, parental contact and information sharing. A locally agreed standard of 100% compliance was agreed.

Results: One-hundred and forty five children (22.7%), with a mean age of 10.4 years, DNA their appointment. Of the 120 available case-notes, one child was recorded as being at 'high risk' of neglect and was managed fully in accordance with the process. The majority of the remaining non-attending children (*n* = 119) were correctly reappointed (87.7%) or discharged (83.7%). An information-sharing letter was appropriately sent in 85% of; with GMPs (85%) and parents (58%) being most commonly informed. However, contrary to the process, information was only shared with GMPs in 15% of cases and attempts to discuss attendance with parents by telephone were recorded.

Conclusions: Although the majority of non-attending children were managed in accordance with the process, there were omissions mainly in copying the GMP. The action plan included further staff training and automatically copying GMPs into all paediatric correspondence which have been implemented.

PZ03.10

Cost-Effectiveness of fluoride varnish in the prevention of early childhood caries in non-fluoridated areas

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Background: Early childhood caries (ECC) is very prevalent in Chile, especially in communities without water fluoridation. The use of a 5% sodium fluoride varnish has been shown to be effective in the prevention of ECC.

Aim: To assess the incremental cost-effectiveness ratio (ICER) of the fluoride varnish in the prevention of early childhood caries in non-fluoridated areas of Chile.

Design: We performed a cost-effectiveness analysis from the payer perspective. Therefore a tree of clinical decisions was made. The effectiveness and the cost of the varnish were determined from a randomized controlled clinical trial with triple blind in 277 caries-free children between 24 and 47 months. The children were randomly allocated in two groups: an experimental group (*n* = 133) who received a preventive protocol, which included fluoride varnish every 6 months and a control group (*n* = 144) with a placebo varnish. The costs were expressed in Chilean pesos (CLP) as of 2014.

Results: Incidence of ECC was 46.79% for the experimental group and 60.5% for the control group with a 2-year follow-up (*P* = 0.038). The weighted cost to intervene and treat the consequences of ECC was CLP 65,493 for the fluoride varnish and for the control group was CLP 67,956. The ICER was -CLP 17,965 for each extra healthy child in favour of fluoride varnish.

Conclusions: The protocol that included fluoride varnish has turned out to be a dominant treatment, more effective and less costly in the prevention of ECC in non-fluoridated areas, when compared with placebo.

PZ03.11

Prevalence of Talon cusp and its genetic link between ethnic groups and the autosomal dominant trait in recent mixing

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Introduction: Talon cusp is a rarely reported developmental anomaly. The prevalence rates of Talon cusp in the modern populations ranges from 0.06–7.7% with higher frequencies reported among Asian populations. Mitochondrial DNA confirms the relationship between the ethnic groups and recent mixing can still express itself as an autosomal dominant trait.

Case report: An 8.5 year old girl of German and Asian origin was referred for a routine dental check up. Family history revealed that the mother is of Malaysian, Indian and Portuguese origin. Clinical examination revealed a unilateral presence of a Talon cusp on the palatal surface of upper left lateral incisor. The talon cusp came in contact with occlusion and since the girl was scheduled for an orthodontic removable appliance due to crowding, X-rays were done to assess pulpal involvement. The accessory cusp was relieved from occlusion by grinding 1 mm of the enamel surface and flouride was applied. Patient is undergoing orthodontic treatment without complications.

Comments: The knowledge of dental anomalies with prevalence in ethnic groups is important for a paediatric dentist. Though Talon cusp is a trait seen in people of Asian descent with prevalence rate in Asian Indians 7.7%, Portuguese 6.3%, Malaysians 5.2%, Southern Chinese 2.5%, Hungarians 2.5%, Keewatin Eskimos 1–2%, Mexicans 0.06%. Due to recent migration and mixing these anomalies do present themselves outside the known regions. The world spread of the Mitochondrial DNA lineage gives a better inside to how these archeological and modern populations share a common trait.

PZ03.12

Evaluation of secondary caries in a microbial caries model after the addition of chlorhexidine in the adhesive procedure

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Background: The antimicrobial activity of chlorhexidine (CHX) against *S. Mutans*, decreases caries, while its anti-MMP effect against endogenous matrix metalloproteinases increases the long-term stability of the adhesive bond.

Aim: To investigate the caries inhibition effect after dentine pre-treatment with CHX and addition of CHX to a 3-step bonding system.

Design: A total of 62 Class V cavities were divided according to the adhesive protocol: 1) Control, Adper-Scotchbond-Multipurpose (3M-ESPE), 2) CHX as dentine pre-treatment, 3) CHX in primer, 4) CHX in bonding agent, 5) Peak Universal Bonding Agent (Ultradent).

Specimens were thermocycled (10.000 cycles) and inserted into the *S. Mutans* caries model. The 10-day biological protocol consisted of consecutive phases of demineralisation (1 h) and remineralisation (3 h). Evaluation under fluorescence microscope followed.

Results: Margins (in μm [SD]): demineralisation in enamel: 1: 60.8 [19.9], 2: 72.8 [22.5], 3: 81.5 [15.9], 4: 78.0 [13.9], 5: 82.3 [18.9].

Demineralisation in dentin: 1: 144.2 [20.9], 2: 150.3 [37.0], 3: 157.7 [28.0], 4: 134.9 [30.6], 5: 134.4 [39.2].

And at 500 μm away from the margins: demineralisation in enamel: 1: 53.4 [12.6], 2: 54.2 [24.9], 3: 62.2 [19.1], 4: 64.7 [22.6], 5: 50.4 [31.6].

Demineralisation in dentin: 1: 103.8 [20.7], 2: 113.6 [62.5], 3: 118.7 [25.3], 4: 65.7 [52.8], 5: 100.5 [50.4]. No significant difference was exhibited in demineralisation within the groups ($P > 0.05$, Bonferroni). Dentine exhibited significantly greater demineralisation values at margins in comparison to enamel and compared to 500 μm for groups 1–4 ($P < 0.05$, ANOVA, mod. LSD).

Conclusions: The findings of the study highlight the positive effect[N3] of CHX addition in the adhesive procedure for controlling the extent of demineralisation.

PZ03.13

ORAI1/2 and STIM1 protein expression patterns and potential functions during tooth development

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Background: The Store Operated Ca^{2+} Entry (SOCE) pathway plays a key role in Ca^{2+} homeostasis in cells, via CRAC channels. Main representative of the SOCE system is STIM1 which interacts with ORAI family proteins. Mutations of the genes encoding these proteins have been linked with various clinical conditions such as immunodeficiency, ectodermal dysplasia, salivary and sweat glands malfunctions, myopathy, thrombocytopenia, cancer and amelogenesis imperfecta. The protein expression patterns and potential roles of STIM1 and ORAI1/2 in tooth development remain unknown.

Aim: To characterize the localization of ORAI1/2 and STIM1 during tooth formation stages.

Design: ORAI1/2 and STIM1 proteins localization was examined with immunohistochemistry. Sections of mice developing molars and incisors were immuno-stained using antibodies against ORAI1, ORAI2, and STIM1.

Results: All three proteins are differentially expressed in dental tissues. The strongest expression is found in odontoblasts and ameloblasts at different stages of dental development, thus, suggesting potential roles of SOCE system at the regulation of Ca^{2+} homeostasis during the deposition and mineralization of dentin and enamel.

Conclusion: Our results provide new insights on the expression patterns of CRAC channels during tooth development. These data provide foundation for follow up studies to examine the role of SOCE in different dental tissues and to evaluate their potential role as therapeutic targets. This new pathway could possibly explain developmental abnormalities in dental tissues at the absence/modification of the expression of the above proteins.

PZ03.14**Efficacy of probiotics in plaque reduction and gingival health maintenance among children under orthodontic treatment: a pilot study**D. KOLIP¹, N. YILMAZ¹, P. KULAN², B. GÖKKAYA² & B. KARGUL²¹Department of Orthodontics, Marmara University, Istanbul, Turkey; ²Pediatric Dentistry, Marmara University, Istanbul, Turkey

Background: Probiotics represent a breakthrough approach to maintaining oral health by utilizing natural beneficial bacteria found in healthy mouths to provide defense against bacteria harmful to teeth and gums.

Aim: The aim of this study was to clinically evaluate the effects of probiotics on plaque and gingival accumulation in subjects with fixed orthodontics.

Design: The study was comprised of 15 healthy patients aged 11–18 undergoing fixed orthodontic treatment. Patients used 'LORODENT[®]' (a complex of six probiotic strains; *Streptococcus salivarius* K12 and five strains of the genus *Lactobacillus*) for 28 days. Gingival Index (GI) according to Löe-Silness, and Plaque Index (PI) according to Quigley-Hain for all teeth were measured at baseline (Day 0), and at the end of probiotic regimen (Day 28). Entire dentition GI and PI scores for all patients combined were compared between baseline and endpoint using a Wilcoxon signed rank test.

Results: Significant reductions in both mean GI and PI scores ($P < 0.01$) were seen at Day 28 for all patients combined. The mean baseline GI score for all participants was 1.05 ± 0.24 SD, reducing to 0.79 ± 0.43 SD at 28 days, with an average reduction within each patient of 28.4%. The mean baseline PI score was 1.31 ± 0.67 SD, falling to 0.97 ± 0.98 SD at 28 days, with an average reduction within each patient of 35.8%.

Conclusions: In this study, the probiotic complex LORODENT[®] was found to be effective in reducing plaque accumulation and gingival inflammation, demonstrating its potential therapeutic value. Our encouraging results warrant future investigation of LORODENT[®] in long-term clinical studies.

PZ03.15**Sweet, salty, bitter and sour taste perceptions of school children and relationship with caries-risk factors**

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Background: Four basic taste perceptions and relationship with caries are poorly investigated in children as compared to adults.

Aim: The aim of this study was to evaluate salty, sweet, bitter and sour taste perceptions of school children and compare them with demographic, clinical, microbiologic and biochemical caries-risk factors.

Design: Two-hundred children (99 boys, 101 girls, and age 6–13) who attended to Paediatric Dentistry Department of Marmara University were included in the study. Informed consent was obtained from parents. Questionnaires were presented to parents to record, the socioeconomic and education levels, oral health knowledge, their child's general health, habits, diet contents and frequency, fluoride exposure. The dental examination was performed using DMFT, DMFS, dft and dfs indices according to WHO. The oral hygiene was assessed with Sillness&Löe Index. Salivary flow rate, buffer capacity, mutans streptococci and lactobacilli counts were estimated using CRT chairside kits. Children rinsed twice sodium chloride (2 mg/L; 4 mg/L), sucrose (12 g/L; 24 g/L), caffeine (0.27 g/L; 0.54 g/L) and citric acid (0.6 g/L;

1.20 g/L) solutions randomly and asked for their taste perception. They cleaned with tap-water between solutions and the same procedure was followed next week. All data were processed with the NCSS Software.

Results: Mean DMFT, DMFS, dft and dfs were 1.74 ± 1.90 , 2.14 ± 2.67 , 2.82 ± 3.23 , 5.26 ± 6.49 respectively. %20 of the children were caries-free. The mean age of children who perceived salt was found significantly higher. No significant difference was found between any taste perception and caries risk factors.

Conclusion: Our study showed that school children's caries prediction results weren't correlated with sweet, salty, bitter and sour taste perceptions.

PZ03.16**Factors predicting the success of pre-formed metal crowns: a retrospective study**E. GUPTA¹, J. COWLAM² & H. RODD¹¹Oral Health and Development, University of Sheffield, Sheffield, UK; ²Paediatric Dentistry, University of Sheffield, Sheffield, UK

Background: There is a good evidence-base to support excellent outcomes for pre-formed metal crowns (PMCs) for managing carious primary molars in young children. There are, however, numerous clinical factors that may interact to influence overall success rates.

Aim: To identify what variables predict the success or failure of PMCs.

Design: Retrospective data were obtained for children who had received one or more PMCs in a hospital setting, including the following variables: tooth type; availability of pre-operative radiographs; experience of operator; provision under GA; use of separators; placement of adjacent crowns; site and extent of caries; technique used (Hall vs conventional) and total number of PMCs placed per child. The primary outcome measure was overall success of the PMC. The survival probability was assessed using Kaplan-Meier analysis. Cox regression was used to assess the risk of failure and to identify possible clinical predictors.

Results: Data were obtained for 177 children, with a mean age of 5.8 years (range 2–15 years) who had a total of 577 PMCs placed. Each child had received an average of 3 crowns (range = 1–8). The mean follow-up period was 26 months. The only significant predictors of PMC success were: caries depth being less than half way through dentine ($P = 0.003$) and the number of crowns (≤ 3) placed per child ($P = 0.04$).

Conclusions: PMCs have good success rates irrespective of the techniques used and the experience of the operator. However, teeth with deep caries, and children receiving multiple PMCs may have less favourable outcomes.

PZ03.17**An unusual and severe sequela following trauma to the primary incisors**

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Introduction: Traumatic injury to primary teeth has the potential to damage the underlying permanent tooth germ which may disturb its development. The extent of the malformation depends on the developmental stage of the permanent tooth and the severity of the trauma. Odontoma-like malformation is a rare consequence following trauma.

Case report: We report a case of an 8 year old girl who was referred for management of the delayed eruption of upper central incisors and history of constant sensitivity associated with par-

tially erupted UR2. She had previously suffered severe traumatic extrusion of upper primary central incisors at the age of one with subsequent extractions of both upper primary centrals. At the age of 8 years she presented with an erupting upper right lateral incisor (UR2) which was hypomineralised. There were no signs of eruption of UR1, UL1 or UL2. Radiographic examination revealed gross abnormality in formation of all upper anterior teeth, following which a small volume CBCT was carried out. This revealed gross defects in crown and root morphology of UR1, UL1, UL2 and UR2. These defects were so severe that they also give the appearance of possibly being compound odontome. The prognosis of all the four upper anterior teeth was considered to be extremely poor. It is expected that these will need to be surgically removed at which time a histological examination will be carried out.

Comments: Trauma to the primary incisors at a very young age can cause serious and irreversible consequences for the developing permanent tooth germs.

PZ03.18

Different phenotypes of Amelogenesis Imperfecta presenting in two siblings

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Introduction: Amelogenesis Imperfecta (AI) is an inherited disorder of dental enamel affecting all the primary and permanent dentition. AI prevalence ranges from 1 : 2000 to 1 : 18,000 and is classified into three main categories: hypoplastic, hypocalcified, and hypomatured. In this case report, we describe variations in the phenotype of two siblings with AI and their management.

Case report: Two siblings, a 15-year-old girl (Patient A) and a 7-year-old girl (Patient B), were referred by their general dental practitioner for the management of what was initially thought to be chronological hypoplasia. No relevant maternal or early life medical factors were found. A family history showed parental consanguinity and a positive history of AI (maternal aunt). Clinical examination revealed different clinical features between both siblings. Patient A, in the permanent dentition stage, had partial expression of AI. She had hypocalcified features affecting all her permanent teeth and hypoplastic lower incisors and canines. The maxillary central incisors were unaffected. She also had microdontia of 12 & 22 and taurodontism. Patient B, in her mixed dentition stage, had complete expression of AI with severely hypocalcified first permanent molars, second primary molars and lower permanent incisors. She also had hypoplastic maxillary incisors, bilateral posterior crossbite and an anterior open bite. Comprehensive treatment plans to suit their individual needs, were arranged.

Comments: This case report represents a diagnostic dilemma as AI may express itself differently even in siblings. Differential diagnosis includes chronological hypoplasia. A multidisciplinary comprehensive long term approach should be considered in the management of these cases.

PZ03.19

Prevalence of enamel defects and dental caries in patients with diamond blackfan anaemia

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Background: Diamond Blackfan Anaemia (DBA) is a rare genetic disorder. The majority of cases are sporadic but 10–25% are familial with autosomal dominant inheritance. The incidence is reported to be 5 per million live births in the UK. DBA is associated with multiple craniofacial anomalies such as hypertelorism and broad flat nasal bridge. To date, there are only two case reports of dental findings in DBA patients in the literature.

Aim: To determine the prevalence of enamel defects and dental caries in patients with DBA attending the paediatric haematology unit at St. Mary's Hospital in London, and to report any other presenting oral anomalies.

Design: In this prospective observational cohort study a total of 48 children with DBA (mean age: 7 years and 5 months; SD 4 years) were seen for clinical dental examination as part of their haematology outpatient visit. Caries experience was recorded using the International Caries Detection System (ICDAS) and enamel defects using the modified developmental defects of enamel (DDE) index.

Results: Twenty nine children (60.4%) had evidence of enamel defects most commonly affecting second primary molars. The defects presenting most often were hypoplasia and diffuse opacities. Thirteen children (27.1%) had dental caries.

Conclusion: The prevalence of enamel defects in children with DBA is high with most defects observed in primary second molars. These children require targeted prevention as they are at increased risk of developing systemic complications from dental pathology. Paediatric dentists play a key role in the multidisciplinary management of these patients.

PZ03.20

A report of inverted primary maxillary central incisors

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Introduction: Tooth impaction in primary dentition is a rare phenomenon. Among the few reported cases, primary second molars are most frequently involved, followed by primary central incisors and first molars. Reported contributing factors include: mechanical obstruction in the path of eruption, like odontomes and ameloblastic fibroma, ectopic position of tooth germ due to trauma or other reasons, primary failure of eruption, ankylosis, infection and interferences of tooth development.

Case report: A 5-year-old Chinese girl visited with a complaint of missing bilateral primary maxillary central incisors. Medical history was non-contributory, and there was no known history of intra-oral infection or trauma. Pregnancy and delivery were normal. Patient had finger-sucking habit since birth. There were callosus and peeling on her fingers. Clinical examination identified moderate enlargement in the buccal aspect of the alveolus in the missing teeth 51 and 61 region with no pain in palpation. Teeth 72 and 82 were in crossbite. Radiographic examination revealed that teeth 51 and 61 were inverted with open apices and incomplete root formation. The inverted teeth were near to the displaced permanent tooth germs of 11 and 21. The inverted teeth 51 and 61 were then surgically removed under general anaesthesia.

sia. The patient was regularly reviewed. Permanent teeth 11 and 21 in good condition erupted in a displaced position 2 years after.

Comments: Finger-sucking habit may be the contributing factor to the impaction. Primary teeth impaction could affect the eruption and development of their permanent successors. Early diagnosis and intervention are necessary.

PZ03.21

Regional odontodysplasia. A report of two cases

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Introduction: Regional odontodysplasia (RO) is a rare developmental anomaly of the teeth where enamel, dentine and pulp is abnormal. In the majority of cases in the literature RO are presents in the maxilla affecting usually one quadrant of the jaw. We describe two cases of RO in mandible with different presentations.

Case reports: Case 1: 7-year-old girl referred with a heavily broken down LR6 and a history of pain. There was facial swelling and buccal abscess associated with LR6 which was partially erupted. Radiographs revealed LR6 to have a 'ghost-like' appearance with a large pulp-chamber and thin enamel walls. There was also possibly a delay in formation of LR7. Acute management with antibiotics followed by surgical extraction of LR6 under general anaesthesia was performed.

Case 2: A 2-year-old boy was referred for management of hypoplastic lower teeth. Teeth were subsequently extracted secondary to infections on three occasions before a diagnosis of RO that symmetrically affected the lower teeth from LR5 to LL5 was made. Subsequent progress and management to age of 13 year is presented.

Comments: While the first case is a typical example of RO the second has an unusual presentation with symmetrical presentation in the anterior region of the mandible. This case is distinctive as majority of the cases that report defect in only one quadrant of the posterior teeth and usually not crossing of the midline.

PZ03.22

Prevalence of early childhood caries in 0–3 year old children from rural areas of South India, using ICDAS

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Background: Early childhood caries (ECC) is considered to be the most widespread unmet health need among children. Epidemiological surveys play a significant role in monitoring the drifts in dental caries and for assessing the dental needs in a community.

Aim: To investigate the prevalence of Early Childhood Caries (ECC) in 0–3 year old children from rural areas of South India using the ICDAS II index.

Design: Representative samples of 1711 children (0–3 years) were recruited from Anganwadi centers in rural areas of Lalgudi taluk of Trichy district in India. Intraoral examinations were performed by 2 calibrated examiners. The International Caries Detection and Assessment System was used to measure caries. Data entry was done using the ICDAS epidemiological software tool and then exported for statistical analysis.

Results: The proportion of children with healthy teeth and ECC was 59.4% (882) and 40.6% (604), respectively. Screening revealed that 604 children (Males-317, Females-287) had either a

cavitated or non-cavitated lesion. Further, among these 604 children with caries, 50.3% had non-cavitated surfaces (ICDAS codes 1 and 2) and 49.7% had cavitated surfaces (ICDAS codes 3-6). An incidental finding was that enamel lesions were present particularly on labial surface of mandibular canines only, in 27 children with otherwise sound dentition.

Conclusions: While the prevalence of ECC in rural areas of South India is high (40%), concerns regarding the greater prevalence towards pre-cavitated lesions, underscore the need for prevention.

PZ03.23

Perceptions of school teacher's towards oral health and school dental health programmes- a qualitative study

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Background: School teachers form an effective workforce towards health promotion. Although their knowledge has been gauged by many quantitative studies but their perceptions and opinions still remain beyond the scope of professionally designed questionnaires.

Aim: To assess the perceptions of school teachers towards oral health and school dental health programmes.

Design: A qualitative research using focus group discussion (FGD) was planned and a focus group discussion guide was designed for this purpose. The FGD guide comprised of a list of questions designed keeping in mind the research question. The discussion was carried out on two groups of teachers comprising of six members each. Their responses were recorded following informed consent. The data collected was transcribed and analysed using QDA Miner 4.0 qualitative data analysis software.

Results: The teachers had a fairly good idea about the oral hygiene practices regarding both themselves & children. Good awareness about school dental health programmes was also perceived. They felt that children from higher socioeconomic status were more prone to dental decay due to their dietary habits. They were of the opinion that repetition was the key to instilling good oral hygiene habits among children.

Conclusion: Teachers are instrumental in creating oral health awareness among students and are very effective in making a school oral health programme successful. However, further reinforcement of the knowledge and training sessions are required to use this manpower in order to impact the oral health status of children.

PZ03.24

Autophagy in odontogenesis and pulp regeneration/revascularisation

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Background: Autophagy, a lysosome or endosome-mediated self-degradation process, participates in embryogenesis and tissue morphogenesis, including angiogenesis, neurogenesis and osteogenesis.

Aim: This study aimed to investigate the involvement of autophagy in odontogenesis and pulp regeneration/revascularisation.

Design: The role of autophagy in odontogenesis was examined by PCR, WB, IHC, and triple-immunofluorescence. *In vitro* study and ectopic pulp regeneration model with SDF-1 α -incorporated silk fibroin scaffold was used to test the involvement of autophagy and its possible role in pulp regeneration. Furthermore, pulp revascularisation model in canine mature teeth were established, and the presence of autophagy in regenerated tissues were tested.

Results: Autophagy related genes (Atg5, Atg7, Atg12) and proteins (Beclin1, Atg5-Atg12 conjugate, LC3) were detected in developing tooth germs. LC3 was immunolocalised in the dental papilla and odontoblast, and partially colocalised with Beclin1 and Caspase-3. *In vitro* studies showed that SDF-1 α enhanced DPSCs migration and optimised focal adhesion formation, which were positively regulated by autophagy. Pulp-like tissues were generated in SDF-1 α -loaded samples accompanied by autophagy (especially in newly formed blood vessels) in ectopic regeneration model. More importantly, in pulp revascularisation model *in situ*, SDF-1 α -loaded scaffolds improved the *de novo* ingrowth of pulp-like tissues in pulpectomised mature teeth, which correlated with the punctuated LC3 and Atg5 expressions, indicating autophagy.

Conclusions: Our findings showed the involvement of autophagy in odontogenesis and pulp regeneration, which provides novel insights into the mechanism of odontogenesis and pulp regeneration. Besides, SDF-1 α -loaded silk fibroin scaffold is indicated for future clinical application in regenerative endodontics.

PZ03.25

Pulp treatment in a male with duplication of the Xq28: a case report

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Introduction: Males with duplication of the Xq28 region exhibit a characteristic phenotype, including hypotonia, delayed or absent speech and language, intellectual disability, neurological conditions and recurrent respiratory infections. An increased susceptibility to infections seems to be common in boys with a duplication of Xq28. One of the explanations for this is that low levels of an infection-fighting antibody, IgA (immunoglobulin A), is found in some boys with Xq28 duplication.

To the author's knowledge there are no studies regarding dental treatment in patients with duplication of the Xq28.

This is a case report of a male diagnosed with duplication of Xq28 with multiple caries.

Case reports: A 4-year-old boy was referred for management of dental decays. Clinical examination revealed multiple caries lesions in the deciduous dentition. Tooth 75 revealed an extensive decay with painful symptomatology associated. The mother described sensitivity to thermic stimuli. After clinical and radiographic evaluation, multiple decays on the deciduous molars were observed. In the first appointment, it was decided to undertake pulpotomy treatment and apply a stainless steel crown on tooth 75. A few days later the patient reappeared with an abscess associated with this tooth. After medication with antibiotics for a week, the extraction of tooth 75 was performed.

Comments: There may be a relationship between the failure of the pulp treatment in patients with duplication of chromosome Xq28 and the immune deficiency they present.

Further investigation is required to truly understand if this condition compromises the prognosis of pulp treatments.

PZ03.26

Evaluation of T-RFLP as a tool for comprehensive analysis of oral microflora

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Background: Terminal restriction fragment length polymorphism (T-RFLP) is a method for the comprehensive analysis of microflora. It can be applied to detecting a change of oral bacterial composition and/or the difference in the bacterial composition between groups with different clinical characteristics.

Aim: The aim of this study was to evaluate T-RFLP as a tool for comprehensive analysis of oral microflora in comparison to the next generation sequencing (NGS).

Design: After 1-min tooth brushing without swallowing, the salivary mixture was collected and centrifuged. Then, DNA was purified and divided into two; one half for T-RFLP using three restriction enzymes (*HhaI*, *HaeIII* and *MspI*) and the other half for NGS. Further, continuous weekly data of T-RFLP from two subjects were obtained for 4 weeks.

Results: Ten predominant bacterial genera including streptococci could be detected by T-RFLP. The composition ratios to the whole oral bacteria were comparable to those obtained by NGS, and the correlation coefficient was 0.901. The 4-week monitoring indicated that the composition ratios fluctuated considerably with a highest standard deviation of 4.4%.

Conclusions: T-RFLP is a useful and relatively simple method for comprehensive analysis of oral microflora. It may allow a longitudinal monitoring of the drift in bacterial composition, which could lead to effective therapies.

PZ03.27

Prevalence of molar incisor hypomineralisation among school children in Kerala, India

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Background: Molar incisor hypomineralisation (MIH) is defined as the hypomineralisation of systemic origin of one to four permanent first molars, and frequently associated with affected incisors. There is rarity of prevalence data MIH for the Indian population and the majority of data originated from European countries.

Aim: To report on prevalence and defect characteristics of MIH for school children of the south Indian region.

Design: A cross-sectional survey including 2170, 7–13-year-old school children of Malappuram, Kerala, India was carried out using European Academy of Paediatric Dentistry (EAPD) 2003 criteria for diagnosis of MIH. Prevalence and characteristics of MIH was recorded and statistically analyzed using the Chi-square test.

Results: Totally 178 children were diagnosed with MIH revealing a prevalence of 8.2% in North Kerala. Almost 112 (62.92%) of the children affected with MIH were males, and 66 (37.07%) were females. Severity of defect increased with age. Involvement of incisors increased when more First permanent molars (FPMs) were affected. Post eruptive breakdown was more in boys than in girls and this difference was statistically significant ($P < 0.05$). Also, maxillary molars were affected more than mandibular molars and this difference was also statistically significant ($P < 0.05$). Majority of incisors showed mild defects while molars showed mild as well as severe defects. The association of dental caries was significantly higher with MIH-affected FPMs.

Conclusion: MIH was observed in about 8.2% of the children examined. MIH-affected FPMs appear to be more vulnerable to early caries and subsequent pulp involvement with need for extensive dental treatment.

PZ03.28

Association between problematic eating behavior and early childhood caries: a cross sectional survey

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Background: Problems in eating behavior during infancy and childhood ranges from infantile anorexia, neophobia, fussy eating, slow eating, selective eating apart from others. Role of diet in dental caries is established in terms of type, quantity, frequency and order in which fermentable carbohydrates are consumed. Problematic eating behavior is associated with all these factors and additionally in terms of duration, that has not been investigated from dental point of view till now.

Aim: Aim of the multicentric study was to describe the problematic eating behavior in children using Children Eating Behavior Questionnaire for Early Childhood Caries (CEBQECC) and check for any association between them.

Design: In a cross sectional, multicentric type of study, 829 school children aged between 36–71 months from the cities of Mangalore, Dharwar, Raichur and Bengaluru of Karnataka, India were randomly selected and examined for the presence of Early childhood Caries by calibrated examiners while the mothers filled the CEBQECC after obtaining institution permission and informed consent from parents.

Results: Prevalence of ECC was 48.5% in the sample. Items that measured time taken and sweetening and type of food had greater odds ratio with respect to ECC while drinking water frequently during mealtimes. Emotional under eating was more in the sample compared to overeating.

Conclusion: The association between problematic eating behavior and ECC is not very clear, more investigations into problematic eating behavior from the pediatric dental point both in term of caries risk and general growth is warranted.

PZ03.29

Correlation of gagging with dental fear in children and adolescents

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Background: Studies in the adult population have shown an association between gagging and dental fear. There are no studies available in children and adolescents.

Aim: The aims of this study were to determine the prevalence of gagging and evaluate any correlation between gagging and dental fear in children and adolescents.

Design: After approval by the Ethics Committee, a representative sample ($N = 849$) of 8- and 14-year-old children from the second largest city in Greece were examined in the classroom. Children filled out a questionnaire consisting of demographic questions, the Gagging Reflex Assessment (GRA), the Childrens' Fear Survey Schedule-Dental Subscale (CFSS-DS) in both age groups; older children also completed the Modified Dental Anxiety Scale (MDAS). One examiner (blind to the childrens' ratings) used the

modified version of the Gagging Problem Assessment (GPA) to assess the gag reflex. Since the data were not normal, they were analyzed with Spearman's rho, Mann-Whitney, and chi square.

Results: 51 children (6.0%, 29 boys and 22 girls) demonstrated gagging on the GPA. There were no relationships between GPA and age, gender, CFSS-DS or MDAS. The GRA ratings were significantly higher for older children ($P < 0.001$), girls ($P = 0.005$), and children rated as gaggers on the GPA ($P = 0.006$). The GRA ratings were also significantly correlated with the CFSS-DS ($\rho = 0.429$, $P < 0.001$) and MDAS ($\rho = 0.429$, $P < 0.001$).

Conclusions: The present study reveals a positive correlation between dental fear and the self-report gagging assessment but no association with the dentist's measurement.

PZ03.30

Etching methods for enamel of questionably carious occlusal surfaces before sealant application

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Background: The effectiveness of pit and fissure sealants on questionable occlusal surfaces is contradictory probably because of the different enamel composition of these surfaces. Alternative etching methods may improve their preparation and increase surface etching uniformity.

Aim: The aim of this *in vitro* study was to test alternative methods of etching materials and times of application on pits and fissures of questionable occlusal surfaces.

Design: 40 occlusal surfaces of ICADS codes 1, 2, 3 were etched with an inorganic acid (H_3PO_4 37%) with or without previous preparation with NaOCl. Sealants were placed and teeth sectioned at the direction of the characterized lesions. Surfaces were studied by polarized light microscopy for estimation of sealant penetration and adaptation on fissure walls. Univariate and multivariate ordinal logistic regression and odds ratios and confidence intervals were used for statistical analysis.

Results: The odds of sealant to get the maximum penetration was 16% lower for ICDAS code 2 compared to 1 (OR = 0.84, 95% CI: 0.28, 2.50, $P = 0.75$) and 73% lower for ICDAS 3 compared to 1 (OR = 0.27, 95% CI: 0.09, 0.84, $P = 0.02$). Respectively, the odds of sealant to get the maximum adaptation were statistically significant lower for ICDAS codes 2 and 3 compared to 1 (OR = 3.69, 95% CI: 1.47, 9.23, $P < 0.01$) and (OR = 20.02, 95% CI: 5.42, 74, $P < 0.001$) respectively.

Conclusions: Application of alternative etching methods did not improve sealant adaptation and penetration especially on surfaces with codes 2 and 3. Probably more invasive methods than sealants are preferable for these surfaces.

PZ03.31

A study comparing the cutting efficacy of dentine using a fluoride-containing bioactive glass vs alumina in an air abrasion set up

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Background: Air abrasion as a caries removal technique is less aggressive than conventional techniques and is compatible for use in conjunction with adhesive restorative materials, thus being

congruous with the concept of minimally invasive dentistry. Alumina, while currently the most common abrasive used for cutting, has controversial health and safety issues and no remineralisation properties. The alternative, original bioactive glass 45S5, has the advantage of potentially inducing remineralisation within hard tissue. However, 45S5 is slower as a cutting abrasive and lacks fluoride in its formulation. In this study, a customised composition of fluoride-containing bioactive glass named Na0SR was fabricated to compare its cutting efficacy against alumina on dentine.

Aim: To compare the cutting efficacy of dentine using a fluoride-containing bioactive glass vs the conventional alumina abrasive in an air abrasion set up.

Design: Two abrasives, in-house fabricated bioactive glass Na0SR (38–80 µm) and commercial alumina abrasive (29 µm), were compared using an air abrasion set up. Fluoride was incorporated into Na0SR to enhance remineralisation properties while strontium was included to increase its radiopacity. Powder outflow rate was recorded prior to the cutting tests. Principal air abrasion cutting tests were carried out on pristine ivory dentine. Finally, the abrasion depths were quantified and compared using X-ray microtomography.

Results: Na0SR bioactive glass was found to create statistically deeper cavities in dentine than alumina, despite its lower powder outflow rate and predictably reduced hardness.

Conclusion: Na0SR, a fluoride-containing bioactive glass, appear to be more efficacious at cutting dentine as compared to alumina.

PZ03.32

Effectiveness of MedCem-MTA® vs formocresol as dressing agents in pulpotomized primary molars: preliminary results

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Background: Devitalization approach using formocresol is nowadays replaced with a verified successful regeneration approach using MTA. Lately, great attention has been focused on the evolution of Portland Cement (PC) as an alternative to MTA. Both materials have comparable antibacterial activity and similar chemical properties. The difference between MTA and PC is the absence of bismuth ions and presence of potassium ions in PC, thus being more biocompatible. A disadvantage of PC is lower radio-opacity than MTA, however, MedCem-MTA® is a second generation PC which consist of a radio-opaque substance to overcome this problem. The major advantage of this product is its lower cost compared to MTA.

Aim: The objective of this prospective randomised clinical trial is to assess, clinically and radiographically, the effect of MedCem-MTA® as a pulp medicament following coronal pulp amputation in human primary molars with carious pulp exposure in comparison to Formocresol.

Design: Following standard pulpotomy procedure, the pulp stumps of 66 primary molars in 66 healthy children were randomly covered either with MedCem-MTA® or Formocresol. The pulp chambers were filled with Intermediate Restorative Material (IRM®) and teeth were restored with stainless steel crowns. At 6 and 12 months follow-up appointments, the clinical status of the treated teeth was assessed and radiographs were taken.

Results (preliminary): After 6 months: 25/25 success of MedCemMTA and 25/7 success of Formocresol.

After 12 months: 8/8 success of MedCemMTA and 6/6 success of Formocresol.

Conclusions: Preliminary results demonstrated a success rate of 100% for MedCem-MTA® while that of Formocresol was 94%, similar to that described in the literature.

PZ03.33

Oral rehabilitation of two cases with ectodermal dysplasia and their long-term follow-up

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Introduction: Ectodermal dysplasia (ED) is a congenital disorder characterized by abnormal development in two or more ectodermal structures (skin, nails, hair and teeth).

There are more than 100 ED types. Two cases of X-linked inherited hypohidrotic (HED) type, treated at the Postgraduate Department of Paediatric Dentistry, are presented.

Case reports: Two 4 year-old children, one male and one female, came to the postgraduate Department of Paediatric Dentistry, University of Athens for dental rehabilitation. Clinical and radiographic examination revealed abnormalities in teeth concerning size and shape, congenital absence of several primary and permanent teeth consistent with a previous diagnosis of ED. No caries were detected. Treatment plan included behaviour modification, application of a preventive program, prosthetic rehabilitation with dentures and over-dentures, that were replaced when needed, and orthodontic treatment. The follow-up period for the first child was 5 years and for the second 10 years.

Comments: Any prosthesis made for a young patient with ED must be closely monitored for needed adjustments or replacements due to the child's growth and development. The effect of removable dentures in children affected by ED is extremely important for their oral function, aesthetics and quality of life.

PZ03.34

Indirect pulp treatment with incomplete removal of carious dentine in primary teeth: a case report after 24 months

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Introduction: Indirect pulp treatment (IPT) is a conservative vital pulp procedure that is performed in teeth presenting deep carious lesions with reversible pulp status. IPT technique involves partial caries removal in affected teeth leaving the dentin that is potentially remineralisable, which is covered by different biocompatible materials (e.g. calcium hydroxide and calcium silicate).

Case reports: Five caries-affected children aged 4-to-8 years old were selected for this case report. They presented 10 primary molars affected by deep dentinal cavities (adjacent to the pulp), without any clinical manifestation of irreversible pulp pathology (e.g. prolonged sensitivity to cold and/or heat and some time to sweets). IPT was undertaken by a postgraduate student in paediatric dentistry, the procedure included complete caries removal from the cavosurface margin of each cavity preparation, reportedly a key element to clinical success. Calcium hydroxide (Dycal®; from Denstply) or calcium silicate (Biodentine®; from Septodont) were used to induce pulp protection and dentin remineralisation. Dental cavities were restored by using resin-based composite (Z350; from 3M). Follow-up after 24-month showed that both materials were successful in maintaining pulp vitality as no children presented clinical or radiographic pathology.

Comments: IPT with incomplete removal of caries-affected dentine looks to be a successful approach in primary teeth when calcium hydroxide or calcium silicate is used as restorative material at least for 24 months. Accurate diagnosis of pulp health status, proper restoration sealing and long-term clinical/radiographic follow-up also play key roles in the success of IPT that need consideration.

PZ03.35

Oral health behaviours and barriers to dental care among preschool children with autism spectrum disorders

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Background: Autism Spectrum Disorders (ASD) is a spectrum of developmental disorders characterized by impairments in communication and social skills. Children with ASD have difficulties in oral health care.

Aim: The aims of this study were to (1) compare the oral health behaviours of preschool children with and without ASD, and (2) identify the main barriers to oral self-care and dental services experienced by children with ASD and their parents.

Design: Two hundred and fifty-seven preschool children with ASD were recruited from 17 Special Child Care Centres in Hong Kong. An age- and gender-matched sample of children from mainstream preschools was recruited as control group. The children's oral health behaviours and their main barriers to oral self-care and dental services were assessed.

Results: Preschool children with and without ASD had similar dental attendance, in terms of time since last dental visit and experience of dental treatment under general anaesthesia ($P > 0.05$). Compared to children without ASD, children with ASD were reported to have performed tooth-brushing and used toothpaste less frequently, but more frequently required parental assistance in tooth-brushing ($P < 0.05$). Similar frequency of snacking was reported among children with and without ASD ($P = 0.05$). Barriers to oral self-care and use of dental services were more frequently reported for children with ASD compared to children without ASD ($P < 0.001$).

Conclusions: Differences in oral health behaviours existed between preschool children with and without ASD, particularly with respect to tooth-brushing habits. Barriers to oral self-care and access to dental services among children with ASD existed and warrant consideration.

PZ03.36

Selective reduction of talon cusps; a biological treatment approach

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Introduction: Talon cusps associated with permanent incisors are a rare occurrence but can cause numerous complications including malocclusion, occlusal interferences, poor aesthetics and caries susceptibility. Treatment options for true talon cusps in the growing patient include complete or stepwise removal of the accessory cusp. Early treatment is often warranted to normalise the appearance for psychological reasons. However, the benefit of early intervention must be weighed up with the risk of devitalising the pulp. Selective tooth reduction aims to promote deposi-

tion of secondary dentine for pulp protection and allows for gradual reduction of talon size while maintaining pulp vitality.

Case reports: This case series of children with talon cusps reviews talon type, associated anomalies, treatments, outcomes and duration of follow up. The rationale and technique of selective reduction for talon cusp management is presented.

Comments: Treatment of talon cusps in the growing patient using selective reduction is a simple and conservative treatment approach which encourages biological healing. It is an effective treatment for the young patient as it is minimally invasive and predictably maintains pulpal vitality.

PZ03.37

The relationship between radiographic depth and clinical cavitation of proximal lesions in primary teeth

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Background: The presence of a radiographic radiolucency penetrating into dentine is generally taken to indicate cavitation and the need for restoration placement.

Aim: The aim of this *in-vivo/in-vitro* study was to find the relationship between the radiographic depth of proximal lesions and clinical cavitation, in primary teeth.

Design: 356 primary molars comprising 213 (60%) first molars and 143 (40%) second primary molars were collected from 78 children aged 5–10 years who required extractions in a hospital setting. All children had bitewing radiographs taken prior to tooth removal. The proximal surfaces of the collected teeth were visually examined *in-vitro* using the ICDAS criteria. Radiographs were scored according to Ekstrand's modified classification. The relationship between the radiographic depth of the lesion and the presence of cavitation was examined by cross tabulating the ICDAS scores and the radiographic scores of the proximal surfaces.

Results: Examination showed that 55% of surfaces with a radiographic radiolucency reaching the outer third of dentine were cavitated, whilst 98% of surfaces showing a radiolucency extending into middle of dentine were cavitated. Less than 17% of surfaces with a radiolucency in enamel showed cavitation. Intra-examiner reproducibility for the radiographic examination was excellent ($K = 0.95$), at the caries in to dentine threshold.

Conclusions: Almost half the proximal surfaces of primary teeth with a radiolucency extending into the outer third of dentine were not cavitated, indicating that many of these lesions may be amenable to preventive management. Conversely, radiolucencies into the middle third of dentine or beyond almost always require restorative management.

PZ03.38

Selective stripping in 1st permanent molars affected by MIH prior its extraction

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Introduction: Molar incisor hypomineralization (MIH) represents a major concern in the actual minimal invasive dentistry world. It's tendency is to preserve these teeth with minimal intervention. Severely affected 1st permanent molars are difficult to treat and often the treatment is a challenge. When indicated, a treatment option is the extraction of the 1st permanent molar and it's replacement by a second permanent molar. In young patients around 9 years of age, when the 2nd permanent molar is behind or in the limit of the alveolar bone, and the root development of

the furcation is starting, a mesial drift of this molar may be expected, allowing a better eruption pattern. Late extractions of 1st permanent molars result in mesial inclination and lingual rotation movement of 2nd permanent molars. This case report shows a progressive way to control mesial drift and a new treatment alternative by selective stripping that preserves alveolar width.

Case report: A 9-year-old boy was referred to our clinic with MIH. Clinical and Radiographic examination show a failure of a previous root canal treatment in 36 and 46. The treatment options for this patient.

- 1) Root canal retreatment and extensive rehabilitation,
- 2) Extraction of both teeth and implant placement, and
- 3) Selective stripping of the 1st permanent molar to be replaced by the 2nd permanent molar.

The third option exchanges a severely compromised 1st permanent molar by a healthy 2nd permanent molar, and the third molar, in time takes the place of the 2nd permanent molar.

PZ03.39

Evaluation and comparison of salivary ions and oral manifestations in children with autism spectrum disorders to children without autism spectrum disorders (ASD)

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Background: Autism Spectrum Disorders (ASD) has become a frequently observed clinical disorder in children with special health care needs. Although recent studies have compared the effect of salivary ions on oral diseases with individuals suffering from various genetic disorders, children with Autism are often neglected.

Aim: The Aim of present study was to investigate the effect of variations in salivary ions on oral diseases in children suffering with ASD.

Design: The study consisted of a sample size of 100 children suffering with ASD in various special schools in Hyderabad city, India and a control group of 100 children without ASD. Children of age group 4–18 years were included in the study. Unstimulated salivary samples were collected after a specific time interval after rinsing with deionised water. Cations were evaluated using Inductively Coupled Plasma Atomic Emission Spectrophotometry (ICPAES). Anions were evaluated using Ion Chromatography, Ion Selective Electrode, and Colorimetric method.

Results: In the present study it was found that levels of sodium, calcium and fluoride ions were significantly higher, whereas levels of potassium, magnesium and phosphorous were less and not significant statistically, in children with ASD. clinical examination showed that bruxism, malocclusion and poor brushing habits were significantly higher, among children with ASD whereas results of dental caries and gingivitis were not significant statistically.

Conclusion: The neurological imbalance in children with ASD may be the reason for variation in salivary ions which in turn has its effect on the oral environment leading to oral and dental diseases in children with ASD.

PZ03.40

A calibration technique to improve the accuracy of working length determination in immature permanent incisors

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Background: Determination of working length (WL) in teeth with open apices is challenging. Apex locators can be unreliable resulting in repeat radiographic examination. Estimated WL measurement on a calibrated digital radiograph may allow for more accurate file placement prior to intra-operative radiographic confirmation.

Aim: To assess the accuracy of radiographic calibration in WL estimation in teeth with open apices.

Design: Retrospective analysis of WL radiographs of teeth with open apices was carried out by two independent examiners. Each radiograph was calibrated using the length of the digital sensor. Using the software's linear measurement function, the Calibrated Digital Length (CDL) of the file was calculated by measuring the distance between a reference point to the file tip and the mean value calculated. The CDL for each radiograph was then compared with the Confirmed File Length (CFL) clinically and Calibration Factor (CF) for each radiograph calculated. Number of EWLR was recorded.

Results: In 19/20 cases, the mean CDL was within 2 mm of the CFL, with 45% (9) being within 1 mm. 40% of patients had 2 EWLR taken.

Calibrated working lengths were on average 0.66 times the uncalibrated. CDL corresponded to actual file lengths in 95% of cases. An average of 1.4 CWL radiographs were taken per case.

Conclusions: Calibration resulted in digital measurements of within 2 mm of the actual WL in the majority of cases.

Further work is required to assess the accuracy of determining a digital measurement of the WL from a calibrated pre-operative radiograph.

PZ03.41

Timing for surgical removal of mesiodens

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Background: Mesiodens were defined as supernumerary teeth located at maxillary central incisor region. Timing for surgical removal of mesiodens has been controversial. Early intervention instead of delaying treatment till root complete of adjacent permanent teeth although was stated to increase risk of harming adjacent tooth germs, it could lower the possibility and difficulty of the treatment afterward.

Aim: This retrospective study was to investigate if timing for removal of mesiodens has relation with harm to adjacent permanent teeth during operation.

Design: A total of 118 Taiwanese children, who received surgical odontectomy of unerupted mesiodens during 2005 to 2012 and had records of longitudinal follow-up, were included. Grouped by different dental stages of permanent central incisors with Nolla's classification, comparison about the surgical complications to associated permanent incisors was carried out using Fisher's exact test between groups with a *P*-level of 0.05 for statistical significance.

Results: 105 patients with 145 mesiodens were in the final analysis. The mean dental developmental stage of the permanent central incisors at the time of surgery was 7.7 ± 1.2 , about one-third

to two-third of root complete. No significant difference was noted between groups about the surgical complications to nearby permanent teeth at follow-up records.

Conclusions: The findings from the present study show that timing for surgical removal of mesiodens has no relation with the possible harm to adjacent permanent teeth. Therefore, a clinical implication rises up that mesiodens could be removed as soon to avoid possible complications and early removal would not make the possibility of surgical complications to adjacent teeth greater.

PZ03.42

Regression of data and invention of Moyers roulette analysis

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Background: To date, one of the most common analysis of mixed dentition is Moyers analysis. This analysis is based on tables of probability. This values has been determined in US population, unfortunately in most of the cases the values do not apply in our population because peruvian people have higher values than we find in the tables.

Aim: This study aimed to project the data Moyers tables through linear regression equations and invent a new material that facilitates the analysis of Moyers in mixed dentition.

Design: The classical tables of Moyers and through four linear equations projected data for both values of men and women were used, roulette was created from a new table with values projected from the measured 25.5 mm. Linear regression and linear equations was used to project values for both, the maxilla and mandible. Roulette model was created on the model of the ortómetro of Korkhaus and emulating the classic gestation tables.

Results: Two tables were created with new data values from 25.5 to 30.5 mm measurement, measures which correspond to the sum of the mesiodistal distance of the lower incisors. The new values include projections for both, the maxilla and the mandible.

Conclusions: The new roulette has projected values above normal in addition to facilitating the analysis of Moyers in a more entertaining way data.

PZ03.43

Remineralizing potential of theobromine on artificial enamel carious lesions

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Background: The consumption of chocolate, as a sugar-containing confectionery, has been associated with dental caries. However, series of studies suggested that cocoa powder and chocolate might contain some caries-inhibitory substances [Stralfors, 1966]. Studies in hamsters showed that pure cocoa powder inhibited dental caries by 84% with cocoa percentage of 20% [Stralfors, 1967]. These reports suggest that cocoa extract, the main component of chocolate, could contain an agent (Theobromine) which has caries inhibitory action.

Aim: The aim of present study is to evaluate the remineralisation potential of Theobromine (100 mg/L, 200 mg/L) when compared to Hydroxyapatite (ReminPro, VOCOTM), Novamine toothpaste (SHY-NM™) and Fluoridated dentifrice (Colgate™) (1000 ppm F) on artificial enamel carious lesions.

Design: 150 extracted primary teeth (30 per sample) were collected and stored in 0.01% Thymol at room temperature. The specimens were allowed to stay in the demineralising solution for

48 h, for adequate demineralisation. The demineralised samples in each group were treated with the respective remineralizing agents. Evaluation was done for mineral content and lesion progression using SEM-EDAX and Diagnodent, respectively post remineralization. Statistical Analysis was done using the appropriate tests of significance.

Results: Exposure to the novel agents like Theobromine reduces the lesion formation ($P < 0.01$) and caries progression.

Conclusions: In conclusion, the present study demonstrated that Theobromine acts in a medium that can enhance the remineralization potential of enamel as determined by using an established *in vitro* caries cycling model, and may be a viable alternative to fluoride additives in commercial dentifrices.

PZ03.44

How to cure black stains: an innovative study

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Background: The black stains are linear black spots that affect the depression of the surface of the tooth crown, whose microbiological origin has been attributed to Negative Actinomyces Catalase, Positive Actinomyces Catalase, Corynebacterium, Streptococci, Neisseria, Prevotella melaninogenica. These spots are mainly found in patients from countries on the Mediterranean Sea.

Aim: The aim of the study is to develop a professional oral hygiene protocol that will allow us to evaluate possible predisposing factors.

Designs: The study aims at recruiting 150 children suffering of black stains on the tooth surface.

The following therapeutic protocol will be used:

- 1) One ablation every week for 3 weeks; a different mouth-wash will be used every week.
- 2) Microbiological analysis every week before salivary collection.
- 3) This study will last 12 months.
- 4) Obtained data will be evaluated by statistical means (mean, ds and t student test).

Results: This study involves the recruitment of 150 children, by now 50 children have already been visited. Among these ones, 30 of them have successfully completed the therapy course, 10 children have completed treatment with positive results and 10 have not finished the therapy course. We expect a positive microbiological confirmation, which is still ongoing.

Conclusions: New data are being collected and we are improving the microbiological part regarding the origin of the disease, but further researches are needed to confirm this study.

PZ03.45

Caries preventive effect of a chlorhexidine/thymol varnish and a fluoride one in erupting permanent molars: a comparative study

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Background: To combat early fissure caries development, until the occlusal surface is fully erupted, topical interventions based on antibacterial agents and fluoride have been suggested.

Aim: The aim of the study was to compare the caries preventive effect of a chlorhexidine/thymol-containing antibacterial varnish to that of a fluoride varnish applied topically during the eruption of permanent molars.

Design: The study group consisted of 183 patients 5–14 years old with at least one sound erupting permanent molar, either first (1st, $n = 110$) or second (2nd, $n = 73$). After stratification by molar and stage of eruption, the patients were randomized to either quarterly topical applications to all present teeth of antibacterial varnish (Cervitec® Plus; CV group) or biannual applications of fluoride varnish plus biannual treatments with placebo varnish (Fluor Protector; FV group) for 2 years. The primary endpoint was caries incidence.

Results: After 2 years, 11 new caries lesions were found on the 1st (4 in the CV group and 7 in FV one, $P > 0.05$) and 2 in the 2nd (1 in CV and 1 in FV group). Salivary mutans streptococci was significantly lower in the CV group after 2 years ($P < 0.05$) for both 1st and 2nd molars.

Conclusions: Quarterly topical applications of chlorhexidine/thymol varnish were as effective as the bi-annual applications of fluoride varnish in preventing caries development during the eruption of permanent molars. Both professional regimes may be considered alternatives for children during this period.

PZ03.46

Emergence time and sequence of permanent teeth in children of Kavre district, Nepal

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Background: To date permanent teeth emergence in Nepalese population has not been investigated. The reference for the tooth emergence age needed for clinical and academic situations is based on American and European standards. But population specific standards on emergence time and sequence of teeth are essential in planning dental care for children.

Aim: To determine the standards for permanent teeth emergence time and sequence in children of Kavre district, Nepal.

Design: A descriptive cross sectional study was conducted in 623 children of age 5–14 years from schools of Kavre district. The number of permanent tooth erupted except third molar was recorded along with age and gender. Data were analysed using SPSS 11.5. Student's 't' test was used to detect the inter-jaw and inter-gender differences.

Results: The study population constituted 50.7% boys and 49.3% girls of the total sample. The first tooth to emerge was the first molar, whereas the second molar tended to be the last to emerge in both the genders. Mandibular teeth tended to precede the corresponding maxillary teeth in emergence. Right and left sided teeth emerged almost at the same time in both the arches. Though not significant, girls showed early tooth emergence than boys.

Conclusion: This is the first study for permanent teeth emergence age in Nepal. So, the result can be used as a reference data for clinical and academic purpose especially for the children of Kavre district, Nepal.

PZ03.47

Establishment of SspB peptide binding assay for *Porphyromonas gingivalis* colonization processes

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Background: *Porphyromonas gingivalis* is a major periodontal pathogen that binds efficiently to *Streptococcus gordonii*, which in turn binds to salivary agglutinin (gp340). The SspB of *S. gordonii* appears to mediate this association.

Aim: We previously reported that the streptococcal SspB peptide analog, designated SspB (390-T400K-402), showed high binding activity with saliva. To understand the three-way interaction among *S. gordonii*, *P. gingivalis* and salivary gp340 as a unit, we established a peptide binding assay using the analogous SspB peptide.

Design: The binding activity of the SspB (390-T400K-402) to *P. gingivalis* was detected by ELISA. Ninety-six well plates were coated with whole bacterial cell (*P. gingivalis* strains ATCC 33277, and W83; *S. gordonii* DL1) in Na₂CO₃ coating buffer. After blocking, bacterial cells were incubated with saliva or salivary agglutinin peptide (SRCRP2). Biotinylated SspB (390-T400K-402) was applied and incubated with 1 : 1000 streptoavidin-conjugated alkaline phosphatase. After development, A₄₀₅ was recorded.

Results: *P. gingivalis* 33277 showed the highest binding activity of the tested bacteria, whereas *P. gingivalis* W83, which is deficient in Mfa1 fimbriae, exhibited poor binding activity, as did *S. gordonii*. The binding of SspB (390-T400K-402) in saliva- or SRCRP2-treated *P. gingivalis* was significantly higher than that in non-treated cells.

Conclusion: SspB peptide binding assay revealed that initial attachment of *P. gingivalis* to the substrata of *S. gordonii* may require salivary gp340-mediated SspB-Mfa1 interactions. The assay is available to assess the relationships among SspB, Mfa1 and salivary gp340 as a unit.

PZ03.48

Knowledge of preschool teachers on early childhood oral health. Association with their demographic and personal characteristics

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Background: In the literature there is little evidence of the knowledge of preschool teachers regarding oral health issues, at that age, leading to implementation of relevant education programs.

Aim: To investigate oral health knowledge of preschool teachers and its association with demographic, educational and personal characteristics.

Design: The teachers ($N = 594$) of the largest preschool institution in Greece participated in this cross-sectional study. They completed a self-administered questionnaire with 40 questions on demographic data, childhood oral health knowledge, personal habits and attitudes and on implementation of oral health educational programs.

Statistical analysis included bivariate correlations and multiple linear regression modelling ($P \leq 0.05$).

Results: The response rate was 85%, participants' mean age was 41 years (SD: 7.5), 68% were parents, mean number of correct answers was 7 (out of 13) and 1% answered all questions correctly. From the participants, 74% had not attended oral health educational courses, their major source of information was the

dentist alone (40%) or in combination with other sources (52%), 70% believed that their oral health knowledge was insufficient and only 45% had implemented oral health educational programs. Significant factors that influenced the overall knowledge were implementation of oral health educational programs ($P < 0.001$), the belief that oral health courses during basic studies are necessary ($P = 0.01$), confidence on personal knowledge ($P = 0.03$) and parenthood ($P = 0.05$).

Conclusions: The results of this study showed that knowledge on basic oral health issues is poor among preschool teachers and relevant education is necessary during their studies or later on.

PZ03.49

The use of DIAGNOcam in children: recommendations and limitations

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Introduction: For caries diagnosis, new digital-fiber-optic-illumination (DIFOTI) techniques became well studied and have shown to be very sensitive in occlusal and interproximal caries.

These new techniques however give no visible pictures. Recently, KaVo DIAGNOcam was introduced. It is a near infrared low power laser system (wavelength 780 nm) with corresponding actual digital video camera and project live captured pictures direct onto the computer screen for lesion analysis and detection. It was the aim to present first findings and recommendations using KaVo DIAGNOcam in children and to find out if bite-wing radiographs can be avoided.

Case reports: During recall visits a series of permanent teeth with discolored fissures were assessed for occlusal and interproximal caries visually, radiographically and with DIAGNOcam.

Comments: It became clear that DIAGNOcam can provide satisfactory information for the diagnosis of occlusal caries. The decision making for necessary therapy either cavity preparation or preventive treatment (including fissure sealant) can be well-planned. Interproximal lesion can also be visualised but give limited information about the extension of the caries in the direction of the pulp. Further, it also became clear that the device is not eligible for use in patients with orthodontic appliances, on erupting teeth or in very young children.

Conclusion: From a series of cases, it can be concluded that the use of DIAGNOcam in daily practice for the diagnosing of 'occlusal caries' can certainly have an added value. Moreover bite-wing radiographs can be avoided thus exposing children to less radiation chances.

Morita Prize Entries (Case Reports Posters) – PZ03 Case Report Posters

PZ03.50

Premature primary incisor exfoliation in a child with Kabuki syndrome

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Introduction: Kabuki syndrome is characterised by distinctive facial features and an array of congenital abnormalities, developmental delay and intellectual disability. It is caused by mutations in the KMT2D (MLL2) or KDM6A genes. Oral features include cleft lip and/or palate, a high arched palate, micrognathia, hypodontia and microdontia. The aim of this report was to present a case of premature exfoliation of primary teeth in a child with Kabuki syndrome, previously unreported.

Case reports: A 2-year-old girl presented to Casualty Clinic having lost her primary maxillary left central incisor whilst having her teeth brushed. There was no history of dental trauma.

On clinical examination, the primary mandibular right incisors and primary mandibular left incisors were fused. The primary maxillary right central incisor displayed grade 1 mobility. Gingival tissues displayed no evidence of trauma, ulceration or bleeding. Histopathological examination of the exfoliated tooth revealed resorption lacunae indicative of premature tooth resorption. The primary maxillary right central incisor exfoliated similarly 4 months later. Spontaneous permanent maxillary central incisor and molar resorption have been reported in Kabuki syndrome however primary tooth resorption has not.

Comments: Dentists should be aware of the possibility of external root resorption causing mobility and premature loss of primary maxillary central incisors in children with Kabuki syndrome. This is important, as Kabuki syndrome is associated with respiratory infections, seizures and patients commonly present with hypotonia resulting in swallowing difficulties.

PZ03.51

Luxation as a treatment option for ankylosed primary molar: a case report

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Introduction: Ankylosis of primary molar is a common clinical finding. The incidence reported varies between 1.5% and 9.9%. Its diagnosis is usually made base on the clinical detection of difference in occlusal planes of adjacent molars and immobility of the affected tooth. Although many of the ankylosed molars do exfoliate naturally, severe complications such as impaction of succeeding premolar has been reported. Treatment strategies usually include monitoring, prosthetic build-up, extraction with and without space maintainer, or orthodontic traction. Luxation has been suggested to break the ankylosed parts and correct the infra-occlusion. We report a boy with an ankylosed primary second molar, which were successfully treated by luxation.

Case report: A 3 years 8 months boy was diagnosed of presenting an ankylosis of lower left primary second molar. Six months monitoring showed sign of caries and progressive submergence of the tooth into gingiva. After consulting with his parents, interceptive treatment with gingivectomy and luxation of the primary molar was performed. Eruption of the ankylosed molar was soon noted after the treatment. The affected tooth received a restorative filling and

reached its normal occlusal level within 6 months. At the end of the postoperative 15 months follow up, the lower left first permanent molar erupt normally without alternation in alveolar bone level.

Comments: Luxation is a simple treatment option for ankylosed primary molar, no coronal build-up or space maintainer is needed when the response to treatment is favorable.

PZ03.52

Primary failure of tooth eruption: a case report

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Introduction: Primary failure of eruption (PFE) is a rare condition where there is tooth eruption failure without obvious local or systemic causes, otherwise, due to a disturbance of the eruption mechanism. It often affects permanent molars, and causes a severe posterior open bite. The condition tends to occur in isolation, and application of orthodontic force often leads to ankylosis rather than normal tooth movement. Here we describe a female with most permanent teeth failed to erupt.

Case reports: A 10 years old girl came to the Department of Pediatric Dentistry Hospital of Stomatology, PKU with the main complaint of no tooth replacement. The patient showed normal physical growth and development, and denied a family history. Clinical examination showed early mixed dentition with 31 and 41 erupted. Panoramic examination showed no obvious developmental defect of permanent tooth germs except 43 missing. No root resorption of primary teeth was observed, and the developing roots of permanent teeth were closed to the inferior border of the mandible. The patient underwent five operations under general anesthesia including serial extraction of primary teeth and surgical exposure of permanent teeth. At age 15, most of the permanent teeth erupted with normal occlusion.

Comments: The diagnosis and treatment of PFE are difficult. Early detection and appropriate treatment such as surgery may lead to good results. Further studies are required to determine the etiology of PFE.

PZ03.53

Prosthetic rehabilitation in a medically compromised pediatric patient: a case report

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Introduction: Infective endocarditis is an uncommon life-threatening complication resulting from bacteremia. Dental practitioners should consider prophylactic measures to minimize the risk of IE in patients with underlying cardiac conditions associated with the highest risk of adverse outcome from endocarditis.

In high risk cardiac patients, antibiotics are recommended for all dental procedures that involve manipulation of gingival tissue, the periapical region of teeth or perforation of the oral mucosa. Thus, extractions are recommended instead of pulp treatment, creating the need for prosthetic rehabilitation.

Case reports: A 4-year-old boy was referred for management of dental decays. Clinical and radiographic examination revealed multiple caries lesions in the deciduous dentition. The patient has indication for prophylaxis of bacterial endocarditis due to surgi-

cal VSD correction, with prosthetic material and residual flow. Several anterior and posterior teeth with extensive decay and pulp involvement were extracted under general anesthesia.

A fixed upper acrylic prosthesis and an inferior removable acrylic prosthesis were performed. Follow-up visits were performed at short intervals to make prosthetic adjustments and oral hygiene.

Comments: Treatment planning of pediatric patients with cardiac conditions associated with high risk of IE, includes antibiotic prophylaxis for invasive dental procedures. Tooth extraction is preferred to invasive pulp therapy increasing the need for prosthetic rehabilitation.

PZ03.54

Novel approach for esthetic rehabilitation of primary anterior teeth using temporization material: a case series

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Introduction: Carious primary teeth are usually restored using intracoronal/ full-coronal restorations. Intra-coronal restorations are for single surface caries and include tooth-colored materials like Composites, GIC etc. Strip crowns with composites are frequently used to restore teeth with multiple-carious surfaces, but moisture control in children is a frequent challenge compromising their retention.

Full-coronal restorations like prefabricated zirconia/ pre-veneered Crowns (indicated to restore traumatized/ grossly carious teeth) exhibit better esthetics and retention but higher cost and difficult adaptation are their limitations.

Hence, an alternative would be to fabricate chair-side, customized full-coronal restoration, which should also be esthetic, durable and cheap. Case-series depicts novel application of temporization material (Luxatemp, DMG-Germany) for full-coronal restoration(s) in primary anterior teeth.

Case report: Patients aged 4–5 years with grossly carious/ traumatized anterior teeth requiring full-coronal restoration were selected from department of Pediatric dentistry, DAV Dental College Yamunanagar. Informed consent was sought from parents after explaining the technique.

Following caries excavation/ pulpal therapy, tooth preparation was done, reducing the tooth ~1.5 mm from all surfaces and ensuring removal of undercuts. Suitably sized strip crowns were selected, and loaded with Luxatemp using Automix syringe. Loaded strip crown were then placed on prepared tooth and were removed when the temporization material was still in elastic stage. Material was then allowed to set extra-orally. Strip crowns were then peeled-off, followed by finishing and cementation of custom-fabricated crowns.

Comments: Excellent aesthetic results were achieved. Randomized clinical trials are required to evaluate color stability and longevity of such custom-fabricated crowns in primary anterior teeth.

PZ03.55

Biliary ducts atresia: oral manifestations. A case report

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Introduction: The biliary ducts atresia (BDA) is an uncommon obstructive cholangiopathy, affecting 1 in every 9000 to 12,000 live births, of unclear etiology, it occurs in neonatal stage, with jaundice after 2 weeks. It is the main cause of extra hepatic origin jaundice in neonatal period and of liver transplantation.

Bilirubin is distributed in the body during the period of hyperbilirubinemia. It is permanently deposited in dental tissue causing green pigmentation of teeth, delayed tooth and bone develop-

ment, enamel hypoplasia, gingival hyperplasia and increased susceptibility to caries.

Case report: Female, 6.3 years, Transplanted Liver, BDA, celiac, mixed dentition, mild gingivitis, decay associated with poor oral hygiene, generalized intrinsic greenish brown stains in primary and permanent dentition, right canine mesiocclusion, left distocclusion, left posterior crossbite, anterior open bite, altered tongue position. Comprehensive multidisciplinary rehabilitation treatment was performed with a minimally invasive approach. Extractions of decayed primary teeth with pulp engagement, composite resin fillings in front teeth, interceptive orthodontic treatment with bimaxillary functional appliances and physiotherapeutic treatment to retrain tongue position were conducted.

Comments: The Role of the Pedodontist is essential, the clinical evaluation in the etiology of tooth staining as a manifestation of systemic diseases, and also in the performance of adequate restorative treatment to reduce family anxiety and self-esteem problems that affect the quality of life in these patients.

In transplant patients the dental management is multidisciplinary and complex due to side effects of immunosuppressive drugs and the difficulty of masking the color of teeth with restorative materials.

PZ03.56

Maxillary cyst associated with tooth-eruption disturbance in a child: a case report with 4-year follow-up

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Introduction: Deciduous, permanent or supernumerary teeth formation and its potential ectopic eruption outside the dental arches is a rare entity. Its occurrence has been reported in the chin, maxillary sinus, palate, nasal and orbital cavities, with maxillary canine and mandibular third molar representing the most commonly affected teeth. Although its pathogenesis remains unknown, development disturbances including cleft palate, trauma, infections, genetic factors and dentigerous cysts following impaction, have been suggested as etiological factors.

Case report: 4-year follow-up case report of a 9-year old child who attended to our department due to persistent infection in the upper left quadrant with recurrent exacerbations in the previous 6 months, not apparently related to erupted teeth pathology. Intraoral examination revealed normal eruption chronology and a marked purulent drainage on distal and vestibular surfaces of the upper left first molar. Computerized tomography disclosed the presence of two ectopic molars on the left maxillary sinus, adjacent to the orbital floor, associated with large cyst. Surgical intervention under general anesthesia was performed according to the Caldwell-Luc procedure. Histological analysis revealed a dentigerous cyst, with complete symptoms resolution following surgery.

Comments: Facial pain, headache, epistaxis, purulent rhinorrhea, nasal deformity and lacrimal duct obstruction may occur in maxillary cysts associated with eruption disturbances. Differential diagnosis should include foreign body, infections, benign and malignant lesions. An exploration of etiology could become critical to exclude concomitant conditions and potential complications. Standard treatment is extraction, which should be particularly urgent in clinical exacerbations.

PZ03.57

Differential diagnosis of Amelogenesis imperfecta in primary dentition – a case report

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Introduction: Amelogenesis imperfecta (A.I.) is a disorder of enamel development, genomic in origin with large variation in epidemiology. It was typically affected in both primary and permanent dentitions. A.I. has very strong genetic association with present proven genes of AI1, AI2, AI3, AIH1, AIGFS, etc. There are also multiple routes of inheritance including autosomal dominant, autosomal recessive and X-linked. We hereby present a case of possible A.I. in primary dentition.

Case reports: A 3 year old Taiwanese girl with medical history of prematurity and necrotizing enterocolitis came to our hospital for her unusual appearance of primary teeth. There is no family history of A.I. The followings were noted after examination.

- 1) Generalized enamel hypoplasia with yellowish discoloration in primary teeth.
- 2) Cavitation and pitting with roughness over occlusal surfaces of primary molars and buccal/lingual surfaces of primary incisors.
- 3) Anterior open bite.
- 4) Radiographically, the enamel contrasts normally from dentine, but the thickness of enamel is thinner than usual.

Based on the clinical and radiographic findings, the etiology for this generalized presentation of enamel hypoplasia cannot be solely attributed to her perinatal sickness. The diagnosis of A.I. was made. Full mouth rehabilitation including stainless crowns and full coverage composite crowns was performed. The permanent lower central incisors appear normal after eruption.

Comments: Amelogenesis Imperfecta in primary dentition can very easily be overlooked. Systematic approach with careful evaluation of the clinical and radiographic presentations will facilitate differential diagnosis of the disorder. Genetic analysis may be indicated to support the clinical judgment.

PZ03.58

Erupting compound odontome presenting in a newborn: a case report

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Introduction: Developmental oral conditions not uncommonly present at birth include natal teeth, Bohn's nodules and Epstein pearls. Less common are epulises, malignancies and odontomes (a type of hamartoma), the latter of which, arise from epithelial and mesenchymal cells, consist primarily of enamel and dentine, often in a disordered pattern. Odontomes are classified as compound, where enamel and dentine deposition is anatomically similar to normal teeth, or complex, where enamel and dentine form irregular masses with a haphazard pattern. Odontomes are benign malformations and when fully calcified do not undergo further development, however may erupt intra-orally. Occurrence within gingival soft tissues has been reported, however odontomes are predominantly intraosseous lesions.

Case reports: A 12 day old Caucasian female newborn was referred by her midwife regarding what was described as an asymptomatic but mobile back tooth present from birth with concern of potential dislodgement during feeding. Examination revealed a mobile calcified mass surrounded by erythematous and oedematous soft tissue (10 mm × 10 mm) overlying the left posterior maxillary alveolar ridge with the appearance of an erupting upper deciduous molar. Excisional biopsy of hard and soft tissue lesions was performed under general anaesthesia at age 19 days, and histological analysis confirmed the diagnosis of compound odontome. Pre-and post-operative clinical and histopathological images are presented.

Comments: This case supports the inclusion of odontomes in differential diagnoses of oral developmental calcified anomalies in newborns. It also highlights the advantage of general anaesthesia when performing an excisional biopsy as regards access and haemostatic control in a newborn.

NuSmile Restorative Case Report Poster Prize Entries – PZ04

PZ04.01

A novel approach for building-up ankylosed primary molars in cases of missing permanent premolars. A case report

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Introduction: Aplasia of second premolars might be found in 17–24% of cases of ankylosed primary molar teeth. Occasionally, there are such cases where treatment plan includes retention of the infra-occluded primary molars for space preservation and future implant placement. In these cases crown built up to the occlusal line is necessary to prevent various clinical problems.

Case report: The technique is presented in a 12 year old girl, with nine missing permanent teeth. Orthodontic evaluation indicated space closure for five teeth and space maintenance for the remaining 4 second primary molars. The technique includes the following clinical steps: a) Elastic separators placed proximally to the primary molars for few days for creating space. b) Proximal reduction of the crown width is performed; a composite core is used to increase crown height facilitating the selection of a preformed metal crown (PMC). The selected PMC fitting perfectly the crown width is filled up with self-cured composite and placed on the primary tooth following acid etch and adhesive procedure. Excess cervical composite is removed. c) A week later PMC is carefully removed using cutting instruments and the revealed composite built-up is polished and occlusally adjusted. Radiographic evaluation confirms the successful result.

Comments: The above described method using conventional instruments and materials appears a valuable clinical tool in the hands of the paediatric dentists who frequently find themselves dealing with infra-occluded ankylosed primary molars that need to be retained and can produce serious clinical problems if left untreated.

PZ04.02

Sonic vibration device to accelerate glass ionomer cement setting in ART technique: a case report

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Introduction: Recently, there are efforts to optimize the required-time of clinical treatment in Pediatric Dentistry. An alternative is to reduce the setting reaction time of high-viscosity glass ionomer cements (GIC) used for Atraumatic Restorative Treatment (ART).

Case report: After clinical examination in one 6-year-old boy, it was detected active caries lesion ICDAS score 5 (International Caries Detection and Assessment System) on the occlusal surface

of permanent molar. After partial caries removal, the dentin was pre-treated with polyacrylic acid for 10 s, followed by rinsing and removing water excess with cotton balls, maintaining the dentin moist. The GIC (Fuji-IX – GC Corp.) was mixed according to manufacturer's instructions and inserted in the cavity with insertion spatula. The tip of vibratory sonic device (Smart Sonic Device – FGM) was inserted into the cavity and activated for 15 s in medium power. The tip was immediately removed from the cavity and the restoration received a layer of petroleum jelly under finger press for 60 s. The material began to lose the shiny appearance after 15 s after application of sonic device. After 6 months of follow-up, the restoration showed a good marginal integrity.

Comments: It was concluded that the use of vibrating sonic device is a useful tool to optimize the clinical chair time in Pediatric Dentistry when using high viscous glass ionomer cement.

PZ04.03

Dental management of a patient with tricho-dento-osseous (TDO) syndrome: a case report

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Introduction: Tricho-dento-osseous (TDO) syndrome is an autosomal dominant disorder characterized by curly hair at birth, enamel hypoplasia, taurodontism, dysplastic nails and generalized osseous dysplasia involving the long bones and calvarium. Genetic studies have identified a 4 bp deletion in the *DLX3* gene.

Case reports: An 11-year-old patient was referred to the Paediatric Dental Clinic for management of dental trauma of #21. The medical history was clear and no abnormalities during pregnancy were reported. The extra-oral examination revealed normal body growth with blonde curly hair and splitting of fingernail edges. The intra-oral examination revealed the remaining root of #21 covered by gingiva, tooth shape and size anomalies and enamel hypoplasia/hypomineralization. Reduced occlusal vertical dimension was also noted due to severe attrition of posterior teeth, as well as dentoalveolar abscesses and mobility of the mandibular lateral incisors. Additional radiographic findings were taurodontism of the permanent molars, wide pulp chambers of anterior teeth and periapical lesions of the mandibular lateral incisors. The family history revealed that patient's mother, mother's father, sister and her son had similar dental defects and hair appearance. The treatment plan included endodontic treatment of the mandibular lateral incisors, preformed metal crowns of first permanent molars, direct composite restorations of anterior teeth, extraction of #21 with semi-permanent prosthetic rehabilitation (Maryland bridge) to improve function and aesthetics.

Comments: The dental management of TDO syndrome should be undertaken by a team approach at an early age. Definitive dental treatment should be completed entering adulthood.

NuSmile Restorative Research Poster Prize Entries – PZ04

PZ04.04

Decellularisation of dental pulp for use as a scaffold in regenerative endodontics

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Background: Current regenerative endodontic techniques of non-vital immature teeth offer less than an ideal approach, with unpredictable results especially with regards to continuation of root development and increase dentine thickness. The use of scaffolds and signalling molecules might guide stem cells into regeneration of pulp tissues rather than revascularisation or healing. With greater knowledge and improvements within the fields of tissue engineering, novel approaches to produce a biocompatible acellular extracellular matrix through decellularisation process could be developed.

Aim: To assess the scientific feasibility of decellularising the human dental pulp tissue to produce a biologically compatible scaffold.

Design: Two human dental pulp tissues were extracted. The test tissue was decellularised using a well-established decellularisation protocol (Wilshaw *et al*, 2006), while the control tissue was left untreated. Histological sections were then prepared and stained using hematoxylin and eosin, alcian blue, picrosirius red and 4',6-diamidino-2-phenylindole (DAPI) stain in order to assess tissue histological architecture, glycoaminoglycans content, collagen distribution, DNA detection respectively.

Results: The decellularised sections showed an acellular collagenous matrix with no evidence of whole cell nuclei. Histological analysis also revealed consistency of collagen morphology with no apparent structural change of the decellularised scaffold when compared to the control tissue.

Conclusion: The decellularisation technique used showed promising results with regards to eliminating cellular materials while maintaining the extracellular matrix needed for stem cell growth and differentiation.

PZ04.05

Bonding performance of a self-adhering flowable composite-resin to different deciduous surfaces

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Background: Self-adhering flowable composite-resin was introduced to the market; they bond to enamel and dentin without etching or bonding.

Aim: Evaluation of the shear bond strength of self-adhering flowable composite-resin to different surfaces of deciduous molars.

Design: Eighteen-freshly extracted sound human deciduous molars were used. The teeth were embedded in acrylic blocks, such that their buccal surfaces were shown and aligned with the acrylic surfaces. The teeth were randomly divided into three groups.

Group I: enamel surfaces without any intervention (Uncut Enamel),

Group II: enamel surfaces with minimal grinding (Cut Enamel), and

Group III: dentin surfaces.

For all groups, self-adhering flowable composite-resin (DyadTM-flow, Kerr, USA); was applied. Specially designed holed-split Teflon mould was used for constructing composite-resin cylinders (3 9 3 mm) over the buccal surfaces of the mounted teeth. The DyadTM-flow was applied in a central hole of the mould upon tooth surface, and then light cured for 20 s. The teeth were stored in distillate water at 37°C for 24 h. The bond strength was recorded blindly by a different assessor using universal testing machine and statistically analyzed. Modes of failure were studied using digital microscope.

Results: Mean values of shear bond strength for groups I, II and III were 9.6, 5 and 3.6 MPa respectively, with statistically insignificant difference $P = 0.09$ (P value 0.05). Some specimens showed spontaneous de-bonding after water storage [groups I (33.33%) and III (83.33%)]. Failure mode was 100% adhesive failure in all groups.

Conclusions: Bonding of DyadTM-flow was highest in uncut enamel however further material improvement may be required.

PZ04.06

Detection of noncavitated occlusal caries with a novel impedance spectroscopy

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Aim: The aim of this study was to investigate the validity of an impedance spectroscopy technology in the detection and assessment of occlusal caries in primary and permanent teeth. To evaluate the performance of CarieScan PRO, the method was compared with a commonly used laser fluorescence device (DIAGNOdent pen, KaVo) and International Caries Detection and Assessment System (ICDAS II).

Design: 83 teeth were assessed using all three systems under standardised *in vivo* conditions. A non-cavitated sample of 83 posterior teeth (21 primary; 62 permanent) was selected and assessed for caries on enamel and dentin level with the aid of CarioScan PRO and DIAGNOdent pen by two examiners.

Results: ICDAS showed the highest validity and repeatability. The DIAGNOdent pen's overall clinical validity was relatively more comparable to that of ICDAS for one examiner while it was CarieScan PRO for the other examiner. The inter-examiner performance of DIAGNOdent is better than CarieScan PRO since correlation coefficient of the former is 0.51 while it is 0.43 for the latter. However, the inter-examiner performance of ICDAS is the best among all since the correlation coefficient turned out to be 0.75.

Conclusions: Overall performances of DIAGNOdent and Carie-Scan PRO changed according to the examiners suggesting that it depends on the examiners themselves.

PZ04.07

Shear bond strength of two novel dentin replacement materials and glass ionomer cement bonded to two resin composites

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Background: The unique anatomic and behavioral considerations in pediatric patients has made necessary the search for newer materials with improved biological, mechanical and handling properties for replacement of lost dentinal structure. Two examples are Flowable Bulk Fill Composite Resin (Smart Dentin Replacement™, Dentsply Inc.) (SDR), and Tricalcium-silicate based cement (Biodentine™, Septodont, France).

Aim: The aim of this study was to evaluate the shear bond strength of Nanofilled and Micro-hybrid composite resin (Filtek-Z350-XT and Filtek-Esthet-X-Flow-XT™), to three different

dentin replacement materials: (i) SDR™; (ii) Biodentine™ and (iii) Conventional Glass Ionomer Cement.

Material handling characteristics and modes of fracture were also analyzed.

Design: 60 acrylic blocks, each with a central hole were prepared. These were randomly distributed into three equal groups, each corresponding to one of three dentin replacement materials-SDR, Biodentine and GIC. The central holes were filled with these materials. After setting and application of the respective adhesive system, the specimens were further divided into two sub-groups each, of Nano-filled or Micro-hybrid Composite Resin. The respective composite material was then applied onto the dentin replacement materials using a cylindrical plastic matrix. Shear bond strength was tested on a Universal Testing Machine (Instron-3366), at a crosshead speed of 1.0 mm/min.

Results: Amongst the dentin replacement materials, SDR showed superior handling characteristics and significantly higher bond strengths ($P < 0.01$) to overlying composite in comparison to GIC and Biodentine.

Conclusion: The superior handling and bonding characteristics shown by SDR indicate its usefulness in the unique setting of Pediatric dentistry, in lesions with significant loss of dentin.

Jens Andreasen Poster Prize Entries – PZ05

PZ05.01

Abstract withdrawn

PZ05.02

Combined surgical and restorative management of invasive cervical resorption: a case report

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Invasive cervical resorption (ICR) is a relatively uncommon and often aggressive resorptive process that may occur in the permanent dentition. The exact cause of this condition remains unclear but is potentially predisposed by trauma, orthodontic treatment, dento-alveolar surgery, periodontal treatment and bleaching. The present report describes the combined surgical-restorative treatment approach in an advanced case of invasive cervical resorption. A 15-year-old male patient was referred to the Paediatric Dentistry Department for diagnosis of pink discolouration at the cervical labial region of a maxillary left central incisor. Clinical and radiographic examination revealed a lesion extending from the cervical level of crown to the coronal third of the root, which strongly indicated diagnosis of invasive cervical resorption. The tooth responded positively to electric pulp testing. A surgical flap was raised to expose the resorption site. Following curettage of the lesion, a large cavity without pulpal involvement was observed. The defect was restored with a glass ionomer cement and composite resin. At 18-month follow up, the patient recalled with pulpal symptoms that led to root canal treatment. At 24 months, the patient was still attending uneventful recalls, as confirmed clinically and radiographically.

Due to the aggressive nature of ICR, early diagnosis can help prevent the consequences of the resorptive process. Advanced cases, however, may require surgical intervention combined with restorative treatment. In the present case, restorative management under surgical exposure of the resorption site provided good aesthetic and functional results during the 24-month follow-up period.

PZ05.03

Multidisciplinary management of a late-referred root fracture

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Introduction: Postponed or late intervention in root fractures may present with various functional and aesthetic consequences that require multidisciplinary treatment. This report presents a combined endodontic and surgical treatment approach in a root-fractured permanent incisor whose complaints surfaced 5 years after trauma.

Case reports: A 12-year-old boy was referred to the Paediatric Dentistry Department with chief complaint of unpleasant aesthetics and intraorally-exposed root tip of a displaced left maxillary central incisor that was traumatized 5 years earlier. Clinical and radiographic examination revealed a root fracture at the apical

level, with overlapping fragments on an oblique fracture plane. The root canals were medicated with calcium hydroxide paste for 2 weeks, after which the coronal root fragment was obturated with MTA. 4 weeks later, surgical intervention was made under local anaesthesia for the removal of periradicular granulation tissue and management of apical fenestration. The tooth was splinted immediately after surgery for 4 months. The patient has been attending regular control visits for 24 months which revealed gradual improvements in periradicular bone healing and mobility as well as the aesthetic appearance.

Comments: The multidisciplinary treatment approach presented herein not only provided improved healing and aesthetics, but also favoured continued growth of the anterior maxilla with proper gingival contours.

PZ05.04

Clinical evaluation of composite restorations of traumatized anterior teeth in children: a four-year prospective longitudinal study

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Background: Only a few clinical studies have been published on long-term prognosis of composite restorations of traumatized anterior teeth in children.

Aim: The aim of this prospective longitudinal clinical study was to evaluate the clinical performance of fractured anterior teeth restored with a composite resin in children.

Design: Seventy-eight fractured anterior teeth in 54 children (8–11 years) were restored with a composite resin (Gradia Direct, GC, Japan) using the etch-and-rinse technique (Prime and Bond NT, Dentsply, U.S.A). The restorations were placed by two operators. The restorations were evaluated according to the modified-USPHS criteria at baseline and every year for 4 years follow up. Statistical analyses included the McNemar and the Mann-Whitney non-parametric tests ($P < 0.05$).

Results: Nine children (16.6%) were lost to dropout throughout the 4-year follow-up period. The complete replacement rate was 18% (12.8% due to the secondary trauma, 3.9% due to the insufficient anatomical form and 1.3% due to loss of pulp vitality). The partial replacement rate was 28.3% (20.6% due to the slight marginal staining and 7.7% due to the mismatch in colour or shade). At the end of follow-up period only 53.7% restorations totally fulfilled the score 'Alfa' of the modified-USPHS criteria.

Conclusions: Despite improvements in mechanical properties of dental composite materials, the composite restorations of fractured anterior teeth should be considered as semi-permanent restorations.

PZ05.05**A clinical audit of avulsion injuries to permanent dentition at School Dental Service, Health Promotion Board**C. K. J. LEE¹, S. K. X. CHUA¹, L. Y. H. LEE¹, A. X. E. LIM¹, W. LIM² & H. J. TONG^{1,2}¹*Faculty of Dentistry, National University of Singapore, Singapore, Singapore;* ²*School Dental Service, Health Promotion Board, Singapore, Singapore***Background:** Avulsion is a serious dental emergency which demands prompt and appropriate management for favourable outcomes, and good documentation for medicolegal reasons.**Aims:** This retrospective study aimed to investigate the appropriateness of clinical documentation, compliance to IADT guidelines, and the success of treatment rendered for patients presenting with avulsion injuries at the School Dental Service, Health Promotion Board (SDS-HPB), Singapore.**Design:** Clinical records of 87 patients (109 teeth) who presented with avulsion injuries at SDS-HPB between January 2006 and July 2013 were reviewed. Radiographic and clinical information relating to the injuries were retrieved from the electronic dental records system and analysed. The quality of operators' records and compliance of treatment to IADT guidelines, as well as the outcome of each case were evaluated.**Results:** The quality of clinical records was generally poor, with information that was deemed essential at the presentation visit and subsequent appointments recorded only 48.3% and 63.1% of the time respectively. Adherence to IADT guidelines with regards to splinting duration, time to pulp extirpation, and follow-up was fairly low. Treatment was successful in 45.0% of teeth, while the rest demonstrated signs of initial or definitive failure. Treatment outcome was significantly associated with storage medium ($P = 0.034$), and appropriateness of time of pulp extirpation ($P = 0.037$). In addition, ankylosis was significantly associated with increased EODT > 30 min ($P = 0.005$).**Conclusion:** The findings of this study underscore the need for better clinical documentation. Furthermore, re-training of dentists and dental therapists on the IADT guidelines is imperative to ensure better compliance and improved outcomes.**PZ05.06****Multidisciplinary treatment approach in a complicated crown-root fracture**

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*Pediatric Dentistry, Hacettepe University Faculty of Dentistry, Ankara, Turkey***Introduction:** A complicated crown-root fracture involves enamel, dentin, cementum and results in pulp exposure. Depending on the severity of the injury, different treatment options can be applied.**Case report:** An 8 year-6-month old girl was referred to the Pediatric Dentistry clinic after a fall accident. The injury had resulted in crown fracture of maxillary right central incisor and also oblique crown-root fracture of maxillary left central incisor. The fracture line was extending subgingivally at the palatal aspect. The right central incisor was restored with composite resin at the same appointment. The coronal fragment was reattached to the left central incisor after completion of root canal treatment. Eight months later, the patient suffered another fall accident which led to the fracture of her maxillary left central incisor and loss of the coronal fragment. Orthodontic root extrusion was initiated with a modified Hawley appliance which also comprised elastic strings placed and tied around orthodontic buttons bonded to the labial surface of the fractured incisor. The treat-

ment was continued with gingivectomy and restoration of the tooth with etch-and-rinse adhesive and composite resin. The patient has been attending regular visits and the tooth has been in function for 4 years.

Comments: Orthodontic extrusion is a viable treatment option to restore function and esthetics of teeth with complicated crown-root fracture.**PZ05.07****A prospective clinical study of regenerative endodontic treatment of traumatised non-vital immature teeth**H. NAZZAL¹, K. KENNY², J. KANG³ & M. S. DUGGAL²¹*Paediatric Dentistry, University of Leeds, Leeds, UK;* ²*University of Leeds, Leeds, UK;* ³*Oral Biology, University of Leeds, Leeds, UK***Background:** Currently there is no consensus with regards to the use of regenerative endodontic technique (RET) in promoting root development in immature non-vital permanent teeth. Most of the available data is of low quality and conflicting results. It has been suggested that damage to the Hertwig's epithelial root sheath during trauma to some of these teeth could be a potential reason for these conflicting results hence the need for further assessment of the success of this technique in traumatised teeth.**Aim:** The aim of our study was to evaluate the treatment outcomes of RET in the management of traumatised non-vital immature teeth.**Design:** Following ethical approval, 15 healthy children (age range = 7–11 years, mean = 8.7 years) with traumatised non-vital immature upper incisors consented to take part in this study. Regenerative endodontic technique, using two antibiotics (ciprofloxacin and metronidazole), was used in treating these teeth with an average follow up of 9.9 months (range = 7–13 months). One operator undertook all treatments, clinical reviews and standardised radiographic exposures. Radiographs were analysed by two experienced clinicians.**Results:** Inter-operator measurement reliability was excellent (overall intra-class correlation = 0.974 (95% CI 0.955–0.986)). Wilcoxon signed ranks test found no statistical significant difference in root length, root dentinal wall thickness or apical foramen width between pre and post-operative radiographs ($P = 0.735, 1.000, 0.310$ respectively). Clinically 100% resolution of clinical signs and symptoms was found.**Conclusions:** Our data showed that teeth treated with RET did not demonstrate any continuation of root development, but complete healing was evident in all non-vital immature traumatised incisors.**PZ05.08****A case of invasion of alveolar bone into the root canal of an avulsed and replanted permanent incisor**

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*Department of Paediatric Dentistry, University of Leeds, Leeds, UK***Introduction:** An avulsed and replanted immature permanent tooth can undergo several healing responses. A rare one can be bony infill in the root canal of the immature tooth.**Case reports:** A 9-year-old boy sustained an avulsion injury to the UR1. The tooth was replanted and splinted after 2 ½ h with EADT of 30 min plus 2 h in milk. Four years later, further dento-alveolar trauma resulted in severe intrusion of UL1, which was surgically-repositioned and splinted.

Radiographic examination showed evidence of infection-related resorption of the UL1, which was anticipated. However, an incidental radiographic finding revealed the UR1 to have undergone

a rare type of pulpal healing, causing invasion of the alveolar bone into the immature root canal. This was characterised radiographically as an immature root with incomplete root development and an ingrowth of bone into the root canal, with presence of a lamina-dura and PDL space within the root canal. This finding was also captured clinically during a planned premolar autotransplant procedure, where a thin bony protrusion of bone was present in the UR2 socket, as well as in the extracted tooth's root canal.

Comments: Bony ingrowth into the pulp space has been reported rarely. This finding would first be diagnosed radiographically. Here we present both radiographic findings and the clinical findings on extraction of this tooth to confirm that the growth is indeed bone like tissue.

PZ05.09

Clinical outcomes and survival rates of transplanted permanent teeth in children

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Background: Congenital absence and loss of maxillary permanent incisors due to trauma in children is a clinical challenge concerning to the most appropriate treatment and prognosis. Literature has shown that tooth autotransplantation is a biologically accepted alternative treatment.

Aim: Assess the clinical and radiographic outcomes in terms of pulp - periodontal healing and root development in 43 transplanted permanent teeth.

Design: In a sample of 20 males and 11 females (11.51 years \pm 2.59 SD), 43 dental transplants were performed within 2004–2014. These were assessed through clinical and radiographic examination to verify pulp-periodontal healing and root development. Success criteria are pulp survival, pulp obliteration and normal periodontal healing. Failures corresponded to cases that developed replacement resorption or severe invasive cervical resorption. Fisher Exact Test and Kaplan-Meier analyses were performed to determine the association between the variables and estimation of survival rates, respectively.

Results: Thirty seven (86.0%) transplanted teeth were recorded as successful and six as unsuccessful (13.9%). During 10 years of follow-up (64.4 months \pm 43.3 SD), survival and success rates reached 97.6% and 83.9% respectively. Only one tooth was extracted and four teeth developed replacement resorption (9.3%). 79.1% of the teeth had incomplete root formation, which proved to be a significant variable in the success. The majority of immature transplanted teeth developed pulp obliteration (56%).

Conclusions: The findings from this study highlights the high success and survival rates of tooth transplantation. The low prevalence of complications confirm that tooth transplantation is a therapeutic option in growing patients.

PZ05.10

Development of a core outcome set for traumatic dental injuries

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Background: Core Outcome Sets (COS) are agreed and standardised collections of outcomes for use in clinical studies and trials. The reporting of core outcomes in published studies allows

researchers to compare, contrast and combine outcomes from different studies.

Aim: To develop a core outcome set for traumatic dental injuries (TDI) in children and adults.

Design: The project was registered with the COMET initiative. A web-based survey was developed to capture the opinions of dentists from around the world. Through multiple dental organisations, dentists were asked to complete the survey and identify what outcomes should be recorded. From this list, duplicates and those not meeting the criteria of an outcome were removed. This list was scored by an Expert Working Group (EWG), according to the GRADE method of achieving consensus. The scoring was undertaken twice, followed by conference calls to discuss and finalise the COS.

Results: 1476 dentists completed the online questionnaire. 1144 outcomes were identified; this was reduced to 287 following removal of duplicates and non outcomes. In keeping with COS best practice, outcomes were organised into six domains. The EWG then scored the outcomes twice. The scores were collated and discussed by the EWG via conference calls. Nine core outcomes to be recorded for all traumatic dental injuries were identified. An additional 17 outcomes specific to each injury type were identified.

Conclusions: A Core Outcome Set has been identified for Traumatic Dental Injuries. Further work is ongoing to detail how to measure these outcomes and when to measure them.

PZ05.11

Cone beam computed tomography assisted management of intruded maxillary primary incisors

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Introduction: The incidence of traumatic injuries to primary teeth varies from 11% to 30%; luxation constitutes 21% of such injuries (Senda et al Ref No 1&2). Intrusive luxation, one of the types of luxation injuries, is defined as dislocation of a tooth in an axial direction into the alveolar bone (Megha et al Ref no 5). It damages the periodontal ligament and fibres of the neurovascular bundle.

Case reports: A 4 year and 1 month old boy, with no health problems was referred to the Pediatric Dental Centre with the chief complaint of intruded upper front teeth. History revealed that he had a fall from the table and hit the floor. After the injury, he visited a nearby dentist who had advised an OPG and referred for the specialist opinion. The parents were concerned about the potential injury to the unerupted permanent incisors. Since all the four maxillary primary incisors were intruded, a Cone Beam Computed Tomography (CBCT) was advised to definitively rule out the possibility of permanent teeth injury. The CBCT images revealed the non involvement and absence of injury to the developing permanent incisors. Hence, parents were advised to wait for spontaneous re-eruption. The patient was followed up until the eruption of permanent incisors.

Comments: CBCT helped to definitively rule out the possibility of permanent teeth injury. Patient had uneventful eruption of permanent incisors after 27 months.

PZ05.12**Tales of a tooth monster**

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Introduction: Traumatic dental injuries affecting the primary dentition are associated with unusual, diverse and severe consequences in the permanent dentition. These sequelae are almost unpredictable and depend upon type & severity of trauma, direction of force and stage of development of the succedaneous tooth.

Case report: An 11 year old girl reported to out patient department with a chief complaint of swelling in upper front region of oral cavity. The medical history was non contributory with a reported trauma by tricycle handle at 2.5 years, leading to avulsed 51 and intruded 61 & 62. Clinical examination revealed an enlargement with palpable anomalous erupting 11. Radiographs exhibited an odontoma like malformation in 11 alongwith root dilaceration. Treatment plan comprising of surgical exposure and shaping of 11 with orthodontic alignment was formulated. However, she didn't report after initial preventive protocol, to turn up 2 years later with pain and swelling in the region. The radiographs now showed a periapical radiolucency in 11. A conservative endodontic management was done followed by diode Laser gingivoplasty

(Zolar 3W, Canada). Exposed monster tooth was 10 mm mesio-distally with an unusual Talon cusp. It was esthetically recon-toured using diamond burs and composite (Z250, 3M, USA). Patient is presently undergoing an orthodontic treatment.

Comments: Knowledge about its etiopathogenesis and outcomes is essential to design an effective treatment plan often requiring multi disciplinary interventions and a long term follow up. The use of newer technologies as Laser are highly beneficial for avoiding complex surgical procedures and motivating the patients.

PZ05.13**Management of crown-root-fractured permanent incisors by multidisciplinary approaches: a case series**

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Introduction: Crown-root fractures can be grouped into uncomplicated and complicated according to pulp involvement. The latter challenges dentists as different treatment options can be chosen, but with uncertain outcome. We present three cases of complicated crown-root-fractured teeth managed by different multidisciplinary approaches.

Cases reports: Case 1: A 10-year-old boy who suffered from crown-root fracture on right maxillary incisor was treated conservatively with stainless steel wire splinting for 3 months and then splinting ribbon was applied as alternative in the lingual side after removal of the stainless steel one.

Case 2: The crown fragment of a 12-year-old boy's incisor was fixed with semi-rigid splint and temporarily reattached with glass-ionomer cement. Endodontic therapy was performed through lingual access followed with a fiber post cementing.

Case 3: A 10-year-old boy was prescribed the same treatment protocol as case 2 at first, but periodontal tissue bleeding was uncontrollable when root canal preparation was carried out.

So we extracted both the coronal and the apical fragments and completed the endodontic therapy *in vitro*. The coronal fragment with a fiber post was bonded to the apical one, and then replanted to its original position and splinted for 1 month. Up to now, all the three cases work well for more than 2 years with no clinical symptoms and signs of foci radiographically.

Comments: So far, no consensus or conclusive evidence on the most appropriate treatment for crown-root fracture has been established. Further investigation with more cases is required to serve for clinical practice.

PZ05.14**Legal aspect updates in traumatology: an Italian overview**S. BERNARDI¹, S. CARUSO¹, L. DI FABIO¹, M. A. CONTINENZA¹, R. GATTO¹ & R. DOCIMO²¹*Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy;* ²*Department of Experimental Medicine and Surgery, University of Rome 'Tor Vergata', Rome, Italy*

Background: Dental traumatic injuries affect in most of the cases pediatric patients. This implies long terms consequences.

Aim: The aim is to evaluate the Italian legal aspect about these issues, which can considerably affect young patients.

Design: Italian legal recommendations have been examined (information among Italian National Dentists Association - INDA-, IADT, Italian National Health Department- INHD) from 2009 to 2014.

Results: The used protocols are those provided from the IADT, updated at 2012. In 2009, in a manual edited by INDA, Montagna et al. stated that tables and methods, which were used to quantify the damages in terms of money compensation, are not suitable. The submitted estimate should include therapies and future restorations needed to complete damages restorations. Anomalies, enamel defects, endodontic therapies are coefficients, which low the refunding. In special cases such as the damages to the permanent teeth, authors recommend to highlight the connection between the injury and the future damages and a timeestimation for long-term distance damage refund. In 2012, INHD published guidelines about dental traumatology, considering it a minor abuse sign. In 2014, in the new update guidelines, it is stated that the medical certificate used for refunding must be written during dental check-up, clearly and provided with all the necessary documentations.

Conclusions: Forensic dentistry plays an important role in dental trauma in young patients in order to obtain a good compensation as the burden of proof meets to the patients.

PZ05.15**Intentional implantation with 180 degrees rotation of complicated crown-root fractured incisor in an anxious child: a case report**

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Introduction: Complicated crown-root fractures are complex dental injuries which affect enamel, dentine, cementum and pulp. They typically present with an oblique fracture line which is supragingival on the facial aspect and subgingival on the palatal aspect. Treatment often involves multiple dental visits and multidisciplinary care. Treatment may not be achievable for patients with learning impairments or extreme dental anxiety. We describe a case of an anxious child with a complicated crown-root fracture who had comprehensive care under general anaesthetic by a paediatric dental team.

Case reports: An anxious, 8 year-old girl was referred for management of dental trauma. Clinical examination revealed a complicated crown-root fracture of tooth 11 with the coronal fragment in multiple parts. Treatment options included extraction, vital root submergence, exposure of fracture line by ortho-

dontic repositioning or periodontal surgery and surgical repositioning with or without rotation. The first treatment phase under general anaesthetic involved removal of the fractured coronal fragments revealing a palatal fracture extending 4 mm subgingivally. The tooth was removed, the root inspected for fractures, rotated 180 degrees and implanted, resulting in the fracture being 1 mm supragingival on the facial aspect. Splint application, pulp extirpation, placement of non-setting calcium hydroxide root canal dressing and glass ionomer restoration were completed. At a subsequent general anaesthetic 3 weeks later, the splint was removed, endodontics completed and the tooth restored with full coverage composite strip crown.

Comments: This approach has avoided extraction in an anxious child and resulted in an aesthetic, functional outcome which is maintaining bone and space.

PZ05.16

Conservative management of severely intruded permanent central incisors in an 8 year old patient

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Introduction: The current recommendation in the management of severely intruded permanent incisors i.e. >7 mm is surgical repositioning. In a young patient more conservative approaches with orthodontics may also be considered.

The proceeding is the conservative management of a male who suffered severe intrusion and dislocation injuries to the 11 and 21.

Case report: An 8 year old male patient was referred from hospital Emergency for management of dentoalveolar trauma following a fall at school.

Clinical examination revealed barely visible 11 and 21 and soft tissue trauma. Radiographs revealed open apices of upper central incisors with no root fractures. Fracture of the labial alveolar plate was noted.

After consultation with the Orthodontic and Oral Surgery departments, consideration was given to patient age, severity of the injury and the increased risks of ankylosis and loss of vitality with surgical repositioning. A very conservative treatment approach was taken with reduction of the fractured alveolar plate and monitoring for spontaneous re-eruption. Orthodontic intervention would be done if required.

At the 3, 6 month and 1 year reviews, re-eruption of 11 and 21, maintenance of vitality and continued root development were recorded. Unaided full re-eruption was observed after 2 years however radiographic pathology and inconsistent sensibility tests in the asymptomatic 11, 21 were found.

Comments: The eruptive potential of the immature permanent incisors and conservative approach resulted in a favourable aesthetic outcome for this patient. Nevertheless, loss of vitality albeit delayed still remains a risk in dental injuries of this nature.

Preventive Dentistry Poster Session – PR01

PR01.01

Infant oral health: the voice of the future

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Background: Early Childhood Caries has been found as one of the most common contagious disease in young children in the United States, and affects children Worldwide.

Prevention and early intervention combined with parental education has been shown to be a successful avenue to promote Oral health, especially in the early stages of life.

Design: A model of a successful integrated Infant Oral Health Clinic addressed for children aged 0–3 years old will be presented. The Academic component will also be discussed, as part of the Undergraduate and Graduate training programs, as well the Inter and Multidisciplinary approaches.

PR01.02

Is a caries risk assessment (CRA) protocol necessary to provide an effective caries preventive regime?

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Background: Clinical guidelines recommend an individual is given a caries risk status based on analysis of defined clinical and social criteria before implementing a tailored preventive plan.

Aims:

- 1) Improve documentation of CRA by a systems based approach to quality improvement methods.
- 2) Investigate the impact of quality improvement efforts on subsequent design and delivery of preventive care.
- 3) Identify barriers to delivery of CRA and provision of preventive care.

Design: Data for patients aged 0–16 years was collected over 2 cycles using standard audit methodology. The first cycle was a retrospective analysis ($n = 400$) using random sampling. The second cycle a prospective analysis ($n = 513$) using consecutive sampling over a 15 week period. Five staff meetings with feedback occurred between cycles.

Results: In cycle 1 no specific CRA system was identified. CRA wasn't stated widely, risk factors weren't analysed and there was variation with respect to the prescription and delivery of preventive strategies. These discrepancies were demonstrable for all the four participating dentists and at all ages. In cycle 2 100% recorded CRA. All risk factors were analysed and individual caries risk was correctly annotated. There was 100% compliance with the protocol for preventive plans.

Conclusions:

- 1) The use of CRA improved documentation of caries risk status.
- 2) This has improved subsequent prescription of age specific evidence based preventive care appropriate to the risk status of that individual.
- 3) Barriers were identified to the delivery of CRA and the provision of comprehensive preventive care by the dentists and other health care professionals.

PR01.03

Investigation and analysis of malocclusion in primary dentition of Shanghai

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Aim: The purpose of this study was to investigate and analyse the prevalence of malocclusion among children in primary dentition in the area of Shanghai. To provide theoretical basis for the establishment of children's oral health care measures.

Design: The investigation of occlusion in primary dentition on 2744 cases of children aged 3–6 of Shanghai was carried out by pediatric specialists.

Results: The prevalence of malocclusion in primary dentition in Shanghai was 69.64%, no significant difference was found in gender. All types of malocclusion symptoms were analysed, Deep overbite prevalence rate is highest (55.39%), followed by deep overjet (24.31%), dental crowding (21.25%), cross-bite (12.03%) and open-bite (7.22%). 35 percent of the patients with more than two kinds of malocclusion.

Conclusions: The prevalence of malocclusion in primary dentition and types of malocclusion symptoms in the area of Shanghai were obviously changed than before. A series of corresponding preventive measures needs to formulate to prevent the occurrence and development of malocclusion in primary dentition.

PR01.04

Comparison of Mineral density in molar incisor hypomineralisation applying fluoride varnishes and casein phosphopeptide-amorphous calcium phosphate (CPP-ACP)

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Background: Previous studies suggested a relationship between visual detection of defects and mineral density (MD) recorded with Laser Fluorescence (LF).

Aim: Compare MD subsequent to application of fluoride varnishes (FV) and CPP-ACP in hypomineralised teeth.

Design: 45 children aged 6–16 years seeking attention from 2013 to 2014 were evaluated. Subjects were divided into two groups according to year of attendance. G1 (2013) was comprised of 37 teeth clinically diagnosed as mild (A) and moderate (B) lesions with no structural loss and G2 (2014) of 33 teeth. They were assessed by DIAGNOdent (KaVo) by an operator. MD was measured on enamel surfaces with simultaneously creamy-white and yellow-brown opacities. Then, teeth received three applications of Duraphat® in G1 and of MI Pasterm in G2 and assessed with LF at 15, 30 and 45 days. Percentage differences in both groups were calculated for each observation with respect to the basal and compared using ANOVA.

Results: Mean value of MD in G1 and G2 in A was 18.57 ± 5.88 and 17.37 ± 7.22 and in B 56.88 ± 15.71 and 29.53 ± 17.85 . At 15 days for A: -7.09 ± 2.34 and -3.76 ± 2.41 and for B: -2.43 ± 2.94 and -1.87 ± 3.02 ; 30 days: A: -15.75 ± 2.74 and -7.86 ± 2.82 and B: -31.2 ± 3.18 and -7.56 ± 3.27 ; and 45 days: A: -18.91 ± 3.11 and -9.12 ± 3.2 and B: -36.17 ± 3.21

and -4.72 ± 3.31 in G1 and G2 respectively. Comparison of estimated marginal means showed that the effect Time and Enamel was greater than with FV than with CPP-ACP ($P < 0.001$).

Conclusion: In this sample, loss of mineral density after the application of CPP-ACP showed a smaller reduction in the magnitude of the effect than that revealed by fluoride varnishes.

PR01.05

The prevalence and risk factors of tooth wear in Chinese adolescents

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Background: Tooth wear has been investigated in numerous countries and the prevalence is various. But the data of tooth wear in China is scarce.

Aim: The aim of this study was to describe the prevalence of tooth wear and to investigate the relative factors associated with tooth wear in Chinese adolescents.

Methods: A cross-sectional descriptive study was done among 720 adolescents in Hubei Province, Central China. The age groups of this study were 12 and 15 years old, each group including 360 participants, of whom the female and the male was 50% respectively. A modified version of the tooth wear index BEWE was recorded on buccal, cervical, occlusal/incisal and lingual faces of all the teeth on the 720 adolescents. Every participant was asked to answer a questionnaire containing 32 questions about their current and historical dietary habits and oral hygiene.

Results: The prevalence of tooth wear was 18.6% and 89.4% respectively in 12 and 15 years old adolescents. The prevalence rates of dentine exposure were 1.94% and 5.56% respectively. Several factors such as drinking soft drinks and fruit juices immediately after sport, taking aspirin, reflux, unilateral chewing, tooth brushing once or less daily, duration of brushing < 2 min and swimming in summer were found to be associated with tooth wear.

Conclusions: Tooth wear in Chinese adolescents is a significant problem and should receive more attention. The prevalence of tooth wear is associated with socio-behavioral risk factors.

PR01.06

Effectiveness of 0.5% epigallocatechin gallate in comparison to 0.12% chlorhexidine mouthwash in reduction of plaque and gingivitis in children

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Background: There is an increased public attention for use of natural products in daily oral care. Epigallocatechin gallate from green tea was reported to be effective in treatment of gingival inflammation.

Aim of this study was to compare effectiveness of epigallocatechin gallate and chlorhexidine gluconate mouthwash in reduction of plaque and gingivitis.

Design: A randomized blinded controlled trial with 50 healthy 12 years old children was carried out. The subjects were randomly assigned to two groups of 25 subjects per group.

Group A (control) was given 0.12% chlorhexidine gluconate and

Group B (experimental) was given 0.5% epigallocatechin-3-gallate (EGCG) mouthwash.

Children rinsed for 1 min, under supervision, during 2 weeks of school based rinsing program. Plaque accumulation and gingival condition were recorded using Turesky modification of the Quigley-Hein plaque index and Gingival index. Plaque and gingival scores were recorded at baseline and after 2 weeks period.

Results: Plaque scores were compared and the difference between epigallocatechin gallate and chlorhexidine mouthwash was determined by *t*-test. Plaque and gingival scores were significantly reduced ($P < 0.05$) in both groups after 2 weeks period. No significant difference in plaque and gingival score between the groups were obtained. Mouthwash containing 0.5% epigallocatechin gallate had similar efficacy compared to 0.12% chlorhexidine.

Conclusions: This study supports the effectiveness of mouthwash containing green tea epigallocatechin gallate in plaque reduction and control of gingival inflammation. It should be explored as a natural, long-term antiplaque rinse, suitable for school based rinsing programs.

PR01.07

'In vitro' dissolution of tooth enamel due to frequently consumed beverages: preliminary study

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Aim: To evaluate 'in vitro' enamel dissolution with regular and diet non-alcoholic beverages.

Design: Twenty-four healthy premolars were used. They were sectioned into two blocks (buccal and lingual) using a high speed steel under constant cooling. Each block was weighed using a Model A5200 OHAUS. Regular Coca Cola[®], light Coca Cola[®], Gatorade[®], Cepita[®] orange juice were used. Following determination of beverage pH, 10 blocks were exposed to each beverage. Control blocks (8) were exposed to distilled water. The blocks were weighed at 1, 8 and 15 days post-exposure, and were immersed in a fresh sample of the corresponding beverage after each determination. Statistical analysis: Results were analyzed using repeated measures ANOVA and Dunnett's *post hoc* test.

Results: No differences were observed between baseline weight and weight at the first determination. The difference between the second and third determination was recorded as mg of weight loss and compared to that of blocks exposed to water. Significant differences were observed between sections immersed in water and those exposed to Gatorade[®] (29 mg difference) ($P < 0.001$), and to Cepita[®] (26 mg difference) ($P < 0.001$). No significant differences were found between blocks exposed to water and those immersed in regular Coca Cola[®] (14 mg) or light Coca Cola[®] (11 mg) ($P < 0.001$).

Conclusions: At similar time points and pH, the beverages showed different behavior; this may be attributed to the composition of each drink. The data presented here indicate that the analyzed beverages may cause enamel dissolution in the long term.

PR01.08

Monitoring levels of preventive care: 7 year results

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Background: Dental caries continues to affect 32% of 5 year-olds in Scotland.¹ The caries assessment risk evaluation (CARE) project started in the paediatric department in Glasgow Dental Hos-

pital & School in 2008.² Clinical audit was used to monitor the impact of CARE on prevention delivered. Cycle 1 in 2007, Cycle 2 in 2010 and the 3rd cycle using this audit project in 2014.³

Aim: 1. Determine the current rates of caries risk assessment (CRA) documentation.

2. Compare current standards of prevention packages with 2007 and 2010 audit cycles.

Standards: 80% of records to have CRA documented within past 12 months and preventive plans documented and undertaken according to CRA.

Design: Random selection of 100 records from all children/clinics within the department at GDH & S from March 2013 to March 2014. A data collection spreadsheet (Excel) was used to record CRA documentation and Prevention plan documentation (as per standards). The results were compared with previous cycles.

Results: From 2007 (92 case records) 2010 (94 case records) and 2013/14 (100 case records) the following results were found (respectively):- CRA 0%, 66%, 50%, toothbrushing instruction 9%, 48%, 54%, toothpaste strength advice 10%, 52%, 53%, dietary advice 10%, 54%, 55%, fluoride varnish application (FVA) 3%, 44%, 59%, fissure sealants 94%, 86%, 84%.

Conclusion: CRA recording and prevention packages do not yet meet the set standards. Further action is required to ensure ALL children attending receive targeted preventive care. The FVA project presently in use GDH & S continues to improve application rates.

PR01.09

Er:YAG laser-A magical wand for cavity free childhood

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Background: Laser irradiation and fluoride has been used as a preventive measure to combat dental caries both in permanent and primary teeth but little has been done to compare their effect among both the dentition.

Aim: The aim of this study was to evaluate the effect of Er:YAG laser application with and without fluoride on the acid resistance of primary and permanent tooth enamel.

Study design: An *in-vitro* randomized-controlled trial was carried out in 80 enamel blocks of sound teeth and were allocated to four groups of 20 teeth (10 primary and 10 permanent teeth) each - Group 1 (No treatment), Group 2 (Laser only), Group 3 (Fluoride only) and Group 4 (Laser + Fluoride). Thereafter, pH cycling was done for 9 days and the enamel blocks were sectioned. The samples were subjected to assessment of surface microhardness in terms of Vickers Hardness and surface morphological changes were observed using SEM. Data obtained was analyzed using ANOVA.

Results: SEM for primary teeth showed higher proportion of melting without any crater formation and surface irregularities thereby significant increase in microhardness with the maximum VHN of 372.40 while permanent teeth showed marked demineralization with crater and crack formation and reduced microhardness with the minimum VHN of 187.

Conclusion: Er:YAG laser irradiation combined with APF treatment of the primary tooth enamel gave morphologically hardened enamel surface than the permanent teeth which can be a protective barrier against a cariogenic attack.

PR01.10

Oral health preventive program for visually impaired children: Indian experience

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Background: Visually impaired children have been reported to have a high prevalence of gingival diseases, dental caries and dental trauma. Conventional methods of teaching oral hygiene for removal of dental plaque involves use of visual perception by using disclosing agents which is not practically feasible for visually impaired children, who depend mostly on their tactile and hearing sensations for learning.

Aim: This Study was carried out to compare and evaluate two specially designed educational and motivational techniques of implementing oral health education program in visually impaired children.

Design: The study was carried out on 148 institutionalised visually impaired children wherein the efficacy of specially designed oral health education program using two different motivational techniques was evaluated utilizing their tactile (Braille + plastic models) and audio sensations (Audio story + JAWS -Job Access With Speech), over a period of 6 months by evaluating the change in KAP regarding oral health practices, dental plaque and gingival scores.

Results: Brushing frequency of twice daily increased in both the groups (Group I 35% to 87.8%, Group II 47.3% to 98.6%, $P = 0.02$). Significant improvement in mean plaque scores (Group I = 1.34 ± 0.29 to 1.04 ± 0.31 , $P = 0.00$, Group II = 1.24 ± 0.47 to 1.10 ± 0.17 , $P = 0.01$) was evident at 6 months evaluation in both the groups. Similar significant improvement was evident in gingival scores thus demonstrating the effectiveness of the two motivational techniques.

Conclusions: The study emphasizes the need and importance of implementing specially framed oral health education program in institutes for visually impaired.

PR01.11

Impact of Nigerian parents / caregivers oral health knowledge, attitude and practices on the oral health of their children

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Aim: To investigate whether the oral health knowledge, attitude and practices of Nigerian parents/ caregivers, had influence on the oral health status of their children.

Study design: An analytical cross sectional study was used.

Methods: Parents/caregiver of children aged 1–12 years, in Ife central Local Government Osun State, Nigeria with different occupation, and educational level participated in the study. A 27 stem questionnaire on socio-demographic, knowledge, attitude and practices regarding oral health were administered.

Result: A total of 113 parents/caregivers participated in this study. About 79 (69.9%) of the participants had never attended the dentist while 34 (30.1%) gave a positive response, with toothache 10 (8.8%) being the major complaint followed by routine check-up 8 (7.1%). Sixty five (57.5%) reported once daily brushing, and 66 (58.4%) used soft bristled textured tooth brush with fluoridated tooth paste. Fifty five (48.7%) reported they change their toothbrush once the bristles worn out, with more significant values

($\chi^2 = 0.027$, $P = 0.01$) found in adults above 30 year old. Many parents (4 4.2%) with tertiary level of education did not know the ideal age for a child's first dental visit and this was statistically significant ($P = 0.04$).

Conclusion: The knowledge of Nigerian parents / caregivers on oral health were inadequate, and this had negative impact on the oral health status of their children. There is need for dental health education amongst Nigerian parents to update their knowledge and promote oral health in the community.

PR01.12

Factors associated with prevalence of the recurrent dental caries after 12 months treatment under general anaesthesia

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Background: There is no data in the dental literature concerning the risk factors of the recurrent dental caries performed in young children with early childhood caries under general anaesthesia (GA).

Aim: The aim of this cross-sectional study was to determine the risk factors associated with the prevalence of the recurrent dental caries in Taiwan pre-schoolchildren after 12-months treatment under G.A.

Design: Eighty-three children, mean age 48.80 months were treated under GA and re-examined 12 months after completion of treatment. A 1-year prospective study on 83 schoolchildren, smaller than 6 years old, was conducted. At baseline, data on general health, diet, oral hygiene and salivary analyses were obtained. Deft and defs were calculated from records. Re-examination for caries was done after 1 year. The children were divided into four groups according to the assessed caries risk at baseline. The correlation between associated factors and dental caries prevalence was analyzed using chi-square test and multiple logistic regression analysis.

Results: The percentage of recurrent dental caries schoolchildren was 80% and the mean deft was 2.54 ± 2.53 (mean \pm SD). The caregivers thought that the main reason for tooth decay was brush, the MS count and CRA were strongly associated with caries experience ($P < 0.05$).

Conclusions: This study indicated that these variables are risk factors associated with recurrent dental caries experience in a community of Taiwan pre-schoolchildren after 12-months treatment under G.A. The Cariogram predicted caries increment in this particular population accurately than any included single-factor model.

PR01.13

What are the chances for the development of caries without prevention programs?

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Aim: The aim of this study was to obtain information on increase of: number of caries lesions and treatment needs of children with primary dentition due to lack of preventive program for pre-school children. This results will be used as start point for planning future preventive measures in Primorsko - Goranska County, Croatia.

Methods: Total of 2934 preschool children (1502 boys and 1432 girls) aged 3–7 years were surveyed. Each child was clinically

examined by calibrated examiners. Dental caries was assessed using diagnostic criteria recommended by WHO. Inclusion criteria was presence of completed primary dentition. Treatment need was assessed using RI index (d/dft ratio) that shows how many of all teeth that require treatment were treated.

Results: The dft scores (mean \pm) were 0.84 (\pm 2.18); 2.42 (\pm 3.59); 3.01 (\pm 3.67); 3.34 (\pm 3.93) and 4.37 (\pm 4.13); for 3, 4, 5, 6 and 7 years old respectively. RI index scores were: 0.04; 0.17; 0.19 and 0.23; 0.25 for 3, 4, 5, 6 and 7 years old respectively.

Conclusions: The mean dft value and the treatment needs increase with age. The conclusion that the dental care for primary teeth is neglected it can be drawn from this results. It also can be concluded that in our region, which is currently without adequate prevention program for preschool children, exist conditions in which child has a good chance to develop more and more carious lesions over the years.

Thus, implementation of quality prevention program and motivation for dental care through it is a high priority.

PR01.14

Assessment of an oral health education programme (OHEP) for pregnant women attending at St. Thomas' Hospital

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Background: Promoting oral health is important for the wellbeing of pregnant women and it appears to benefit the oral health of their expected child. In some instances, Dentists have consolidated teams with Midwives to reach for this population, but none in the UK.

Aim: To find out the acceptability of an OHEP and its improvement on the oral health knowledge of pregnant women.

Design: An educational programme was developed for pregnant women attending an antenatal workshop at St Thomas' Hospital focusing on preventing early childhood caries of their expected child. It consisted of questionnaires, a short presentation, and a telephone interview. A trial of this programme was carried out involving Community Midwives and pregnant women attending the workshop to assess the design and acceptability of the study, via a self-reported questionnaire. Demographic and qualitative data were obtained.

Results: The trial involved 30 participants. The majority of which were satisfied with all the proposed intervention elements: 71.4% of Midwives and 92.9% of pregnant women reported that the questionnaires were relevant and easy to understand; 81.8% of Midwives and 92.3% of pregnant women agreed that the presentation was informative; 90% of Midwives and 84.6% of pregnant women agreed with the follow-up of pregnant women's knowledge. Research Ethics Committee approval was granted (REC reference: 14/YH/1239).

Conclusions: Based on the feedback received from the participants, improvements were made on the OHEP. The educational programme is ready to be delivered to pregnant women attending an antenatal workshop at St Thomas' Hospital.

PR01.15

Early childhood caries prevention: a survey on knowledge, attitude and practices among pediatricians, general and pediatric dentists in Taiwan

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Background: To date, there has been increasing interest to incorporate physicians in preventing early childhood caries, considering young children's better access to medical care in their first years of lives.

Aim: To evaluate physicians' and dentists' knowledge and practices on children's oral health and attitudes towards implantation of medical setting based prevention in Taiwan.

Design: A cross-sectional, self-administered survey was conducted among 194 dentists and 31 pediatricians currently practicing in Taiwan.

Results: The mean knowledge score of pediatric dentists were higher than those of general dentists and pediatricians ($P < 0.05$). More than 80% of the respondents agreed that physicians can play important role in preventing dental caries in children. For the medical setting based preventive intervention, the proportion of dentists who agreed physicians can apply fluoride varnish was significantly lower: 16.4% of pediatric and 34.3% of general dentists despite of 54.8% of pediatricians who agreed to perform the task. Potential barriers affecting this opinion of dentists include, physicians are not confident to identify dental caries, patients are too young and uncooperative in medical office, physicians may not have time for oral screening and caries risk assessment ($P < 0.05$). 90% of the pediatricians were strongly willing to inquire about bottle usage, tooth brushing and referral to dentist during children's visits. Pediatricians with higher knowledge score were significantly more willing to carry out oral health-related practices.

Conclusion: Although the majority of pediatricians reported willingness to include preventive interventions in children's visits, a lack of dental knowledge and confidence appear to pose barriers.

PR01.16

The effect of matrix metalloproteinases (MMPs) inhibitor on caries progression in ratsD. YANG¹, J. XUN², C. MIAO², J. LI² & L. GE²*¹Department of Pediatric Dentistry, Capital Medical University School of Stomatology, Beijing, China; ²Capital Medical University School of Stomatology, Beijing, China*

Background: The process of caries involves demineralization and degradation of organic matrix. Studies revealed that matrix metalloproteinases(MMPs) may cause the degradation of organic matrix in caries.

Aim: Observe the effect of MMPs inhibitor on caries progression in rats.

Design: Sixty-five SD rats were divided into three groups. Experimental group (CMT-3G, 25 rats) was inoculated with *Streptococcus mutans*, fed with keys 2000 and applied MMPs inhibitor CMT-3 on surface of mandibular molars. Positive control group (C Group, 25 rats) were inoculated with *Streptococcus mutans* and fed with keys 2000. Blank control group (BG, 15 rats) were fed with standard rats diet. Rats were put to death after 10 weeks. Caries decay and Keyes score of mandibular molars of each rat was detected and calculated.

Results: No caries was detected in BG. Incidence of caries were 75.0% and 83.3%, while incidence of dentine caries were 33.3% and 70.8% in CMT-3G and CG respectively. There no significant

difference was found in incidence of caries between two groups, but incidence of dentine caries of CMT-3G was significant less than CG ($P < 0.01$). Mean Keyes score of enamel was 3.67 ± 3.11 and 5.75 ± 4.65 in CMT-3G and CG respectively. There was no significant difference between two groups. Mean Keyes score of dentine was 1.25 ± 2.31 and 3.08 ± 3.75 in CMT-3G and CG respectively, CMT-3G was great lower than CG ($P < 0.05$).

Conclusion: MMPs inhibitor CMT-3 has no effect on incidence of caries, but might inhibit the progress of dentine caries.

PR01.17

Comparison of the newer preventive therapies on remineralisation of enamel *in vitro*

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Background: A range of new agents based on milk products have been developed to enhance the remineralisation of early enamel carious lesions such as CPP-ACP.

Aim: To investigate *in vitro* the effect of CPP-ACP containing products (Tooth Mousse (TM), MI Paste Plus (MIplus)) in the remineralisation of enamel subsurface lesions when used supplementary to fluoridated toothpastes (FTP) and to compare these to the effect of 0 ppm, 1450 ppm and 2800 ppm FTP.

Design: Enamel subsurface lesions were created in bovine enamel slabs ($N = 120$) which were assigned randomly to five groups; 0 ppm FTP, 1450 ppm FTP, 2800 ppm FTP, 1450 ppm FTP + TM and 1450 ppm FTP + MIplus. The enamel slabs were subjected to a pH cycling regimen for 21 days. QLF images were taken before and after treatment and were analysed. Data analysis was carried out using one way ANOVA.

Results: In all groups, both ΔF and ΔQ values improved significantly within the same group after the treatment. In addition, the mean difference in ΔF of 0 ppm FTP was significantly lower than the mean difference in ΔF of 1450 ppm FTP, 1450 ppm FTP + TM and 1450 ppm FTP + MIplus but not 2800 ppm FTP. Also, the mean difference in ΔQ of 0 ppm FTP was significantly lower when compared with all other groups ($P < 0.05$).

Conclusions: The use of TM and MIplus in conjunction with 1450 ppm FTP showed some increased efficacy in the remineralisation of enamel subsurface lesions; however this did not reach a significant level.

PR01.18

Children's access to oral health care in Nigeria: the role of paediatriciansO. O. ORENUGA^{1,2}, O. O. SOFOLA^{3,4}, E. N. EKURE^{5,6} & C. I. ESEZOBOR^{5,6}*¹Child Dental Health, University of Lagos, Lagos, Nigeria; ²Child Dental Health, Lagos University Teaching Hospital, Lagos, Nigeria; ³Preventive Dentistry, University of Lagos, Lagos, Nigeria; ⁴Preventive Dentistry, Lagos University Teaching Hospital, Lagos, Nigeria; ⁵Paediatrics, University of Lagos, Lagos, Nigeria; ⁶Paediatrics, Lagos University Teaching Hospital, Lagos, Nigeria*

Background: Access to professional oral health care in Nigeria as in most underserved populations in developing countries is poor. This may be attributed to various reasons: low professional manpower and inequitable distribution of oral health facilities.

Aim: Assessment of the knowledge and practices of paediatricians regarding oral health screening and counselling and to determine

their willingness to incorporate preventive oral health care in their routine well child visit.

Design: Cross sectional self-administered questionnaire survey of doctors attending an annual paediatric conference in Nigeria was conducted to assess their knowledge of dental caries and gingivitis as well as their current experiences with oral diseases in their practice. The questionnaire also assessed their current practice of and willingness to include oral disease screening in their consultation.

Results: One hundred and sixteen questionnaires were distributed, 71 responded (61.2% response rate). Respondents were spread through 19 of 36 states in Nigeria giving coverage of 52.8%. More than half (56.6%) reported seeing dental complaints at least once a month in their practice. Forty-seven (66.2%) currently carry out 'well child care' however this does not involve anticipatory guidance and counselling on oral health. Nearly all respondents were willing to screen for oral diseases but a busy practice and lack of knowledge of what to look for were identified as obstacles. A short rotation in child oral health would also be beneficial.

Conclusion: Paediatricians in Nigeria have a huge potential to improve preventive oral health of Nigerian children with a reorientation of their services if properly harnessed.

PR01.19

Bonding ability of novel pit and fissure sealant system containing S-PRG filler

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Background: Fissure sealant has been widely used as an effective method to prevent occlusal surface caries in primary and immature permanent teeth. However, pretreatment with phosphoric acid etchant demineralizes sound enamel, which becomes susceptible to caries.

Aim: This study aimed to evaluate bonding ability to enamel using a novel S-PRG filler containing pit&fissure sealant system combined with a novel non-phosphoric acid conditioner, compared to a phosphoric acid etchant.

Design: Materials used were a novel conditioner, a 33%phosphoric acid etchant, and a novel sealant system (BeautiSealant) consisting of self-etching primer and ion-releasing S-PRG filler containing sealant. Bovine enamel surfaces polished with 600-grit paper were treated with

- 1) Primer,
- 2) Conditioner,
- 3) Etchant, or
- 4) Conditioner + primer.

A mold (diameter: 4 mm) was fitted onto each treated surface, filled with sealant, and light-cured to obtain specimens. After 2000 thermal cycles (5°C/60°C), specimens were subjected to shear bond strength (Initial SBS = i, Durable SBS = d) testing. The data were analysed using ANOVA, Tukey test ($P < 0.05$).

Results: Self-etching method ((1) primer-treatment i: 17.7 MPa, d: 18.6 MPa) showed higher SBS than Total-etching method ((2) conditioner-treatment i: 12.8 MPa, d: 12.0 MPa (3) etchant-treatment i: 16.7 MPa, d: 14.9 MPa). (3) Etchant-treatment showed higher SBS than (2) Conditioner-treatment. However, (2) conditioner-treatment showed little SBS decrease after thermal-cycling, suggesting good bonding durability. (4) Combined method (i: 20.1 MPa, d: 23.6 MPa) using (2) Conditioner followed by (1) Primer exhibited the highest increase in SBS.

Conclusions: Unlike the conventional surface treatment with phosphoric acid etchant, the method using conditioner did not

excessively demineralize tooth structure while exhibiting excellent bonding durability. The combined use of the novel conditioner and the standard BeautiSealant method was expected to stabilize bonding ability.

PR01.20

Motivational interview, a useful strategy in preventive dentistry when used with mapuche paediatric patients

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Introduction: Prevention is key in paediatric dentistry, but it often becomes a small complement of the clinical treatment and a peace-of-mind exercise for the practitioner. One of the reasons for this is the difficulty for changing the lifestyle of the patients, since many of the good habits on oral health promoted by the dentist implicate changing routines at home. To reduce the caries risk, the practitioner needs to communicate/interact with the patient with the objective of encouraging the patient to engage in self-care behaviours. Motivational Interviewing (MI) is an individual-centred counselling method that uses an empathic, collaborative style to build on patients' own reasons for change.

Case reports: Five patients aged 5–9 from mapuche ethnicity attending the clinics of Universidad Mayor in Temuco, Chile, were chosen to be interviewed by a trained 5th year student using MI concepts. Four principles of the MI technique were preserved during the first two visits, before the beginning of the clinical treatment:

- 1) expression of empathy,
- 2) facilitation of the individual's formulation of arguments for changing
- 3) progressing through the resistance and
- 4) supporting self-efficacy.

Compliance with dental treatment, reduction of plaque indexes, reported satisfaction and reported change in high-caries-risk habits were improved when compared to similar patients undergoing normal protocol interviewing. Two of the five patients did not attend to the first clinical control.

Comments: MI technique can be used by dentists, improving the risk factors associated with lifestyle and, as in these cases, contribute to a better practitioner/patient understanding.

PR01.21

Effect of short-term probiotic yogurt consumption on caries risk factors in infants

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Background: Probiotics provide several advantages to both general and oral health.

Aim: To evaluate the effect of short-term probiotic yogurt consumption on buffering capacity and Streptococcus mutans, Lactobacilli, secretory IgA levels of saliva in 6–8 months old infants.

Design: Twenty healthy 6–8 month old infants and their mothers were enrolled in the study. They were randomly allocated into two groups as study and control. In the study group, probiotic yoghurt (Bifidobacterium Longum BB536, Bifidobacterium Bifidum Bb12, Lactobacillus RhamnosusHN001) was given to infants as morning snack for 3 weeks whereas in the control group home made yoghurt was consumed.

Saliva samples were collected by the help of sterile cotton rolls at baseline and at the end of 3 weeks.

A dental saliva pH-Indicator strip (GC, Japan) was used for salivary pH measurements. CRT Buffer (Ivoclar, Vivadent) strips

were used for obtaining buffering capacity of saliva. CRT Bacteria (Ivoclar-Vivadent) kit was used for bacteriological examination. Enzyme-Linked Immuno-Sorbent Assay (ELISA) (IBL International GMBH, Hamburg, Germany) was used for the measurement of salivary secretory IgA. Scores at baseline and 3 weeks after were statistically evaluated by Wilcoxon test.

Results: Salivary pH, Ig A, Streptococcus mutans and lactobacilli values showed no significant change after 3 weeks of probiotic yogurt consumption however there was a statistically significant increase in the buffering capacity of saliva ($P = 0.04$).

Conclusion: Within the limitations of this study, improvement in buffering capacity is worth gaining attention and the role of probiotic consumption on oral health will be of interest for future research.

PR01.22

Can a pacifier act as a reservoir for bacterial contamination of teeth in young children? A pilot study

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Introduction: Extent and type of bacterial colonization of primary teeth are important factors associated with caries experience in young children. The work presented here aimed to evaluate microbial load and composition on a pacifier used by a young child and to compare this with that retrieved in different oral niches in both child and parent.

Case reports: In a 3-year old boy attending the pediatric dental clinic of the University Hospitals Leuven, microbial samples were taken from both outer and inner surface (after cutting with sterile bistouri) of his pacifier. In addition, samples were taken from saliva, plaque and tongue coating using standardized procedures in both the child and his parent. Samples were plated on blood agar (aerobic and anaerobic conditions), TYCSB (*S. mutans*, SM) and Rogosa agar (lactobacilli, LB).

Results: The outer surface of the pacifier was colonized by aerobic and anaerobic species ($5.96E+03$ and $6.56E+03$) and SM ($1.24E+03$). A similar pattern was seen at the inner surface, but with lower counts ($3.20E+02$, $3.20E+02$ and $2.00E+01$). The saliva, plaque and tongue showed high numbers of bacteria, with massive counts of SM in plaque. The parent showed a comparable picture but with lower SM counts in plaque ($3.62E+04$).

Comment: Analyses presented here demonstrate the presence of a considerable microbial load on the pacifier, reflecting the microbial composition in other oral niches. The fact that bacteria were also present on the inner surface might indicate that the pacifier can act as a reservoir for continuous (re)contamination possibly withstanding standard hygiene protocols.

PR01.23

The effects of ozone therapy on clinical success of fissure sealant application

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Background: Ozone therapy can be used due to its oxidative and antimicrobial effect in fissure sealant applications in pediatric dentistry.

Aim: The aim of this study was to evaluate the effects of ozone therapy on clinical success of Clinpro™Sealant and Teethmate F-1 fissure sealants.

Design: In this study, a total of 166 children (89 boys, 77 girls) with sound mandibular first permanent molars, aged 9–12 years, were selected and divided into three groups. In Group-1 (52 children), either Clinpro™Sealant or Teethmate F-1 were applied randomly to 104 first permanent molars. In Group-2 (56 children), Clinpro™Sealant was applied to 122 teeth with or without ozone therapy. In Group-3 (58 children), Teethmate F-1 was applied to 116 first permanent molars with or without ozone therapy. The children were recalled for clinical examinations at 3, 6, 12 and 18 month. USPHS criteria were used for follow up examinations. Statistical analysis was performed by using Chi-square and Fisher's exact tests.

Results: In Group-1, there was a significant difference between Clinpro™Sealant with 82.7% success and Teethmate F-1 showing 63.4% success at the end of 18-month follow-up ($P < 0.05$).

In group-2 and group-3, although there was no significant difference ($P > 0.05$), general success was higher in the ozone subgroups (Group-2: 83.9%, Group-3: 70.7%).

Conclusions: The results of this study indicated that Clinpro™Sealant's clinical success rate was higher compared to Teethmate F-1, on the other hand it was observed that ozone therapy did not show a statistically significant difference ($P < 0.05$).

PR01.24

The survey on deciduous dental caries for young children in Nanjing

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Background: Deciduous dental caries not only affected children's oral health but also detrimental to the systemic health. Recent years pediatric dental patients in the hospital increased more and more.

Aim: The purpose of this report was to obtain data about the prevalence of deciduous dental caries of young children in Nanjing city.

Design: According to the criteria by WHO's 'Oral Health Surveys Basic Methods', 4th. A sample of 612 young children 3 and 5-years-old who were from eight kindergartens in Nanjing, China, which were sampled with a stratified cluster sampling procedure and divided to four equal groups by the gender and the age. Between the prevalence of different gender groups used by Chi-square and dmft, dmfs score by T-test with SPSS 11.5 for windows.

Results: The trends of deciduous teeth caries increased significantly with the growing of age, at the age of 3 and 5-year groups were 33.33% in girls, 30.72% in boys and 66.45% in girls, 68.42% in boys respectively. The mean number score of dmft, at the age of 3 and 5-years-old groups were 1.46 ± 2.52 in girls, 1.18 ± 2.11 in boys and 3.03 ± 5.70 in girls, 2.84 ± 5.18 in boys respectively. When compared between boys and girls, the prevalence of deciduous dental caries and the mean number score of dmft in each group, there were no significant differences $P > 0.05$.

Conclusions: The survey data show that should arouse dentists, parents of children more attention, therefore it is very necessary that early detect deciduous dental caries and take effective measures of preventive and treatments.

PR01.25

The rate of retention of fissure sealants in the paediatric dentistry clinic

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Background: Pits and fissures are generally recognized as highly susceptible for caries and least likely to benefit from systemic or topical fluoride. Fissure sealant (FS) is a material that is placed in the pits and fissures and early (non-cavitated) carious lesions of teeth in order to prevent or arrest the development of dental caries by providing a physical barrier that inhibits microorganisms and food particles from collecting in pits and fissures. Indications for the placement of FS are documented in the literature.

Aim: The aim of this audit was to identify the rate of sealant retention in the paediatric dentistry clinic in an effort to improve the quality of preventive and therapeutic oral health care provided in the clinic.

Design: Random retrospective case note study for sealants placed in the clinic for a period of 6 months or longer using the electronic patient file. The results were analysed using Simple descriptive statistic.

Results: In the 49 teeth selected: 93.4% of the FS were retained, 96% of the FS were performed in the clinic, 98% of the FS were performed under isolation of cotton rolls and 6.6% of the FS were partially or totally lost. The patients with partially or totally lost FS were not regular clinic attendees.

Conclusions: The findings from the audit highlighted the high quality standards of practice in the paediatric clinic. A second cycle of the audit will be conducted with new residents to assure maintenance of these standards.

PR01.26

Assessment of acidic beverages consumption habits in sports children

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Background: In recent times the popularity and ease of availability of sports and other soft drinks among young children has raised many questions over their health impact. There is limited data on their consumption and effect on oral health in India.

Aim: To assess consumption pattern of sports drinks, sugar sweetened beverages and aerated soft drinks and assess the prevalence of dental erosion among sports children in New Delhi, India.

Design: A cross-sectional study was carried out to assess the prevalence of sports drinks and soft drinks consumption habits among children playing organized sports in New Delhi. This study included 300 children aged 6–18 years attending various sports training programs in New Delhi. A close-ended structured questionnaire was exclusively developed to evaluate consumption patterns of sports drinks and soft drinks and attitude among young athletes with intraoral examination.

Results: Prevalence of dental erosion was high among children who consumed sports drinks and soft drinks and was statistically significant ($P < 0.05$). Significant number of children involved in sports thought that sports drinks are good for oral health, and also, consumed it at least once a day.

Conclusions: The findings from the present study highlight that knowledge about sports drinks is inadequate, emphasizing urgent need for preventive and promotive programs for children, coaches and parents in New Delhi, India. Acidic sports and soft drinks can cause dental erosion and young athletes are prone,

but unaware of the long term oral health risks of consuming these beverages.

PR01.27

Mother's knowledge about early childhood caries in Chilean children from low socioeconomic status

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Background: Early childhood caries (ECC) is a major public health problem, being the most common chronic infectious childhood disease. It is difficult to control due to the complex interaction of many risk factors (behavioral, biological and social) associated with their onset and progression. Oral Health Education (OHE) is one of the most important strategies to prevent and control the Early Childhood Caries. Parents are the primary educators in the early years of life. Therefore, it is necessary to measure their knowledge about this topic and recognize strengths and weaknesses.

Aim: To assess the mother's knowledge about ECC in a population of Chilean children of low-income status in Santiago, Chile.

Design: A Descriptive study was conducted. The sample consisted of 114 mothers from preschool children that answered a self-administered questionnaire that inquire about primary risk factors, eating habits, oral hygiene and visits to the dentist by yes or not answers and results were expressed in frequency. Data were analyzed using Chi square test.

Results: Mean average knowledge for all dimensions was 63.7%. More positive answers were obtained in eating habits and dentist visits. Knowledge related to hygienic habits and primary risk factors were insufficient. Mother's knowledge was related to their access to OHE and not to age or educational level.

Conclusions: For our study population, the global knowledge about ECC is sufficient, but far from optimal. The results strengthen the fact that mother's access to Oral Health Education is of high relevance for the children's oral health.

PR01.28

The effect of computer-based intervention programme on adolescents

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Background: Effect of different types of interventions on oral health has been studied in the past. Hardly any studies have investigated the effect of computer-based feedback systems on person's oral health behaviour.

Aim: The main aim of this study was to investigate how computer-based feedback affected oral health behaviour of adolescents. Another aim was to question the opinion of adolescents on this type of feedback. Additionally, sources of oral health information for secondary school pupils were analysed.

Design: A total of 66 pupils in two secondary schools in Oulu, Finland responded a computer-based questionnaire regarding their oral health behaviours, sources of health information and opinion on the programme. According to their responses, the programme gave pupils feedback or advice towards better oral health. The same questionnaire was repeated 4 weeks later. The pupils were then, additionally, asked to evaluate the effect of the programme on health behaviours.

Results: The pupils found this kind of oral health promotion both useful (51%) and easy-to-use (79%). They gained new information on all issues, especially the harmful effects of beverages on dentition (21% of all pupils). Boys received oral health information from their parents (86% vs girls 72%), whereas girls learnt most from magazines (63% vs 38%) and friends (37% vs 18%). Internet was a common source for both genders (about 1/3). After 1 month 22% reported improvement in the quality of meals, and 15% decrease in snacking.

Conclusions: Computer-based oral health promotion is modern and useful way of delivering information for adolescents.

PR01.29

The effectiveness of fissure sealing permanent molars of 8 year old children

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Background: Occlusal caries represents a significant proportion of all caries.

Aim of the study was to determine the morbidity of caries in 8-year-old children, the proportion of children with at least one FPM sealed, and to compare morbidity of caries in a group with at least one FPM sealed and a group without sealed FPM.

Design: Dentitions of 478 children, aged 8 years, were examined according to ICDAS recommendation and results converted to DMFT.

Results: Of all children 325 (67.99%) had caries-free permanent teeth (DMFT = 0) and 67 (14.02%) caries-free deciduous teeth (dmft = 0). The mean DMFT and dmft were 0.64 and 4.45, respectively. 378 children (79.08%) had at least one sealed FPM. The mean number of sealed FPM were 2.52 and 3.19 of all children and in the group with sealed FPM, respectively. Of all 1906 FPM there were 1207 (63.33%) sealed, 99 (5.19%) decayed unsealed, 189 (9.92%) filled unsealed and 411 (21.56%) healthy unsealed. In the group of children with sealed and in the group with unsealed FPM number of children with DMFT = 0 were 268 (70.9%) and 58 children (58.59%), respectively. In these two groups in the same order the mean DMFT were 0.48 and 1.27.

Conclusions: FPM are most caries-susceptible teeth in the young permanent dentition (Skeie et al., 2006). Fissure sealing effectively prevents the development of fissure caries (Ahovuo-Saloranta et al., 2008). In the study, a higher DMFT was estimated in 8 year olds with unsealed FPM comparing to their peers with sealed FPM.

PR01.30

Influence of targeted tooth brushing on remineralisation of initial caries lesions in newly erupted second molars

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Background: Targeted brushing of erupting teeth has been shown to effectively decrease the occurrence of dental caries. Remineralisation of initial caries lesions after regular use of fluoride tooth paste is detected by laser fluorescence (LF) even in weeks.

Aim: This study aimed to investigate the effect of targeted tooth brushing with fluoride or non-fluoride tooth paste on remineralisation of initial caries lesions in newly erupted second molars.

Design: The study group comprised 13–14-year-old school-children ($n = 51$) who at baseline had at least one initial caries lesion

indicated by LF value >10 in their second molars. At baseline, all participants got individual instructions concerning targeted tooth brushing of their second molars and were randomly provided tooth paste containing 0 or 1500 ppm fluoride. After 1 month's intervention period, remineralisation was evaluated by the change in LF values. The change in LF values was compared between non-fluoride and fluoride groups, considering i.e. the tooth (upper/lower; left/right), brushing frequency and depth of the lesion at baseline (LF 11-20/21-30/ >30). For statistical analyses, chi-square test and t-test were used.

Results: There was no significant difference in remineralisation between non-fluoride and fluoride groups. In both groups, LF values decreased in upper molars, the decrease being most distinct in the upper right molars in lesions with LF values 11–20 at baseline.

Conclusions: Surprisingly, targeted tooth brushing of newly erupted molars seems to be effective in remineralisation of initial caries lesions even without fluoride. This effect can be detected using LF.

PR01.31

Re-mineralising effect of CPP-ACP (Recaldent) and β -tricalcium phosphate varnishes on dental enamel

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Background: The Minimally Invasive Dentistry development has fostered remineralizing treatments of demineralised enamel. Development of remineralizing agents based on casein phosphopeptide-amorphous calcium phosphate (CPP-ACP), β -Tricalcium Phosphate in combination with sodium fluoride have been shown effective in the enamel remineralization and can be used both as enamel defects and incipient carious lesions (white spots).

Aim: The aim of this study is to compare the remineralizing capacity of two varnishes composed of casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) (Recaldent 1–5%) and β -TCP both combined with 900 ppm of sodium.

Design: A total of 28 bovine lower incisors were used. The basal level of enamel mineralization, demineralization produced by an acid solution, and remineralization at 14 and 28 days was determined, after a single treatment with MI Varnish[®] (Recaldent) and Clinpro[™] White Varnish (β -TCP). To measure (% weight) SEM-EDX was used.

Results: The results of EDX analysis no showed significant differences in the elements Ca, F, P, with the different varnishes. For Calcium and Phosphorous concentrations, the highest values (% weight) were found for MI Varnish at 28th day.

Conclusions: In both study groups, the varnishes remained on the enamel surface hindering mineral content measurement after 28 days of study, but with no statistical significant differences between the groups. The use of a varnish comprising Recaldent molecule and with 900 ppm sodium fluoride, allows a highest increase in the concentration by weight of calcium and phosphorus after 28 days of employment, with no statistical significant differences.

PR01.32

Effect of fluoride varnishes on surface microhardness of enamel – an *in-vitro* study

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Background: The ease of application of fluoride varnishes has led to its popularity in pediatric dentistry. Precipitation and hyper-

saturation of fluoride ions into hydroxyapatite crystals restores the lattice structure of superficial layer of enamel and increases its surface microhardness (SMH).

Aim: To evaluate and compare the SMH of enamel following application of three commercially available fluoride varnishes.

Design: One hundred and twenty premolar teeth indicated for orthodontic extraction were collected and divided into four groups, group A, B, C and D, consisting of 30 teeth each. For evaluating surface microhardness, samples of group A, B and C were coated with MI varnish[®], Fluorprotector[®] and Bifluorid[®], respectively. Samples of group D formed the control group. Following application of varnish, these samples were subjected to a demineralization-remineralization cycle for 7 days. The surface microhardness of all the samples were assessed using surface microhardness tester machine. Data obtained was subjected to statistical analysis using one way ANOVA and Tukey multiple *post hoc* test.

Results: The mean SMH of Group A, B and C were found to be 488.68 ± 5.54 KHN, 487.84 ± 6.16 KHN and 449.47 ± 7.37 KHN, respectively. All the three study groups showed a significant increase in SMH as compared to that of the control group ($P \leq 0.05$). SMH of group A and group B were significantly higher than that of group C ($P \leq 0.05$).

Conclusion: MI varnish[®] was as effective as Fluorprotector[®] in increasing surface microhardness of enamel.

PR01.33

The prevalence of S-ECC and related factors in 3-year old children in middle of Taiwan

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Background: The prevalence of severe early childhood caries (S-ECC) was 80% for Taiwanese children in 1997. S-ECC could induce many problems including infection, pain, esthetics, unbalanced nutrition, and bad life quality. Oral health policy were implemented to reduce the high prevalence of S-ECC. However, the prevalence of S-ECC was very high in Taiwan.

Aim: This study was to investigate the prevalence of S-ECC and related factors in middle of Taiwan.

Design: A total of 836 children, 3-year-old children and under were examined in our department of Pediatric Dentistry from June to December in 2014. The caries numbers of primary dentition was recorded. Fluoride application and oral health instruction were performed. Questionnaires were delivered to mothers of the children with S-ECC and caries-free children. The questions were related to the children's dietary habits, oral hygiene, and the use of fluoride toothpaste.

Results: The prevalence of S-ECC is 53%, and is higher than other countries. The most common factor is bottle feeding without cleaning before and during sleep. The second is insufficient cleaning. The third is incorrect cleaning method, many parents didn't use toothbrush. The fourth is lack of regular check up, most of parents bring their children to visit dentist until the dental caries have existed. The fifth is insufficient fluoride supplement, many children didn't use fluoride dentifrice until 3 years old.

Conclusions: S-ECC could induce many problems and waste resources, and it could be effectively prevent by correct eating habit, fluoride, correct cleaning method, and regular check up.

PR01.34

The relationship between mothers' attitudes to diet and oral hygiene and caries risk in infants

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Background: Early childhood caries prevalence in the Czech Republic is reported to be about 20%.

Aim: The aim of the study was to associate mothers' attitudes to diet, oral hygiene, possible transfer of microbes and knowledge of caries preventive measures in relation to early childhood caries.

Design: A total of 127 pairs of mother/child were invited to participate in the study. After filling in the questionnaire, 94 children (mean age 11.15 months, SD = 2.724) were orally examined and their dental status (dmft) was recorded. Saliva and dental plaque samples were taken both from children and their mothers and assessed for the presence of mutans streptococci (Dentocult[®] SM Strip mutans). SPSS Statistics 21, IBM Corporation, 2011 was used.

Results: The analysis of questionnaire responses showed that sugar intake was not a risk factor for the development of dental caries in most of the infants involved in this study (77.2% of mothers did not sweeten beverages). A more significant risk factor was the absence of oral hygiene (21% of mothers did not clean infants' teeth) and bacterial transmission from mother's mouth to infants. Our results demonstrated a significant relationship between the presence of microbes in mothers and children ($P < 0.05$). In addition, children with higher amounts of microbes showed higher dmft index. Decayed teeth in 1-year-old infants were identified in 2.4%.

Conclusions: Mothers' attitudes towards dietary habits were generally at a high level in our cohort, nevertheless, more profound education focused on further caries preventive measures is recommended.

PR01.35

A new toothpaste effectiveness at reducing gingival inflammation and preventing gingival bleeding: a double blind randomized controlled clinical trial

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Objective: A combined effect of a new toothpaste containing active ingredients potassium nitrate (5.00%) and zinc citrate (0.50%) was tested among a randomly selected group of 80 participants who attended the dental clinic of the School of Dental Medicine in Zagreb (Croatia).

Materials and methods: Participants were aged 16–55 years and equally divided by genders. Inclusion criteria were: hypersensitivity to thermal, chemical and mechanical stimulations due to accumulated plaque and gingival retraction. The toothpaste had previously been clinically tested and had been produced according to ISO 9001/14001 integrated quality normatives. Soft toothbrushes were used and provided by the same supplier. Plaque

index (Aproximal Silness & Løe Index) and gingival bleeding (Probing Bleeding Index after Saxer & Muhlemann) were clinically evaluated at the initial visit and again at 2 and 4 week check-up intervals.

Statistical analysis: Data was analyzed by using analysis of variance (ANOVA), t-test and the Mann-Whitney U test.

Results: Plaque index significantly decreased among participants who used the toothpaste with active ingredients potassium nitrate and zinc citrate (15.4%) vs participants who used the toothpaste without active ingredients (5.8%). Gingival bleeding significantly reduced among participants who used the toothpaste with active ingredients potassium nitrate and zinc citrate (10.9%) vs participants who used the toothpaste without active ingredients (2.5%).

Conclusion: This 4-week clinical trial sustains a combined effect of active ingredients potassium nitrate and zinc citrate contained in the new toothpaste on reducing gingival bleeding and inflammation due to accumulated plaque and can be recommended in preventing periodontal diseases.

PR01.36

The effect of different fluoridated toothpastes and fresh orange juice on enamel surface microhardness *in vitro*

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Aim: The aim of this study was to compare the rehardening effect of three different fluoridated toothpastes on bovine enamel softened with fresh orange juice.

Design: The crowns of 16 bovine incisors were cut longitudinally and embedded in acrylic resin blocks. 32 enamel specimens were softened via immersing in fresh orange juice for 15 min. The specimens were divided into four groups and brushing was performed using Colgate[®] Maximum Protection Caries (Group A), Crest Pro-Health (Group B), Sensodyne Pronamel (Group C) and untreated samples served as control group (Group D). The toothpastes were applied via brushing the samples at 0, 8, 24 and 32 h. The Vickers surface microhardness measurements were performed at baseline, after immersion in orange juice and 48 h after the rehardening procedures. Friedman, Kruskal Wallis and Dunn's Multiple Comparison tests were used for the statistical analysis.

Results: Enamel surface microhardness was decreased significantly after immersion in fresh orange juice. The three different toothpastes significantly increased the hardness of softened enamel compared to the control group ($P < 0.05$) and there was no statistically significant difference between the groups ($P > 0.05$).

Conclusion: Although the microhardness values after rehardening could not reach the baseline values in all groups, three different fluoridated toothpastes significantly increased the microhardness of enamel *in vitro*.

PR01.37

Habit changes in infants under four years of age, with systemic pathology attending the oral health program at Luis Calvo Mackenna Hospital (HLCM), Chile

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Introduction: The importance of optimal oral health in infants with systemic pathologies is well recognized. Evidence shows professional preventive measures are effective at reducing oral pathologies. The Oral Health Program accomplished in 2–4 visits to the specialist, includes providing anticipatory guidance regarding dental and oral development, healthy oral habits, and oral preventive measures.

Aim: To describe the habit changes in infants <4 years presenting systemic pathologies and who are attending the Oral Health Program at HLCM.

Methods: In a descriptive cross sectional study, medical records of 195 patients, cared by professors and students from the Specialization Program of Pediatric Dentistry, University of Chile, registered between 2011 and 2014, were analyzed assessing changes in oral hygiene, nutritive and nonnutritive habits.

Results: At baseline, 50% of patients who presented poor hygiene habits, showed a significant decrease to a 24% ($P = 0.00001$). In relation to infants using bottle feeding, its use showed a significant decrease from an 80% to a 53% ($P = 0.00001$). On the other hand, pacifier sucking showed an only 6% reduction, which is statistically non-significant ($P = 0.9496$).

Conclusions: A Preventive Oral Health Program produces substantial improvements in hygiene changes and nutritive habits, but not in pacifier sucking use. Therefore, it is necessary to continue working on preventive programs, in order to pay special attention to infants' oral care, particularly those with systemic diseases.

PR01.38

Early childhood caries: protective and determinant factors correlated with disease manifestation in children up to 4 years old

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Background: There are few studies in the literature about behavioral aspects of early childhood caries.

Aim: The aim of this study is to correlate and evaluate the dental caries experience (0–48 months), behavioral and clinical aspects of dental care, who attended a preventive government program in the State of São Paulo, Brazil.

Design: 465 participants on a dental care preventive government programs were assigned: G0 – babies whose mothers joined the program when still pregnant ($n = 50$); G1 – babies that joined the program during the first year of life ($n = 230$); and G2 – children that joined the program between 13 and 18 months

($n = 185$). Parents also answered a questionnaire including questions about the children's diet habits, day and night hygienic habits, night feeding habits, parents' education level, social economical condition, and children's behavior during home and professional treatment. Dental caries experience/children's age were correlated with variables. Chi-Square test and the Mann-Whitney test was used, the gross odds ratio was calculated and adjusted by the Logistic regression (CI 95%).

Results: Assiduity, night oral hygiene presence and parents' level of education variables were protection factors for dental caries. Cariogenic diet and night feeding were determinant factors for dental caries. Children's behavior throughout the treatment, at home or at the office, was associated with dental caries ($P < 0.05$).

Conclusions: We concluded that positive behavioral, assiduity and the children's age when joining the program that represent dental caries protection factors, are essential to promote oral health and the prevention of dental caries.

PR01.39

***In-vivo* evaluation of acidogenic proprieties of Stevia rebaudiana extracts on human saliva: a pilot study**

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Background: There is a definite relationship between dietary consumption of sucrose and incidence of dental caries. Recent researches are oriented towards the discovery and evaluation of novel potentially non cariogenic sweeteners from plants, as the diterpene glycoside Rebaudioside A: a steviol glycoside extracted from Stevia rebaudiana Bertoni plant.

Aim: This preliminary study evaluated the effect of Stevia extracts oral assumption on salivary pH value in pediatric people.

Design: 30 volunteer children between 12 to 16 years old, free of oral disease were included in this pilot study. Each subject was casually included into the two different treatment groups: Group 1 subjects rinsed the mouth with 10 mL of a solution made of water and 10% of sucrose for 1 min. Group 2 subjects rinsed for 1 min with 10 mL of a solution made of water and 0.5% of Rebaudioside A. The different concentrations in solution of the two molecules are due to their different sweetener power. Salivary pH value was measured for each subject before rinsing (t_0), at the end of rinsing (t_1), 10 min (t_1), 20 min (t_2), 30 min (t_3) and 60 min (t_4) after rinsing.

Results: After 10 and 20 min, the *in vivo* sucrose rinse produced a statistical significant lower pH value compared to the Stevia extract.

Conclusions: Despite the limitations of a preliminary *in vivo* evaluation, Rebaudioside A can be considered non-acidogenic: it is possible to suppose that steviol glycosides could not be metabolized by oral bacterial flora to produce cariogenic acids, obtaining a stable non-acidic salivary pH value.

PR01.40

Development of an evidence based oral care protocol for the prevention and management of oral mucositis for paediatric patients on chemotherapy

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Background: Oral mucositis (OM) is a term that describes the inflammatory response of epithelial cells of the oral mucosa to the cytotoxic effects of oncology treatment. Its high incidence and impact on patients' quality of life and prognosis have led to numerous studies and interventions for prevention and treatment, complicating the lack of uniform standards.

Aim: The aim of this study was to develop a protocol for outpatient applicability and possible application in hospitals, made by the assessment of dental health of the entire sample of paediatric oncohematologic patients.

Design: A sample of 36 patients of the Oncohematology Paediatric Department of the General Academic Hospital Gregorio Marañón of Madrid, is analyzed in order to describe the oral health status (descriptive study). Moreover, a cross-sectional study is performed to determine whether oral hygiene recommendations that follow in the Service Oncohematology, are effective against the presence of mucositis and to determine the importance of oral health in the prevention of mucositis.

Results: 67% of the patients had not received prior dental board. 72% did not receive oral hygiene tips. 17 patients had mucositis at the time of evaluation, 11 of them had high levels of the entity. After analyzing the data and valuation analysis between variables, according to the results of our study, patients who received hygiene tips, presented higher degree of mucositis values.

Conclusions: It is necessary to unify criteria and therapeutic protocols for clinical applicability, as proposed in the present study.

PR01.41

pH measurement, flow rate calculation, salivary concentration of CPP-ACP and Quercetin after medicated chewing gum oral delivery

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Background: Casein phosphopeptides (CPPs) are phosphorylated casein-derived peptides that prevent demineralization and enhance remineralization of enamel caries by stabilizing high levels of amorphous calcium phosphate (ACP) on the tooth surface; Quercetin is a flavonoid active against gram-positive and gram negative bacteria. Chewing gum can be considered a suitable drug delivery system for dental prevention.

Aim: The objective of this study was to evaluate the salivary release of both Casein-Phosphopeptides-Amorphous-Calcium-Phosphate (CPP-ACP) and Quercetin (Qt) in a novel experimental gum using an *in vivo* experiment; to assess pH changes and flow rate in salivary samples.

Design: The release of CPP-ACP and Qt from the gums was assessed *in vivo* by a chew-out method: 10 subjects were recruited to chew for 30 min 1 g of gum and separate samples of whole saliva over the 0–5, 5–10, 10–20, 20–30 min periods were collected. Salivary pH was measured with a glass electrode and

flow rate was calculate; the amount of Ca and QT were analyzed for all saliva samples.

Results: The results showed that there were no significant differences in flow rate and in pH and demonstrated that both CPP-ACP/Ca and Qt were released during chewing and decreased progressively as a function of the chewing time.

Conclusions: The study suggests that CPP-ACP/Ca and Qt in a gum formulation are efficiently released during the chewing process and both the drugs can serve their role as a novel anti caries agent.

PR01.42

Audit of compliance with Scottish Dental Clinical Effectiveness Programme (SDCEP) guidelines on provision of topical fluoride and fissure sealants in a general dental practice setting

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Background: All children are at risk of dental caries. A caries risk assessment will determine the appropriate level of prevention relative to their needs.

Aim: Identify compliance with SDCEP guidelines on provision of topical fluoride and fissure sealants as part of a dental caries prevention strategy within general dental practice.

Design: Two cycles of retrospective data collection using a random sample of 50 patients were completed using computerised clinical notes of patients aged 2–16 years, in November 2013 and again in March 2014. Gold standard is SDCEP guidance document 'Prevention and Management of Dental Caries in Children':

- 1) Biannual fluoride varnish application to children over 2 years of age, with additional two applications for those at increased caries risk.
- 2) Fissure sealants placed on permanent teeth if the child or particular tooth has an increased caries risk.

Results: The first audit cycle demonstrated 44% of patients were classified as 'moderate-high caries risk'. 14% had topical fluoride placed at their last recall and 50% had fissure sealants. After the cycle, staff were educated on identifying the caries risk of each child and providing appropriate prevention therapies. The second audit cycle showed 44% of patients were classified as 'moderate-high caries risk'. 91% had topical fluoride applied at their last recall. 100% of these patients had sealants.

Conclusions: It is imperative to identify the caries risk of each child and implement a prevention strategy specific to their needs. Dental caries prevention strategies should be evidence-based, with the opportunity to re-audit and continuously improve.

PR01.43

Acidogenic potential of plain milk, milk with sugar, cornflakes with milk, and cornflakes, milk with sugar – *In vivo* comparison

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Introduction: Dental caries is an infectious and a nutritious related disease. There is sufficient evidence regarding the effect of saliva in controlling plaque pH and stimulation of saliva by foods is an important factor in determining their acidogenic potential. The introduction of fermentable carbohydrates into the modern diet has been associated with the increase in the prevalence of dental caries. Milk is universally considered as the ideal food for the growing child. Milk products and cornflakes etc which consumed for a breakfast are prone to risk for excess sugar consumption which appears to be a reasonable component in the carious process yet there is no evidence demonstrating the

effect of cornflakes when consumed with milk has an acidogenic potential.

Aim: Study was done to assess the acidogenic potential of milk and cornflakes and also compare the acidogenic of Plain milk, Milk with Sugar, Cornflakes with Milk and Cornflakes, Milk with Sugar.

Study design: 24 h prior to the conduct of the study Oral prophylaxis was done in all 40 children. Baseline unstimulated saliva was collected and salivary pH recorded with salivary ph meter among all. The saliva samples from respective groups were obtained 5, 10, 30 min and 2 h after breakfast and the pH of saliva were recorded again.

Results: Baseline pH was an average of 7.26. All the groups showed a fall in pH at 5 and 10 min duration except milk group.

PR01.44

A phase II randomised controlled trial of an oral health education video game for high caries risk children

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Background: A quarter of children undergoing general anaesthesia (GA) for caries treatment end up needing more treatment, indicating failure in reducing caries risk. Families have requested support and suggested video games as an education method.

Aim: to compare an oral health education video-game to verbal education in terms of family satisfaction and ability to improve dietary knowledge and habits.

Methods: A two-armed randomised controlled trial involving 4–10 year-old children undergoing carious teeth extractions under GA. The primary outcome measures were:

- 1) Parent and child satisfaction measured by a Visual Analogue Scale,
- 2) improvement in child's dietary knowledge measured by a quiz, and
- 3) Change in child's diet and oral hygiene habits as reported by parent and child.

Measures were taken at baseline, post intervention, and 3 months later.

Results: 109 children were recruited. Average age was 6.5 years and 56% were male. Groups were well matched in age, gender and ethnicity. Children and parents found both methods of education satisfactory, although parents seemed to slightly favour verbal delivery [$P = 0.003$]. Both groups showed significant improvement in recognition of healthy foods following the intervention [$P < 0.001$]. 55% of parents completed phone follow-up after 3 months and reported changes in dietary practices, including less sweet drinks [$P = 0.019$] and non-core foods consumption [0.046]. Attendance for a 3 month follow-up visit was poor (11%).

Conclusion: Video-games can be as acceptable and effective as verbal oral health education. Application in high caries risk families should be part of a wider oral health promotion programme.

PR01.45

Effect of probiotic bacterium *Lactobacillus reuteri* on white spot lesion development in orthodontic patients

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Background: Since mutans streptococci accumulation is thought to be a primary ecological factor in WSL-development, the con-

cept of probiotics may be beneficial also for orthodontic patients. To our knowledge, there are no long-term orthodontic studies available with WSL formation as endpoint.

Aim: The aim of the study was to evaluate the effect of daily intake of probiotic bacteria on salivary lactobacilli (LB) and mutans streptococci (MS) counts, as well as white spot lesion formation (WSL) in patients undergoing orthodontic treatment with fixed appliances.

Design: A randomised double-blind placebo-controlled study design with two parallel arms was employed. Patients ($n = 85$, mean age 15.9 year) with maxillary braces on at least eight teeth and a remaining treatment period of 7–24 months were enrolled and randomly allocated to a test (intake of one probiotic lozenge containing *Lactobacillus reuteri* once daily) or placebo group (one identical lozenge without active bacteria once daily). Dental plaque, WSL and salivary MS and LB levels were recorded at baseline and at debonding.

Results: There were no differences in the incidence of WSL between the groups at debonding. The patients had generally a neglected oral hygiene, both at baseline and at the follow-up. The levels of salivary LB were significantly reduced in both groups ($P < 0.05$) at the time of debonding compared with baseline, while no alterations of the MS counts were unveiled.

Conclusions: Daily intake of probiotic lozenges did not seem to affect the development of WSL during orthodontic treatment with fixed appliances.

PR01.46

Oral health, vitamin and trace element status in child with ASD

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Background: Children with autism spectrum disorder (ASD) have problems of food selectivity, implying risks of nutritional deficiencies. Bad feeding habits have a direct effect causing dental malocclusions and bruxism, as well as other dental disorders.

Aim: To assess the nutritional status and oral health in a population of children with ASD in Madrid (Spain), and correlate with associated anthropometric parameters.

Design: A survey consisting of 17 children (aged 5–19 years) from ASD centre in Madrid, approved by the ethic committee. The intraoral examination was carried out under OMS criteria. Anthropometric parameters were recorded by bioelectrical impedance (TANITA) and nutritional intake was analysed by 72 h food diary, obtaining the quantitative amount consumed, and percentage values for each nutrient in accordance to Recommended Dietary Allowance (DRA) with Nutriber program.

Results: 47% of the patients in this study had mixed dentition and 52.9% had permanent dentition. 41.1% had dental malocclusions, 23.4% bruxism. 100% of gingivitis was observed and poor hygiene habits were shown in 35.3%. 29.4% presented caries. 41.2% of children had low-weight compared to 17.6% who were overweight. 41.9%, 48.4%, 12.9% and 19.4% of children showed an insufficient intake of minerals (<75% RDA) as Zn, I, Mg and Fe respectively. The intake of vitamins showed as 29.0% and 22.6% of children had a lower intake to 75% of the RDA for retinol and pantothenic acid respectively.

Conclusions: Children with ASD require more oral prevention, due to a higher propensity to suffer nutritional problems.

PR01.47

Preventive effect of CPP-ACP/NaF and NaF varnishes on dental erosion associated with abrasion, and on dental caries

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Aim: Evaluate the preventive effect of CPP-ACP/NaF and NaF varnishes on dental erosion associated with abrasion, and on dental caries.

Design: Enamel specimens were pre-treated and divided in two parts, also called erosive and abrasive experiment (EAE) and caries experiment (CE). In EAE – the challenge was 4 times/day, 5 min in acid soft drink+2times/day for 15 s of abrasion, during 3 days. In the EAE, treatments were: G1 = CPP-ACP/NaF varnish (V1), G2 = NaF varnish (V2) or G3 = Mili-Q water. Enamel loss (Gap) and roughness (linear-Ra and volumetric-Sa) were measured using the 3D non-contact profilometry. In CE, the cariogenic challenge was made with a mixed bacterial biofilm growing. The treatments were G4 = V1, G5 = V2, G6 = culture medium with biofilm) and G7 = culture medium without biofilm). The inoculum of 1.5×10^6 CFU/mL of microorganisms was placed on treated enamel blocks (microaerophilic environment, 24 h, 37°C). The percentage of surface microhardness loss (% SML) was evaluated. Photomicrographs were obtained in scanning electron microscopy for both EAE and CE.

Results: Anova/Tukey tests showed that in EAE both G1 and G2 were able to significantly reduce Gap, Ra and Sa when compared with G3 ($P < 0.0001$). G1 present better results than G2 ($P < 0.05$). In CE, although G4 and G5 did not differ ($P > 0.05$), G4 differ from G6 ($P < 0.05$) and G5 did not ($P > 0.05$). The photomicrographs revealed worst structural loss in G3. G4 and G5 presented small areas of demineralization, compared with their controls.

Conclusion: The best performance to prevent erosion plus abrasion as well as dental caries was observed with CPP-ACP/NaF varnish.

PR01.48

The prevalence of enamel demineralization of primary teeth in children 12 to 48 months old

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Background: The enamel demineralization of deciduous teeth were very popularly in the children, but to the present so far failed to arouse people's enough attention.

Aim: The purpose of this investigation is to detect the status of enamel demineralization of deciduous teeth in children, in order to find and prevent to it early.

Design: Total 600 children from 12 to 48 months old were from our dental health care clinic with six anterior teeth of the maxillary were erupted, and were divided into three groups (each group $n = 200$). Children in A group was 12–23 months old, children in group B was 24–35 months old, children in group C was 36–48 months old. The detection on smooth surface of the teeth (51, 52, 53, 61, 62, 63 FDI) was using visual diagnosis. Criteria for DEDT-P (Deciduous Tooth Early Demineralization

Prevalence), DTED-I (DTED Index) the basis of the white or chalky spot or with brown stain covered the surface of enamel by the scope of size was scored from DTED-I = 0 to 4. The data analysis of DEDT-P and DTED-I used chi-square and ANOV test with SPSS 11.5 for windows.

Results: DEDT-P and DEDT-I at three groups were 23.50%, 49.00%, 64.50% and 0.48 ± 0.96 , 0.87 ± 1.25 , 1.60 ± 1.38 respectively. when compared among three groups which there were significant difference ($P = 0.000$).

Conclusion: The data show that both DEDT-P and DEDT-I were increased in children with growing of age. So preventing it further develop into to ECC that seeks to eliminate related risk factors, and detecting early is all-important.

PR01.49

A retrospective longevity study of occlusal sealants

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Background: Dental sealants have been considered as an important adjunct to caries prevention in occlusal surfaces.

Aim: The aim of this retrospective longitudinal study was to evaluate the clinical performance and effectiveness of occlusal sealants in first and second permanent molars.

Design: Dental records of 206 patients were analyzed totaling 954 teeth, being 544 first molars and 410 second molars. Data included: gender, date of birth, previous caries experience, tooth sealed and date of placement, repair/replacement date and proximal caries. At a second stage, dental examination was done by one calibrated examiner considering the retention, marginal integrity and the incidence of carious lesions.

Results: for the first molars, the follow up time varied from 4.9 to 26.3 years (average 15.1 years). The retention was 100% and marginal integrity rated 96.3%. 3.7% were repaired and 6.06% were decayed. For second molars, the follow up varied from 0.6 to 22 years (average 8 years) and had 100% of retention and marginal integrity was 98.5% and the incidence of sealant repair was 1.5%. Caries were detected in 0.73% of the cases.

Conclusions: Occlusal sealants of permanent molars present an excellent clinical performance under the prism of the retention, marginal integrity, and marginal carious lesions in patients regularly followed up at the private practice.

PR01.50

A retrospective study of the retention rate of non-invasive vs minimally invasive fissure sealants- 2 ys follow-up

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Introduction: There are many discussions about the poor retention of non-invasive sealants but few about the retention of sealed restorations.

Aim: To evaluate the rate of retention of sealings applied by two techniques and with two materials (Alphaseal, N'Durance Dimer Flow).

Material and methods: The study was carried out on 264 first permanent molars sealed by students in the Paedodontic Department. Modified UPHS criteria for the direct clinical evaluation adapted for sealing were used to assess the status of each sealing. Data were analyzed using SPSS for Windows.

Results: The prevalence of non-invasive sealings was 75% and for minimally invasive technique 25%. The main cause of failure for both materials was retention loss. At 6 months the complete loss of sealings was higher: 40% for Alphaseal and 20% for N'Durance for non-invasive procedures and lower 16% for Alphaseal and 11% for N'Durance for minimally invasive procedures. At 12 months unchanged clinical evaluations. At 18 months 30% Alphaseal non-invasive sealings were lost but only 5% N'Durance; 16% for Alphaseal and 11% for N'Durance sealed restorations were lost. At the end only 21% Alphaseal and 57% N'Durance non-invasive sealings were intact; 66% Alphaseal and 78% N'Durance were there.

Conclusions: The retention of minimally restorations with both materials was better compared with non-invasive sealings; but between them N'Durance was more performant.

PR01.51

Oral microbiota of children in public and private school and their relationship with food and oral habits

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Background: The interaction between acid producing bacteria such as *S. mutans* organized in the plaque, the presence of fermentable carbohydrates, poor eating habits and lack of oral hygiene, associated with parental education, are considered at high risk for caries. In children attending different social economic school areas, has been observed that *S. mutans* quantity is different.

Aim: Determine the association between the *S. mutans*, eating habits and oral hygiene in 6 year old children in a public school and a private in Tepic, Nayarit, México.

Design: Explanatory, transversal, in 125 children of 6 years old, of a private and public school, mother's scholarship was identified, as well as oral and eating habits and caries risk. Plaque sample was taken and the amount of *S. mutans* was identified in laboratory.

Results: 40 children in a public school in 38 in private met inclusion criteria. Pearson χ^2 showed a significant relationship between *S. mutans* and hygiene habits in both schools. Mother professional scholarship was 30% public school and 68% private was found a high caries risk by *S. mutans* in the public school.

Conclusions: There is a significant relationship between oral hygiene with the number of *S. mutans* bacterial colonies, not being significant to the eating habits. Because of the mother low scholarship, in public school the *S. mutans* caries risk was high.

PR01.52

To compare the remineralization potential of milk, cheese and GC tooth mousse on demineralized human enamel

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Background: Caries initiation is associated with demineralization of the subsurface tooth enamel. Today bioactive agents based on milk products have been developed to enhance remineralization of the enamel and dentine under cariogenic conditions. However, there is limited information on the remineralization potential of milk and milk products.

Aim: To assess and compare the remineralization potential of milk, cheese and GC tooth mousse on demineralized human enamel.

Design: 70 enamel specimens were prepared from sound human premolars. All enamel specimens were then placed in demineralizing solution for 4 days at 37°C to produce artificial carious lesion. Enamel specimens were then randomly divided into four groups. Group 1 specimens were kept in artificial saliva whereas group 2, 3 and 4 enamel specimens were treated with milk, cheese and GC tooth mousse respectively for 5 min twice daily for 21 days. Pre and Post treatment surface microhardness (SMH) measurements of all specimens were evaluated on the 1st, 7th, 14th and 21st day. Data was statistically analyzed using One-way Anova test.

Results: The mean baseline SMH value of enamel specimen was 314.4 ± 15.3 VHN which reduced to 127.9 ± 16.8 VHN after demineralization. There were statistically significant increases in the post SMH values in milk -211.2 ± 16.9 VHN, cheese -198.04 ± 10.3 VHN and GC tooth mousse -228.4 ± 12.9 VHN [$P < 0.001$] at the end of 21st day of remineralization.

Conclusion: Milk and GC tooth mousse showed better remineralization potential followed by cheese on demineralized human enamel.

PR01.53

Withdrawn abstract

PR01.54

Dental caries recurrence after treatment for severe early childhood caries under general anesthesia: a 1-year follow-up

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Background: severe early childhood caries has high prevalence in china (66% for 5 years old) and is difficult to treat successfully, up to 50% of children have new caries lesions after therapy, but the reasons is not clear.

Aim: the aim of this study was trying to characterize factors associated with new lesions post-treatment.

Design: A total of 70 children accept caries treatment under general anesthesia participate this study. Questionnaires and treatment records including basic information, feeding and oral habit and treatment informations were collected. Opaque spot didn't include in dt was treated with apply fluoride only. Children back to hospital for recall examination on 3, 6 and 12 month after treatment, their feeding and oral habit and new lesions occurrence information were collected. For children with new lesions post-treatment, apply treatment and fluoride; for children without new lesions, apply fluoride. All the informations were statistically evaluated.

Results: The caries recurrence rate after 1 year was 42.1%. On 3 months after treatment, children with new lesions compared with without new lesions has significant differences on age, dt and ft ($P = 0.048$; $P = 0.026$; $P = 0.042$ respectively). There are no significant differences between with new lesions and without new lesions group on 6 and 12 months after treatment on all the observed factors.

Conclusions: On the time of treatment children in young age are more likely to develop new lesions short-term after treatment than elder children. Children with opaque spot before treatment are likely to develop into cavity short-term after treatment even applied with fluoride.

PR01.55

Powered vs manual tooth brush in children oral health

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Aim: Good plaque control facilitates good gingival and periodontal health, prevents tooth decay and preserves oral health for a lifetime. The purpose of this study was to compare and determine the plaque-reducing effectiveness of powered and manual tooth brushing method in a small group of children.

Design: 10 children aged ranged between 7 to 10 years old were included the study. Each child firstly used manual tooth brush (ORAL B Stages for children). After 2 weeks children were asked to use powered tooth brush (ORAL-B TRIUMPH 5000 SMART GUIDE) for 2 weeks. as well. Buccal surface plaque was recorded according to TQHPi every 2 weeks. Data were statistically analyzed by using IBM SPSS Statistics 22 (IBM SPSS, Turkey). Mann-Whitney U test and Wilcoxon signed rank test were used. for comparison the jaws and automatic brush /manual brush. Significance at $P < 0.05$ were considered.

Results: Both brushes significantly reduced the plaque accumulation, though to different degrees. Powered brushes showed significant plaque reduction as compared to the manual brushes.

Conclusions: Moderate quality evidence finds statistical benefit in oral health for powered over manual toothbrushes. Therefore, powered tooth brush can be recommended for children to increase the oral health.

PR01.56

The influence of ozone, sealants and fluoride varnish on occlusal caries development in 24 months period

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Background: Application of fissure sealants and fluoride varnishes are two preventive procedures for dental caries developed since 1960's. The application of ozone on dental hard tissues is a novel preventive and therapeutic approach.

Aim: To detect influence of ozone, fissure sealants and fluoride varnish on occlusal caries development in permanent premolars of children.

Design: A clinical trial was conducted on four groups of 10 years old children:

a group 1 ($n = 19$) in which fluoride varnish (*Fluocal solute, Septodont, France*) was applied and re-applied up to 24 months; and

a group 2 ($n = 17$) in which fissure sealant (*Clinpro™ Sealant, 3M ESPE, USA*) was applied and re-applied up to 24 months,

group 3 ($n = 17$) in which ozone (*Prozone, W&H, Austria*) was applied and re-applied up to 24 months, and

control group 4 ($n = 44$). Percent of caries reduction was studied in these initially healthy premolars: 90 (fluoride varnish), 78 (fissure sealants), 95 (ozone) and 144 (control) premolars met inclusion criteria.

Results: Occlusal caries was developed in: group 1 – 2.2% ($n = 2$), group 2 – 5.1% ($n = 4$), group 3 – 3.2% ($n = 3$) and group 4 – 9.7% ($n = 14$). The changes in occlusal caries incidence between fluoride varnish, fissure sealants and ozone groups were not statistically significant. Caries increment was significantly less in preventive groups as compared to control at 24 months.

Conclusions: The results suggested that for occlusal caries prevention all these preventive procedures could be recommended at individual and also at community level.

PR01.57**The effect of MI paste plus on initial caries lesion using focus ion beam/scanning electron microscopy (FIB/SEM)**B. KITIKI¹, M. SEZEN² & B. KARGÜL¹¹*Department of Pediatric Dentistry, Marmara University Faculty of Dentistry, Istanbul, Turkey;* ²*Nanotechnology Research and Application Center, Sabancı University, Istanbul, Turkey*

Background: Caries process is not a static one, but is dynamic with interspersed periods of demineralization and remineralization of enamel. Novel caries preventive dental materials are now incorporating CPP-ACP in the composition of their products for the prevention of caries.

Aim: This study was designed to evaluate the effectiveness of MI Paste plus in inhibition of enamel demineralization using focus ion beam/scanning electron microscopy examination.

Design: Two freshly extracted human molars were collected and pumiced by using rubber cups with fluoride-free paste, washed, and dried. The specimens were immersed in the demineralizing solution for 48 h. In pH cycling method, samples were subjected to pH cycling for 7 days. FIB-SEM tomography studies were performed using 'slice and view' technique at the JEOL JIB 4601F MultiBeam platform. FIB milling was carried out on the sample at the conventional angle of 53° such that the ion beam impacted perpendicular to the sample surface and was able to sequentially 'slice' surfaces away from the volume of interest, while electron beam was used to image the cross-sectional surfaces simultaneously. The enamel surfaces with magnification of 5000, 10,000, 20,000 taken by FIB/SEM.

Results: The FIB/SEM observation showed that demineralized enamel surface and subsurface was disorganized, with variable rod widths and a smaller number of enamel rods. After remineralization enamel rods and prismatic substance are not discernable, at a higher magnifications the areas of calcified deposits are more evident.

Conclusions: Detailed morphological analysis is critical to understanding the structural features of enamel and designing preventive strategies.

PR01.58**White spot lesions and orthodontics: a clinical study and proposed preventive protocol**

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Introduction: The enamel demineralizations, more commonly known as 'white spot lesions' (WSL), lead in some rare cases to the creation of true cavities, causing both esthetic and functional problems. The aim of our retrospective clinical study was to evaluate the incidence of the appearance of these WSL in a Moroccan orthodontic population and to determinate possible associations with a number of risk factors.

Patients and methods: The study was based on intraoral photographs of a pool of 69 patients who underwent orthodontic treatment with or without extractions. Patients with prostheses or WSL before the beginning of the study were excluded. Digital pre and posttreatment photos for each patient were compared looking for the appearance of WSL on the vestibular surfaces. WSL were classed according to three degrees of severity: slight, severe and cavitation. Data were processed using SPSS 13.0 software.

Results: The results of the study showed that the prevalence of WSL in the sample was 66.7%, with a highly significant predomi-

nance of localization in the premolar/molar segment and in patients with poor oral hygiene.

Conclusion: Poor oral and dental hygiene was identified as the most important risk factor for the development of white spots during multibracket orthodontic treatment.

Orthodontists should be proactive and take active responsibility to prevent the development of WSL by educating their patients about the importance of maintaining an excellent dietary compliance and oral hygiene regime. In front of the appearance of the white spots, several preserving palliative treatments can be suggested.

PR01.59**Application of ICDAS and CAMBRA protocols in patients with cerebral shunt valves. A case report**A. HERNANDEZ FERNANDEZ^{1,2}, E. FERNÁNDEZ-MINANO¹, Y. MARTINEZ-BENEYTO¹, A. J. ORTIZ-RUIZ¹, A. M. ALCAINA-LORENTE¹ & S. NAVARRO-GARRIDO¹¹*University of Murcia, Murcia, Spain;* ²*Clinica Dental, Murcia, Spain*

Introduction: The lack of drainage of cerebrospinal fluid (CSF) produced in the cerebral ventricles causes a condition called hydrocephalus. The treatment chosen for these patients is surgical placement of a by-pass valve to decrease intracranial pressure and thus avoid CNS lesions.

The oral cavity is a source of pathogens, and after dental procedures these pathogens can pass into the bloodstream, causing bacterial endocarditis that may be present in patients with cardiac devices

Case reports: 6-year-old child came to the clinic for an oral cavity review. The patient suffered a severe brain hemorrhage encephalopathy secondary to arteriovenous malformation that fell into a coma for 6 months. She was treated with drainage and ventriculo-peritoneal by-pass valve.

ICDAS: The patient had three teeth with severe decay (codes 5 and 6) as well as three pieces with established decay (code 3 and 4). Likewise three teeth with early stage decay (Code 2)

CAMBRA: the girl showed a high caries risk. There were four interproximal lesions and five tooth with enamel defects. Besides the child required special needs. The only protective factor was brushing daily fluoridated with toothpaste.

The treatment plan consisted in restoring advanced lesions, pit and fissure sealants, topical fluoride application, monitoring of early lesions and diet tips.

All procedures were performed with bacterial endocarditis prophylaxis.

Comments: Patients with valves must be introduced into a protocol that includes prophylaxis of bacterial endocarditis and into a preventive program against caries, to decrease the risk of infection. We propose the use of Cambra index.

PR01.60**Improving integration of dental and medical oral health services for young children**J. J. CRALL^{1,2}¹*Public Health & Community Dentistry, UCLA, Los Angeles, CA, USA;* ²*UCLA-First 5 LA Oral Health Program, Los Angeles, CA, USA*

Background: Early childhood caries (ECC) is a persistent common chronic disease. Efforts to increase access and utilization of dental services for U.S. preschoolers at elevated risk for ECC have yielded some success, but new approaches are needed. One such strategy involves engagement of primary medical care providers (PCP) who generally have more encounters with infants and young children.

Aim: To develop and test interventions to increase PCP involvement in oral health care and improve integration of oral health/dental care delivery for young children.

Design: A multi-faceted intervention comprised of infrastructure enhancements, training and technical assistance, and implementation of a quality improvement learning collaborative (QILC) was developed and implemented in partnership with six community clinics that provide primary medical and dental care to high-risk population groups in Los Angeles. Six additional clinics participated, but were not involved in the QILC.

Results: Baseline assessments identified several factors associated which limited participation of PCP and dental personnel in oral health care for young children – including lack of professional training in contemporary caries prevention and disease management, limited inter-professional collaboration, and information system barriers which limited sharing of information collected during medical and dental care delivery. Evaluation of the impact of various intervention components demonstrated improvements in oral health care service delivery and clinic system capacity to serve young children, and underscored the importance of coordinated and sustained efforts to address system barriers that limit capacity, effectiveness and efficiency.

Conclusions: Integration of medical and dental services can be achieved through sustained systematic efforts.

PR01.61

Contributions of caregiver's social support to children's dental caries in Guangzhou: a structural equation model

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Background: Caries of preschool children still remains highly prevalent in China. Psychological factors can increase an individual's engagement in health-promoting behaviors, and finally influence the oral health.

Aim: To explore the contributions of caregiver's social support to children's caries in Guangzhou, China.

Design: A structure model which explored the contributions of social support to children's dental caries in Guangzhou was tested by structural equation modeling. Information on social support and oral health knowledge, attitudes and practices of the caregivers of children aged 5 years, and information on the children's oral health practices was collected by a questionnaire. Examination of the children's dental caries was conducted.

Results: Caregiver's social support influenced the children's caries indirectly by the children's oral health practice. Meanwhile, Caregiver's social support influenced children's oral health practices indirectly by caregiver's oral health knowledge, attitudes and practices, and caregiver's oral health knowledge affected children's oral health practices indirectly by caregiver's oral health attitudes and practices.

Conclusions: Caregiver's social support could be an important predictor for the children's caries.

PR01.62

Treatment of immature permanent teeth with periapical lesions

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Background: Mineral trioxide aggregate (MTA)-it is the first biocompatible with periradicular tissues material, of which surface can cementum growing. It is non cytotoxic to fibroblasts, but antimicrobial to bacteria.

Bioactive calcium silicate-based materials Biodentine™ (Septodont) have recently been developed with the aim of improving clinical use and overcoming MTA limitations.

Aim: To compare two biocompatible and bioactive materials.

Design: Study has included two groups of 10-years old children (nine of them were treated with using MTA (Dentsply), other eight with using Biodentine™ (Septodont). All those children have diagnoses Acute apical periodontitis of pulpal origin or K04.5 Chronic apical periodontitis of immature permanent teeth, which were complications of unsuccessful of previous treatment. X-Ray examination and clinical observations were performed at interval of 3, 6, 12, 18, 24 month.

Results: Both teeth have similar instrumentation and irrigation protocol (order). In first case apical 1/3 of root canal was obturate with MTA (Dentsply). In second case root canal was obturate to the working lang with bioaktiv calcium silicate-based materials Biodentine (Septodont). The two cases were considered completely healed and were followed for 2.5 more year. The 2-year follow-up consolidated the previous observation with absence of clinical symptoms and radiographic evidence of regeneration of the periapical tissues and revealed toothroot development and formation, and as result apexification.

Conclusions: Both clinical cases showed reduction of root-canal space and forming of apical part and apexification was achieved. That means both biocompatible and bioactive materials MTA (Dentsply) and Biodentine (Septodont) can be used with expectations of success.

PR01.63

Management of white spot lesions before and during orthodontic treatment

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Introduction: White spot lesions (WSLs) occur as early as 4 weeks after placement of fixed appliances and if not managed properly can progress into a cavity. Icon[®] is a low viscosity resin infiltration technique used to manage WSLs in orthodontic patients. The aim is to present two WSLs management cases, before and during orthodontic treatment, as well as their follow up.

Case reports: Case 1: A 12 years old female with multiple cervical WSLs on upper incisors and generalized gingivitis was referred from the orthodontist. Prevention prescribed was: 5000 ppmF toothpaste, flossing, 0.12%, chlorhexidine mouth-rinse, 2.26% topical fluoride varnish in office application. Icon[®] was used over the WSLs to halt their advancement. After bonding the fixed appliances and for the 1.5 years follow up, the progression of the WSLs was halted.

Case 2: A 12 years old male under orthodontic treatment was referred due to severe WSLs on all upper incisors, caries, heavy plaque deposits and generalized gingivitis. Fixed appliances were removed and preventive treatment plan was prescribed (χ^2 daily

MI plus toothpaste (900 ppmF), χ^2 daily 0.12% chlorhexidine mouth-rinse, 2.26% NaF in office varnish). WSLs were managed with Icon[®]. In the 6 months follow up, patient's oral health has improved and his fixed appliances were bonded back.

Comments: WSLs in orthodontic patients can be managed successfully with Icon[®] before and during the orthodontic treatment.

PR01.64

Effect of carbonated beverages on aesthetic restorative materials – an *in-vitro* surface microhardness study

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Background: The consumption of carbonated beverages over the years by all age groups, especially children has increased at large, thereby causing a rise in tooth wear and a subsequent demand for aesthetic restorative materials.

Aim: This *in-vitro* study assesses the surface microhardness changes of four aesthetic restorative materials following exposure to two commonly consumed acidic beverages.

Design: The initial surface microhardness of the restorative materials GC Fuji IX, Nano Glass ionomer (Ketac[™] N100), Filtek[™] Z350 Composite and Ceram X[™] Nano ceramic restorative was recorded in Knoop hardness number (KHN). These materials were studied under three experimental categories that included those exposed to a Coca Cola[®] and Sprite[®] group daily for a week, once a week, and with no exposures at all and the final surface microhardness was recorded. The Institutional ethical clearance was obtained for this experimentation.

Results: KHN data were subjected to statistical analysis using paired t-test and one-way ANOVA at 5% significance level. The t-test comparisons showed a high statistical significance on comparison of the surface microhardness changes among all the four restorative materials exposed to both the beverages on a daily basis for a week ($P < 0.0005$). Inter-comparisons among the restorative materials exposed to both the beverages displayed a varying response, however showing the maximum surface microhardness reduction with Ketac[™] N100 and Nano ceramic restorative ($P < 0.0005$).

Conclusions: Repeated exposure of carbonated beverages on restorative materials markedly reduced its surface microhardness; Coca Cola[®] producing the maximum effect.

Dental Anomalies Poster Session – PR02

PR02.01

Phenotypic and genotypic profile of a child with a unique pattern of molar teeth agenesis

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Tooth Agensis is the congenital absence of one or more of the normal complement of teeth, and is one of the most frequent alterations of the human dentition. The etiology of Tooth Agensis is still unknown. However, different studies show distinct phenotypic and genotypic heterogenous patterns affecting different demographic and geographic profiles. Tooth Agensis either alone or associated with craniofacial developmental disorders can pose speech and masticatory dysfunctions as well as aesthetic and functional problems thus significantly affecting the oral health related quality of life.

Objectives: To describe the pattern of clinical presentation of molar teeth agenesis in this patient.

To describe the mode of inheritance of molar tooth agenesis in this family.

To establish the mutations in candidate genes responsible for tooth agenesis in this pattern.

It was a descriptive study.

Setting: The clinical examination of the affected individual, Oral Stereognostic (OSA), Oral Motor ability (OMA) testing and genetic assessment was conducted in the Department of Prosthodontics, National University of science & Technology Pakistan. Demographic data like age, gender, number and pattern of missing teeth was recorded on the prescribed proforma.

Clinical pattern was established using history, examination and radiographic evaluation of the affected subjects. Family pedigree was drawn and the mode of inheritance was established.

This study added to the knowledge about the clinical presentation and pathogenesis of tooth agenesis in the studied population. This in turn assisted in establishing clinico pathological and molecular diagnosis and genetic counseling facilities for the affected patients and families.

PR02.02

Early prosthodontic intervention in children with ectodermal dysplasia at age three

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Introduction: Ectodermal dysplasia is characterized by the abnormal development of embryonic ectoderm derivatives. This triad is usually accompanied by partial or complete absence of the primary and permanent dentition. The objectives of prosthesis fabrication in the early childhood period include the improvement of masticatory and speaking function; the establishment of better facial appearance; and the development of self-esteem during the pre-school period.

Case report: Severe oligodontia were noted in two 3-year, 4-month-old twin girls who suffered from ectodermal dysplasia. In their deciduous dentition, only few primary molars were present. It is difficult to gain adequate retention and support for conventional dentures because of their underdeveloped alveolar ridges.

Stainless steel crowns for deciduous molars and final impression of upper and lower ridges were performed under general anesthesia due to uncooperative behavior. Fixed-type partial dentures with band-retained on primary molars were inserted at subsequent appointment. The results showed a significant improvement in the esthetics, chewing and phonetic function of the patients. The dentures became unfitted due to continued alveolar arch development 3 years later. New removable partial dentures were fabricated when they were 6-year-old.

Comments: Early prosthodontic treatment for ectodermal dysplasia cases is usually difficult because of their oligodontia, undeveloped alveolar ridges and very young age. In our cases, early prosthodontic intervention established the function and improved the social living and life quality of the patients. The proper age for implants insertion should be considered in the future.

PR02.03

Treatment for a patient with molar-incisor hypomineralization

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Introduction: Molar incisor hypomineralization (MIH) could be recognized as hypomineralized dental enamel of idiopathic etiology of systemic origin affecting permanent first molars (PFMs) and permanent incisors. Patients with MIH often suffered from hypersensitivity and unacceptable esthetic. Rapid development of caries, repeated marginal breakdown of restorations in affected teeth are frequently occurred. We describe a clinical case and its management.

Case report: A 7-year-old girl was referred from local dentist to treat the newly erupted PFMs. Clinical examination revealed demarcated opacities on tooth 11, 32, 31, 41, 42, 46, post eruption breakdown of 16 and 26 with hypersensitivity, atypical restoration of 36 and dental caries of 64, 65, 75, 85. All major systemic diseases and prolonged antibiotics therapy since birth were denied by the parents. The girl received SSC restoration on 16, 26 and 36, composite resin restoration on 64, 65, 75, 85, 11 and 21. Fluoride varnish was applied thereafter. The girl was scheduled for regular 3-month-follow-up.

Comments: MIH can be associated with alteration of permanent teeth development during the same formative period. The diagnosis depends on a thorough history taking. Early detection and diagnosis are essential. Preventive measures such as frequent topical fluoride application and dietary adjustment should be taken after the affected tooth is detected. When defect demarcates with supragingival margin, composite resin is the material of choice. However, in moderate to severe cases, full coverage SSC restoration is the choice of treatment. For anterior teeth, esthetic is concerned, composite resin veneer with minimal tooth preparation is suggested.

PR02.04**Dental treatment consideration in a child with Pompe disease**

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Introduction: Pompe disease is a rare genetic disorder caused by mutations in the gene that encodes for α -glucosidase, which leads to accumulation of glycogen in cells throughout the body. The most severe form, infantile Pompe disease, historically resulted in early mortality within the first year of life. Now treatment with enzyme replacement therapy (ERT) has extended the life span of individuals with this disease. As living longer due to ERT, the need of dental treatment for children with infantile Pompe disease is encountered clinically to pediatric dentist nowadays.

Case reports: A 5-year-old boy was referred to the pediatric dentistry department for dental examination from pediatrics department. He is a patient with the history of Pompe disease, classical infantile-onset type, under ERT.

The facial appearance showed long face appearance, mouth opening posture, mid-face ditch-in, and mandible prognathism. After an intra-oral examination which revealed poor oral hygiene, multiple caries, and class III malocclusion. The most significant radiographic finding was consistent pulp chamber morphology alternation of both permanent first molar. The developing of tooth germ and dentition was in normal range and comparable to his calendrical age.

He received full mouth dental treatment and oral hygiene instruction was also provided to his primary caregiver.

Comments: As children with infantile Pompe disease are now living longer due to ERT. Therefore, pediatric dentists are more likely to provide dental treatment to those children. Through this case, we identify special characters that we must pay attention in the process of dental treatment.

PR02.05**Dental management of a patient presenting with incontinentia pigmenti (IP)**

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Introduction: Incontinentia pigmenti (IP) is a rare X-linked dominant multi-systemic ectodermal disease that principally occurs in females. A bullous rash along Blaschko's lines (BL) followed by verrucous plaques, evolving over time to hyperpigmented swirling patterns is one main manifestation. It is characterised by teeth abnormalities, alopecia, nails dystrophy and occasionally affects the retina and the central nervous system (CNS). Majority of IP cases are caused by mutations in the NEMO gene located in Xq28 locus that are responsible for 80% of new mutations. As this mutation causes variable characteristics and expressions, cutaneous findings that follow a chronological sequence are the main symptoms of the disease. Four clear stages of IP can occur: inflammatory or vesicular stage, verrucous stage, hyperpigmented stage, and hypopigmented stage.

Case report: A 10-year-old young girl was referred to the Eastman Dental Hospital. Upon intra oral examination, she presented with missing permanent teeth and retained primary teeth. Dental anomalies related to her medical condition were; malformed shape and form of the dentition, hypodontia, impacted teeth and under-developed alveolar bone. Treatment provided was to restore the dentition and to provide partial dentures to restore occlusion and aesthetics.

Comments: Patient reported improvement in appearance and function. She will have further clinical reviews for future planning.

PR02.06**Prevalence of hyperdontia and hypodontia in a Turkish pediatric patient population**

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Background: Hyperdontia and hypodontia are the most widely reported and significant anomalies in children affecting the primary and mixed dentition.

Aim: The aim of this study was to determine the prevalence of hyperdontia and hypodontia in patients referred to Marmara University, Pediatric Dentistry Department.

Design: A retrospective study was performed using patient records aged between 6 and 12. In total 1008 patients included to the study whom radiographs had been taken for routine dental treatments. All radiographs were examined by two researchers and the anomalies including supernumerary tooth and tooth agenesis were noted for each patient.

Results: In 1008 patients, 13 hyperdontia (1.29%) and 74 hypodontia (7.34%) cases were detected. In 13 hyperdontia patients 9 were boys (69.23%) and 3 were girls (23.07%). Only one patient had two supernumerary teeth. According to morphology, the most common supernumerary teeth were conical (57.14%), following tuberculate (21.42%), supplemental (14.30%) and paramolar types (7.14%). In 74 hypodontia patients 48 were girls (64.86%) and 26 were boys (35.14%). Only one patient had oligodontia. In 74 hypodontia patients 131 germ agenesis were diagnosed; 85 premolars (64.89%), 45 laterals (34.35%), one second molar (0.76%).

Conclusions: The prevalence of hypodontia and hyperdontia in this study were within the range as reported in the literature. Those cases are often diagnosed in paediatric patients during mixed dentition. Females were affected mostly from hypodontia whereas males were affected mostly from hyperdontia. Pediatric dentists have the essential role in the initial diagnosis of hyperdontia and hypodontia. Early detection of these anomalies leads to interceptive treatment modalities within a multidisciplinary team for better esthetics and function.

PR02.07

Abstract withdrawn

PR02.08**Supernumerary teeth: prevalence in a dental hospital sample**

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Supernumerary teeth are those in addition to the normal series that can affect both dentitions and cause complications in adjacent teeth.

Objective: Analyze the characteristics of supernumerary teeth and the clinical-eruptive complications associated with adjacent teeth, in non-syndromic patients.

Method: Retrospective observational study. Medical records of patients with erupted or retained supernumerary teeth who were derivate for their attention to the Department of Pediatric Den-

tistry FOUBA in the period 1999–2013 were evaluated. The study included all the complete medical records that presented periapical, panoramic and/or occlusal radiographs. 4 calibrated operators (Kappa 0.97 0.95–0.99) recorded: age, sex, number, type, orientation, position, erupted or retained supernumerary and the relationship with adjacent teeth, on specially designed forms. Results were statistically analyzed with percentages (confidence intervals 95%) and Chi square.

Results: 159 patients (9.47 + 2.47 years) were evaluated (37.21% females $P = 0.2$). 232 supernumeraries, 83.62% (78.20–88.15) remained retained ($P = 0.00$). Quantity of supernumerary for patient: 64.78% presented one, 28.30% two, 4.40% three, 1.88% four and 0.62% over 5. In relation to the orientation: 73.70%, 18.96%, and 7.32% were normal, inverted and transversal respectively. 47.84% (41.24–54.49) were located horizontally over the central incisor. In relation to the form: 63.4% were conical. Significant differences between the type and orientation, horizontal position, anteroposterior position and no eruption of permanent teeth were found ($P < 0.05$). The 56.46% of supernumerary caused retention in permanent teeth.

Conclusions: In this study, supernumeraries were mostly presented retained causing complications in the eruption of permanent teeth.

PR02.09

Attitudes towards genetic testing for dental disorders in children

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Background: Specialist Paediatric Dentists often see children with rare dental disorders of genetic origin. With the declining cost associated with whole genome sequencing it is now possible to offer this as a diagnostic service for a small number of conditions seen on the dental clinic. It is important to know families' views on this and there are no studies in the UK highlighting attitudes towards genetic testing for dental disorders.

Aims: To ascertain what families think about the possibilities of genetic testing being offered, to find out what participants wish to do with the information resulting from genetic testing and who they think should disseminate such information, and to ascertain if there is any difference in opinions among the public and professionals (qualified dentists and research scientists).

Design: Prospective study of a convenience sample of 51 families and 23 dentists and researchers at Guys and St. Thomas' NHS Trust completed either paper based or online questionnaires.

Results: Seventy-three (99%) of the participants agreed that people have a right to know about their own genes, forty-seven (92%) of the public and twenty (87%) of the professionals agreed that genetic testing should be available in the dental clinic as a diagnostic tool. Sixty-one (82%) of the participants agreed that incidental findings should be made available to them.

Conclusions: The results of this study provide evidence of an overwhelming positive attitude towards genetic testing for dental disorders in children. How dental genetic information is communicated needs to be explored further.

PR02.10

Solitary median maxillary central incisor (SMMCI) syndrome – a variant with a supplemental median maxillary central incisor

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Introduction: Solitary median maxillary central incisor (SMMCI) syndrome affects approximately 1 in 50,000 live births with unknown aetiology. Developing midline structures in utero are affected including the cranium, nasal structures, facial bones, dentition and other midline structures. We describe a case of SMMCI syndrome with dental features not previously described.

Case reports: A 5 year old female diagnosed with SMMCI syndrome at age 2 after surgical removal of a midline dermoid cyst and extraction of a maxillary midline tooth was examined. There was a complete deciduous dentition with a midline diastema and radiography showed an unerupted supernumerary midline central incisor together with a normal complement of permanent teeth.

Her 2 year old brother had a normal deciduous dentition with an additional maxillary supplemental central incisor. Anterior radiographic examination revealed that he too had a permanent supernumerary midline central incisor as well as normal central and lateral incisors.

Comments: Recognition of classical SMMCI syndrome is critical as it can be a predicting sign for the serious developmental anomaly holoprosencephaly (HPE). Less severely affected babies have normal or near normal cerebral development but may present with eye, nose and lip deformities as well as cognitive impairments and developmental delay.

A positive family history of SMMCI or any of the other mentioned associated features is seen in 25% of cases.

The dental practitioner may be the first healthcare professionals to recognise SMMCI and medical liaison is essential.

PR02.11

Non-syndromic hypo-hyperdontia in the mandibular anterior region

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Introduction: Hypodontia and hyperdontia are two developmental dental anomalies and are more frequently seen in permanent dentition. The most common site for hyperdontia is the upper premaxillary area. And as for hypodontia, the teeth most often missing are upper lateral incisors and second premolars besides third molars. There are few published cases having both hypodontia and hyperdontia in the same arch.

Case reports: A 7-year old boy came to our department of pediatric dentistry with his parents asking for extraction of retained lower primary incisors. After the radiographic examination, two missing permanent lower lateral incisors and a partial erupted conical shape supernumerary tooth between the two lower central incisors were found.

Comments: Hypodontia and hyperdontia are of great concern to the dentists due to associated malocclusion and esthetic problems. However, the etiology of non-syndromic hypohyperdontia still remains unclear and the diagnosis relies on both clinical and radiographic examinations. Management of the dentition during early mixed dentition may lead to a better outcome in the long run.

PR02.12

Regional odontodysplasia: the report of two unusual cases involved cross-region and over-region

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Introduction: Regional odontodysplasia is a rare and nonhereditary developmental disorder in tooth formation and involves both primary and permanent dentitions. On radiographs, affected teeth have an abnormal morphology, a hypoplastic crown, and only a faint outline of hard tissue, a condition termed ‘ghost teeth.’ The affected teeth display a grooved and brownish surface with swelling gingiva or periapical abscess without caries. According to previous cases, this condition mostly affects teeth in one quadrant. In this article, we will present two unusual general involved cases which weren’t confined to only one quadrant.

Case reports: A 4-year-old boy was referred for the swelling of left side. Intra-oral examination revealed the lower left quadrant and the upper left molars and canine were affected with swelled gingiva.

2. A 6-year-old girl came for the complaint of uneruption of permanent teeth and yellow discoloration of the teeth in the right lower quadrant. Intra-oral examination revealed right mandibular first molar to left mandibular canine crossing the mid-line. The Histopathology examination showed inflamed gingival tissue and hypocalcification with areas of cleft within dentin

The Panoramic radiograph of two cases showed the both the primary and permanent teeth were affected with the ‘ghost teeth’ appearance. However, the etiology is still unknown.

Comments: Because of the over-regional and cross-regional involved condition, dentists should consider the number of involved teeth and the patient’s stage of growth to make a long-term therapy for function and appearance.

PR02.13

Oligodontia in a pediatric patient with systemic diseaseZ. A. GÜÇLÜ¹ & A. ALAÇAM²*¹Erciyes University, Faculty of Dentistry, Pediatric Dentistry Department, Kayseri, Turkey; ²Pediatric Dentistry, Faculty of Dentistry, Gazi University, Ankara, Turkey*

Introduction: Oligodontia is defined as congenital absence of more than six teeth in permanent or both dentitions. The incidence of oligodontia is very rare, the prevalence ranges from 0.08% to 0.16%. Oligodontia can occur in association with various syndromes and systemic disorders. In this case report an oligodontia case with hypothyroidism was presented.

Case reports: A 9-year old boy complained for pain, was referred to the Gazi University Pediatric Dentistry Department. His past medical history revealed no systemic disease. There was no congenitally missing teeth in family history. Mother had hyperthyroidism. Extra oral examination was normal. Clinical examination, revealed deep caries lesions in primary teeth. The upper and mandibular right first molars were missing. The patient had no extraction history. Mandibular deciduous central incisors were retained, lateral incisors were new erupting. Panoramic radiography showed all four first and second premolars, permanent right mandibular and maxillary molars, permanent mandibular central incisors were missing. The germ of all four third molar teeth were absent. Patient was referred to pediatric endocrinology for investigation. High TSH value was detected. He is still under control of pediatric endocrinology department with hypothyroidism diagnosis.

Comments: Dentists may be the first clinicians whom suspect a child with systemic disease and oral conditions could present the

first clue. This case highlight the importance of the complete investigation to guide the patient. Patients with oligodontia should be examined for symptoms of systemic disorders, although association does not have to be present.

PR02.14

Comprehensive care of a young child diagnosed with a de novo mutation of osteogenesis imperfecta type IV and dentinogenesis imperfecta with 4 year follow up

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Introduction: Dentinogenesis imperfecta (DI) is a hereditary condition affecting dentine formation with variable expressivity. Osteogenesis imperfecta (OI) is an autosomal dominant disorder characterised by abnormal collagen, repeated fractures and skeletal deformities. De novo mutations may arise. We describe the comprehensive management of a young child with OI type IVB who had a tumultuous start to life, leading to complexities in management and late diagnosis.

Case reports: A 6-year-old boy was referred by his endocrinologist regarding sensitive teeth. Multiple fractures occurred during the first year of life, before being diagnosed with OI. The presentation of a rare subtype of OI, and lack of family history, raised safeguarding concerns. He was fostered for 11 months until a de novo mutation of the COLIA2 gene was discovered. He experiences bone pain, frequent fractures and receives bisphosphonates. Examination revealed DI, caries, pulpal pathology and tooth wear. Management included placement of preformed metal crowns and extractions under general anaesthetic, without complication. 4 years following completion of treatment the patient attends for regular review and maintains excellent oral hygiene.

Comments: This patient was referred late as a result of stressful family experiences of hospital care. Optimal communication with medical colleagues was imperative, particularly regarding preoperative planning. Patients with OI are susceptible to bone fractures during manual handling, hyperthermia and secondary bleeding. There are no reported cases of osteonecrosis-bisphosphonate related in children and no antibiotic prophylaxis was prescribed. The OVD is maintained despite delayed intervention. The patient and his family became motivated attenders who prioritise dental care.

PR02.15

Primary failure of eruption presenting in a patient to varying degrees in all four quadrantsP. ASHLEY¹, C. CLAYTON², J. NOAR², A. SHARMA² & L. KNEAFSEY²*¹Paediatric, Eastman Dental Institute, University College London (UCL), London, UK; ²Orthodontics, Eastman Dental Institute, University College London (UCL), London, UK*

Introduction: Primary failure of eruption (PFE) is an isolated condition causing failure of tooth eruption with no other identifiable local or systemic involvement.

We describe the long-term follow up of an 8-year-old female with PFE in all four quadrants.

Case report: An 8-year-old was referred for the management of delayed dental development. Clinical and radiographic examination revealed infraocclusion of LRD, delayed eruption of LR4, impacted UR6 and UL6. LL6 was vertically delayed in its development, LR6 was partially erupted, there was no evidence of hard tissue obstruction. Treatment carried out included extraction upper E’s and LRD, soft tissue exposure of LL6.

Ten-year follow-up showed failure of eruption of varying degrees in all quadrants. On the right side there was partial eruption of 6's and no eruption of 7's. In the upper left quadrant there was eruption of UL6 but no eruption of UL7. In the lower left quadrant LL6 showed further infraocclusion, with soft tissue exposure having no effect on its position.

As the patient had no functional problems due to the missing posterior teeth and it was felt the destructive nature of removal of the teeth would outweigh any benefit, no treatment was carried out. Long-term follow up is required to assess LL6 for cystic change and there is the need for excellent oral hygiene around partially erupted teeth to minimize risk of caries or periodontal problems.

Comments: This case shows PFE having different manifestations in different quadrants in the same patient and the importance of monitoring dental development.

PR02.16

Regional odontodysplasia: an unusual case report and two years follow up

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Introduction: Regional odontodysplasia (RO) is an uncommon, nonhereditary developmental anomaly affecting dental tissues derived from mesoderm and ectoderm. The aetiology is unknown. The criteria for diagnosis are based on clinical, radiographic, and histologic findings. This report describes a child patient with RO affecting both sides of midline.

Case report: An 8 year-old boy referred to the Paediatric Dentistry Department of Marmara University with complaint of delayed eruption of 21. Clinical examination showed that an apical abscess existed on 36. All teeth of lower left quadrant had abnormal crown, with a yellowish discoloured hypoplastic enamel. 41 was also affected. Panoramic radiography showed impacted 21, 34, 35 had delayed and misshaped development and erupted 41, 31, 32, 36, 73 and 74 showed typical 'ghost-like' appearance. Diagnosis of RO was achieved and a treatment plan was initiated with a goal to preserve all affected teeth. Endodontic treatments of 31 and 36 has completed with MTA. Diode laser was used for crown lengthening of 36 and teeth was restored with SSC. An apical abscess progressed on 31 at the end of 1 year and apical resection was done and restored by strip crown. Eruption of hypoplastic 21 was observed at the end of first year. The patient is still in our routine follow up.

Comments: RO is usually unilateral. Our case showed bilateral abnormality and conservative approach to those patients is recommended in order to preserve the bone tissue surrounding the affected teeth. This approach also eliminate the need for prosthodontic treatment in a growing child.

PR02.17

Premature tooth loss in a 4-year old healthy boy, a diagnostic challenge

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Introduction: Premature tooth loss in the primary dentition can occur locally, triggered by trauma or infection. In absence of

these, a systemic cause should be considered. The literature describes several conditions presenting with premature tooth loss, such as Coffin-Lowry syndrome, precocious puberty and hypophosphatasia.

Case report: A 4-year-old boy without medical antecedents was referred to the pediatric dentistry clinic of the University Hospitals of Leuven for advice after spontaneous exfoliation of tooth 73 while toothbrushing. Clinical examination showed increased mobility of all remaining front teeth, both in upper and lower jaw. Dental history revealed a traumatic insult, 1.5 years earlier, resulting in avulsion of the left upper central incisor. Both right upper incisors were lost spontaneously shortly afterwards. A panoramic X-ray revealed the absence of the roots of all primary front teeth and reduced roots on primary first molars. Family history was negative and a general check-up did not reveal any dimorphism, showing normal bone age and absence of arguments for an underlying endocrinopathy. Chemical blood analysis presented an aberrant (low) value of alkaline phosphatase activity. Despite matching clinical symptoms, no mutation of the alkaline hypophosphatase liver-type-gene (*ALPL*) could be detected.

Comments: This case report describes a 4-year old boy presenting with unexplained premature tooth loss in the primary dentition. Without an accurate diagnosis, there is no guidance for an appropriate prognosis and treatment.

PR02.18

A case report of pre-mature eruption of an upper left first permanent premolar in a 5 year old patient

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Introduction: The normal eruption date expected from an upper first permanent premolar is around the 10–11 year old period for most individuals. Certain factors may influence teeth to experience delayed or pre-mature eruption. In this case report I describe a 5 year old female who attends with a erupted 24 tooth.

Case reports: A 5 year old girl attended for a routine exam with concerns from their mother regarding a tooth which appeared carious. The patient had previous extractions under GA of the 54, 52, 51, 61, 62, 64, 74 and 84 2 years previously. There was no mention of carious lesions in the previous exam appointment 5 months prior. On examination the oral hygiene was good. A tooth was observed anterior to the 65 which was hypoplastic and similarly shaped like a premolar. No pain was reported from this tooth and was grade 2 mobile. A OPT confirmed this was the 24 which had pre-maturely erupted by 5 years and it was seen that the 14 was near to eruption also. Following consultant advice, 24 was temporarily restored with glass ionomer to be retained in the short term for space maintenance.

Comments: This case demonstrates that pre-mature eruption of a permanent premolar can occur by as much as 5 years. It is important to exclude the presence of supernumerary teeth and although the long term prognosis of such teeth are poor, it is still of benefit to consider preserving and maintaining these teeth in the short term.

PR02.19

Dens invaginatus in an immature permanent tooth combined with chronic periapical periodontitis

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Introduction: Dens invaginatus is a congenital tooth developmental deformity caused by over folding or local proliferation of enamel organ to dental papilla before dens calcification. Dens invaginatus is the weakest anatomy part, prone to food accumulation and bacterial reproduction, which will further trigger pulpitis, pulp necrosis and periapical periodontitis. Here we have described a case of dens invaginatus combined with chronic periapical periodontitis in an immature permanent tooth.

Case reports: A 12-year-old patient with repeated suppuration of the right side of the maxillary anterior labial gingiva over 3 years. Clinical examination revealed dens invaginatus and abnormal tongue ditch of the maxillary right permanent central incisor (tooth 11), with alveolar pyorrhea adjacent to the labial frenum. Periapical and CBCT radiographs showed high density image in the neck of 11, wide space in the root canal, open apical foramen and radiolucency image in the periapical area. Apexification was performed and the tongue ditch was restored with composite resin. The labial gingival fistula healed in 2 weeks. After 4 months, the radiolucency around periapical tissue disappeared. 8 months later, both the periapical and CBCT examinations revealed an image of hard tissue deposition in the periapical area with the apex closed. Permanent root canal filling was finally performed.

Comments: It's critical to control the infection in a necrotic immature tooth, which can recover the vitality of the root sheath and dental papilla, thus to induce cell differentiation of dental papilla and deposition of hard tissue at the apex.

PR02.20

Mutation in *WNT10A* and *MSX1* genes associated with oligodontia – a case report

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Introduction: *Wnt10A* is strongly expressed in the epithelium and *MSX1* in the mesenchyme of the developing teeth. Mutations in *WNT10A* and *MSX1* can cause tooth agenesis. *WNT10A* mutations affect all tooth types, with considerable variation. Mutations in *MSX1* are associated with oligodontia typically involving third molars and second premolars. *WNT10A* and *MSX1* mutations are also responsible for some rare syndromes exhibiting tooth agenesis as a prominent feature.

Case report: The proband, originally from Thailand, was a 10-year-old boy. He was referred to the Unit of Specialized Oral Care, Metropolitan Area in Helsinki for diagnosis and treatment of oligodontia. In addition to third molars, 10 permanent teeth (seven premolars, mandibular central incisors and a mandibular second molar) were missing. His maxillary lateral incisors were conical. He had grade III microtia and atresia of the right ear. He had also café au lait skin lesions. His 11-year-old brother had seven missing premolars and agenesis of third molars. Both brothers had normal hair, nails and function of sweat glands. Their mother and 9-year-old sister had no missing teeth. Mother reported that the father of the children and his mother had some teeth and nails missing. Genetic analysis revealed that the brothers had a homozygous missense mutation in *WNT10A*, c.637G>A (p.G213S). Mother was heterozygous. All three had also a heterozygous mutation in *MSX1*, c.818G>C (p.G273A).

Comments: We conclude that tooth agenesis is caused by the homozygosity of the *WNT10A* mutation.

PR02.21

Dental anomalies associated with agenesis of mandibular second premolars in Turkish population

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Background: It has been proven that genetic factors are effective in etiology of tooth agenesis. A single genetic damage might cause different phenotypes such as tooth agenesis, microdontia or ectopic tooth position.

Aim: The aim of the study was to evaluate the prevalence of other dental anomalies found in patients with 1 or more congenital agenesis of mandibular 2nd premolar teeth.

Design: 87 patients applying to Ankara University Faculty of Dentistry Department of Pedodontics between the years 2012–2014, with 1 or more agenesis of mandibular 2nd premolar teeth were included in the study. Clinical and radiographic examinations were carried out to detect other dental anomalies such as; agenesis or microdontia of maxillary lateral teeth, infraocclusion of persistent deciduous molars and other form anomalies (talon cusp, taurodontism, supernumerary teeth). Data were evaluated with Chi-square and Mann-Whitney U tests.

Results: Out of 87 patient, 64.4% were girls and 35.6% were boys aged between 7–15 (mean age 10.3). Microdontia (14.9%) and agenesis (6.9%) of maxillary lateral teeth were the most common dental anomalies associated with mandibular 2nd premolar agenesis. 19.5% of the persistent molars exhibited infraocclusion.

Conclusion: The results of the study showed that microdontia and agenesis of maxillary laterals and deciduous molars' infraocclusion were related with the agenesis of mandibular 2nd premolar teeth in Turkish population.

PR02.22

A case report: multiple un-erupted teeth and other dental anomalies in a non-syndrome patient

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Introduction: Delay or failure of eruption of teeth can occur in association with other dental anomalies and early diagnosis is critical in effective patient management. The following is a male patient with multiple causes of failure of permanent tooth eruption with other dental anomalies.

Case reports: A 13 year old Afro-Caribbean male was referred for management of unerupted incisors and canines. His medical and family history revealed nothing of significance and there was no report of previous dental trauma.

Examination revealed retained 53, 55, 65 and 73, unerupted 21, 22, 23, 33, 15, 25, impacted 37, 47 and ectopic 34 and 35. There was transposition of 12 and 13, dilaceration of 22 and unilocular radiolucent lesions encircling the crowns of 15 and 25 and some decayed teeth.

Consultation was undertaken with the departments of paediatric dentistry, orthodontics and oral surgery. Premolar impaction was ascribed to over-retained primary teeth and dentigerous cysts and the aetiology of the other multiple unerupted teeth was deemed idiopathic as there was neither family/dental trauma history nor evidence of a syndrome, supernumerary teeth or ankyloses.

The proposed treatment under general anaesthesia included restoration of carious permanent teeth, extraction of all retained primary teeth, surgical removal of 22, 34, 35, exposure and bonding of 21 and 23 and marsupialization of dentigerous cysts associated with 15 and 25.

Comments: Recommended treatment was not obtained and the patient presented 5 years later interestingly with continued eruption of teeth 15 and 35 that were not thought to have eruptive potential.

PR02.23

Management and follow up of an erupting mesiodens in a four year old patient

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Introduction: Supernumerary teeth, a developmental problem in children, can be supplementary or accessory, single or multiple; mainly occur in the maxilla. Mesiodens is the most common supernumerary tooth that occurs in the premaxilla, with a prevalence of 0.09–2.05%. Only 25% of mesiodens erupt; their presence can cause failure of eruption of the permanent successor and malocclusion.

Case reports: A 4.5-year-old healthy boy attended a paediatric dental clinic following the loss of his upper right primary incisor, with no history of trauma or underlying cause. Clinical examination showed no abnormalities. However, radiographic examination (periapical and panoramic) revealed a mesiodens in the upper right primary incisor site. No further treatment was carried out at that stage due to the good position of the mesiodens and the age of the patient. At 6 months follow up, the mesiodens erupted in place of the upper right incisor improving aesthetics and compensating for the early loss of the primary incisor. At the age of 6.5 the upper left primary incisor exfoliated, further imaging revealed no resorption of the mesiodens with displacement and rotation of the upper right central incisor. The mesiodens was extracted under local anaesthesia. Nine months later both upper right and left permanent incisors erupted normally.

Comments: Proper diagnosis and management of supernumerary teeth is essential, the timing of extraction of the supernumerary is of utmost importance, early surgical extraction can cause iatrogenic damage to the adjacent structure and teeth, and requires a general anaesthesia.

PR02.24

Dental findings in the diagnosis of ectodermal dysplasia with immunodeficiency: a case report

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Introduction: Ectodermal dysplasia (ED) syndrome is a group of genetic disorders identified by lack or dysgenesis of at least two ectodermal derivatives such as hair, nails, teeth, or sweat glands. More than 150 different variants of ED have been described. Anhidrotic/Hypohidrotic ectodermal dysplasia with immunodeficiency (EDA-ID) is characterized according to its various manifestations, which include ectodermal dysplasia, vascular anomalies, and diverse immunological abnormalities. Two genes responsible for EDA-ID have been identified: nuclear factor- κ B (NF- κ B) essential modulator (NEMO) for X-linked EDA-ID (XL-EDA-ID) and κ B α for autosomal-dominant EDA-ID. NEMO mutations are scattered across the entire NEMO gene in XL-EDA-ID patients, which explains the broad spectrum of clinical manifestations. We report here the dental findings in a male patient with XL-EDA-ID.

Case reports: An 8-year-old boy was referred to our department with the chief complaint of delayed eruption of the permanent teeth. The patient presented with several abnormalities including

curly scalp hair, scarce eyebrows and eyelashes, dry anhidrotic skin. Intraoral examination at the initial visit revealed that the soft tissue was normal and 15 primary teeth and nine permanent teeth had been presented. No microdontia or hypoplasia were seen on the teeth. The radiograph revealed no congenitally missing permanent teeth were seen.

Comments: For the appropriate prevention and treatment of EDA-ID, the dentists should be well aware of the broad spectrum of its clinical phenotypes. Since patients with EDA-ID have immunodeficiency, careful follow-up including effective caries preventive measures and dental therapy is important in order to manage their systemic condition.

PR02.25

Developmental enamel defects in 1-year-old infants delivered with low and extremely low birthweights

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Background: Preterm infants with very low birthweights (VLBW) and extremely low birthweights (ELBW) suffer from several neonatal complications and morbidity that may affect mineralisation of primary teeth and occurrence of enamel hypoplasia and hypomineralisation.

Aim: The aim of the study was to evaluate the prevalence and possible risk factors of enamel defects in primary dentition of infants delivered prematurely with VLBW and ELBW.

Design: A cross-sectional study was carried out with 132 1-year old infants. The perinatal (gestational age, birthweight) and post-natal variables (frequency of orotracheal intubation, number of teeth with enamel defects) were collected through hospital records and clinical examination. The obtained data were statistically evaluated using chi-squared test.

Results: The research cohort consists of 62 boys (47%) and 70 (53%) girls with mean gestational age 28.8 weeks, mean birthweight 1119.7 g and mean number of erupted teeth 5.6. The prevalence of enamel developmental defects was 34.1% and the teeth most affected were maxillary central incisors in 52.2%. The gestational age ($P = 0.22$), gender ($P = 0.054$) and frequency of orotracheal intubation ($P = 0.053$) correlated negatively to the number of primary teeth with enamel defects. The significant statistical relationship was between ELBW and the number of teeth with developmental defects ($P = 0.009$).

Conclusion: The prevalence of developmental enamel defects of primary incisors was 34.1%. ELBW represents statistically significant risk factor for development of enamel defects in primary teeth.

PR02.26

Management of pre-eruptive intra-coronal radiolucency in a maxillary canine: a rare case report

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Introduction: Pre-eruptive intra-coronal radiolucency (PEIR) is a rare but significant radiographic finding. It has been described as a lesion in the coronal dentine, adjacent to the dentine-enamel junction of an unerupted tooth. There are very few cases in the litera-

ture describing PEIR. Only four studies have reported on the prevalence of this condition. It ranges from 0.85% to 6%. The aetiology is not fully understood, however four aetiologies have been proposed to explain these radiolucent lesions. Currently, the most widely accepted theory is idiopathic external dentine resorption. The prognosis for the affected tooth will depend on the lesion size, pulpal involvement and timing of intervention. At the moment there is a lack of consensus in the management of these lesions.

Case reports: A 12-year-old boy was referred to the orthodontic unit in St James's Hospital, Dublin, for treatment of a posterior crossbite. Clinical examinations revealed a class I incisor relationship on a class I skeletal base, with overjet of 2 mm, overbite 50%, complicated by a unilateral crossbite on the right side associated with 2 mm displacement. There was an incidental finding of PEIR on the unerupted maxillary left permanent canine on the pre-treatment radiographs. The crossbite was corrected orthodontically. The tooth was then root canal treated and restored with glassfibre post and indirect composite resin crown.

Comments: The difficulty in terms of management is whether to intervene surgically or monitor the tooth until it has erupted. Thus, it is important to determine whether or not the lesion is progressive.

PR02.27

Minimally invasive rehabilitation of a case with amelogenesis imperfecta

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Introduction: Amelogenesis imperfecta (AI) is a hereditary developmental condition that affects the dental enamel.

Patients with AI have weak enamel and therefore present with dental sensitivity and breakdown of hard tissues. This has a marked impact on the child and adolescent patients aesthetics and function, leading to psycho-social issues. In light of this the paediatric dentists have a vital role in the treatment of AI for immediate and long term benefits.

Case report: A 14-year-old boy with AI presented with unsatisfactory aesthetics and dental hypersensitivity. The intraoral examination revealed the patient to be in a permanent dentition phase. A decrease in the vertical dimension with a resultant traumatic deep bite leading to structural loss of the labial aspects of the mandibular incisors was observed. A hypoplastic smooth and thin form of AI was diagnosed. A treatment plan was formulated with focus on prevention and rehabilitation. Initially, preventive treatment was implemented, with fluoride varnish and tooth mousse. In the second stage rehabilitation treatment was executed. Face bow records were taken. Gold onlays were provided with minimally invasive dental preparation on the posterior teeth whereas direct composite resin restorations were used to improve the appearance of anterior teeth. The treatment resulted in establishing the vertical dimension, reduction of the dental hypersensitivity and improvement of the aesthetic and function, along with the quality of life.

Comment: Paediatric dentist have a pivotal role in improving the quality of life by protecting the enamel along with dealing with the psychosocial issues related to AI.

PR02.28

Idiopathic pre-eruptive coronal resorption of four impacted mandibular premolars in a child with STIM-1 deficiency

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Introduction: STIM-1 or oral interaction molecule 1 plays a crucial role in store-operated calcium entry (SOCE), an important calcium influx pathway in many non-excitable and some excitable cells. STIM-1 deficiency leads to primary immunodeficiency, muscular hypotonia, anhidrotic ectodermal dysplasia with amelogenesis imperfecta, autoimmunity and lymphoproliferative disease. Here we describe a case with resorption of impacted teeth, not yet described in association with STIM-1 deficiency.

Case reports: A 7-year-old boy from consanguineous Turkish parents was referred to the paediatric dental department for the management of amelogenesis imperfecta. Between 2000 and 2009, permanent teeth needed extensive restorative treatment. A panoramic radiograph at the age of 13, led to the presumption that all four mandibular premolars were impacted, which was confirmed 2 years later. Surgical extraction was suggested as treatment option, but because of noncompliance never executed. At the age of 20, continued resorption of the crowns of the impacted premolars was seen. A radiograph taken 2 years later showed progression, with almost complete resorption of the crowns, extending to the roots. Considering the medical condition of the patient, further follow-up without intervention was suggested.

Comments: Impaired SOCE is known to interfere with hard tissue formation, leading to amelogenesis imperfecta. The exact mechanism of action is not yet understood. Inadequate SOCE leads to impaired mineral deposition by osteoblasts. Osteoclasts will still show resorption activity, but resorption pits are smaller. Current knowledge regarding STIM-1 deficiency does not provide an explanation for the unusual resorption pattern of impacted premolars seen in this case.

PR02.29

Microscopic analysis of new dental anomaly: molar-incisor malformation (MIM)

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Background: Molar-incisor malformation (MIM) is a newly discovered type of dental anomaly that involves a characteristic root malformation of the permanent first molars. A MIM tooth has a thin, narrow, or short root and a normal crown. Although the first permanent molar is most commonly affected, occasionally the second deciduous tooth can exhibit these characteristics along with cervical malformation of the upper incisors.

Aim: The aim of this study was to reveal the microstructure of MIM teeth.

Design: Two MIM teeth were extracted from a 9-year-old girl due to severe mobility. The detailed microstructure of the teeth was determined by examinations using microcomputed tomography (micro-CT), hematoxylin-eosin (HE) staining, immunohistochemical staining with antibodies raised against osteocalcin (OC), dentin sialoprotein (DSP), and collagen XII, and scanning electron microscopy (SEM) to reveal the detailed microstructure.

Results: Micro-CT and HE staining revealed the presence of a normal crown, malformed root, and thick pulpal floor. The pulpal floor comprised three layers: upper, middle, and lower. Amorphous hard tissues and hyperactive cells were observed in the middle layer of the pulpal floor, and the cells stained positively for DSP and OC, but not for collagen XII. SEM revealed the presence of crystal-like structures and a reduction in the number of dentinal tubules at the boundary between the upper and middle layers of the pulpal floor.

Conclusions: MIM-affected molars have a normal crown and a malformed root, and appear to result from inappropriate differentiation of the apical pulp.

PR02.30

Children with deciduous-molar-hypomineralisation are at higher risk of developing molar-hypomineralisation

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Background: Deciduous-Molar-Hypomineralisation (DMH) is defined as demarcated opacities affecting second primary molars. Due to anatomical co-localisation and overlapping development, it has been suggested that DMH might be used as a predictor of Molar Hypomineralisation (MH), a prevalent enamel defect of 6-year-old molars that causes increased caries risk for affected children. As MH aetiology remains unknown, clinical detection of risk factors of MH is needed to establish early dental-care measures, in an effort to prevent and limit pathological sequelae.

Aim: To determine the prevalence of DMH and its relationship with MH in 6-to-9-year-old children.

Design: This cross-sectional study with appropriate ethical approval included 207 children who received dental care at the Dental Clinics Centre of the University of Talca, Chile. Clinical check-up was undertaken by a DMH/MH-calibrated examiner (Kappa = 0.865/0.855). Exact Binomial Test was used to determine prevalence and relative risk (RR) between DMH and MH.

Results: The prevalence of DMH and MH was 28% and 32.3% at child level and 13.4% and 20.4% at molar level, respectively. The risk for MH based on DMH presence was statistically significant at child (RR 2.21, CI 1.52–3.21) and molar levels per quadrant (Molar 1.6/RR 3.64 CI 2.18–6.07; 2.6/RR 3.06 CI 1.89–4.95; 3.6/RR 2.65 CI 1.46–4.80; 4.6/RR 2.54 CI 1.45–4.46).

Conclusion: DMH-affected children are at higher risk of developing MH. Thus, DMH presence may be used as a clinical predictor of MH in the studied population. The validation of these findings in a larger population need further research.

PR02.31

Dental management of a patient with Turner syndrome – a case report

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Introduction: Turner syndrome is a common genetic disorder associated with a 45X karyotype, many of which involve mosaicism. It only affects girls and the prevalence is around one in 2500 female live births. The most characteristic features of this syndrome are growth failure, congenital heart disease, gonadal failure, and learning disabilities. Dental manifestations include high arched palate, poor or abnormal tooth development that may lead to a greater risk of tooth loss, periodontic disease and

tooth decay. A multi-disciplinary approach to management is therefore essential. This case presents the dental care for a Turner syndrome patient.

Case reports: A 14Y11M girl with Turner syndrome came to our clinic for dental treatment. Her clinical features showed some typical characteristics of Turner syndrome such as: short stature, low hairline, low-set ears, obesity, small feet and typical facial features like down-slanting eyes and hypertelorism. Dental exam showed high palatal vault, spaced dentition and some caries as well as poor periodontal health. Mental retardation was also present. Due to her mental retardation and inability to cooperate, dental treatment under GA was suggested. Full mouth rehabilitation was done under GA followed by periodic check-ups and preventive dental care in 3-month intervals.

Comments: Early diagnosis of oral anomalies and timely treatment of dental problems is important for patients with Turner syndrome. Effective patient assessment and regular dental check-ups are advised to manage problems with tooth abnormalities thus improving their quality of life.

PR02.32

Multiple anomalies in the mixed dentition: a case report

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Introductions: Impaired tooth development (Anomaly) may occur due to the presence of abnormalities at the time of differentiation of dental lamina and tooth germ, as well as abnormalities at the time of the formation of dental hard tissues. Tooth development disorder can occur because inherited, congenital, or idiopathic.

Case reports: A 10-year-old girl came with complains of the maxillary anterior teeth has the shape and arrangement of irregular that it interferes with the aesthetic and often wound on the inner lips because of sharp teeth. Intraoral examination and radiographs showed excessive number of teeth on the upper jaw, reduced the number of teeth on the lower jaw, as well as the anomalous shape of deciduous teeth and permanent teeth in the maxilla and mandible. The treatment was supernumerer tooth extraction which causes sores on the lips and the inside of the tooth that has undergone unsteadiness persistence. For preventive action performed fissure sealant on the teeth with a deep fissure in the teeth as well as fusion, geminasi, and spoon-shaped teeth.

Comments: It takes a long-term care plans include revocation, aesthetic restoration, creation of permanent and temporary dentures, and orthodontic treatment. Provide clear information to patients and their parents with regard to the treatment to be performed and counseling inheritance pattern.

Keywords: Dental anomalies, developmental anomaly, pattern of inheritance

PR02.33

Effect of analgesics in mineralization degree of molars and incisors of mice

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Background: To date, molar incisor hypomineralization has been associated to several factors, including prenatal, perinatal and postnatal ones. Within the latest, the use of analgesics has been proposed as a possible etiological factor.

Aim: To determinate mineralization degree of molar and incisor enamel of just weaned mice medicated during 30 days with ibuprofen and acetaminophen.

Design: A total of six mice were included in each group (acetaminophen $n = 6$, ibuprofen $n = 6$ and control group with no medication $n = 6$). Medication were administered during 30 days. Samples were fixed in 10% buffered formalin (1 week), dehydrated 24 h and sputter coated with carbon and examined by EDX (JSM-6100 JEOL SEM). The counting was conducted on all cusps of molars, and the incisal, middle and cervical third of incisors.

Results: With the anova one way test the results were as follow: Calcium: control 47.72 ± 0.89 ; Acetaminophen 39.55 ± 0.94 ; Ibuprofen 42.58 ± 1.44 . Phosphate control 22.02 ± 0.46 ; Acetaminophen 19.18 ± 0.42 ; Ibuprofen 19.11 ± 0.47

Ratio Ca/P: control 1.67; Acetaminophen 1.59; Ibuprofen 1.72. There were statistical difference between control group compared with both study groups ($P < 0.05$).

Conclusion: Ibuprofen and acetaminophen produced a decrease in mineralization degree of molar and incisor enamel of mice.

PR02.34

Tricho-Dento-Osseous syndrome and its phenotypic aspect: a case report

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Background: Tricho-Dento-Osseous syndrome is a rare autosomal dominant disorder which belongs to the group of ectodermal dysplasias, which usually affects hair, teeth, bones, nails and/or skin. It is difficult to recognize and name the diagnosis of Tricho-dento-osseous syndrome (TDO) because of its various possible phenotypic aspects, as not always all triad of the clinical features are evident, some defects are not visible namely the defects of hair, nail and bones. The purpose of this case report case is to help to detect general and intraoral features which are meant to be consistent in this TDO syndrome, which would help to make diagnosis quickly and precisely and start the treatment as soon as possible.

Case presentation: An 8.5 year-old boy together with his mother addressed to our Clinic for Preventive and Paediatric Dentistry, in Kaunas. The patient was diagnosed with the main clinical features of TDO syndrome: severe generalized enamel hypoplasia, kinky, uncombable hair and nail or skin defects, but taurodontia and bone density defects are not identified in our clinical case.

Conclusion: According to clinical and radiological data, the TDO syndrome with attenuated phenotypic expression was diagnosed to our clinical case. If we want to prove our diagnosis, we need a molecular genetic investigation of DLX3 gene. This article reveals the variety of phenotypic expressions of TDO syndrome, and shows that its explanation requires further studies, which would help to better understand the genetic-phenotypic correlation.

PR02.35

Enamel agenesis amelogenesis imperfecta in a 8-year old patient

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Introduction: Amelogenesis imperfecta (AI) is a hereditary dental disorder affecting the formation of enamel. The prevalence ranges from 1 : 700 to 1 : 14,000, depending on the population. Various classifications are available with Witkop's classification being mostly used. This is based on the phenotype, which are divided into four groups; hypoplastic, hypomature, hypocalcified, and hypomature hypoplastic with taurodontism. In some

instances, AI can be linked with delayed eruption. I will describe a child with Enamel Agenesis Amelogenesis Imperfecta.

Case report: A 8-year-old girl was initially referred for tooth surface loss and delayed eruption. There was no reports of any discomfort, but parents and the patient were worried about the appearance. Clinical examination revealed severe tooth loss in the primary dentition with no permanent teeth clinically present. Interproximal caries were noticed in the upper primary molars. There was an anterior openbite present. Radiographic assessment showed that all permanent successors are visible, with a thin layer of enamel. The immediate plan involves a comprehensive prevention plan with high fluoride toothpaste and regular fluoride applications. Restorative plan involved full coverage restorations on the primary second molars and a denture replacing upper primary anterior teeth for aesthetic reasons. Long term plan includes 3-months reviews and full coverage restorations of permanent teeth following eruption.

Comments: As paediatric dentists, we may be the first to diagnose this dental anomaly. Early identification and comprehensive planning is essential to improve the long term prognosis.

PR02.36

Case report: pre-eruptive coronal resorption of mandibular canine

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Introduction: Pre-eruptive coronal resorption appears as a radiolucent lesion in the coronal dentine of an unerupted tooth. These lesions are usually detected with routine dental radiographs. However the aetiology of resorption remains unclear.

Case report: A 11 years 5 months old boy was referred to Gazi University Faculty of Dentistry Department of Paediatric Dentistry for restorative management of tooth #43. Intraoral examination revealed only the cusp of the tooth was visible in the mouth and the tooth was asymptomatic. There was an irregular radiolucent area within the crown involving both enamel and dentine. The demineralized tooth structures were excavated and temporary restoration was performed with glass ionomer cement. At the end of 3 months, the tooth was erupted and following further excavation of remaining demineralized tooth structures, the tooth was restored with composite resin.

Comments: In this case, eruption process of a tooth with intracoronary resorption was followed up for 13 months, where as the lesion of tooth was treated gradually.

PR02.37

Pre- eruptive intra-coronal resorption in a maxillary canine tooth

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Introduction: Eruption of the teeth with coronal resorption could be challenging to diagnose for clinicians. Pre- eruptive intra-coronal resorption is a defect located in the dentin of an unerupted tooth, just beneath the dentin-enamel junction. The depth of the lesion is variable and may also reach the pulp. A more common view that these lesions are sourced from resorption, however there might be many reasons about the etiology. The report describes the clinical management of a case of a pre-eruptive intra-coronal resorption.

Case reports: 13 year old girl was referred to Gazi University Faculty of Paediatric Dentistry for restorative management of tooth # 23. The patient claimed that tooth erupted with caries and there was no tooth structure in appearance. Intraoral examination revealed soft tissue like caries intracoronally in tooth #

23. Based on the lack of symptoms, the soft tissue was excavated and apexogenesis was started. However, in the next control appointment, the treatment was shifted to apexification due to the tooth mobility and the patient suffering from pain. After root canal treatment, the restoration was completed with composite (Tetric N- Ceram Ivoclar Vivadent, Asia). Esthetics and function were recorded with a 2-year follow-up period. 30 months after the restoration, because of coming with missing filling it was decided to make the crown restoration to the patient.

Comments: According to the 3 years radiographic and clinical follow-ups, the teeth were asymptomatic and esthetic was maintained during this time.

PR02.38

Regional odontodysplasia: report of a case

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Introduction: Regional odontodysplasia (RO) is a rare developmental odontogenic anomaly that affects the enamel, dentin, dental pulp and dental follicle of both primary and permanent dentitions. The affected teeth are described as 'ghost teeth'. The maxilla is typically affected twice as often as the mandibula. The clinical and radiographic findings of a case with RO on the right mandibula and treatment objectives are presented.

Case reports: A 10 year-old male came to Gazi University, Faculty of Dentistry, Pedodontics, with lack of teeth on the right mandibula. The patient had neither other local abnormalities nor any relevant medical history. Clinical examination revealed that permanent incisors and canine tooth on the right side of the mandibula were affected. At the affected area, the gingiva was enlarged, fibrous, and tense. Radiographically, the affected teeth showed abnormal morphology and hypoplastic crowns. The pulp chambers were wide and the roots were short with wide and open apices. The gingivectomy and aesthetics composite restoration were planned in order to resolve the sensitivity and aesthetics problems of the patient.

Comments: Treatment of RO is controversial and no consensus has yet been reached. The dentist should take into consideration factors such as the medical history, the age, the number of affected teeth, the presence of any pathology. The conservative treatment of these patients is preferable to extraction due to preserve optimum oral function and aesthetics until the end of the growth period.

PR02.39

Amelogenesis imperfecta type I. Hypoplastic: a case report (therapeutic treatment)

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Introduction: Amelogenesis imperfecta (AI) is a genetically determined disease affecting primary and permanent teeth.

Children are worried about aesthetic aspect of their teeth (discolorations, destruction of enamel structure, hypersensitivity, pathology of occlusion).

Case report: A 9-year-old girl patient was referred to the Pediatric Dentistry Department of Moscow State University of Medicine and Dentistry due to discoloration of her teeth (dark-yellow color), hypersensitivity, having difficulty chewing food.

The patient's medical history revealed allergy to penicillins, severe toxicosis in the mother during the first trimester of pregnancy.

Radiographic examination revealed that enamel was located only in the cervical part of the crowns of the teeth.

No root pathology was discovered.

Dental examination of the other family members was performed and the family dental history was constructed.

On the basis of the clinical and radiographic appearance, Amelogenesis Imperfecta Type I was suspected.

The treatment plan included adherence to oral hygiene rules, remineralizing therapy, restoration of molars with standard crowns, restoration of anterior teeth with non-invasive veneers.

Comments: The treatment of AI depends on age at which the diagnosis was established.

The main aims of the therapeutic treatment are: to prevent early pathological abrasion of patient's teeth and prepare the patient for orthodontic treatment.

PR02.40

Early loss of primary incisors: a suspected case of hypophosphatasia

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Introduction: Hypophosphatasia (HPP) is a rare metabolic bone disease where oral symptoms are often the first clinical signs of the disease and can provide the key to its diagnosis. HPP is characterised by low or zero levels of tissue-non-specific-alkaline-phosphatase (ALP).

Severe forms of HPP have a prevalence of 1 : 100,000 live births; however it is speculated that the milder forms have a higher prevalence as they tend to go undiagnosed for a number of years[i].

Early loss of teeth is characteristic of all forms of HPP, in particular early exfoliation and periodontal changes in the primary dentition. These signs, along with low ALP levels are often diagnostic of HPP. We describe the initial diagnosis and investigation of a boy with suspected HPP

Case reports: A 4-year-old boy attended the community dental services for routine care. An examination revealed that the upper incisors were splayed and mobile. His mother reported loss of the lower incisors at age two. Medical history included annual radiographic review of the long bones in the first 2 years of life due to concerns regarding bowing of the legs.

A radiograph of the upper incisors showed funnel-shaped bony defects. Shortly afterwards the upper left central incisor exfoliated with the root intact. Blood tests revealed very low levels of alkaline phosphatase. A diagnosis of suspected HPP, pending review by the paediatrician was made.

Comments: Dentists are often the first clinicians to recognise HPP, particularly in its childhood form and vigilance is essential in identifying atypical exfoliation patterns of primary teeth.

PR02.41

Non-syndromic supernumerary teeth in maxillary and mandibular region

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Introduction: Supernumerary teeth or hyperdontia are abnormal teeth development that may or may not be associated with a syndrome. Hyperdontia is defined as teeth that exceed the normal dental formula. According to the literature, the reported prevalence is 0.1–3.8% in permanent dentition. Males are affected twice as frequently when compared to females. The presence of

multiple supernumerary teeth associated with non- syndrome occurs in <1% of cases.

Case reports: An 11.1 year old male patient was presented to the clinic for a routine check. The patient gave familial history of extra teeth in his father. At clinical examination we observed Class I molar relationship type 2 Dewey-Anderson with signs of hypomineralization in second premolars, root fragments left upper second primary molar and the presence of upper canine left of the first dentition, an erupted supernumerary in the palatine area and the upper left permanent canine eruption in process. In the panoramic radiograph a total of six supernumerary teeth were observed, five of them unerupted, two in the right jaw and two in the left jaw with a normal crown form in the premolar region, the other one between the right upper canine and premolar with undefined crown form.

Comments: The pediatric dentist should be aware of this condition; the presence of multiple supernumerary teeth can interfere in the normal occlusal development and aesthetic so it's essential to diagnose them as soon as possible to give prevention and management of complications.

PR02.42

Developmental defects of enamel in first permanent molars associated with use of asthma drugs at preschool age in Greek children. A retrospective case-control study

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Background: Asthma and drugs used for treatment have been studied as potential risk factors for Developmental Defects of Enamel (DDE) in a few studies.

Aim: To investigate the association between the occurrence of DDE, in first permanent molars, and bronchodilators and/or corticosteroids intake for asthma like episodes treatment at preschool age, in 6–12 year old children.

Design: Children of study group ($n = 70$) were followed in the Pulmonary Clinic of 'Aghia Sofia' Children's Hospital, Athens and had used asthma drugs (0–4 y.o) Control group ($n = 70$) consisted of healthy children who visited the Postgraduate Paediatric Dental Clinic, University of Athens. Information regarding demographic data, medical history, pregnancy, birth weight, duration of breastfeeding, mother's smoking habits and antibiotic use, at preschool age were obtained through questionnaire. Data for asthma drugs were extracted from medical records. Modified DDE Index was used. Chi square statistics, Spearman correlation and logistic regression analysis were conducted ($P \leq 0.05$).

Results: DDE were present in 24 children (34.3%) in the study group and only in 6 (8.6%) in the control. Difference between the two groups was statistically significant (OR = 5.56). 41.6% of the children with DDE presented hypoplastic molars with loss of enamel. Type of asthma drug, age at treatment onset and duration of drug use were not significantly associated with the severity and extent of DDE. Gender was the only statistical significant factor.

Conclusions: The use of asthma drugs in preschool age was associated with DDE occurrence. Severe hypoplastic lesions with loss of enamel was a frequent finding among affected molars.

PR02.43

Abstract withdrawn

PR02.44

Dental care for a Cornelia de Lange syndrome child

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Introduction: Cornelia De Lange Syndrome (CdLS) is a rare congenital disease which affects the physical and psychological development of the child. It is characterized by craniofacial, skeletal, gastrointestinal and cardiac deformities or malformations. The incidence is estimated at 1 in 30,000–50,000 neonates. Diagnosis of this disease is difficult, to date is mainly based on clinical findings.

Case report: Here, we want to present a case of a 12 y/o girl who were diagnosed as Cornelia De Lange syndrome. The poor function of mastication, malnutrition, severe delayed physical development, loss of facial muscle tone and being long-term bedridden was noticed, and the episode of dysphagia and esophageal reflux was appealed frequently. She also suffers from epilepsy and was hospitalized for aspirational pneumonia several times.

She visited our dental department due to full mouth gum bleeding and severe gingival inflammation. In the oral examination, she had full mouth severe calculus deposition, delayed exfoliation of deciduous teeth and class II malocclusion was noticed.

In the treatment planning, we conducted oral hygiene instruction to her parents, performed full mouth scaling using manual instruments due to her choking tendency, extract the retained deciduous teeth #51, 61, 71 and fluoride application for caries prevention were arranged. The 3 months interval check-up schedule was set for her to promote her oral health and hygiene.

Comments: In this case of Cornelia De Lange Syndrome, who always suffered of physical, psychological and intellectual disability, may need of intensive dental care from dental professional, parents and caregivers to enhance their oral and dental health.

PR02.45

Dens invaginatus, hypodontia and taurodontism in the permanent dentition of a healthy child

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Introduction: Dens invaginatus occurs as a result of the invagination of the enamel organ. Hypodontia is characterized by the developmental absence of one to six teeth excepting third molars. Taurodontism is another dental anomaly where involved teeth have enlarged and elongated bodies and pulp chambers with apical displacement of the pulpal floor. A rare case of a healthy male with these concurrent dental anomalies in his permanent dentition is presented.

Case report: A healthy 8-year-old boy was referred for the management of a dental abscess in the maxillary left permanent lateral incisor (22). Clinical examination revealed abnormal size and shape of 22, a fistula in the area, malocclusion (class II, deep overbite) and a missing incisor in the mandible. The radiographic examination showed dens invaginatus type III with open apex and periapical lesion in 22, hypodontia involving bilateral agenesis of maxillary canines, agenesis of a maxillary lateral incisor, an ipsilateral premolar and a mandibular incisor. Finally, taurodontism of primary and permanent molars in maxilla and mandible was observed. Comprehensive dental care was undertaken consisting of the application of a preventive program, endodontic treatment and restoration of 22 and orthodontic treatment. Dur-

ing the 1 year recall the clinical and radiographic examination revealed no pathological signs and symptoms. Due to the fact that taurodontism has been associated with chromosomal aneuploidy, karyotype analysis has been scheduled.

Comments: The triad of dens invaginatus, hypodontia and taurodontism is very rare. Dentists should investigate the correlation of dental disorders to the underlying genetic alterations.

PR02.46

Prevalence of dental developmental anomalies: a radiographic study

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Background: The study of developmental dental anomalies is important as it generates information that is important for both anthropological and clinical management of patients. Additionally developmental dental anomalies are rarely observed by dental practitioners.

Aim: The aim of the study was to determine the prevalence of developmental dental anomalies and the gender difference related to these anomalies in patients attending Near East University, paediatric department of school of dentistry.

Design: This retrospective study was based on the panoramic radiographs of 2784 patients (1429 female, 1355 male) attending the Near East University, paediatric department of school of dentistry between the dates of January 2008 to January 2015. The radiographic investigation included one panoramic radiograph from each individual. The ages of the patients examined ranged from 3 to 18 years. These patients were examined for the following developmental dental anomalies: hypodontia, supernumerary teeth, microdontia, infra occlusion of deciduous teeth, impacted teeth, taurodontism, fusion and germination. Additionally presence of systemic diseases and history of trauma was also recorded.

Results: Of the 2784 patients, 433 patients had one or more developmental dental anomalies (15.6%). The percentage of anomalies was 7.4% for boys and 8.1% for girls. *P* values indicated that the dental anomalies were statistically independent of gender (*P* > 0.05). Anomalies seen frequently were hypodontia (7.9%), impacted teeth (1.7%) and taurodontism (1.2%).

Conclusions: The most common developmental dental anomaly was hypodontia and mandibular left second premolar teeth was frequently the missing teeth.

PR02.47

Arresting progression of molar-incisor hypomineralisation (MIH) syndrome on permanent first molars – a case presentation

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Introduction: The molar-incisor hypomineralisation (MIH) syndrome is an enamel matrix formation disturbance of the first molars and incisors with multicausal aetiology. Following tooth eruption, hypomineralised dental hard tissues with high porosity are lost rapidly with subsequent caries development. Hypersensitivity of the affected teeth and the decreased adhesion capacity to dental materials make the clinical management more difficult.

Case report: A 7-year-old girl was referred for treatment accusing persisting hypersensitivity and irregular pain on tooth 3.6. Clinical examination revealed hypomineralized enamel defects on all four fully erupted first permanent molars. The incisors were not

affected. The lower left molar was severely affected, with brownish discoloration and partial enamel breakdown, cavitation extending into dentin. Both upper molars presented discolorations, but no hard tissue loss was recorded: 1.6 showed mild defects with demarcated opacities, on 2.6 the yellow-brownish area reached into the occlusal half of the smooth surfaces. After gently cleaning and polishing, the soft parts of the occlusal enamel of 3.6 were carefully removed under pain-free conditions, and occlusal filling with fluoride-releasing glass ionomer cement (Fuji Triaje, GC) was applied. The upper molars were treated with fissuresealant (Clean Pro, 3M). Additional preventive home-care was administered using amorphous calcium phosphate (Tooth Mousse, CG) on a weekly basis. The 6 month, 1 year and the 2 year follow-up showed arrested defects.

Comments: For MIH patients, early diagnosis and treatment is of essential importance. The applied methods should follow the principles of minimal invasive dentistry with highlights on preventive measures.

PR02.48

Minimal invasive treatment protocol for young patients with enamel hypoplasia. A report of 2 clinical cases

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Introduction: Enamel hypoplasia is a developmental defect of the enamel that is caused by initial failure of the deposition of enamel protein, clinically visible as enamel defects. Disorders that occur during the stages of enamel development and maturation reduce the amount or thickness of the enamel, resulting in white spots, tiny grooves, depressions and fissures in the enamel surface.

Case reports: This paper based on two cases presents treatment protocol for patient with EH. Case 1: Seven year-old female patient with localized enamel hypoplasia on teeth 11 and 21 due to trauma of primary predecessor, Case 2: Sixteen-year old female patient with generalized enamel hypoplasia. In both cases minimal invasive approach was applied after initial examination, using CPP-ACP daily in order to obtain a remineralization of the enamel opacities. Enamel defects were restored with composite resin to improve aesthetic appearance. In case 2 microabrasion with 18% hydrochloric acid was used to reduce discoloration and preparing enamel surface. All restoration were re-evaluated after 6 and 12 months – aesthetic appearance were satisfactory, and the restorations were intact and functional. In order to decrease the risk of recurrence of the defects patients were asked to maintenance therapy with CPP-ACP.

Comments: The presented protocols based on the combined use of CPP-ACP and low-invasive treatment options have shown to be effective and safe, with a good clinical outcome.

PR02.49

Chronology of developmental defects of enamel and its relation to systemic disturbances – a case series

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Introduction: Local and systemic factors can interfere in formation of tooth. Interfering with the normal matrix formation leads to enamel hypoplasia and factors interfering calcification and maturation produces enamel hypocalcification. Developmental defects in tooth can be correlated chronologically to the time of systemic disturbances.

Case reports:

Case 1: An 8-year-old girl with complaint of sensitivity on drinking water was referred for management of enamel hypoplasia in

relation to 11, 12, 21, 22, 16, 26, 36, and 46. On interviewing mother revealed history of severe calcium deficiency at birth and pregnancy.

Case 2: A 7-year-old girl with complaint of sensitivity on eating food was referred for management of fluorosis in relation to 11, 21, 16, 26, 36, and 46. On interviewing parents revealed history of staying in a place with high fluoride content in water during the first year of child.

Case 3: A 9-year-old boy with complaint of discoloured teeth was referred for management of enamel hypoplasia in relation to 11, 21, 16, 26, 36, and 46. On interviewing parents revealed history of episode of high fever and hospital admission at the age of 8 months.

Case 4: A 10-year-old boy with complaint of discoloured teeth was referred for management of tetracycline stain in relation to anterior teeth. On interviewing parents revealed history of administration of tetracycline during first year of life.

Comments: Identifying the factor responsible developmental defects in enamel will help dentist to do a comprehensive treatment plan for discolouration, tooth sensitivity, susceptibility to caries, wear and erosion.

PR02.50

Syndromic amelogenesis imperfecta in Morocco: a cohort study

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Background: Amelogenesis imperfecta (AI) is a group of hereditary disorders that affect the quality and/or quantity of dental enamel. The clinical data are whose manifestations are very diverse, which makes nosological classifications very difficult (classification of Witkop, 1988). Few studies (case reports or descriptive cases) were reported in Morocco with syndromic amelogenesis imperfecta.

Aim: To analyse the distribution of syndromic amelogenesis imperfecta in respect to gender and sex, and to study the correlation between this different forms and the dental abnormalities.

Design: We collected 10 cases of syndromic amelogenesis imperfecta among 40 cases of amelogenesis imperfecta, four cases of Jalili syndrome, three cases of AI associated with gingival hypertrophy, two cases of Heimler syndrome and one case of orofacial-digital syndrome. The criteria of selection of these patients was made based on age, sex, clinical appearance, family history, diagnosis examination (calcified dental plaque Agensis, gingival hyperplasia, absence of rash or retention dental root, resorption orthodontic).

Results: The syndromic amelogenesis imperfecta is more common in the female patient, the hypoplastic type is the most dominant, and the familial form is more dominant compared to sporadic cases. The form of AIH is frequently associated with failure of tooth eruption.

Conclusions: In Morocco, the AIH syndromic amelogenesis imperfecta is more frequent in patients with consanguineous parents and the characteristics of AIH are: hereditary disorders, severe forme is the hypoplastic type and failure of tooth eruption. The disease is associated with dermatologic manifestations, otorhinolaryngol and ophthalmic problems.

PR02.51

Amelogenesis imperfecta: a report of 4 cases with long term management and 7 years follow-up

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Introduction: Amelogenesis Imperfecta (AI) is a heritable enamel defect with many classifications depending on the quality and/or the quantity of dental enamel. AI can affect both the primary and the permanent dentition and is inherited with multiple patterns. Severe sensitivity of teeth, unsatisfactory esthetics and poor mechanicals properties of dental tissues are the most common problems which finally result in reduced oral health and related quality of life. The aim of this case series is to present the different treatment approaches of the AI patients in different ages during a period of at least 5 years.

Case reports: Four children (two boys and two girls) aged 6–11 years old, referred to the Postgraduate Paediatric Dental Clinic. Their chief complaint was the unsatisfactory appearance and the high sensitivity of their teeth. An individualized treatment plan was performed for each patient including, detailed preventive program and restorations mostly with stainless steel crowns and composite resins. During the long follow up of those patients (4–7 years) they presented new therapeutic needs in the permanent dentition. Some of these problems were associated with old restorations and others with newly erupted teeth. More complex techniques were then used such as composite resins build-ups and direct composite on lays.

Comments: AI is a defect that requires interdisciplinary treatment and close monitoring during the development of the dentition. The restorative treatment should be suitable to the child's age, needs and type of the defect and should ensure function and aesthetics.

PR02.52

Fluorosis of the primary teeth

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Introduction: Fluorosis – a disease that occurs in regions with high concentration of fluorides in drinking water – endemic areas, and in the case of increased individual susceptibility child's organism to fluorine. The optimum concentration of fluorides in water is 0.7–1 mg/L. In case of a higher concentration various forms of dental fluorosis can develop. A fluorosis in permanent teeth were described earlier. It is now believed that the placenta does not delay fluorides that come into the organism before birth.

Case reports: A 4-year-old girl with discoloration in temporary teeth. History: mother lived in the village during pregnancy and used water from a well. Breastfeeding continued up to 10 months. In the first year girl also lived in the village, and received food and drinks prepared on the well-water.

On examination: grooves on the labial surface of the front teeth. White spots and light brown stripes on the molars. Enamel of temporary teeth hard, without shine. Spots on the teeth are not colored by caries indicator.

Diagnosis: Fluorosis in temporary teeth. The tooth surface was cleaned and dried. The Tooth Mousse pasta was applied. Using of water without fluoride, and milk, juices, foods high in calcium is recommended. Parents should hold regular remineralizing den-

tal care for child. The dentist should examine the child 3–4 times a year.

Comments: Pregnant women, living in the local centers of high fluoride content, should receive defluorinated water and food. Children with fluorosis in temporary teeth must be carried out remineralizes therapy.

PR02.53

Management of dens evaginatus in a pre-adolescent child

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Introduction: Dens evaginatus is a dental anomaly that can result in complications such as pulp necrosis and infection. The management of dens evaginatus in children is often complicated by incomplete root development and orthodontic considerations.

Case report: A 10 year-old male with a repaired unilateral cleft lip and palate and unremarkable medical history presented complaining of pain and swelling on the lower left side of his face of 2 days duration. He presented with an indurated, painful swelling of the left mandibular region. Intra-orally, he had a minimally restored caries-free permanent dentition and a Class III malocclusion. Dens evaginatus were observed on 34, 35, 44, 45. The pulp was exposed on 35, the tooth was mobile and pus was present at the buccal gingiva. Radiographic examination revealed a radiolucency associated with the immature apex of 35.

Diagnosis was cellulitis of the left submandibular and buccal spaces and symptomatic apical periodontitis secondary to pulp exposure of 35.

Following resolution of infection with oral antibiotics (clindamycin), treatment options included extraction or pulp treatment and restoration of 35. Endodontic treatment was performed with mineral trioxide aggregate (MTA). Enameloplasty was performed on 34, 44, 45 with the aim of promoting tertiary dentin formation.

Comments: Identification of dens evaginatus soon after eruption of an affected tooth is important to prevent pulp exposure. Collaboration with orthodontics is advised if the extraction of affected teeth is being considered. Management of the immature apex is a consideration in endodontic management.

PR02.54

Oral rehabilitation with implants and dentures in child with ectodermal dysplasia

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Introduction: Ectodermal dysplasia is an anomaly determined by genetic factors that alters ectodermal structures, such as the skin, hair, nails, glands and teeth. Children affected by this condition require extensive, comprehensive and multidisciplinary treatment. To present a case of oral rehabilitation with a complete upper denture and mandibular fixed implant-supported denture in an eight-year-old female with ectodermal dysplasia.

Case reports: An 8 years old female patient, sought the Dentistry Clinic, with the chief complaint of 'multiple dental absences'. The mother reported that she was a carrier of ED. In the clinical and radiographic examination, there was congenital absence of several deciduous and permanent teeth and tooth germs. The child has been oral rehabilitated with maxillary complete denture and mandibular implant-supported fixed denture.

Comments: This type of rehabilitation proved to be a satisfactory treatment option able to restore the functions and esthetics as well as to improve the patient's self-esteem and social wellbeing.

PR02.55

Clinical and radiographic delineation of Goldblatt syndrome

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Introduction: The association of dentinogenesis imperfecta (DI) with a distinct form of chondrodysplasia in a boy was reported by Goldblatt et al. [1991]; and has been given the name of Goldblatt syndrome or odontochondrodysplasia (ODCD; OMIM#184260). Since the original description, only 11th further individuals have been reported (one sib pair and two unrelated cases). We report on an additional one, with clinical and radiographic features that confirm the nosologic status of this entity. The main radiographic features are Metaphyseal irregularities affecting all long bones with severe metaphyseal changes particularly of the hands, wrists, and knees, mesomelic limb shortening, and coxa valga. The main physical signs are short stature, joint laxity, narrow chest, and DI. This combination of clinical and radiographic findings allows clear recognition of this syndrome in early childhood. Of note, t

Case report: This girl was originally given a diagnosis of chondrodysplasia schmidts type. She had surgical procedure and orthopedic treatment by armed splints in the lower limbs. Dental examination performed several years after the medical diagnosis showed that this girl is also suffering from dentinogenesis imperfecta (DI). DI is also seen in the permanent teeth of Patient. But mutation analysis of COL2A1 gene on chromosome 6q21-q22 has given negative results, and the molecular etiology is as yet unknown.

Comments: This observation shows the role of dentists in the diagnosis and treatment of this genetic disease and It is therefore possible that ODCD is more common than the reported case numbers would suggest.

PR02.56

Molar incisor hypomineralization: a survey of dentists in Morocco

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Background: Molar-incisor hypomineralisation (MIH) is a qualitative defect of enamel, affecting the first permanent molars and frequently associated with lesions of one or more incisors. Very little data exists about this condition in countries south of the Mediterranean.

Aim: To assess the knowledge and awareness of Moroccan dentists concerning MIH. To describe current management strategies used in Morocco.

Design: A sample consisting of 300 Moroccans dentists was surveyed. A 24-item questionnaire based on a previous European study, which included clinical photographs of MIH, was distributed to dentists at national and international meetings, and in dental offices in different regions of Morocco.

Results: In the studied sample, 88% knew about MIH and had noticed it at least once on their patients, while 12% were unaware of this condition.

A percentage of 95% of dentists surveyed found it relevant to study MIH, while 84% noted that it was a clinical problem.

The most common clinical difficulties were in relation to achieving profound anesthesia and placing an adequate restoration. Regarding the etiology of MIH, 62% of surveyed practitioners believed that environmental pollutants were a predominant factor.

Composite resins were the most commonly used material in the restoration of teeth affected by MIH.

Conclusions: This study finds that MIH is present in the Moroccan population and that dentists in Morocco are aware of this clinical condition.

PR02.57

Teeth in a newborn – treat or leave!

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Introduction: Presence of teeth in a new born may affect the baby and the mother either physically or psychologically. The teeth which are present in mouth at birth are referred to as 'natal teeth' and those which erupt within the first 30 days are 'neonatal teeth'. Natal teeth are a rare phenomenon occurring most frequently as pairs in the anterior mandible and are more frequent than neonatal teeth. 90% of the natal teeth belong to primary dentition.

Case report: In this report we present six new born kids with different presentations of natal tooth/teeth. The appearance were dependent on the degree of maturity, but most of the time they were small, loose, covered by gums, discoloured, and hypoplastic. Some of the natal teeth exhibited a brown-yellowish or whitish-opaque colour, attached only to the oral mucosa in many instances as the root development is incomplete or defective. Dentists are often consulted when teeth are present in the newborn. Common issues arising from natal tooth relate to poor attachment while feeding, ulcerations on the ventral surface of tongue or mother's breast, risk of aspiration and diverse superstitions among the different ethnic groups.

Comments: Natal teeth should ideally be managed conservatively and be extracted only if indicated clinically. Negative cultural attitudes towards natal teeth if seen will demand proper parental counselling and guidance. It must be considered that these teeth are conditions of fundamental importance not only for dentists but also for paediatricians since their presence may lead to numerous problems.

PR02.58

Unique dental features in Allgrove syndrome

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Introduction: Allgrove syndrome is a rare autosomal recessive disorder. The syndrome has been mapped to chromosome 12q13 and is characterized by alacrima, achalasia, and adrenal insufficiency and often amyotrophy.

Case report: We report on a case of Allgrove Syndrome (AAA syndrome) presenting peculiar dental findings; such as anomalies in number and shape of the teeth.

Comments: These dental features resemble those of Ectodermal Dysplasia (EDs).

PR02.59

The management of spontaneously erupted supernumerary teeth: three case reports

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Introduction: Supernumerary teeth are extra teeth which may have either erupted or unerupted. The etiology behind it is still unclear although proliferation of dental lamina and genetic factors have been implicated. Mesiodens is the most common type of supernumerary teeth which is located in the central incisor region. It may present in both the primary and permanent dentition. If it is not managed, It can result in malocclusion and poor aesthetics. The extraction is the mostly preferred treatment option of spontaneously erupted mesiodens. We present the management of three cases diagnosed with mesiodens.

Cases: A 7 year old girl and two 6 year old boys were referred to Yeditepe University Faculty of Dentistry Department of Pediatric Dentistry with the presence of supernumerary teeth. Clinical and radiographic examination revealed spontaneously erupted mesiodens. In the first two cases supernumerary teeth were palatally positioned and in the third case mesiodens was located between central incisors. All the supernumerary teeth were extracted as precautionary measure for malocclusion.

Comments: The diagnosis and management of mesiodens by paediatric dentist is important to prevent any further complications like malocclusion and esthetic problems.

PR02.60

Dental abnormalities in a patient with microcephalic osteodysplastic primordial dwarfism Type II

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Introduction: Microcephalic Osteodysplastic Primordial Dwarfism II (MOPD2) is a rare condition of an autosomal recessive inheritance defined by severe intrauterine and postnatal growth retardation, short stature of the affected individual and skeletal abnormalities. After birth, the final adult height ranges from 20 inches to 40 inches. Many patients are also affected with cerebrovascular abnormalities. Mental delay if present is usually mild or absent.

Case report: A 11 year old boy with MOPD II and narrowing cerebral vessels showing the onset of Moya Moya disease was referred from the community dentist to our clinics for the extraction of the left mandibular permanent second molar. The patient had two previous dental treatments under general anaesthesia. Examination revealed hypodontia with congenitally missing permanent canines, generalised severe microdontia, spacing, hypoplasia, small pulp spaces and under developed root formation. Due to the risk of the patient having a cerebral stroke with either another GA or under stress of a difficult procedure, the patient was managed conservatively. As a result, a preformed metal crown (SSC) using Hall technique was decided to be placed on the left mandibular permanent second molar. Follow up and rigorous prevention is planned.

Comments: Dental abnormalities in children with MOPD II have seldom been reported in the dental literature. The management of such patients requires the appropriate liaison with the medical team taking into consideration a full detailed and updated medical history. Conservative approaches are indicated in these situations where radical interventions might be a contraindication.

PR02.61

Molar-Incisor-Hypomineralization (HIM) in a group of Brazilian preterm children: preliminary findings

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Background: The definition of preterm birth is children who born alive before 37 weeks of pregnancy. In Brazil, the population-based data showed 10.7% of preterm birth prevalence in 2011. Because of the infection morbidities, poor feeding and lack of optimal nutrition, preterm children may have a higher risk of developing hypomineralized teeth.

Aim: The aim of this descriptive study is to investigate the occurrence of hypomineralization permanent incisor and molar teeth (HMI) in children born prematurity.

Design: Total of 24 preterm patients (29–35 weeks pregnancy-age, 15 males, 9 females, 10–14 years old) were attending at premature dental service (Federal University of São Paulo) in order to diagnosing and classifying molar-incisor hypomineralization (MIH index) according to European Academy of Paediatric Dentistry criteria. The dental examination was performed after professional cleaning and a numeric score was record for each tooth: no defect (0); demarcated opacities (1), pos-eruptive enamel loss (2), atypical restorations replacing the affect dental hard tissue (3), molar extraction because of pronounced hypomineralization (4) and uneruption molar or incisor (5).

Results: 284 teeth were evaluated in 24 children. 76 (26.8%) were no rated HMI index, 181 (63.7%) had rating score 1, and 27 (9.5%) were classified by score 2. No teeth were rated with 3 or 4 score.

Conclusions: The finding of this preliminary study is a high number of affect teeth in demarcaded opacity (score 1) in premature children. Pre and perinatal factors might influence in the development of the permanent teeth.

PR02.62

Premature exfoliation of primary teeth – a case report

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Introduction: Non-traumatic, early exfoliation of primary teeth can be a daunting experience for children and their parents. Hypophosphatasia is a rare condition causing pre mature exfoliation of teeth due to defective mineralization secondary to reduced alkaline phosphatase activity. The symptoms are highly variable and severity of disease is not directly related to serum alkaline phosphatase levels.

Case report: A 4 year old boy was referred from the community dental services regarding premature exfoliation of primary teeth in spite of good oral hygiene. Following minor dental trauma 71, 72 and 81 were lost starting at 11 months of age. Increasing diastema between 51 and 61 was a further concern reported by the patient's mother. Pocketing of 4 mm was detected around 51 in the absence of other periodontal pathology. Dental radiographic examination revealed bony support at the apical one third of 51 and 61 roots and up to apical half of 82 root. Subsequently, in spite of maintaining excellent oral hygiene, 51 and 61 were lost. Histopathological examination of one exfoliated tooth revealed the cementum layer was atrophic except near the apex. Blood tests confirmed reduced alkaline phosphatase level and radiographic assessment identified serious irregularity and sclerosis of distal metaphysis, features consistent with hypophosphatasia. Genetic studies are under way.

Comments: In some children premature loss of primary teeth may be the initial presenting complaint of hypophosphatasia. It is important for paediatric dentists to identify this condition and initiate an appropriate referral for medical management.

Dental Anxiety and Behavioural Management Poster Session – PR03

PR03.01

Pulpal laser anaesthesia vs local anaesthetic injection

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Aim: To evaluate the acceptance and efficiency of laser induced pulpal anaesthesia, during conventional cavity preparation in primary and permanent teeth.

Design: It is a randomised cross-over clinical study. The study includes 14 children of 5–9 years old for primary teeth and 24 patients of 10–25 years old for permanent teeth. ICDAS: 4 or 5. Two conventional cavities treatments were made at each subject, one under local anaesthesia by injection, 20 mg lidocaine hydrochloride (2%) with epinephrine 0.0125 mg (1 : 80,000) and one under pulpal anaesthesia by low level laser irradiation, 810 nm, 600 μ m, spot size 6 mm, 250 mW, 120 s. The sequence of the two treatments was random. Wong Baker faces pain scale was used for self-reporting of pain felt during cavity preparation.

All persons gave their informed consent prior to their inclusion study.

Results: Mean value for primary teeth: 0.71. Permanent teeth: mean value was 1.37 for laser anaesthesia and 1.25 for conventional anaesthesia. A comparison of quantitative variables between the two different methods of anaesthesia was performed (Wilcoxon test) resulting that there were no statistical significant differences in the pain level between them.

Conclusions: It was possible to provide painless cavity preparations after laser anaesthesia in permanent and primary teeth. It is an important method of behavioural management of dental patients and conduces in the reduction of the pharmacological agents overuse.

PR03.02

Environmental factors affecting children's anxiety & coping with dental general anaesthesia

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Background: In paediatric dentistry there is still a high need for dental general anaesthesia (DGA). Ensuring a positive hospital experience for those children is thus regarded of high importance, as it will influence their future dental attitudes. The ability of a child to cope with the hospital experience is determined by a variety of factors; both genetic and environmental.

Aim: To detail the literature related to the impact of the hospital environment on children's anxiety and coping with DGA via a systematic/narrative review.

Design: An electronic search of the literature was carried out from 1985 to the present, using terms related to the hospital environment, children's anxiety and general anaesthesia (GA).

Results: A total of 113 papers were identified that dealt with children's anxiety or coping with GA one way or another. There were no studies identified in the literature directly related to DGA.

Review summary: The link between the hospital environment and patients' anxiety is well established; however with regards to children the literature remains scarce. Environmental factors affecting children's anxiety include elements of: the physical environment (space, interior décor, colours), the sensory environment (artwork, music, scents), the social environment, noise levels, waiting times and others. Alleviating children's anxiety and enhancing patients' satisfaction is now widely recognized as integral to the provision of high quality care 'patient centered care'. **Conclusion:** Environmental factors play a significant role in modulating the child's anxiety and coping with DGA. Future studies of high quality are needed in that area.

PR03.03

Managing patients with special health care needs – are we there yet?

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Background: Special Care in Dentistry has been a controversial segment of Dentistry especially when focusing on the patient behaviour management and treatment planning in a clinical setting. Various techniques contemplating behaviour management and desensitisation have been proposed and practiced all over the years. Nevertheless, when it comes to exercising them in our daily clinical practice it seems to become not a feasible easy option.

Hospital Dentistry has been showing to be a valuable resource; however, often it is not a possible choice for a large number of patients, neither the various levels of Sedation – Conscious or Intravenous – especially when taking into consideration the variables regarding the health systems in place in each Country, around the World.

Aim: The aim of this presentation is to review and discuss the different approaches regarding the behaviour management and oral care of the patients with Special Health Care Needs, and consequently of their families and caregivers.

Conclusions: Summarizing the possible factors for a successful and not as successful use of such techniques, daring to bring out a new perspective into the 'Dentistry for Patients with Special Health Care Needs'.

PR03.04

Attitude towards oral health and prevalence of caries in school children in Tijuana, BC Mexico

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Aim: Identify the attitude towards oral health and caries prevalence in school children in Tijuana, Baja California.

Design: For this study, 560 children from 13 primary schools and one secondary school were reviewed in the city of Tijuana, Baja California, whom they observe the presence or absence of caries by the epidemiological index Knutson and we applied the survey in attitude Likert scale.

Results: A total of 562 children distributed in 13 primary schools and one secondary school in the city of Tijuana were reviewed, Baja California. The results of attitude increased frequency of response according to the Jose de Jesus Lopez Elementary School with 94.4%, primary school Otto Murillo in response hesitant 50.6% and school reform laws with 14.7% in disagreement response was observed and In the lower frequency response was observed according to the Lázaro Cárdenas elementary school with 47.9% undecided response in the José de Jesús López primary school with 5.4% and response also disagree primary school José de Jesús López. Results caries prevalence was observed more frequently in the prevalence of caries in primary school Lázaro Cárdenas 91% and a lower prevalence of caries in primary school Emma A Bustamante.

Conclusions: It was concluded that 66.6% of schoolchildren, agreed with the survey but alarming is the data observed among 26.9% undecided well as those who had to be disagreement with 6.5%. The relation of attitude and caries that 66.6% who agreed and healthy patients with 55%.

PR03.05

Evaluation of the effect of general anaesthesia and restraint during dental treatment on dental anxiety and behavior in children

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Background: The impact of restraint and general anaesthesia (GA) on the level of children's dental anxiety and behavior are very concerned by pediatric dentist and parents.

Aim: To compare the level of dental anxiety and behavior between dental fear (DF) children with dental treatment under general anaesthesia and those under restraint.

Design: The GA group and restraint group both included 31 4–6 years old DF children. Age, gender, DMFT and MCDAS_F score before treatment were matched. The Chinese version of MCDAS_F was used to evaluate the level of dental anxiety in each child before treatment, right after treatment and before examination at recall visit. The Chinese version of Venham clinical anxiety and cooperative behavior scale was used to evaluate children's dental behavior in each child before treatment and before examination at recall visit.

Results: The average scores of MCDAS_F in GA group right after treatment and before recall were significantly lower than that before treatment ($P < 0.05$). Furthermore, the average score of MCDAS_F before recall was lower than that after treatment ($P < 0.05$); The average scores of MCDAS_F in restraint group right after treatment and 2–3 weeks after the treatment were higher than that before treatment ($P > 0.05$). Children's dental behavior was significantly improved at recall visit in both groups ($P < 0.01$).

Conclusion: Dental fear could be reduced by treatment under GA. And children's dental behavior was improved after GA. Restraint did not result in the significant elevation of dental anxiety level, but dental behavior was improved after restrain during short-term recall.

PR03.06

Comparison of oral and intramuscular ketamine, midazolam, atropine for sedation of 1–4 year old uncooperative pediatric dental patients

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Aim: The purpose of this study was to evaluate the efficacy and safety of a mixture of ketamine, midazolam and atropine and compare oral and intramuscular routes for sedation of pediatric uncooperative dental patients

Design: This crossover clinical trial included 31 1–4 year old pediatric patients who were definitely negative (Frankl behavioral scale), randomly received Oral ketamine (10 mg/kg), midazolam (0.2 mg/kg) and atropine (0.02 mg/kg) in one session while ketamine (6 mg/kg), midazolam (0.05 mg/kg) and atropine (0.02 mg/kg) through the IM route. Sedation scores, were recorded as well as behavior ratings (Haupt scale), physiological parameters. Each case was selected and assigned for two groups based on two similar size Dental treatment needs.

Results: A significantly deeper sedation was noted in patients at their IM session than their Oral ($P < 0.035$). There were no significant differences in sleeping, movement, crying and overall behavior scores and physiological parameters in two treatment groups ($P > 0.05$). Success rate at the first 15 min was 80.7% in the oral route and 87.1% in the intramuscular. Nausea, vomiting, visual disturbances and hallucination were reported. Practitioner and parent's satisfaction of the oral and intramuscular routes did not differ significantly ($P > 0.05$).

Conclusion: This cocktail provides sedation similar to that produced by the same drugs given IM. Because of children's preference for oral medications, it can be used in limited and emergency dental treatments in uncooperative patients.

PR03.07

Efficacy and outcome assessment of a specially designed augmentative communication program for managing children with special health care needs in a pediatric dental set-up

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Background: Dental care is the most prevalent unmet health care for special children affecting substantially more children than any other health care need category in India. The most common reason given by caretakers and practicing dentists is lack of education about managing them in the dental set-up.

Aim: To evaluate the efficacy of a specially designed AAC system software in improving: >communication skills of children and their caretakers/special educators with the dentist.

>specific Behaviour towards specific dental procedures.

Design: A longitudinal study wherein 590 SHCN subjects aged 7–16 years with none to moderate difficulty (Capacity and Performance qualifiers for Activities and Participation as per (ICF) were subjected to a specially designed software program named 'Special smiles for special child' in english and spoken regional language after baseline assessment of knowledge of caretakers/special educators as well as special children through a pre-assessment questionnaire scored on a three point likert scale. Dental behaviour of the subjects was assessed by pre-calibrated clinicians

through two behaviour rating scales before subjecting them to the program. Evaluation and reinforcement sessions were carried out at equal intervals of time for a total of 24 months.

Results: Wilcoxon Signed Ranks Test was applied to non-parametric data to study the change in behaviour before and after training. The results were evaluated with P value <0.001 level of significance and found to be highly significant for all dental procedures.

Conclusion: This training method proved to be beneficial to treating dentists in improving behaviour issues of special children in a dental set up.

PR03.08

The effectiveness of using visual pedagogy in dental checkups and preventive dentistry for children with autism: a randomized clinical trial

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Background: Autism is a pervasive neuro-developmental disorder. The purpose of this study was the evaluation of using visual pedagogy in dental check up and preventive dentistry for children with autism.

Material and methods: In this Randomized clinical trial study (IRCT2014102519665N1), the level of cooperation for 4 purposes including: Entering the dental surgery and sitting in the dental chair, opening the mouth and showing the teeth, examining with mirror and fluoride therapy, has been evaluated. Forty children with autism aged 6–12 years, in Autism Charity Center recruited. Children in the test group were trained by center trainers to get familiar to dental visit by the use of visual pedagogy method, step by step. Finally the data was analyzed using statistics test such as Cochran test, chi square test and fisher test.

Result: Cochran test proved that the level of cooperation only in fluoridtherapy was significantly increased in test group with the repetition of dental visit and training ($P \leq 0.001$), but the level of cooperation with the repetition of dental visit and training had no difference in control group ($P = 0.41$).

Conclusion: The result of this study proved that the visual pedagogy method in fluorid therapy has been effective significantly in the test group. The results showed that the repetition of dental visits was more effective to increase the level of cooperation in purposes such as entering the dental surgery, opening the mouth and showing the teeth and examining with mirror.

PR03.09

Degree of anxiety and colour priority of child in a dental session

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Introduction: Anxiety and fear are present in minds of many patients during dental procedures. Being able to prefer provides more positive interaction and cooperation between patient and dentist.

Aim: To determine the degree of anxiety and choice priorities of children in between the coloured mouth rinsing liquids during a dental treatment session (DTS).

Methods: Totally 222 children (ages 3–15 year old; mean age: 8.70 ± 2.40 ; 112 female, 110 male) assessed in this study. Beginning of DTS, child's anxiety scored by using FIS (Facial Image Scale). Three transparent cups filled with water, green and pink rinsing solutions and aligned near dental unit. During DTS, child was told to rinse his/her mouth with one of the cups whichever he wanted. The preferred colour of cups, gender, age and number

of sessions were recorded. All the recorded data were statistically analysed by SPSS 15.0 programme and chi-square tests.

Results: FIS scores of children who were younger than 9 years old were 2, and older children's scores were 3. FIS scores of boys were 3 and girls were 2. According to FIS scores, age was a statistically significant criteria, but gender was not. Children preferred water 48.7%, pink 27.2%, green liquid 17.4% and only 18 children tried all of the cups in one DTS. Children who preferred more than one cup had significantly ($P: 0.021$) higher FIS scores.

Conclusion: Water was the mostly chosen rinsing liquid. Children whose FIS scores were 3, may be curious about trying different colours of rinsing liquids.

PR03.10

Considering two scales for behaviour assessment during paediatric dental sedation

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Background: There are several scales but little information on their ability to properly assess children's behaviour during dental sedation procedure.

Aim: To evaluate the characteristics of two scales, Houpt scale and the Ohio State University Behavioral Rating Scale (OS-UBRS) in assessing the behaviour of preschool children during sedation for dental procedures.

Design: This observational study nested to a randomised clinical trial (NCT02284204) included 27 children, 4–6 years old, with early childhood caries. They were rendered dental treatment under moderate sedation with oral midazolam and ketamine. Dental appointments were video recorded; four trained and calibrated observers assessed video files to score children's behaviour according to the Houpt scale and OSUBRS. Data were analysed by descriptive, correlation and survival tests ($P < 0.05$).

Results: Based on 1209 min of observation, Houpt scores indicated that children were mostly awoken (median 1.0, minimum 1.0 – maximum 2.0), with controllable movement (3.5, 2.8–4.0) and mild crying (3.4, 2.4–4.0), and very good overall behaviour (5.0, 2.0–6.0). OSUBRS scores in a session were: quiet (54.4%, 23.3–100%), crying/no movement (6.4%, 0–38.5%), movement/no crying (0%, 0–23.3%), struggling (22.2%, 0–61.1%). Houpt and OS-UBRS scores significantly correlated ($\rho < -0.8$, $P < 0.001$). Favourable behaviour was maintained for a median of 24 min (Houpt-movement), 23 min (Houpt-crying) and 22 min (OS-UBRS). Procedures more frequently associated with switching into less favourable behaviour were the insertion of rubber dam/clamp for absolute isolation and the administration of local anaesthesia.

Conclusions: Houpt scale and OSUBRS were strongly correlated and adequate to measure children's behaviour, mainly movement and crying.

PR03.11

The use of relaxation and needle desensitisation to treat and resolve dental phobia

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Introduction: Phobia is a clinical mental disorder where subjects display persistent and extreme fear of objects or situations with

avoidance behaviour and interference of daily life. Assessment with an appropriate clinical history and assessment tool (eg faces version of the Modified Child Dental Anxiety Scale – MCDASf), is recommended. Treatment success is based on dental treatment completion and resolution of the phobia.

Case report: An 8-year-old boy was referred for restoration of permanent molars. He was needle phobic with a 2 year history of attendances at general dental practitioner (GDP) and public dental service (PDS). Assessment history revealed a palatal injection (GDP) triggered his dental phobia, inhalation sedation was not successful (PDS). His MCDASf score was 31/45 indicating both dental and medical needle phobia. He was an information seeker and happy for relaxation exercises and needle desensitisation (ND). Clinical examination revealed caries in 16, 26, 36, 75 and 46, the OPT radiograph confirmed these teeth restorable. Relaxation was taught at his assessment visit. He completed the seven stage needle desensitisation over two visits, with L.A. administered and restoration of 16. All carious teeth were subsequently restored and at his review appointment he remains caries free both clinically and radiographically. His MCDASf is now 15/45.

Comments: A comprehensive assessment is essential in understanding the best treatment for dentally phobic children. An information seeker, taught to cope and understand (relaxation and ND) was the key to ensuring this patient's dental phobia resolved with discharge and care with GDP now possible.

PR03.12

Parent, dentist, and independent rater assessment of child distress during preventive dental visits

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Background: Clinicians, parents, and independent observers have varying interpretations of patients' stress behaviors. Some studies found medical and dental healthcare providers can underestimate children's pain while focusing on clinical procedures, a concept known as 'pain blindness.' Although typically not painful, preventive dental care may be difficult for preverbal children. Learning how parents, dentists, and independent observers perceive child distress facilitates better understanding of clinical interactions during pediatric preventive care.

Aim: This study examined the concordance between parent and dentist ratings of child distress during preventive dental procedures and compared each with the assessment of an independent observer.

Design: 65 children under 3 years of age enrolled in a government insurance program for low-income children were seen for preventive dental care at a university-based dental clinic. Parents, dentists, and an independent observer rated intensity of child distress on a 5-point scale (0 = none; 5 = extreme) during 4 phases of the dental visit: pre-examination, positioning, visual examination, cleaning and fluoride application, and after examination.

Results: The average age of the children was 24.4 months (SD 7.2). The visual exam with cleaning and fluoride was judged to be most distress inducing. Mean distress ratings for this phase were: 2.30 (parents), 2.47 (dentists), and 3.08 (independent observer). Scores given by all three raters were highly correlated and ranged from a correlation of 0.76 (parent and dentists) to 0.85 (dentists and independent observer).

Conclusions: Our findings suggest that dentists do not have 'pain blindness' in judging young children's distress during preventive dental procedures.

PR03.13

Comparison between two types of video eyeglasses in management of pediatric dental patients

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Background: Distraction is one of the most popular techniques for behavior management of child dental patients. Ideal distraction should isolate the child from the dental environment, and wireless video eyeglasses is able to do so by replacing the signals from the environment by a pleasant movie.

Aim: This study compared the use of 3-D vs 2-D audiovisual distraction in management of child dental patient, using video eyeglasses.

Design: A total of 60 children, 4–8 years, requiring restorative dental treatment were recruited for this study. They were randomly assigned for one of three groups; using either 2D video eyeglasses (group A), 3D video eyeglasses (group B), or traditional audiovisual distraction (group C). Anxiety level was assessed using Venham's scale. Behavior was assessed using Modified Houpt Scale, and pulse rate was monitored using pulse oximeter.

Results: There was a significant decrease in anxiety between both group 'A' and 'B' in comparison to group 'C'. Behavior was significantly improved in both groups in comparison to group 'C', while intergroup comparison showed insignificant difference between group 'A' and 'B' regarding anxiety level and behavior ratings. Pulse rate showed significant lower levels in both group 'A' and 'B' in comparison to 'C', with insignificant difference between 'A' and 'B'.

Conclusions: The use of both types of eyewear is more effective in distracting children in the dental office, in comparison to traditional audiovisual method. The use of 3d is of comparable effect to the use of 2d video eyewear.

PR03.14

Children's intelligence quotient following dental general anesthesia: clinical observation

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Background: It has been demonstrated that anesthetics exposure may lead to neurocognitive impairment in developing brain of animal models. However, for the limitation that the animal models cannot fully mimic the dose and duration in clinical settings, the clinical significance of anesthetics exposure on developing central nervous system remains undetermined.

Aim: We conducted the current study in order to observe the fluctuation of intelligence quotient (IQ) after the administration of dental general anesthesia comparing to that before surgery.

Design: Thirty three patients who were exposed to dental general anesthesia, aged 4–6.5 years, were enrolled in this prospective study. Intelligence quotient was evaluated with the Chinese Wechsler Young Children scale of Intelligence (Urban version) before and 2 weeks after dental anesthesia.

Results: The results of intelligent assessment from 28 subjects were collected. The postoperative Full IQ (128.46 ± 10.85) was higher than that before surgery (124.64 ± 11.46) ($P = 0.017$). We found that the elevation of Performance IQ, from a large extent, contributed to this changes in Full IQ ($P = 0.007$). Correspondingly, there was no statistical difference in the Verbal IQ ($P = 0.854$).

Conclusion: Dental general anesthesia has no negative effect on preschool children's intelligence. The Full IQ and Performance

IQ were slightly enhanced after treatment which can be explained by the memory effect.

PR03.15

An integrated care approach in the management of small children requiring dental treatment under general anaesthesia (GA)

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Background: Dental treatment under GA of small children leads to the improvement of quality of life of the children themselves and their parents.

Aim: At MSUMD a multidisciplinary team provides holistic treatment planning for uncooperative children. The objective of the study was to assess the medical status, nature and extent of treatment and outcome for patients treated in an integrated care pathway in 2012.

Design: The study group comprised of 97 children (43 boys and 54 girls; aged 1–3 years – 18 patients, 3–4 years – 42 patients, 5–6 years 18 patients). Dental caries was the most common diagnosis – 90%. All the children were uncooperative and the cases were selected only those where intervention was justified.

Results: Comprehensive dental care undertaken under GA, administered in a specially designed room by anesthesiologists, included preventive measures (70/78), dental extraction (30/78), adhesive resin restorations (70/78) and performed metal crowns (SSC) (23/78). All the patients entered a regular review programme at MSUMD. To date, none of the study group has required repeat GA.

Conclusions: An integrated care pathway minimizes the need for repeat GA and reduces morbidity in small children. Multidisciplinary planning, intra-operative assessment, strict treatment criteria and follow-up are integral parts of this approach.

PR03.16

Midazolam sedation for young children

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Background: midazolam sedation makes dental treatment in young children less traumatically from psychological point of view.

Aim: The objective was to determine the safety and efficacy of midazolam (orally or intramuscularly) for conscious sedation, when administered by anesthesiologists in a dental out-patient's clinic.

Design: 1116 teeth that should be treated in 132 children aged between 1 and 5 years were under study. The selection criterion was Frank LS et al II- III. Exclusion criteria were any conditions that predispose to airway difficulties and the use of medications interfering with pharmacokinetics of midazolam. All the children were previously examined by the anesthetist. Informed consent was obtained. The patients received 0.005–0.15 mg/kg of midazolam as injections or 0.5–0.75 mg/kg per os as cherry syrup.

Results: 605 teeth with caries were treated – 54.2%; 355 teeth with chronic pulpitis were treated – 31.8%; 156 cases of periodontal disease were treated – 14%; 114 teeth (1, 3%) were extracted under sedation. All the manipulations were performed for one visit or for two visits – 94 (71, 2%) and 38 (28, 8%) cor-

respondingly. Minor adverse events, such a vomiting, hiccup and hyperexcitability occurred in 14% of sessions.

Conclusions: Midazolam sedation administered orally or intramuscularly and performed with anesthesiologists is a safe and effective method for dental treatment in very young children, on the condition of an appropriate selection of the patients.

PR03.17

Comparative study of articaine vs lidocaine for extraction of primary molars

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Background: Surgical procedures are quite challenging in children especially when cooperation is questionable. Thus the replacement of poorly tolerated inferior alveolar nerve block (IANB) and palatal injections by buccal infiltration of articaine required to be tested.

Aim: The objective of this study is to compare the clinical effectiveness of 4% articaine vs 2% lidocaine buccal infiltration anesthesia during extraction of mandibular and maxillary posterior teeth in children above 6 years.

Design: This prospective, randomized, split-mouth comparative study was conducted on 60 children (6–10 years old) requiring extraction of unrestorable primary teeth or remaining roots for bilateral mandibular or maxillary primary molars. Children were randomly assigned to receive buccal infiltrations of 4% articaine on one side and 2% lidocaine on the other side, at two separate dental visits. Child pain and behaviour was assessed using face, leg, activity, cry and consolability (FLACC) Behavioral Pain Assessment Scale. Child overall experience and postoperative self-report of pain was also assessed using the Wong-Baker FACES pain rating scale.

Results: Articaine buccal infiltration anaesthesia showed significantly higher clinical effectiveness than lidocaine in extraction of primary maxillary and mandibular teeth in children. Concerning the FLACC behavioral pain scale and self-report of pain using Wong-Baker FACES scale articaine infiltration showed significantly lower scores over lidocaine.

Conclusion: Under the conditions of this study, articaine buccal infiltration anaesthesia provide an effective, deep and less painful alternative to anaesthize primary molars and related lingual and palatal gingival tissues utilizing less anaesthetic dose.

PR03.18

Acceptance of child behavior management techniques by a group of Cambodian mothers

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Introduction: Success of child management in dentistry does not solely depend on expertise of clinicians to use techniques but also on parental acceptance toward those techniques which varies among population. In Cambodia, mothers play an important roles in child cares and their attitudes toward the techniques have not yet been explored.

Aim: To evaluate Cambodian mothers' acceptance toward different behavioral management techniques effectively used in dentistry.

Design: There were 417 mothers of preschoolers in Phnom-Penh participated. Background information of the mothers and children including child oral care were recorded. Mothers were asked to watch video tape showing seven behavior management techniques utilizing on a preschooler, Passive Restraint, Parent Present/Absent, Oral Sedation, Active Restraint, Tell-Show-Do, Voice Control and General Anesthesia in random order and rated the technique in Likert Scale from strongly disagree (1) to strongly agree (5) at each technique ended. Wilcoxon signed Ranks Test was used to determine if there were significant differences among the mean scores of each technique.

Results: Ranking from the most acceptable to the least acceptable were: Tell-Show-Do (4.58), Parent Present/Absent (3.60), Passive Restraint (3.62), Active Restraint (3.36), Voice Control (3.18), Oral Sedation (2.76) and General Anesthesia (2.50). The mean Likert score for Parent Present/Absent was not different from Passive Restraint, whereas other techniques were significant differences from each other ($P = 0.001$).

Conclusion: Cambodian-mothers prefer communicative and non-pharmacological techniques to pharmacological ones. Voice control is the least accepted in communicative techniques. The two least accepted techniques are oral sedation and general anesthesia.

PR03.19

Comparative evaluation of clinical effectiveness of a vibrating device (Vibraject) and surface anesthetic agent in reducing pain during local anesthesia injection

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Background: Local anaesthesia (LA) administration commonly used in paediatric dentistry to avoid pain requires needle injection which itself is accompanied with significant pain. We frequently use surface-anaesthetics (SA) to avoid pain but with varying success. 'Vibraject' has recently been introduced that claims to alleviate pain significantly.

Aim: Randomized-clinical study was undertaken to comparatively evaluate clinical effectiveness of 'VIBRAJECT' and SA agent in reducing/alleviating pain during intra-oral LA injection.

Design: 120 participants of age group 5–12 (ASA grade-I) requiring administration of intra-oral LA were selected and randomly divided into 3 equal ($n = 40$) groups using three-different intervention strategies; Vibraject, 20% Benzocaine gel and Normal Saline (Control-NS) respectively. 'Vibraject' (vibrating motor) was attached to dental syringe through its autoclavable attachment and kept-on during administration of LA injection. In Group-2 and 3, Benzocaine and Normal Saline (NS) were applied topically for 1-min prior to LA injection. Pain perception using Sound-Eye-Motor (SEM) and Wong-Baker FACES (FS) pain rating scale during and after LA administration was assessed and videotaped later seen by Observer-2 who also gave SEM scores independently. Mean score of Observer-1 and 2 was considered.

Results: For both SEM and FS parameters, Vibraject showed minimum mean pain scores (Mean^{SEM} = 3.70 ± 0.99 , Mean^{FS} = 0.95 ± 1.28) followed by Benzocaine (Mean^{SEM} = 6.08 ± 1.79 , Mean^{FS} = 3.90 ± 1.50) and NS (Mean^{SEM} = 7.13 ± 1.71 , Mean^{FS} = 4.70 ± 1.40). Kruskal Wallis-H test for intergroup comparison showed highly significant result ($P^{\text{SEM}} < 0.001$, $P^{\text{FS}} < 0.001$). Mann-Whitney U-test, where Benzocaine and NS were compared with Vibraject also showed significant results ($P^{\text{SEM}} < 0.001$, $P^{\text{FS}} < 0.001$).

Conclusion: Vibraject was able to alleviate pain of needle administration significantly better than benzocaine and control.

PR03.20

The application of video glasses to manage challenging paediatric dental situations

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Introduction: Dental fear in the paediatric population can be a significant barrier resulting in failure of treatment delivery. Pharmacological management techniques utilised to tackle this problem require specialised equipment, staff training and are expensive. With recent advances in technology, video glasses are an economic and novel distraction technique that can overcome this barrier.

Case reports: A healthy 5 year old boy was referred for a general anaesthetic to extract carious primary teeth due to anxiety. Inhalational sedation was contra-indicated as he was a mouth breather. Using video glasses, we were able to stabilise his dentition by carrying out vital pulpotomies and stainless steel crowns, thus avoiding the need for a general anaesthetic.

An immature and non-vital UR1 in a 7 year old girl was being managed under inhalational sedation. It was difficult to provide a hermetic seal with the rubber dam due to the nasal hood. The video glasses engaged her attention and allowed root canal treatment to be undertaken comfortably.

A 15 year old Aspergers syndrome girl with hypodontia was under fixed appliance therapy to correct her malocclusion. A heavily restored lower left first permanent molar devitalised and was unable to be managed by her local dentist. The ability to choose and watch her favourite movie in the dental surgery allowed root canal treatment to be undertaken successfully.

Comments: There is a paucity of data for dental treatment facilitated by video glasses. It has been shown however to be an alternative cost-effective method in improving a child's dental experience.

PR03.21

Computer capillaroscopy assisted assessment of stress level in children undergoing dental treatment under conscious sedation

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Background: Dental treatment of infants and pre-school children is challenging with general anesthesia and conscious sedation (MCS) being the most popular options for behavioral control. Standard techniques of monitoring do not always provide accurate determination of stress level in children.

Design: The research involved 298 children. 256 of them were treated under MCS (intramuscular injection of midazolam in dosages of 0.1, 0.15, and 0.2 mg per kg) and 42 constituted reference group treated without MCS. Following microcirculation parameters were recorded by capillaroscopy (CC): density of capillary net, size of arterial, venous and transitional microcirculation links (ML), linear and volume blood flow velocity, perfusion balance.

Results: Statistically significant difference especially prominent in children undergoing oral surgery procedures was obtained in

parameters when comparing midazolam group with reference group ($P < 0.05$). Midazolam group demonstrated the reduction of blood pressure and heart rate, the raise of SpO₂, the increase of capillary net density and of the transitional ML size. The dynamics of physiological parameters did not show any notable differences. Likewise, no influence of the anesthetic dosage or child age was noted for both groups.

Conclusions: Children undergoing dental treatment without MCS are affected by stress. The degree of stress in surgical patients was noted to be significantly higher. The absence of physiological parameters changes in children treated without MSC does not prove the absence of stress. The increase of midazolam dose over 0.15 mg per kg is not associated with further reduction of stress.

PR03.22

Dental treatment in a patient with Ullrich congenital muscular dystrophy under total intravenous anesthesia

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Introduction: Ullrich congenital muscular dystrophy (UCMD) is characterized by early-onset, generalized and slowly progressive muscle weakness, multiple proximal joint contractures, marked hypermobility of the distal joints and normal intelligence. Weakness of the facial muscles, a high-arched palate, congenital hip dislocation, protrusion of the calcaneus, torticollis, contractures, and distal laxity may be the neonatal findings. Motor milestones are delayed. Muscular dystrophy patients appear abnormal reactions to several drugs. Especially, the development of malignant hyperthermia during inhalation anesthesia for patients with muscular dystrophy is a concern.

Case reports: A 8-year-1-month old, 27 kg girl with Ullrich congenital muscular dystrophy was scheduled for dental treatment of multiple caries. She was poorly cooperative for treatment due to developmental delay and movement disorder, so general anesthesia was considered. Dental treatment - resin restoration, pulpotomy, and stainless steel crown restoration - was successfully performed under total intravenous anesthesia (TIVA). There were no airway complications and signs of hyperthermia during anesthesia.

Comments: In conclusion, our cases suggest that TIVA may be a safe strategy for dental treatment in uncooperative patients with progressive muscular dystrophy considering the possibility of sedation - related airway problems.

PR03.23

Dental phobia with anxiety in adults who needs comprehensive dental treatment: a case report

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Introduction: Dental phobia is the severe fear of dentistry and dental treatment. It may not only affect patient's healthiness, but also affect their social life. We describe a 32-year-old female who had suffered from dental phobia since childhood and asked for comprehensive dental treatment.

Case reports: A 32-year-old female had suffered from fear of visiting the dentist, and severe dental problems made her depressed and affected her social life for years. She was diagnosed as dental phobia with anxiety by her psychiatrist, hence Lorazepam was prescribed. The clinical examination revealed multiple tooth cavities, full mouth heavy calculus accumulation, and multiple un-restorable teeth. We tried behavior management and some simple

dental treatments, but in vain, the patient was whining and trembling during treatments. Hence we arranged comprehensive dental treatment under general anaesthesia, which included composite resin filling, endodontic treatment following by direct resin restoration, extraction of non-restorable teeth, and full mouth scaling. After the full mouth dental treatment, the patient's dental fear had lessen and was finally able to receive simple dental treatments. Consequently, she was referred to our Prosthodontics department for the fabrication of removable partial denture in the upper jaw. Now, she visits our department for a regular dental check-up every 3 months.

Comments: Dental phobia is a huge barrier of dental care and could have a severe impact on patient's social life. Therefore, comprehensive treatment under pharmacologic management is an effective and a worthy regimen for regaining their good oral hygiene, confidence, and normal social life.

PR03.24

To compare the efficacy of various sedative agents - oral, inhalational and intravenous, in children for minor dental procedures

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Background: Behaviour management is of paramount importance in the field of pediatric dentistry. When non-pharmacological techniques fail sedation remains the next choice for the control of pain and anxiety, where there is always a need for newer combinations of sedatives agents.

Aim: To compare the efficacy between the five groups, nitrous oxide (NO), nitrous oxide with midazolam premedication (NM), oral combination of midazolam and ketamine (KM), intravenous combination ketamine and propofol (KP) and intravenous combination of ketamine and dexmedetomidine (KD) for sedation in children undergoing minor dental procedures.

Design: 75 Patients were selected, evaluated according to the criteria decided and divided in equal numbers of 15 amongst five groups NO, NM, KM, KP and KD. Informed consent was taken, NPO (Nil per Oral) guidelines were followed and the study drug was delivered. The heart rate (HR), blood pressure (BP) and oxygen saturation (SPO₂) were monitored continuously throughout the procedure. The Modified Ramsay sedation (MRS) score was recorded along with Houtp and later recovery status was accessed by Modified Aldrete's recovery scale. The results were statistically analyzed by one way anova, posthoc assessment tukey test and chi square test.

Results: The sedation achieved with Ketamine-Dexmedetomidine was adequate and highly significant (P values for MRS = <0.001 , Houtp = <0.001) compared to all other groups, but the postoperative recovery was fastest and highly significant with Nitrous-oxide group (Recovery scale: P value = <0.001) followed by Nitrous-Midazolam, Ketamine-Midazolam, Ketamine-propofol and Ketamine-Dexmedetomidine respectively.

Conclusion:

- 1) Ketamine-Dexmedetomidine intravenous combination has the best efficacy.
- 2) Nitrous-oxide had the fastest recovery and ease of delivery.

PR03.25

Dental treatment under general anesthesia (DGA) among healthy and medically compromised children

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Background: Dental care in general anesthesia (DGA) is an option when normal dental care cannot be accomplished especially for children.

Aim: The aim of this study was to investigate DGAs and causes for them among healthy and medically compromised children.

Design: Data were collected from the medical records of children under 7 years of age treated under DGA in 2009 and 2010 in the Oulu University Hospital, Finland. Background information (year of DGA, age in months, gender, dental and medical diagnosis, ICD10) as well as DGA procedures were registered. In analyses Chi-squared test was used; difference was considered significant with *P* values < 0.05.

Results: The number of children treated in DGA was *n* = 140; mean age was 57.3 months (SD 15.91). Proportion of boys was bigger than that of girls (*n* = 81; 57.9%). Majority of the study group were healthy (72.1%). Dental caries and fear were the two main causes for DGA of all children. Procedures under DGA were not associated with general health, rather the age; i. e. children 35 months or younger had commonly stainless steel crowns, whereas extractions were more common among children >35 months. Medically compromised children had had more frequently DGAs (16.2%) in the past compared with healthy children (5.2%).

Conclusions: Threshold for treating medically compromised children in DGA seems to be lower than treating healthy children. To avoid unnecessary DGAs, caries control should be emphasized for all children according to individual needs. Children and parents need information and continuous support for good self-care.

PR03.26

Evaluation of pediatric patients' needs who treated with sedation in the first place: a retrospective research

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Background: Treatment of pediatric patients could be challenging. To treat them effectively, application of various behaviour management techniques could be required.

Aim: It is widely known that basic behaviour guidance techniques are pretty successful in managing dental behavioural problems. The aim of this research was to investigate if the pediatric patients treated under sedation in the first place require to be treated under sedation again for their further dental treatment needs.

Design: The data received from the records of 1190 patients who referred to Gazi University Faculty of Dentistry Department of Pediatric Dentistry between 2012–2014 and treated under deep sedation. 499 patients with various systemic diseases and syndromes excluded from the study.

Results: % 57 of the sedated patients were boys and 43% were girls (*P* = 0.05). Mean age of the patients was determined as 3.96

(*P* = 0.05). 239 patients out of 610 visited the clinic again with the need of dental treatment (% 34.6) (*P* = 0.05). 142 of those 239 patients required sedation for the second time (% 59.4), whereas 97 (% 40.6) patients were treated without sedation (*P* = 0.05). There were no statistical difference between the ages of the patients required sedation for the second time, and the patients who were treated without sedation after the first sedation.

Conclusions: It can be concluded that, the patients who are in need of sedation for dental treatment would possibly require sedation again for their further visits.

PR03.27

Child in the dental chair - communicating beyond words

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Background: Due to anxiety & fear, young children tend to be less co-operative in the dental setting. Even the very sight of the dental chair can frighten some children. It is therefore essential for dentists to have good communication skills - both verbal & nonverbal; to provide the best possible care for their child patients. Nonverbal communication accounts for majority of information transmitted during interpersonal interactions.

Aim:

- 1) To document through video analysis, nonverbal communication between the child patient and the dental team during paediatric dental consultations.
- 2) To identify patterns in nonverbal communication during dental consultations with child patient.

Design: A Pilot study (13 cases of 5–12 years old healthy children) was conducted to analyze nonverbal communication between the dental team and child patient during dental consultation. Naturally occurring routine clinical dental consultations were captured using audio-visual recording devices. The data was stored electronically and accessed for data analysis.

Results: All cases analyzed showed existence of nonverbal communication during paediatric dental consultations. The very young children (5–6 years) are almost always subjected to nonverbal communication in the form of body language like - hand gestures, body movements, facial expressions & body position. The frequency of use of body language decreases as the child's age increases.

Conclusions: Using body language to communicate is an integral part of paediatric dental consultations in gaining the confidence of a young, anxious child. This phenomenon decreases in older children, exhibiting physical & intellectual independence.

PR03.28

Diurnal bruxism treatment with behavior management: a case report

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Introduction: Patterns of oral behavior have been suggested as factors leading to head and facial pain. Bruxism is a habit that causes significant dental damage such as wear on teeth, damaged bone structures, craniofacial pain.

Case report: A 10-year-old girl was referred to the Department of Pediatric Dentistry, Gazi University, because of the pain on right side of her face. Patient and her parents reported that she had

diurnal bruxism. Extraoral examination showed that the patient was sensitive to palpation on her right cheek. The measurement results were determined according to limitation in mouth opening (24 mm). At first visit the patient was informed about the potential consequences in case of not quitting her habit. At weekly intervals the extraction of the teeth which are indicated for extraction due to exfoliation time arrival had been performed and the level of pain and mouth opening had been checked. In every visit she was motivated to quit her habit and in time she reported that the habit reduced gradually. At the end of 5th week it was found that the patient completely quit her oral habit and she wasn't gnashing her teeth any more. Mouth opening was determined as 41 mm which is within the normal range and she had no pain.

Comment: This case report describes the relationship between bruxism and pain, limitation in mouth opening. The treatment was performed only by providing the patient to quit her oral habit.

PR03.29

Dental anxiety in Czech pre-schoolers

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Background: Dental anxiety and uncooperativeness is common reason of preschool children's referral to the clinic. There are many factors connected to the origin of dental anxiety (DA) as child age, gender on one hand and the preceding experience on the other.

Aims: The aim of this preliminary study was to assess preschool children's level of DA using Venham picture test and to compare it to dental status.

Design: Local ethical committee approved the study. The child subjects were recruited in randomly selected public nurseries in the Czech Republic and based on parental informed consent. The investigators or teachers filled the questionnaire out with the children. Oral examination was conducted using head-light, mirror and probe. Caries status of every tooth surface was recorded together with child's age, gender and place of residence. Statistics - chi square test ($P = 0.05$) was used for comparison.

Results: The Venham test was completed by 138 children (64 girls, 74 boys), the dental examination underwent 124 children (54 girls, 69 boys), response rate 54.7% children within an age range of 2–7 years. Lower levels of DA were observed in children over 4 years (mean 0.88) and in boys (mean 1.4) compared to younger ones (mean 2.7) and girls (mean 1.9). Higher DA score correlated significantly with higher means of ds, ms and dmfs ($P < 0.05$) in both under and over 4 years of age.

Conclusions: The preliminary study confirmed that Czech pre-schoolers's dental anxiety level depends on the age, gender and dental status.

PR03.30

DentalVibe injection comfort system vs traditional syringe for palatal local infiltration anesthesia in children

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Background: Palatal local infiltration anesthesia is one of the painful procedures during dental treatment. Several methods

have been developed to minimize the injection pain of local anesthesia. A new procedure to reduce the injection pain is DentalVibe Injection Comfort System based on the vibration stimulus.

Aim: The aim of this randomized controlled crossover clinical study was to compare injection pain during palatal infiltration anesthesia injected by either traditional syringe (TS) or DentalVibe Injection Comfort System (DV) in pediatric patients.

Design: Sixty children who required palatal anesthesia for the operative procedures on their maxillary molars bilaterally were selected. One of the teeth was treated with a TS and the contralateral tooth was treated with the DV. A total of 120 injections were applied by using two different anesthesia systems. Subjective evaluations were performed using the Wong-Baker Faces Pain Rating Scale (PRS) and objective evaluations were performed with the Face, Legg, Activity, Cry, Consolability Scale (FLACC Scale) to measure each child's pain. Also preference of patient was determined. The data was evaluated using Mann-Whitney U and Wilcoxon t tests.

Results: There were no statistically significant differences between two injection methods for objective pain evaluation. Traditional syringe injections were detected more painful according to PRS. Most of the patients preferred DentalVibe injection.

Conclusions: The pain during palatal infiltration anesthesia administered with DentalVibe injection was less painful than traditional syringe according to self-report of the children.

PR03.31

Comparing dental stress in new child patients and returning patients using salivary cortisol, Immunoglobulin-A and alpha-amylase

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Background: Dental treatment can be a major source of anxiety and fear for patients, especially children.

Aim: This study was aimed at comparing dental stress in children having their first dental visit to those returning for dental treatment using salivary stress biomarkers including salivary cortisol (s-cortisol), Immunoglobulin-A (s-IgA) and alpha-amylase (s- α -amylase). Additionally, the study was aimed at monitoring the change in stress in new patients as they progressed from the waiting to the clinical areas.

Design: Salivary samples were collected from 40 children coming for their first dental visit and similar samples collected from 40 children who were returning for completion of dental treatment. Salivary cortisol, s-IgA and s- α -amylase concentrations were obtained by Enzyme-linked Immunosorbent Assay (ELISA).

Results: s-cortisol levels were higher for new patients at the waiting area compared to that while being in the dental chair ($P = 0.05$). Returning patients had higher s- α -amylase ($P = 0.001$) and s-IgA ($P = 0.016$) compared to new patients.

Conclusions: Children coming in for their first dental visit experience dental stress at the waiting area before being seated for dental examination. Returning children experience higher levels of stress compared to new patients possibly due to previous dental exposure. We recommend paying special attention to stress reducing techniques to returning children and new patients at the waiting area.

PR03.32

The increasing rate of autism spectrum disorders and associated factors in Taiwan

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Background: The prevalence of diagnosed Autism Spectrum Disorders (ASD) has increased rapidly over the last several decades among U.S. children, the increasing rate was 78% from 2002 to 2011 according to the CDC of America. Due to impaired social relationships, language, and communication, ASD usually needs pharmacologic management like sedation or general anesthesia for dental treatment. Recently, the case numbers of ASD was growing. We wonder whether the numbers of ASD was increasing in Taiwan.

Aim: To investigate the numbers of ASD, increasing rate, and the associated factors in Taiwan.

Design: According to the Ministry of Interior and Taipei Autism Children Social Welfare Foundation record, there were statistical data of diagnostic numbers of ASD and the increasing rate from 2006 to 2013 in Taiwan.

Results: The numbers of ASD was 6185 in 2006, 12,712 in 2011, and 13,366 in 2013. The increasing numbers was 1000 ASD per year. The increasing rate was 16.52% per year. ASD is the most rapid increased disorder among the groups of special need. The associated factors include genetic factors, complications during labor and delivery, virus infection during pregnancy, metabolic syndromes, and toxic exposure in pregnancy, and environmental factors. Among the suspected toxins surveyed, some ethers and aluminum adjuvants have increasing trends that correlate positively to the rise in autism.

Conclusions: Diagnosed autism prevalence has risen dramatically in Taiwan and other countries. Prevent infections and exposed to toxins during pregnancy and early detection are important for reducing the prevalence of ASD.

PR03.33

Acceptability and cognition of dental general anesthesia to parents in Xi'an, China

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Background: Researches have demonstrated dental general anesthesia (DGA) to rank the third most acceptable behavior management technique among all eight techniques in 2005. However, another survey showed that DGA was the penultimate one to accept. Meanwhile, there is no study to claim what the affected factors are.

Aim: To investigate the acceptability and cognition of DGA to parents and to analyze the possible affected factors.

Design: 1002 parents were included in this investigation. After explaining the DGA technique, parents filled the questionnaires which contained the parental age, income, educational level, types of medical insurance, and resident place. SPSS 11.0 software was used for statistical analysis. We used the relative number to express the level of the acceptability and cognition to parents, and used chi-square test to figure out the correlation between investigatory factors and the acceptability.

Results: Among all behavior managements in pediatric dentistry, parents' familiarity with DGA was lower than others. Only 6.69% of the parents had heard about DGA, and 20.76% of them would accept the technique when dentists suggested. The percentage of worrying about the side effects of anaesthetic was

61.98%, meanwhile more than 33.33% of them considered that anaesthetics would hurt children's physical and brain development. The income, educational level, and resident place were the statistically significant affected factors on parents' acceptability.

Conclusions: There was a low degree of acceptability among parents for DGA. The selection of DGA need informed consent of the parents. We should reinforce health education about behavior management techniques to the public.

PR03.34

Children's dental disease treatment effect observed under general anesthesia

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Background: In recent years, the low age children's dental caries incidence increased gradually. More and more children can't cooperate with the pediatric dentist, and so many children's disease is not treated in time. Present more demand for the treatment of general anesthesia. And treatment of the credibility of the general anesthesia is rising.

Aim: Observed the treatment effect for adopting the method of general anesthesia treatment of children's dental disease, and they cannot accept the usual dental treatment

Design: Through 2003.7~2013.1 statistic 3~8 years old children's dental patients with 252 cases, by adopting a one-time treatment under general anesthesia and monitoring of caries and pulpitis and apicitis etc. such as caries filling, root canal therapy, metal crown, extraction, space keeping etc. With 2 weeks, 6 months, 1 year, 2 years, follow-up the therapeutic effect was observed.

Results: 252 cases of children treated with general anesthesia, can reach pain relief, occlusal function to recover as much as possible, followed by the children's growth and development did not see abnormalities.

Conclusions: Treatment of children's dental disease under general anesthesia effect is reliable.

PR03.35

Factors correlated with children's dental anxiety in Latvia

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Background: Dental anxiety has multifactorial origins and manifestation, having remarkable consequences on dental health.

Aim: To evaluate relationship between children's dental anxiety (CDA), dental health (DMFt) and psychosocial factors.

Design: Totally 240 randomly selected children (mean age M = 7.96, SD = 2.61, range from 4 to 12) and their parents were taking part in the study. Parents evaluated their own (MDAS) and their children's anxiety (CFSS-DS). Psychosocial factors were evaluated by a large, newly developed questionnaire, consisting of seven blocks of independent variables: socio-demographical/ economical, medical experience, dental experience, parental/information, dental habits/behavior, children's character, family stress. Evaluation of children's dental status was performed according to WHO ICDAS criteria. Frankl's scale was used to evaluate child's behavior in the dental setting. Pearson's correlation and stepwise linear regression analysis were performed within the blocks of independent variables.

Results: Children's character (general anxiety and children's behavior at dentist) gave the most impact on CDA, totally explaining 55.4% of CDA variance. Dental experience (restorations under GA and negative experience) as well as parental/

information factors (parental anxiety and promising gifts before treatment), and medical experience (cautious attitude towards doctors) explained 39.0%, 29.7% and 33.8% of CDA variance, respectively. Socio-economical/demographical factors (number of children and mother's age) explained 11.8%, but children's dental habits (brushing as a duty) – 13.3% of variance. Family stress factors had no correlation with either CDA or DMFt and were excluded from further analysis.

Conclusions: Variables that represented children's character, medical experience as well as parental/information factors predicted CDA at the most.

PR03.36

Pharmacological vs physical restraint: a clear polarization among Brazilian paediatric dentists

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Background: In paediatric dentistry, behavioural management techniques aim to guide children to accept dental treatment with the least possible discomfort. Sometimes, uncooperative children should be managed with pharmacological methods such as sedation and general anaesthesia, instead of physical restraint, to have their dental treatment accomplished.

Aim: This study aimed to explore the attitudes of Brazilian paediatric dentists in regards to pharmacological methods and physical restraint for children's dental behaviour management.

Design: This survey included the attendees of the Brazilian Congress on Paediatric Dentistry, who were requested to answer self-administered questionnaires. The questionnaire covered items related to dentists' attitudes on pharmacological methods - relative analgesia, moderate sedation and general anaesthesia - and physical restraint for guiding uncooperative children behaviour. Data were analysed through hierarchical cluster analysis.

Results: 301 questionnaires were analysed (92.0% women; mean age of 38.5 years, standard deviation 8.9, range 23.0–66.0). Physical restraint was the most preferred behaviour management method; general anaesthesia was the least preferred one, no matter the child's age. Respondents showed clear familiarity to physical restraint method instead of pharmacological methods. Hierarchical cluster analysis found two-cluster solutions about dentists' attitudes, revealing two clear major groups: on one side those who mostly disagree about physical restraint and on the other, those that mostly disagree about pharmacological methods.

Conclusions: The majority of paediatric dentists are not familiarized and do not use pharmacological methods for child behaviour management in Brazil. Moreover, there is a clear polarization in Brazilian paediatric dentists' attitudes about physical restraint vs pharmacological methods.

PR03.37

Assess the relation between the behavior of children in home and in dental clinics

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Aims and objective: To check for any association between behaviour of the child in home and their behavior in dental clinics.

Study design: Parents / guardians of newly registered patients and walk-in patients to the Pediatric Dentistry clinic were involved. A Questionnaire was specifically designed is used to assess the Child behaviour at home and in dental clinics. Child behavior at home, were assessed under five categories such as emotional symptoms,

conduct problems, hyperactivity, peer problems and prosocial behavior.

Child behaviour in dental clinic was assessed by the investigator by using modified Frankl's Behavior Rating Scale. A total of 175 children of 3–14 years of age participated in this study.

Results:

- 1) 80% of children show abnormal behavior in home whereas only 8% shows good behavior.
- 2) 83% of child shows positive modified frankl scale in dental clinics during treatment followed by 7% of child showed definitely positive, 9% child showed negative scale and 1% constitutes definitely negative behavior.
- 3) Approximately 75% of child of all age groups, showed positive behavior in dental clinics. The child with negative and definitely negative behavior scale comes from lower age groups of 3–7 years.
- 4) 84% male and 82% female child shows positive behavior in dental clinics. The negative behavior is shown by 7% male and 11% female. The definitive negative behavior is shown by 1% of male.

Conclusion: The children behave differently in home environment and in dental clinics.

PR03.38

Prevalence of intra-oral injection fear in children and adolescents. Preliminary results

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Background: Reports on the prevalence of blood-injury-injection phobia (BIIP) are based on different criteria and do most frequently not distinguish between the subtypes, fear of intra-oral injections are included if at all reported.

Aim: To i) estimate among children and adolescents the prevalence of BIIP and the prevalence of its subtype intra-oral injection phobia and ii) explore their possible overlap with dental anxiety.

Design: This was a cross-sectional questionnaire study, performed in elementary schools in the county of Hordaland, Norway. The schools were randomly selected, and a total of 1400 of 10–16 year-old pupils were invited to participate. The questionnaire consisted of four psychometric instruments; Intra-Oral Injection Phobia Scale (IOIP), Injection Phobia Scale for children (IP-c), Mutilation Questionnaire for children (MQ-c) and Children's Fear Survey Schedule - Dental Subscale (CFSS-DS). Based on these instruments descriptive statistics were conducted. Cross tabulation analyses were used to explore the overlap between fear of injections and dental anxiety.

Results: Preliminary results will be presented.

Conclusions: Conclusions for the preliminary results will be presented.

PR03.39

Dancing tango on teeth and lips - a medical anthropological study on oral care for persons with profound intellectual and multiple disabilities

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Background: We are curious about how dentists understand patients' emotion by their facial expressions or body movements and release patients' fear during the oral care.

Aim: The study aims to explore how the patients with profound intellectual and multiple disabilities (PIMD) transform attitude from resisting to accepting, and how the role of dentists shifts during the process of oral care.

Design: A qualitative research study was conducted with hermeneutic phenomenological approach to explore the process of dental care for persons with PIMD.

- 1) This study is taken place at Special dental clinic of Kaohsiung Medical University Chung-Ho Memorial Hospital in Taiwan.
- 2) Research data are collected by field observation and in-depth interviews with family members of the patients and dentists. The data are analyzed by hermeneutic phenomenological research method.

Results: This qualitative research reveals explicitly that

- 1) The occurrence of fear begins in the waiting time.
- 2) The reaction of fear or reject to oral care of patients with PIMD might be the reflection of dentist internal feeling.
- 3) The approach for facing dental fear in PIMD is better with 'partnership' method than the dentist single-handedly dealing with the dental fear.

Conclusions: This qualitative research reveals explicitly fear has always existed, fear itself is not eliminated or generated; what changes it the attitudes and reaction toward fear. Physical body is the stage of doctor-patient communication. It's more than oral care and the whole process of oral care can be described as 'Dancing Tango on teeth and lips'.

PR03.40

Ehlers-Danlos alternative: a new syndrome for anesthesia?

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Introduction: Ehlers-Danlos syndrome is an inherited disease characterized by an alteration of connective tissue. EDS is due to mutations in genes encoding various types of collagen or collagen-modifying enzymes (collagen I, III, and V; tenascin-X (TNX); or lysyl hydroxylase-1) and leads an abnormal procollagen production by fibroblast. The prevalence of Ehlers-Danlos syndrome is estimated between 1 in 5000 and 1 in 10,000.

Clinical manifestations of the syndrome are joint hypermobility, skin hyperextensibility, and tissue fragility. The different types of EDS are classified into six types according to clinical signs: classical, hypermobility, vascular, Kyphoscoliosis, Arthrochalasia and dermatosparaxis types.

Because collagen is present throughout the oral and maxillofacial area, specialists in dentistry are made aware of the complications

EDS. These included fragility of the oral mucosa with delayed healing, microdontia, short or malformed roots, large pulp stones and calcification of the pulp, and periodontal disease. Furthermore, some study and clinical experience shown that topical local analgesia or local infiltration anesthesia might be ineffective, due to tissue scarring for ELS patients. Pain during dental care is also difficult to manage. In this presentation, we suggest an other approach, an alternative technical anesthesia to improve its success and the comfort of these patients during dental care.

PR03.41

Pre-operative fasting time for chewing gum: a survey of anaesthetists

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Background: A child attending for dental treatment under general anaesthetic at a dental hospital was chewing gum during the pre-operative fasting period. The anaesthetist decided to delay the child's general anaesthetic to allow time for gastric emptying. Departmental pre-operative fasting guidance did not state that chewing gum is a nil-by-mouth substance. A review of national guidelines revealed variation in guidance for fasting times for chewing gum in the pre-operative period.

Aim: The aim of this survey was to ask NHS England anaesthetists to report and comment on pre-operative chewing gum fasting time within their trust.

Design: Thirty NHS England acute trusts were randomly selected. A survey was sent via an online survey tool with seven questions relating to pre-operative chewing gum fasting times. Information was requested about mention of chewing gum in the trust's fasting policy, specific fasting time for chewing gum, personal opinion on fasting time for chewing gum and any cancellations or complications due to chewing gum pre-operatively.

Results: 163 anaesthetists participated in the survey. 60% of fasting policies mentioned chewing gum. Minimum fasting times varied: no specific time (17%), 2 h (29%), 4 h (5%) and 6 h (14%). 43% thought chewing gum fasting time should be 2 h. 23% had cancelled GA due to chewing gum pre-operatively. 3% experienced chewing gum related complications.

Conclusions: Pre-operative fasting time for chewing gum varies across the trusts surveyed. Similarly, anaesthetists' personal opinion varies. This poses a challenge for surgical departments to provide accurate pre-operative fasting guidance for their patients.

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PR04.01

Gutkha and paan - a threat to our youth

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Background: Gutkha use among teens is becoming serious problem in developing countries. The early age of initiation underscores the urgent need to intervene and protect this vulnerable group from falling prey to this addiction. 40% of the tobacco consumed in India is in the smokeless form. The last two decades have seen a phenomenal growth in the smokeless tobacco industry.

Aim: To determine the prevalence of gutkha and paan chewing among adolescent of lower socio-economic class
To identify reasons for indulging in chewing habits.
To access knowledge about ingredients, benefits and harmful health effects.

To investigate the oral mucosal disorders associated with habitual paan consumption in the above mentioned population.

Design: A cross-sectional community-based survey and examination of oral cavity was done by amongst 144 adolescents of Age between 12–17 years belonging to lower socio-economic class in Kerala, India.

Results: Results show 26.4% of the population used paan with arecanut and tobacco and 13% were meeta paan users. The reasons stated are use of these substances by family members and friends, low cost and easy availability.

91% of users were aware of the harmful effects of paan chewing. 47% of users had white lesions and mucosal burns. Paan users had poorer oral hygiene, stains on teeth and higher prevalence of localized periodontitis.

Conclusions: The findings from the present study highlight the need of eliminating the use of paan and gutkha control programmes and public education.

PR04.02

Children's oral health outcomes after school-based oral health program in Nepal

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Background: NYU College of Dentistry (NYUCD) introduced a dental outreach program at the Srongsen Bhrikuti Boarding High School in Kathmandu in 2013. Of 680 pupils, 40% lived at the school ('boarders'), while the rest commuted to school daily ('day scholars'). NYUCD initiated a school-based oral health intervention consisting of daily toothbrushing with fluoridated toothpaste and quarterly fluoride varnish applications performed by the school nurse and teachers. Follow-up examinations were conducted in 2014.

Aim: The aim of this study was to review the oral health outcomes of children who participated in the school-based dental programs.

Design: A retrospective review of dental records from dental outreach programs in 2013 and 2014.

Results: Dental examinations were conducted for 211 (2013) and 230 (2014) children. Caries prevalence decreased significantly from 83% at baseline to 73%. Caries prevalence among day scholars was 13% higher than among boarders (87.3% vs 74.2%; $P < 0.05$) at baseline. In 2014, there was no significant difference in caries prevalence based on boarding status. There was no significant difference in dmfs scores between day scholars and boarders in 2013 or 2014. The inability to match individual patient records from 2013 to 2014 prohibited analysis of caries incidence.

Conclusion: At baseline, boarders had better oral health than day scholars, but these differences did not persist after 1 year of intervention. The high caries prevalence indicates a need for comprehensive intervention techniques.

PR04.03

Changes in caries prevalence of Isle-of-Isly children 1999–2014

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Background: The Isle-of-Isly has a remote-rural population. Two dentists have been responsible for the care of the majority of the school-age children for 15 years. The island affords a unique situation to measure caries prevalence in a relatively static population.

Aim: This study measures the changes in the dental caries experience of 5 and 12-year olds exposed to a preventive based approach to improving dental health which included a school-based toothbrushing programme (4–12 years).

Design: Data from the practice based records were collected for children aged 5 and 12 in the years 1999–2003 and 2012–2014. Indices including percentage of children with no obvious caries, dmft/DMFT and care index were calculated, translated into graphs and compared to Scotland's National Dental Inspection Programme data.

Results: 478 children were included in the study. The mean number in each year group for 5 year olds was 28 (SD \pm 5.65) and for 12 year olds was 31.75 (SD \pm 8.30). The percentage of children caries free increased from 39% to 85% (5 year-olds) and 31% to 97% (12 year-olds). dmft/DMFT decreased from 3.04 to 0.30 (5 year-olds) and 3.74 to 0.03 (12 year-olds). Figures for care index and percentage of first permanent molars fissure sealed were higher than national data averages.

Conclusion: Caries prevalence decreased in children in Isly aged 5 and 12 years over the period 1999–2014. There was no control group but the differences described above can be associated with the introduction of a preventive approach, however they cannot be assumed to be causative.

PR04.04

Wait times for pediatric dental treatment under general anesthesia at three U.S. Federally qualified health centers (FQHCs)

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Background: There is inadequate access to care for pediatric patients requiring dental treatment under general anesthesia. The mean wait time from consultation to the surgery date is reported at 71 days. Wait time for treatment impacts the health status for patients requiring general anesthesia. Patients at FQHCs are at increased risk for dental caries and require greater access to care. **Aim:** The aim is to analyze factors related to wait time for dental treatment under general anesthesia at FQHCs in Maryland, Massachusetts, and Missouri. The data describes patient demographics; wait time; distance from patient home to FQHC; and clinical findings.

Design: Institutional review board approval was received for a retrospective dental record review at three FQHCs. Records met the inclusion requirements if the subject underwent treatment between Jan 9, 2010 and Jul 2, 2014. Data were collected from 601 dental records.

Results: The results are as follows:

- 1) Race/Ethnicity: 37% Hispanic, 34% Caucasian, and 30% African-American,
- 2) Payer: 92% government-sponsored Medicaid,
- 3) Mean age: 3.19 years old,
- 4) Mean distance from residence to FQHC: 43.3 miles,
- 5) Mean wait time: 110 days,
- 6) Mean average # teeth treated intra-surgically: 11.52,
- 7) Percent subjects with unserviceable restorations at first post-surgical visit: 19.9%.

Conclusions: The mean wait time of 110 days is greater than the 71 days reported by other studies. The mean # teeth treated intra-surgically, 11.52, is lower than other studies. The 19.9% of subjects presenting with unserviceable restorations at the first post-surgical visit is lower than other studies.

PR04.05

Reasons for seeking dental care, caries profile and treatment need of children in Tabuk, KSA

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Background: Dental Caries is the most prevalent dental disease of childhood. Despite credible scientific advances and the fact that caries is preventable, it continues to be a major public health problem.

Aim: The aim of this study were to identify the most common reason for seeking dental treatment, to determine caries profile and there treatment need in children visiting dental department of hospital in Tabuk, KSA.

Design: A total of 170 Saudi children between the age of 1–5 years, who visited the hospital for treatment were examined by single pedodontist and their chief complaint, caries status and overall treatment needs were recorded.

Results: The most common reason for seeking treatment by the children between age of 1–5 years was decayed teeth (52.4%) followed by pain or swelling or abscess (40.6%). The mean dmft/dmfs index was 9.8/22.4. The mean dmft/dmfs was slightly higher among girls (9.97/22.54) as compared with boys (9.79/22.25). Each child needs different types of dental treatments ranging from one surface restoration to pulp treatment and crown. In Each child 3.412 teeth need one-surface restorations, 2.041 teeth

need two-surface restorations, 0.441 teeth need more than two-surface restoration, 2.641 teeth need pulp therapy, 0.547 teeth need extraction, 0.153 teeth needs space maintainer and 1.988 teeth needs crown. Only 4 (2.4%) children out of 170 were caries free.

Conclusions: This study demonstrated that parents most often seek dental care for problems like decayed teeth, pain, abscess and swelling rather than seeking dental assistance at a much earlier stage for preventive measures.

PR04.06

Antley-Bixler-syndrome oral findings, a case report

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Background: Antley and Bixler was described an unusual syndrome disorder in newborn consisting of complex craniosynostosis with midfacial hypoplasia. The Antley Bixler syndrome is complex disturbance of craniofacial growth due to premature synostoses of the cranial base and the vault. The mode of inheritance is supposed to be autosomal recessive; however diagnosis is based on a characteristic craniofacial deformity in association with humeroradial synostosis.

Case report: 11 years old boy complaining of palatal swelling on the left side of the maxilla, following examination the child has typical feature of Antley Bixler Syndrome.

Oral examination revealed that left palatal swelling was associated with 25 eruption palatally, the 65 is in good occlusion with no signs of mobility and 26 deviated buccally. On the right side the 55 was lost with no residual space left.

Oral hygiene is good, caries free, other else shedding and eruption are in sequence, angle class III occlusion and upper anterior spacing.

The radiographic examination was revealed 25 eruption in palatal position crowded in area form 56–26 after orthodontic consultation the decision was to extract the 25 to allow good alignment of the 26, extraction of 25 was done under local anaesthesia.

Comments: It is important that all clinicians are aware of the physiopathology and oral manifestations of Antley Bixler syndrome, so that they can plan any dental treatment such that it is appropriate to the patient's limitations and needs.

PR04.07

The oral health regimes, dental experience and parental perceptions of oral health care of children with special needs

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Background: Children with special needs are at an increased risk of dental disease, yet they experience significant barriers to their care.

Aim: To investigate the oral health regimes, dental experience and parental perceptions of oral health care of children with special needs.

Design: Following ethical approval by the University of Liverpool's committee of research ethics, an anonymous 'Oral Health Questionnaire' was designed and distributed via school administration teams, to the parents/guardians of children attending three special needs schools in Northwest England. Questionnaires used visual analog scales, multiple choice and short answer questions. Data was analysed using SPSS.

Results: Of the 176 questionnaires distributed 72 (41%) were returned. The participating children had an average age of 11.0 years (range 3–18), 57% were male and the majority had a diagnosis of Autistic Spectrum Disorder. The majority reported suboptimal dental care regimes; 54% brush once a day or less and 38% rinse with water after brushing. Most children receive routine dental care in general dental practice (59%) and attend at least twice yearly (83%). Thirty-two percent had received dental treatment under general anaesthesia. Many parents reported their child's special needs 'significantly affects their ability to cope with dental treatment' (74%), that the 'condition of their child's mouth/teeth affects their overall life' (44%) and that they would approve of dental check-ups in a school setting' (93%).

Conclusion: This study reinforces the oral health care needs of this high risk group and emphasises the barriers perceived by parents to oral health care.

PR04.08

The burden of oral disease in children with welfare concerns in Glasgow, Scotland: the work continues

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Background: The relationship between oral health and child maltreatment has been investigated locally and internationally. Many studies show an increased burden of oral disease in maltreated children.

Aim: To build on previous work by Harris (now Park) et al describing the demographics and oral health of children with welfare concerns for whom a comprehensive oral assessment (COA) was completed in Greater Glasgow and Clyde, Scotland.

Design: Data from oral examinations of 283 children attending for a COA was available from a database. Child demographics, dmft/DMFT scores, BPE, tooth wear and presence of tooth structure defects were recorded.

Results: Age range was 4 months to 16 years (mean 6.5 years). All resided in areas with SIMD quintiles ≤ 3 . 62% of children ≤ 9 years and 79% of children ≥ 10 years had dental caries. Mean number of decayed, missing and filled teeth (dmft) was 7.26 for those ≤ 9 years and 3.7 for those ≥ 10 years. 6.3% had evidence of dental hard tissue trauma and 7.1% had enamel defects.

Conclusion: Children in Glasgow who completed a COA continue to have a high burden of dental caries and evidence of poor oral hygiene which is in keeping with previous research.

PR04.09

What influence mothers to control children's sugared snack? An application of theory of planned behaviors

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Background: Theory of Planned Behaviour (TPB) has been successfully applied by wide range of behaviors such as smoking habits, alcohol drinking, health screening and tooth brushing behaviors. Few studies have been conducted to apply TPB regarding to sugared snack control especially in Asian culture.

Aim: The aims of this study were to examine the factors related to children's controlling of children's sugared snack among Thai mothers of preschool children based on TPB.

Design: A total of 293 mothers of 3–6 years old children attending Pediatric Dental Clinic at Faculty of Dentistry Mahidol University participated. Data on controlling children's sugared snack, attitudes, subjective norms, perceptions of behavioral control, and self-efficacy were collected by structured questionnaire. Both direct measures and belief-based (indirect) measures were evaluated. Spearman's rank correlation and multiple regression were used to analyze the relationship between mother's behaviors and the predicting variables.

Results: Factors related to controlling sugar snack were self-efficacy ($r = 0.425$, $P < 0.01$), perceived behavioral control ($r = 0.361$, $P < 0.01$), attitude ($r = 0.302$, $P < 0.01$), and subjective norm ($r = 0.211$, $P < 0.01$), respectively. Control beliefs were the most significant factors related with behaviors, followed by normative beliefs, but not the behavioral beliefs. Multiple linear regression analysis revealed that self-efficacy, attitude, and mother's age significantly predicted the controlling of sugared snack behaviors.

Conclusions: To control children's sugared snack, mothers should develop their self-efficacy and perception of control, rather than focusing only on the attitude towards caries prevention.

PR04.10

ECC: a disease that is about more than just baby teeth

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Background: ECC is a serious public health problem that has thrived in the traditional disciplinary divide between medicine and dentistry. ECC prevention is simple and inexpensive, yet previous efforts to promote it have failed. The solution is a coordinated national awareness campaign that engages the public, medical and dental professionals, social workers, the judiciary and public health authorities and policymakers at all levels of government.

This totally preventable disease affects the well being of the whole child and this is what we need to understand if we are to succeed in our quest to eliminate it.

Aim: We are on three paths that have this common goal. The first is dealing with the children who currently suffer from ECC. The second is to minimize the occurrence of this disease in infants and young children.

The third is to teach these children while they are in elementary and middle school the importance of oral health to their overall well being and to the overall health and wellbeing of their future children.

YES, it parallels the philosophy that if you give a village fish to eat, they will eat it and when it runs out they will suffer the pangs hunger or if you teach them to raise the fish -supplying the knowledge and tools to do so, they will care for themselves.

PR04.11

Childhood risk factors for the late eruption of permanent teeth

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Background: Adequate knowledge of tooth emergence assists in diagnosis and treatment planning in pediatric dentistry and orthodontics; however, reports of perinatal influences on eruption of permanent teeth were limited in the literature.

Aim: The study aimed to associate potential factors in early life with eruption status of permanent teeth of 12 years old children.

Design: Clinical examination of tooth emergence was conducted on a birth cohort of Hong Kong children from local secondary

schools. Subjects' background information including birth characteristics, prenatal and early childhood exposures, family socioeconomic status and medical records were prospectively collected. Children were divided into complete emergence (of 28 permanent teeth) and partial emergence groups based on clinical examinations. Bivariate analyses were used to assess the association of tooth emergence status with each potential factor.

Results: Complete background information and clinical data were available from 514 children. Maxillary central incisors were found to have emerged in all subjects, followed by first molars (99.9%), maxillary lateral incisors (99.6%) and mandibular canines (98.8%). Except for the maxillary (61.8%) and mandibular second molars (81.8%), over 90% of all other teeth had emerged. Bivariate analyses showed that the average birth weight in the partial emergence group was significantly lower compared to the complete emergence group (mean difference 0.2 kg, $P = 0.006$). Mode of birth delivery was significantly associated with tooth emergence status ($P = 0.037$).

Conclusions: Birth weight and mode of delivery were associated with emergence of permanent teeth in a group of 12 years old children in Hong Kong.

PR04.12

Improvement of oral health conditions of school children in Cambodia by oral health education

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Background: In Cambodia, numerous children have extensive caries but lack opportunities to receive dental treatment or oral health education.

Aim: We investigated the effect of oral health education by teachers on school children's dental health, in addition to yearly researcher-led dental education.

Design: We examined the oral health conditions of 126, 117, and 164 school children at the primary school in Siem Reap, Cambodia yearly between 2011 and 2013. Furthermore, we educated not only the school children but also their teachers about oral health.

Results: After our instructions, teachers taught oral health in their daily work, established 'brushing time,' and repeated to children the importance of oral health. As evidenced by oral examination, prevalence of dental caries in primary and permanent teeth was very high, over 96.0% each year. Mean number of DMFT plus dft is 8.22 in 2011. However, it decreased to 6.58 in 2012, and 5.73 in 2013. Moreover, prevalence of untreated tooth decay decreased remarkably to 90.5% in 2011, 76.3% in 2012, and 51.7% in 2013.

Conclusion: We have shown the oral health conditions of children in this primary school to improve yearly. Consequently, we have initiated a similar program at the teacher training school in Cambodia, because when these education students learn and utilize the program in primary schools across the country, every child benefits. We believe our program will lead to self-supported dental health in Cambodia.

PR04.13

Prevalence of oral habits and its related malocclusion among 6–12 years old school children of Lucknow city, India

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Background: Oral Habits are frequent problems encountered in children and their importance can be gauged by the number of articles published in various journals for more than half a decade. These abnormal oral habits are of interest to general Dental practitioners, Pedodontist and also child physician so as to recognise in early stage and prevent its deleterious effect on dentition, perioral structures and craniofacial complex of developing child.

Aim: The present prevalence study is a part of an epidemiological study carried out with an aim to investigate the prevalence of various oral habits and to correlate their harmful effects on the developing oro-facial complex of children.

Design: The study was conducted on 5000 school children of both the sexes comprising of 2612 (52.24%) boys and 2388 (47.76%) girls, aged 6–12 years in Lucknow city, India.

Result: The statistical analysis showed that the prevalence of abnormal oral habits in children of Lucknow city was 19.24% with significantly higher in girls (21.61%) than in boys (17.08%). ($\chi^2 = 16.21$, $P < 0.001$). Among the habits tongue thrusting was the most prevalent habit (14.22%),

($\chi^2 = 20.34$, $P < 0.001$) and lip biting the least prevalent (0.10%), ($\chi^2 = 0.03$, $P = 0.87$). Regarding malocclusion, maxillary proclination and posterior crossbite was mostly seen in thumb sucking cases, openbite and spaced dentition in tongue thrusting cases. Whereas retroclination was observed in cases of lip biting and thumb sucking habit.

Conclusion: Early detection of abnormal oral habits can prevent and intercept the possible malocclusions or skeletal dysplasia from occurring on developing dentition.

PR04.14

Caries prevalence of 15-year old Greek children using the ICDAS. A national pathfinder survey

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Background: Epidemiological surveys are conducted in an attempt to develop and propose long-term and effective strategies for the prevention of oral health diseases of the population.

Aim: To study the caries experience and treatment needs of 15-year-old children in Greece in correlation to socio-demographic factors and its evolution over the 2004–2014 period.

Design: A total of 1131 13-year-old adolescents of Greek nationality, randomly selected throughout the country, were examined by 10 calibrated examiners under standardized conditions. Caries prevalence was recorded using the ICDAS II criteria combined with the caries experience mft/s component of WHO index. The demographic data collected included gender, county, urban and rural areas, and parents' educational status.

Results: Of the participants, 33.2% were caries-free (ICDAS = 0). The rural areas demonstrated more caries $D_{3-6}MFT$ rural = 2.31 and $D_{3-6}MFT$ urban = 2.89 and the care index was $CI = 39.91\%$

showing that the largest amount of the treatment needs were unmet. Parental educational status, residency status, region, oral hygiene, smoking and alcohol consumption were the risk indicators for caries inequalities.

Conclusions: Despite the decrease in the prevalence of caries in Greek adolescents, disparities remain and their dental health problems remain higher than most European countries, with the adolescents from rural areas with a lower socioeconomic status showing most of the caries. All of the above call for more drastic intervention with preventive programs and better geographic targeting of the dental services at a national level.

PR04.15

Temporomandibular disorders (TMD) in children: postural alterations as a risk factor

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Background: Studies on the relationships between postural alterations and TMD are controversial and inconclusive.

Aim: To estimate frequency and assess the presence of postural alterations as a risk factor for TMD in patients aged 10–15 years.

Design: The study comprised patients aged 10–15 years seeking comprehensive dental care between 2012 and 2013. TMD diagnosis was made by dentists who were standardized in the use of RDC/TMD (Kappa = 0.88). For static postural assessment, photographs were taken of patients standing in an upright relaxed position in front of a grid, and then analyzed by a physiotherapist following Kendall's model. Patients were divided into three groups: A: without TMD ($n = 133$; 12.56 ± 1.69 years); B: with muscle disorders ($n = 61$; 12.57 ± 1.90); and C: with disk displacement ($n = 49$; 12.65 ± 1.82). Data were statistically analyzed using ANOVA, OR, and percentages with confidence intervals of 95%.

Results: No differences in age were observed among groups ($P = 0.95$). Significant association was observed between the presence of alterations in spinal curves, head posture, and lower limbs, and muscular TMD: OR: 3.40 (1.73–6.69), 2.44 (1.20–4.94), 2.22 (1.19–4.15) respectively. All variables in group C had an OR <1. The most frequent alterations in A and B were hyperlordosis 23.30% (16.40–31.44) and 32.78% (21.27–46.03); forward head posture 39.85% (31.44–48.71) and 52.45% (39.23–65.43); and genu valgum 33.08% (25.15–41.78) and 45.90% (33.03–59.18) respectively.

Conclusions: The most frequent postural alterations were lumbar hyperlordosis, forward head posture, and genu valgum. Alterations in head posture, vertebral curves, and lower limbs could be considered risk factors for muscular TMD.

PR04.16

Occurrence of variations in morphology of frenum among children of different racial groups

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Background: The distribution of the variation in morphology of the maxillary and mandibular labial frenum in the children of different ethnic backgrounds of Nepal has not been studied extensively.

Aims: To assess the variation in morphology of maxillary and mandibular labial frenum among children of two ethnic groups.

Design: A cross-sectional epidemiological study was done among 900 children of age (1–14 years) of two ethnic groups (Mongoloids and Aryans) attending the department. Morphological varia-

tions of labial frenum were assessed in both maxillary and mandibular arch. A modified Sewerin's typology of frenum was employed for classification. Data were collected and analysed using chi square test.

Results: Of 900 children examined, 53% were male, 47% were female. The ethnic background of the children varied with 56.77% Mongoloid and 43.22% Aryans. 59.1% had simple frenum, 25.22% had nodular type, 4.6% had appendix type, 7.11% had persistent type and 3.88% had variation type of frenal attachment in maxilla. In mandible, 95% had simple frenum, 0.22% had nodular type, and 3.22% had variations type of frenum. Frenum was absent among 1.55% of children in mandible. No statistical difference was found between two ethnic groups in relation to morphology of frenum.

Conclusion: In this study, simple frenum was found to be the most common morphology in both maxilla and mandible; followed by nodular type of frenum, among both ethnic groups in maxilla. No statistical significant difference was found between two ethnic groups with respect to frenum morphology.

PR04.17

Association of temporomandibular dysfunction signs and the different types of malocclusion in children (6–13 years old)

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Background: Temporomandibular dysfunction (TMD) is a pathology that has been considered unrelated to the children. However, their presence has been more frequent and malocclusions are a very important etiologic factor.

Aim: The aim of this study was to investigate the association between symptoms and signs of TMD with malocclusion in children.

Design: A prospective and descriptive survey was performed in 1521 children with an age average of 8.54 ± 1.9 years (6–13 years), from four elementary schools in León, Guanajuato. The presence of malocclusion, Angle molar and signs of TMD were evaluated. Also they were evaluated by age groups (6–8, 9–10 and 11–13 years) and gender.

Results: TMD signs were identified in 801 of the cases (52.7%), it was more frequent on girls ($P < 0.0001$) and in children from 11–13 years old. The most frequent molar class was class I (52.5%). The presence of clicks and grating was higher in children with molar Class II and III. The clicks were more common in students with posterior crossbite and anterior open bite; grating with crossbite leading edge to edge.

Conclusions: The presence of DTM signs was more frequent in Molar Class II and III, in more than half of the evaluated children.

Keywords: Articulation, dysfunction temporomandibular, malocclusion, frequency

PR04.18

Prevalence and correlates of halitosis among adolescents in Debrecen, Hungary

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Background: Bad breath (halitosis) is a common complaint all over the world, regardless of age and gender.

Aim: The aim of this study was to investigate the prevalence of halitosis among adolescents, and to examine the possible aetiological factors.

Design: The study group consisted of 120 patients aged 14–18 years, 335 adult subjects belonged to the control group. All had completed a questionnaire and had undergone a clinical examination where cariological and periodontal indices were recorded. The extent of tongue coating was also determined. Halitosis was measured by organoleptic evaluation and confirmed by measuring volatile sulphur compounds (VSCs) using a portable gas chromatograph (OralChroma).

Results: Halitosis was found to be present in 43.4% of the adolescent group when using organoleptic testing method, in 38.3% of subjects when employing gas-chromatography. Significant correlation was found between organoleptic scores and VSC measurements. The prevalence of halitosis increased with age. In the adolescent group gender, number of missing teeth and plaque index positively correlated with the organoleptic scores while the presence of calculus showed a significant, negative (protective) effect against oral malodour. In the adult population halitosis level was significantly related to the tongue coating index, DMFS score, plaque and bleeding indices and the presence of prosthetic replacements.

Conclusion: Halitosis is a significant problem among Hungarian adolescents. Measuring oral malodour, as an indicator of oral health, may serve as a motivating factor for improving oral hygiene.

PR04.19

Prevalence and associated factors of molar incisor hypomineralisation among schoolchildren in Debrecen, Hungary

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Background: Molar incisor hypomineralisation (MIH), the enamel defect of the first permanent molars and incisors is a common finding nowadays. The prevalence varies from 5–40% depending on the criteria and population used for the investigation. As far as we know no Hungarian data were collected yet.

Aim: Our aim was to study the prevalence and the possible etiological factors of MIH in North-eastern Hungary.

Design: The study group consisted of 505 children aged 11–15. Clinical examination was done by one examiner with dental probe and mirror, for dental status the WHO and for the MIH IAPD 2003 criteria were used. A questionnaire was used to gather information about pregnancy, the mother's and child's previous medical history. Data were analysed statistically.

Results: The prevalence of MIH was 16.8%, no gender differences were found. The findings showed a significant correlation between MIH and illnesses occurring during the first year of life and medicaments used to treat them, especially in the group of low birth weight children. Certain medicaments enhance the risk of MIH without low birth weight as well.

Conclusion: The high prevalence of MIH emphasize the importance of the collaboration and the discussion between general practitioners and dentist about the used medications during pregnancy and early childhood. The early recognition of the defect is very important to avoid late complications and provide a better life to the child.

PR04.20

Oral conditions in extremely low birth weight children

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Background: The majority of low birth weight (≥ 2500 g) is due to preterm birth. These children are at a great risk of medical problems among them oral and dental problems. Our aim was to evaluate the oral condition of extremely low birth weight (ELBW, ≤ 1000 g) children and compare it to children with normal birth weight.

Design: Fifty-six ELBW 8-year-old children were evaluated and compared with 56 age and sex matched normal birth weight children. Oral examination were performed according to the WHO criteria. The parents answered a questionnaire about the child's feeding habits, oral hygiene practices, previous medical history and the exact birth weight. Data were analysed statistically.

Results: There were significant association between birth weight and the occurring systemic diseases. We found correlation between ELBW and cariological indices (dt $P = 0.010$, dmft $P = 0.040$). Higher prevalence of enamel defects ($P < 0.001$) was found in the ELBW group. We could not find any association between the birth weight and DMF-T or orthodontic anomalies.

Conclusion: ELBW and pre-term labour can be a predisposing factor for structural diseases and caries in the primary dentition.

PR04.21

The relationship between childhood oral habits, dental abnormalities and articulation disorders

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Background: Previous studies revealed a strong correlation between orthodontic and speech disorders. Childhood oral habits significantly influence the development and maintenance of these anomalies.

Our aim was to analyse of the relationship between malocclusion, oral habits and the associated articulation disorders in primary school age.

Design: The study group consisted of 1364 children aged 6–15. A parental questionnaire was used to gather information about the child's past and existing oral habits, speech disorders and orthodontic treatment. The clinical examination consisted of dental and orthodontic screening according to the WHO and the Angle orthodontic diagnostic system. Local anomalies were also recorded. Speech therapist examined the articulation disturbances.

Results: According to the parents' opinion 24.3% of the children had oral habits, but the clinical examination found parafunction in 52.8% of the cases. Although the parents' attention was called that the child had malocclusion in 26.5% only 12.2% had past or present orthodontic treatment. Among those children whose parents recognised no articulation disorder, the specialist found anomaly in 24.1%. Orthodontic anomalies associated with parafunctions were significantly more common ($P = 0.000$) than orthodontic problems alone. The co-existence of parafunction and orthodontic anomaly significantly increased the incidence of speech disorder ($P = 0.000$).

Conclusion: The frequent occurrence of parafunction and orthodontic disorder associated speech disorders emphasize the impor-

tance of regular and complex (dental, orthodontic and speech) screening. Early diagnosis can help the effective treatment. It is very important to educate the parents as well.

PR04.22

Childsmile National data linkage birth cohort: Scotland 2003–2012

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Background: Childsmile, Scotland's national child oral health improvement programme, established in 2006, delivers oral health interventions: fluoride varnish application, toothbrushing instruction and dietary advice from birth in educational and dental services settings via extended duty dental nurses and with additional support from Dental Health Support Workers.

Aim: Identification and linkage of individual Electronic Patient Records (EPR) datasets to evaluate the effectiveness of Childsmile interventions.

Design: We have piloted the Scottish Informatics Programme (SHIP), a secure research portal that allows researchers to gather, manage, share and analyse EPR datasets.

Baseline data were children with a Child Health Surveillance 6–8-week review record from 2003–2012. These were linked through the Community Health Index Number (unique NHS ID) to multiple national datasets containing individual level data on Childsmile interventions, dental registrations and treatments, with outcome data including hospital inpatient cases, National Dental Inspection Programme (NDIP) and childhood body mass index. Geographical and deprivation data were also included.

Results: The initial linked database consists of 482,955 children from across Scotland (85% of births due to Health Boards rolling out implementation of the Child Health Surveillance programme). A sub-cohort of 177,731 children with NDIP data indicates an improvement of 5-year-olds with no obvious dental caries experience (62% in 2009 to 66% in 2013), in keeping with published NDIP data.

Conclusions: We have created an invaluable resource for evaluating the national Childsmile programme. Further analysis will help determine which interventions are more effective and efficient for improving oral health and reducing oral health inequalities.

PR04.23

Mother's immigrant status as indicator for caries among 5-, 7-, 12- and 15-year old children in Denmark: a study based on data from 2006 and 2013

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Background: During the last decade the public dental care service in Copenhagen has focused on children of mothers with immigrant status in relation to caries risk and preventive activities.

Aim: The aim of the present study was to investigate immigrant status as a risk indicator for caries experience compared to other risk indicators among children attending the public dental care service.

Design: Caries data were collected among all 5, 7, 12 and 15-year-olds during their regular dental visit in 2006 ($n = 12,706$) and in 2013 ($n = 14,260$). Information on mothers' immigrant status, mothers' education, family income and number of children in the family was obtained via public registries.

Results: A considerable reduction of caries experience was seen in all age groups, and variations were found within the age groups

between children of immigrant mothers and Danish mothers ($P < 0.001$). In total, children of immigrant mothers had on average dmfs+DMFS = 3.1 in 2006 compared to 2.2 in 2013. Danish children had dmfs+DMFS = 1.7 in 2006 compared to 1.1 in 2013. The multiple regression analysis showed that even when adjusted for other explanatory variables, children of immigrant mothers still suffer from a larger caries experience compared to Danish children illustrated by an incidence rate ratio of 2.1 ($P < 0.001$).

Conclusions: Despite overall reductions in caries prevalence among Danish children as well as children of immigrant mothers, immigrant status should still be regarded as a separate risk indicator for caries, in addition to indicators such as education, family income and number of children in the family.

PR04.24

Dental caries prevalence using ICDAS - a call for proper diagnosis

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Background: Permanent molars remain highly vulnerable to dental caries due to their susceptible occlusal surfaces. Generally low caries prevalence has been reported in some Nigerian studies using the WHO criteria for diagnosis.

Aim: To assess caries prevalence on the occlusal surfaces of first permanent molars in some Nigerian children using the icdas scores.

Design: This was a descriptive study. Children from four public junior schools were randomly selected and only children with fully erupted first permanent molars were included in the study. Ethical considerations were observed. Diagnosis of dental caries was made using icdas criteria for assessment and scoring after standardization of the researchers. Occlusal surface of each tooth examined was cleaned to remove food debris using a ball ended probe and thoroughly dried with cotton wool. Intraoral source of light was with the aid of a moxie led head lamp.

Results: 178 children with mean age of 13.2 years mainly from middle social class and with a total of 712 first permanent molars were examined. 121 teeth (17%) from 57 children had caries. Using codes 5 and 6 of icdas (cavitation stage), a prevalence of 4.8% (34 teeth) was recorded, while over 50% of the carious teeth were in the initial stages of the lesion –codes 1 and 2 and would have responded to remineralization/ inhibition of lesion progression therapy.

Conclusion: The use of icdas in this study captured the continuum of the caries process and emphasizes the need for detection of initial carious lesions for non-invasive intervention.

PR04.25

The perception and practices of nomadic women in a rural community in South Western Nigeria to their children's oral health

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Background: Nomads move from one settlement to another and it has been difficult to have adequate documentation about their oral health and that of their children.

Aim: To investigate the perception and practices of nomadic Fulani women towards their children's oral health.

Design: A cross sectional study was conducted among 197 Fulani women using a structured interviewer administered questionnaire.

Results: Two fifths attributed bleeding gums to worms (40.1%). Over half (59.4%) cleaned children's teeth once daily and (14.8%) occasionally. Polyurethane foam (46.7%), toothbrush (32.0%), finger (18.8%) and wooden twigs (2.5%) were aids used for cleaning children's teeth. A few used ground ceramics (3.0%) and sand (1.0%) as cleaning agents while (5.6%) used nothing. For bleeding gums (45.1%) gave children self medication with antibiotics, and herbs (10.2%). Perceived causes of tooth decay include worms (23.9%) and sugar (5.1%). For tooth decay (32.0%), (15.2%) and (5.1%) will give children antibiotics, traditional concoctions and analgesics respectively. Over two fifths (43.1%) give their children sugary diet in between their meals. Many (68.0%) feed babies with sweetened drinks in bottles, Sippy cups (82.7%) and (71.6%) give them pacifiers dipped in sweet liquids. Majority (88.3%) give children sweets to reduce temper tantrums. Respondents associated teething with fever (67.0%), diarrhea (17.8%), and cough /catarrh (18.3%).

Conclusions: These mothers have suboptimal oral health knowledge, attitudes and practices towards their children's oral health. There is a need for urgent intervention among this group of people.

PR04.26

Association between being overweight and caries experience among children 5–8 years old

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Background: The increase the children with overweight is a worldwide serious public health problem. The overweight is associated with several health problems. Researchers suggest that overweight children have more dental caries, but the results of the association between dental caries and body mass index (BMI) in children are inconsistent.

Aim: To verify the associations between overweight and caries experience in children.

Design: This is a cross-sectional study conducted with 465 children with 5–8 years old. Children answered a questionnaire and underwent a clinical examination. Overweight was diagnosed using age-adjusted BMI and the oral health was evaluated by dmft index. The children with dmft + DMFT = 0 were classified as caries-free. A multivariate binary logistic regression was used for the analysis.

Results: The dmft mean was 2.11 ± 2.6 . Children with overweight have an increased risk (OR = 1.85; 95% CI: 1.14–2.99) for dental caries compared to those children with normal weight independent of dental anxiety; frequency of tooth brushing; family income; age of child and gender.

Conclusions: The result of this study shows that children with overweight may be a risk group for dental caries development and should be offered additional preventive measures.

PR04.27

Prevalence and characteristics of supernumerary teeth in Japanese children and the influences on permanent dentition

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Background: Supernumerary teeth (ST) are mostly located in the anterior maxillary region and are often detected by a clinical and radiographic examination. Although an appropriate approach to ST is crucial to make a comprehensive treatment plan, it has not been provided yet.

Aim: To establish the appropriate approach to ST, radiographs were investigated about as follows; the prevalence and the number of ST and the influence on permanent dentition.

Design: 1251 images at our pediatric dental clinic were examined. For each patient with ST, the demographic variables, number and location were recorded. In addition, ST were classified according to the presence or absence of complications (displacement, root resorption, and eruption disturbance of adjacent tooth) and whether any treatments were carried out.

Results: ST were detected from 172 images (13.8%). If children visited our clinic because of ST-associated chief complaint were omitted, we happened to find ST in 2.7% of children and it was likely to be true prevalence rate. Children with ST comprised 136 males and 36 females ($P < 0.0001$). 55.0% of ST was vertical, 29.2% was inverted and 6.4% was horizontal. ST were usually extracted at 5–7 years old in the vertical type and at 7–8 in the inverted type. 71.4% of children with ST was judged to require orthodontic treatment after extraction and following observation period.

Conclusions: There is controversy regarding the appropriate extraction time of ST, especially inverted type. From our data, the extraction of ST at an early stage did not suppress the need of orthodontic treatment.

PR04.28

Factors influencing prevalence of caries in a Chilean preschool population: econometric analysis

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Background: Different studies worldwide have highlighted different factors influencing caries prevalence and with Chile there appears to be a difference between regions in prevalence. Why this prevalence differs warrants investigation and additional studies are required to determinate the factors associated with this difference.

Aim: To examine the relationship of several risk indicators with the prevalence of caries (dmft >0) in the Chilean preschool population.

Design: The data used come from a cross-sectional study directed by the Chilean Ministry of Health. This dataset is drawn from a clinical examination of 1600 4-year-olds children and a parental completed questionnaire carried out in 2010. Variables used in the analysis include socioeconomic status, oral health behaviours, and coverage of fluoridated water by county. Multivariate logistic regressions were conducted to investigate the relationship between these variables and prevalence of caries.

Results: Educational level of head of household and dependency of school (private, subsidised or public) showed statistically sig-

nificantly relationships indicating that children with a lower risk of caries were those who attend private schools and those with a more educated head of house. Other significant variables were mother's number of teeth, frequency of toothbrushing, autonomy of toothbrushing, drinking sugary liquids before bed, previous dentist experience and perceived need for treatment. The presence of fluoridated water was highly significant ($P < 0.001$) and had an OR of 0.3 (IC₉₅ 0.2–0.4).

Conclusions: The nonexistence of fluoridated water was the most significant predictor of caries prevalence. These findings will allow better targeting of preschool population in future studies.

PR04.29

Challenges for the management of paediatric dental emergencies in major metropolitan urban area: Paris

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Background: A profound reflection on the state of paedodontic care management in Parisian metropolitan area is needed, with its lack of paedodontic care coverage in general and its sole night and weekend dental emergency department.

Aim: Our study highlights the dysfunctions of paedodontic emergency care management in order to propose appropriate measures for its improvement.

Design: This is a retrospective review of the emergency dental service coverage using the La Pitié Salpêtrière Hospital Emergency services Urquel informatics system to extract the information concerning night and weekend dental emergencies. The original data extracted was imported into Excel to obtain the graphics illustrating the results of the study.

Results: More than 11% of the night and weekend emergency dental patients are 16 years and younger, with a majority of males. 60% of the paedodontic emergencies are of endodontic nature with patients 10 years old and younger. The 93 suburb is ahead with close to 800 consultations out of 3284, Paris intramuros is 2nd. By adding the results from the 20th, 19th and 18th arrondissements, the Parisian north-east, which has lower socio-economic profile, represents 30% of the patients, socio-economically challenged.

Conclusions: All paedodontic emergency night and weekend care is delivered by La Pitié Salpêtrière Hospital the sole greater Parisian metropolitan structure covering dental emergencies, ill suited to welcome, manage and care for paediatric patients. The regular paedodontic needs are not met due to a serious lack of paedodontists in the greater Parisian metropolitan area, leading to higher numbers of night and weekend emergencies.

PR04.30

Regional disparities and resources used in dental health care among children in China

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Aim: This study examined the disparities in dental health and resources used in dental care among children in different economic regions, urban and rural areas of mainland China.

Design: Data used were the Chinese National Third Oral Epidemiology Survey and dentist density, disposable income data from Statistics Year Book of Health Ministry of China. Multiple logistic regression analysis was used to adjust for confounders.

Results: Children who were from the western part of China were less likely to have had a dental visit within last 1 year (aOR: 0.79; 95%CLs: 0.72, 0.87), and lower filling rates (aOR: 0.44; 95%CLs: 0.37, 0.53) than the children who were from eastern China. The children who were from rural areas were less likely to have filling services (aOR: 0.43; 95%CLs: 0.29, 0.64) when they had caries. The children who were from higher dentist density areas (aOR: 1.71; 95%CLs: 1.47, 1.98) and higher disposable income areas (aOR: 1.69; 95%CLs: 1.29, 2.22) were more likely to have had a dentist visit within the last year.

Of the total survey population, 56.8% of children had never visited a dentist.

Conclusion: The total dental care potential for Chinese children was underused. The children who were in the 5-year-old group, in western China, rural areas, low dentist density areas and low income areas were less likely to have had dental care services.

PR04.31

Prevalence survey of dental trauma to schoolchildren in Xi'an, China

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Aim: Dental trauma is a common disease, after the incidence of dental caries for schoolchildren. We're aimed to assess dental trauma injury by questionnaires, with regard to background information in schoolchildren in Xi'an referred to Stomatology Hospital of Xi'an Jiaotong University, China, from 2012 to 2013.

Design: The study was based on the cluster and simple random sampling survey, 4013 pupils in schools in nine districts and four counties in Xi'an were sampled respectively. The children who have a history of dental trauma were examined clinically for traumatic dental injuries by two investigators. The following information was recorded: age, gender, trauma history, teeth involved, type of trauma, treatment provided, previous trauma histories, and management technique. Results of the questionnaire were expressed as frequency distributions in percentages.

Results: A total of 4013 survey questionnaires, back 3883, the response rate was 96.8%, the effective rate was 93.8%. 1882 boys and 1759 girls with age of 6–13 years were participated in the study. The prevalence rate of immature permanent dental trauma was 10.5%. Dental injuries were frequent in boys, 7–9 years old have the highest percentage (75.6%), falls are the most common causes (50.9%), the maxillary central incisors were the most frequently traumatized teeth (75.4%), the most frequent type of dental injuries recorded was enamel fracture (35.6%). We have low level attendance rate for dental injuries (38.2%) and it's treatment is not timely.

Conclusions: Public health policies and educational programs aimed at prevention should be developed and provide more continuing education programs for someone who will work to reduce dental injuries.

PR04.32

Caries experience of 12 year-old Greek children using ICDAS II criteria. A national pathfinder survey

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Background: Epidemiological studies provide information about prevention, dental care and treatment in public and private level and contribute to changes for effective dental care.

Aim: To register caries experience and treatment needs of 12 year- old Greek children, under standardized criteria with calibrated examiners and to correlate the above findings with socio-demographic parameters.

Design: A stratified cluster sample of 1102 healthy children without fixed orthodontic appliances was randomly selected and examined by calibrated examiners. Dental caries was recorded according to ICDAS II criteria. Data about socio-demographic features and the knowledge, attitudes and behaviour related to oral health were retrieved through a structured questionnaire, via interview. Statistical analysis was performed with SPSS. Uni- and multi-variable (negative binomial regression models and Logistic regression models) were conducted to investigate potential risk indicators for the manifestation of dental caries in this age group.

Results: Dental caries varied considerably between the different geographic districts, with mean $D_{3-6}MFT = 1.26$ and $ICDAS_{1+2} = 1.75$. Caries free was 28% of the sample, Care Index (CI) was 19.5% and sealants were recorded at 14.7% of the sample. Girls had higher $D_{3-6}MFT$ than boys ($P = 0.040$). Children living in rural areas demonstrated higher $D_{3-6}MFT$, less sealants and low CI. Children with highly educated fathers and mothers showed lower $D_{3-6}MFT$ values ($P < 0.001$).

Conclusions: The mean $D_{3-6}MFT$ was 1.26 and incipient carious lesions was 1.75 ($ICDAS_{1+2}$). Gender, mother's educational status and tooth brushing frequency found to be the only statistically significant risk factors for the development of caries in 12 year-old children.

PR04.33

Over retained primary teeth in children attending the paediatric dentistry clinic - Bucharest, Romania

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Background: Overretained primary teeth can be either the cause or a consequence of a variety of developmental particularities which need to be taken into account and adequately managed in order to favour evolution towards a harmonious permanent dentition.

Aim: To assess the frequency of overretained primary teeth and find possible associations between the status of the overretained primary tooth and that of the permanent successor.

Design: Retrospective study on 847 patients (448 boys) from Paedodontics Department, Carol Davila University Bucharest aged between 8 and 18 years (mean age = 10.96 ± 2.24 years). Frequency, topographic distribution and status of overretained primary teeth were recorded, as well as the permanent successor's status. Data was statistically analyzed using SPSS 20.0 ($P \leq 0.05$).

Results:

- 1) 8.26% of patients (n = 70 patients, 35 boys) had 145 overretained primary teeth: 48.9% (71 teeth) in boys and 51.1% (74 teeth) in girls (NS);
- 2) topography: 42.75% upper jaw, 57.24% lower jaw (NS); 50.34% right side, 49.66% left side (NS);
- 3) most affected teeth: 48.27% second lower primary molars, 17.93% second upper primary molars, 12.41% upper lateral incisors;
- 4) permanent successor's status: 62.07% congenitally absent, 19.31% abnormal position, 14.48% generalized delayed eruption;

- 5) status of overretained primary teeth: 37.24% had caries (treated or untreated), 30.34% infra-occlusion; 23.45% had one-quarter of the root resorbed.

Conclusion:

- 1) There are no statistically significant differences between sexes/ jaws concerning the frequency of overretained primary teeth.
- 2) Congenital absence of permanent successor was most commonly associated with persistent primary teeth, followed by abnormal position of successor.

PR04.34

Academic performance and athletic activities of Greek schoolchildren with cleft/lip palate: pilot study

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Background: Cleft lip/palate is a craniofacial malformation that has a significant impact in ones quality of life. The literature indicates that these individuals often experience learning difficulties and low school achievements during their childhood/adolescence.

Aim: The aim of the study was to evaluate the academic performance and athletic activities of Greek schoolchildren/adolescents with cleft/lip palate.

Design: The sample consisted of 38 Greek individuals with cleft lip/palate, 6–18 years old, who visited university and private orthodontic clinics. Information was collected using questionnaires (modified version of Persson et al. 2012) from the parents or the patients concerning children's academic performance and sports achievements.

Results: 23% of the parents mentioned that their child faced learning difficulties. The majority of the children had high grades in Mathematics and Greek literature in elementary school (>80%) while 65% of them followed a foreign language course. In middle school, high scores in Mathematics were achieved by 38% and in Greek literature by 31%, while in high school this was the case for 30% and 40%, respectively. Almost 70% of the children were involved in sports.

Conclusions: These preliminary results indicate a good performance in school and an increased interest in athletic activities of Greek children and adolescents with cleft. Further investigation into the academic and athletic performance as well as the self-esteem of a larger number of Greek young persons with cleft lip/palate, and in comparison with healthy individuals, could reveal possible differences in their quality of life.

PR04.35

Assessing the prevalence of early childhood caries and the associated determinants in children: a cross sectional study in Egypt

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Background: Early childhood caries (ECC) is a public health problem especially in developing countries. The pattern of ECC reflects a specific risk profile related to socio demographic and lifestyle factors. Little is known about the prevalence of ECC in Egypt and the influence of several determinants on its incidence and severity among children.

Aim: The aim of this study was to assess the prevalence of early childhood caries among Egyptian children and investigate the potential determinants associated with this condition.

Design: A total of 651 children aged 3–5 years were randomly selected from 160 gathering points located in 26 governorates in Egypt. A cross sectional study was designed and data on oral hygiene practices, feeding habits and socioeconomic status was collected through a questionnaire conducted with the primary caregiver of the enrolled children. Information on dental caries was also recorded through dental examination of the teeth following a standardized clinical protocol based on World Health Organization measures.

Results: 67.7% of examined children had at least one decayed tooth in their primary dentition and mean dmf score was 3.3. Girls had lower mean dmf score than boys. There was a positive correlation between dmf scores in children and their mothers having high caries experience ($r = 0.130$, $P < 0.001$). Moreover, caries risk decreased with tooth brushing ($P < 0.01$) and increased with high sugar intake.

Conclusions: The findings from the current study imply there is high burden of early childhood caries among children. This highlights the importance of implementing caries preventive programs in Egypt.

PR04.36

Prevalence of white spot lesions of teeth in Gifu, Japan

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Background: White spot lesions of teeth (WSLs) are divided into carious and non-carious lesions. The pre-cavitation carious lesion is reversible, therefore, early detection and appropriate correspondence are important to arrest the demineralization process. Nevertheless, there were few clinical surveys about the prevalence of WSLs in Japanese children.

Aim: To evaluate of the prevalence of WSLs on anterior teeth and canine with deciduous, mixed and permanent dentition in Japanese children.

Design: A total of 1130 patients aged 2–18 years attending Asahi University Hospital Pediatric Dentistry for the recalls were examined. The labial surfaces of the anterior teeth and canine were investigated the presence of WSLs by the ocular inspection under appropriate illumination.

Results: In deciduous dentition, 12.9% of the subjects had WSLs and the incidence of maxillary teeth was significantly higher than those of mandibular teeth. In mixed dentition, 27.7% of the subjects had WSLs and the incidence of 11 and 21 was significantly higher than those of the other teeth. In permanent dentition, 23.9% of the subjects had WSL and the incidence of maxillary anterior teeth was significantly higher than those of the other teeth. The ratios of person with WSL of the cervix increased significantly in mixed and permanent dentition as compared with deciduous dentition. The ratios of person with WSL which has history of the traumatic injury of precursor were 14.3% in mixed dentition and 10.0% in permanent dentition.

Conclusions: Results suggest that the treatment of pre-cavitation carious lesions to assist remineralization is necessary from the mixed dentition period.

PR04.37

Socioeconomic status and oral conditions related to quality of life

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Aim: To investigate the influence of socioeconomic status (SES), oral conditions, and oral habits on the subjective self-perceptions about oral health-related quality of life (OHRQoL) using the Brazilian Portuguese short versions of the Child Perceptions Questionnaire (CPQ_{8–10}) and (CPQ_{11–14}).

Design: Data were collected in public ($n = 73.5\%$) and private schools in the city of Fortaleza-Ce, Brazil. Data about oral habits were collected using a structured questionnaire answered by the schoolchildren and they were clinically examined for the presence or absence severity of the following conditions, according to the methodology set forth by the World Health Organization. The Chi-square test was used to measure the risk estimate between socioeconomic status, self-perceived oral health and OHRQoL and logistic multiple regression was performed, considering caries prevalence as the dependent variable and gender, age and type of school (private vs public) as independent ones.

Results: Both age-specific questionnaires detected differences in the self-perceived impact of gingivitis on quality of life, with the greatest scores in the expected direction ($P = 0.02$; $P = 0.01$), respectively. Higher impacts on OHRQoL were observed for children 11–14 years of age with untreated dental caries ($P = 0.03$). The logistic regression model indicated that children in public schools with a low SES were 3.7 times more likely to have caries than those who studied in private schools and were significantly better off economically.

Conclusion: The findings from the present study support the evidence that some clinical conditions (caries and gingivitis) and socioeconomic status had significant impact on schoolchildren's oral health-related quality of life.

PR04.38

Relevance of motor function and oral function in childhood: efficiency of the mouth rinsing function test

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Background: Eating behaviors such as quick feeding and picky eating may be associated with oral function such as biting and gulping down. However, a convenient evaluation of oral function in early childhood has not been established.

Aim: In our division, we divided gargle development into five steps and we devised the mouth rinsing function test (MRFT) to evaluate the oral function. The purpose of this study was to examine the usefulness of the MRFT.

Design: Subjects were 3 to 5-year-old total of 24 preschool children (14 boys, 10 girls; average age, 4Y2M ± 9M). Age, gender, height, weight, the eating behavior questionnaire; the Children's of Eating Behavior Questionnaire (CEBQ), body composition (InBody[®]), oral examination, oral function evaluation (MRFT, DENTAL PRESCALE[®]) were examined. This survey was conducted with the approval of the Ethics Committee of Showa University School of Dentistry (2014-015).

Result: The MRFT scores increased with advancing age. Children whose parents answered that their child had a problem with eating based on the eating questionnaire, and low-birth-weight

infants had a low MRFT score with age. The group mouth rinse completely were more significantly average occlusal pressure.

Conclusion: Mouth rinsing in dental clinics is frequent. The MRFT may be useful for evaluating infant oral function.

PR04.39

Relevance of motor function and oral function in childhood: eating behavior and general development

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Background: Currently, there is a worldwide decline in the incidence of dental caries among children, and eating behavior that affects dentition and occlusion has been noted. However, for pediatric patients, there are very few items of conventional oral functional examination. Reports of safe and highly cooperative methods or items are very few.

Aim: The purpose of this study was to create safe and highly cooperative methods through a questionnaire survey. This study also examined the relationship between eating behavior and oral function through whole-body function.

Design: Subjects were total of 24 preschool children (14 boys, 10 girls). The age, gender, growth, and development of the children were examined. Eating functions were investigated using the Children's of Eating Behavior Questionnaire (CEBQ). Other questionnaires was used to assess the children's living environment. The following survey items were assessed: anthropometric data (InBody[®]), masseter muscle and triceps surae muscle thickness (Miru-Cube[®]), occlusal force (DENTAL PRESCALE[®]), oral function evaluation (mouth rinsing function). This survey was conducted with the approval of the Ethics Committee of Showa University School of Dentistry (2014-015).

Result: The average age of the children was 4Y2M ± 9M (range, 3Y0M-5Y7M). The earlier the child began walking, the greater was the occlusal force. In premature children, the average occlusal pressure was high. Food motivation was increased when the Kaup index was high.

Conclusion: Oral function development was correlated with whole-body development. It is important to examine the teeth and dentition, and to evaluate the development of oral function and whole-body power.

PR04.40

Dental health of 1 to 3-year old children in a large city in northern Poland

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Background: The prevention of caries in early infancy is a decisive factor which determines future dental health in children and adolescents. Early detection of caries is fundamental to the success of subsequent treatment.

Aim: The aim of the study was to assess the condition of dental health of children aged 1–3 years in day nurseries in a large city in northern part of Poland (Gdansk).

Design: The study was conducted in 7 randomly chosen private day nurseries in Gdansk in 2015 among a group of 140 children aged 1–3 years.

The research focused on qualitative as well as quantitative assessment of teeth healthy, with caries, filled, filled with caries, post-traumatic, extracted and unerrupted. Dental caries was identified at cavity level. It was carried out in ordinary day light with a standard dental examination mirror.

Results: The average age of the surveyed children was 2.74 years. The research has shown surprisingly good level of dental health. The incidence of caries was generally 15%; mean dt 0.67; mean dmf/t 0.72. Dental Treatment Index was 0.073.

9.3% of surveyed children has a malocclusion and 7.3% had had already suffered dental trauma.

Conclusion: The survey has shown satisfying level of oral health in the surveyed children. However, there is still a need to continue with dental hygiene and promote regular check-ups, and varnishing.

PR04.41

Relevance of motor function and oral function in childhood: association between occlusal force and triceps surae muscle thickness

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Background: Although occlusal force in adults have been reported to be associated with size of masseter muscle and limb muscle, there are few reports about muscle thickness and occlusal force in preschool children.

Aim: The purpose of this study was to clarify the factors which including muscle thickness (triceps surae and masseter) and body composition in relation to occlusal force in preschool children.

Design: The subjects were total of 17 preschool children aged 3 to 4-year-old (11 boys, 6 girls; mean age 44 ± 7 months) from 24 children aged 3 to 5-year-old. Occlusal force was evaluated by DENTAL PRESCALE[®], masseter and triceps surae (soleus, gastrocnemius) muscle thickness was measured by Miru-Cube[®], and Body Composition was examined using InBody[®]. Age, gender, height, weight, grip strength, calf circumference were also measured. This survey was conducted with the approval of the Ethics Committee of Showa University School of Dentistry (2014-015).

Result: The size of the Soleus muscle was significantly related to occlusal force ($P = 0.016$). The size of masseter muscle was not significantly related to occlusal force.

Conclusion: Result of examining the background factors related to occlusal force in preschool children showed that the thickness of soleus muscle and occlusal force was associated. Muscle size and motor activity is inferred that affect occlusal force in preschool children. Furthermore, it was considered to be able to infer the occlusal force from growth condition of the lower extremities.

PR04.42

Mothers related risk factors of ECC in very low birth weight children

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Background: ECC can be associated with health complications and poorer oral health of pregnant women.

Aim: The aim of the study was to identify relevant risk factors of early childhood caries in mothers delivered their child pre-

maturely with VLBW in comparison to those delivered eutrophic, full-term children. The study was approved by the ethical committees of University Hospitals in Hradec Králové and Pilsen.

Design: Altogether 104 age-matched mothers of 1-year old children have been included in the study, 56 with VLBW children, 48 with full-term children (30.9 vs 31 years) based on their informed consent. Mothers were dentally and periodontally examined and basic oral health data were calculated (DMFT, PBI). Health history was obtained by the questionnaire. Statistics - Fisher exact test, t test ($P < 0.05$).

Results: Risk pregnancy was reported more frequently in mothers with VLBW children (64.3% vs 16.7% - $P < 0.05$). Systemic diseases and complications of pregnancy were more frequent in women delivering pre-maturely as compared with those with full-term deliveries (17.9% vs 4.2% - $P < 0.05$). The most of mothers from both groups were non-smokers (83.9% vs 93.7% - $P = 0 > 0.05$). Oral health was slightly better in mothers delivered full-term compared to pre-term (DMFT 9.5 vs 11.4, PBI 16.5 vs 29.9 - in both parameters $P > 0.05$).

Conclusion: Risk pregnancy, frequently associated with poorer general and oral health may lead to pre-mature delivery and VLBW of the child and thus can be taken as a relevant risk factor of perinatal complications and of the ECC in these children.

PR04.43

Caries experience in children with cleft lip and palate in Latvia

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Background: Previous epidemiological studies showed high prevalence of caries in Latvian children. The incidence of caries negatively affects children with clefts because the success of the oral rehabilitation is related to adequate oral health.

Aim: to assess if children with clefts have an increased caries experience.

Design: A total of 171 children with clefts and 196 noncleft control were divided into three age groups: 2–3; 6–7; 11–12 year olds and examined for dental caries using the dmft(t)/DMF(T) index for decayed, missing and filled teeth and dmf(s)/DMF(S) for surfaces. Indices were used according to the WHO criteria (1997). Gained data were registered in clinical evaluation forms.

Results: In the cleft group, 74.8% were affected by caries compared 86.2% in control group. In the primary dentition, the mean dmft(t) for the 2–3 year olds was 3.49 (± 4.70) vs the control group 4.83 (± 3.83) while that for the 6–7 year olds was 7.7 (± 3.79) vs the control group 5.97 (± 3.11). In the permanent dentition, the mean DMF(T) for the 6–7 year olds was 0.48 (± 1.02) vs the control group 0.88 (± 1.40) and for 11–12 year olds 4.64 (± 3.66) vs the control group 4.48 (± 2.98).

Conclusions: Caries experience in primary dentition is higher in 2–3 year olds to noncleft children compare to children with clefts. In permanent dentition 6–7 year olds caries experience is higher in noncleft children and 11–12 year olds in cleft children. It is necessary to develop preventive programs for children with cleft lip and palate according to their needs.

PR04.44

Analysis of caries status among 5-year old children in Shanghai from 2008 to 2011

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Background: Dental decay is one of the most common diseases threatening children's health.

Aim: To analyze the status of 5-year-old children's dental caries in Shanghai from 2008 to 2011.

Design: By using equal-sized randomly sampling method, this survey was carried out on the caries status of randomly selected 950 children aged 5 years in Shanghai respectively in 2008 and 2009, and 900 children respectively in 2010 and 2011. The data of prevalence of dental caries, dmft, caries filling constituent ratio and SiC index were collected.

Results: From 2008 to 2011, the prevalence of deciduous tooth caries among 5-year-old children was 63.47%, 64.00%, 64.89% and 64.44% respectively. The mean dmft score was 2.96, 2.99, 3.23 and 3.09 respectively. The caries filling constituent ratio was 10.93%, 12.76%, 16.96% and 20.63% respectively. The prevalence of caries and mean dmft showed no significant difference in 4 years ($P > 0.05$), and the caries filling constituent ratio was obviously increased ($P < 0.01$). Each year the prevalence of deciduous tooth caries and mean dmft in urban areas were lower than suburban areas ($P < 0.01$), but the children came from urban areas showed significant higher filling rate than those from suburban areas ($P < 0.01$).

Conclusions: The prevalence of deciduous tooth caries and dmft of 5-year-old children in Shanghai have changed little, and the caries filling constituent ratio has increased year by year. To promote children's oral health further, we still need to take more active preventive measures for high caries risk group.

PR04.45

Maternal active smoking and its risk of oral clefts: a meta-analysis

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Aim: To figure out the association between maternal active cigarette smoking and the risk of oral clefts in newborns.

Design: The present meta-analysis included 29 case-control and cohort studies through Cochrane, PubMed and Ovid Medline. Oral clefts are discussed separately as three subgroups: total clefts, cleft lip with or without cleft palate (CL/P) and cleft palate only (CP). Studies involving different levels of smoking information were gathered to examine the dose-response effect.

Results: A modest but statistically significant association was found between maternal active smoking and CL/P (odds ratio 1.368, 95% confidence interval 1.259–1.486) and between maternal active smoking and CP (odds ratio 1.241, 95% confidence interval 1.117–1.378). The odds ratio of isolated CL/P decreased a little while it increased for isolated CP (isolated CL/P: 1.324, isolated CP: 1.326). Half of the studies showed positive dose-response effect for each subgroup (test for linear trend, P value < 0.05).

Conclusions: There is a moderate but existent risk for having a child with a CL/P or CP in smoking women during pregnancy. We could still not confirm if there is a positive dose-response effect between maternal smoking and clefts.

PR04.46

Incidence and risk factors of traumatic dental injury in preschool: a prospective longitudinal study

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Background: Studies on incidence of traumatic dental injuries (TDI) in primary dentition are scarce and there is no evidence on

the association between previous episodes of TDI and the occurrence of new cases of TDI.

Aim: The objectives of this prospective longitudinal study were estimate the incidence of TDI in primary dentition and test the hypothesis that children with previous TDI are more prone to new cases of TDI.

Design: The first TDI exam was carried out with 261 children aged 1–4 years in Diamantina, Brazil. The second exam was carried out 1-year later with the same participants of the first phase. Among 261 children, 194 were reexamined. In the follow-up exam, the expose group was composed by children with previous TDI ($n = 65$) and a non-exposed group ($n = 129$) by children who had no previous TDI. TDI was diagnosed based on the criteria proposed by Andreasen and Andreasen (2007). During the exam, incisor overjet was measured and lip coverage was evaluated. Parents were interviewed about socioeconomic indicators. Descriptive, bivariate and adjusted Poisson regression model analyses were performed.

Results: The incidence of TDI in the overall sample was 55.7%: 64.6% in the exposed group and 51.2% in the non-exposed group. The risk of a new cases of TDI was significantly higher among children with a history of TDI (RR: 1.30; 95%CI: 1.01–1.67), independently of the other variables.

Conclusions: The incidence of TDI was high. Previous TDI in primary dentition was associated a new cases of TDI.

PR04.47

Oral and dental health status of children with chronic renal failure (CRF)

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Background: Advances in pediatric-nephrology during the last two decades have resulted in a marked increase in the number of CRF-children's survival. Improving their dental hygiene reduces the risk of infections as oral-cavity is considered as septic-foci.

Aim: The aim of this study was evaluating the oral and dental health status of children with (CRF), to investigate the cariogenic-microflora.

Design: A total of 50-children with CRF were compared with 50-normal children. Salivation of each child was stimulated by chewing a paraffin pellet for 5-min to collect 3 mL of saliva. Salivary levels of urea and pH were measured. Salivary Streptococcus-mutans and Lactobacilli were counted by means of selective culture media. Oral examination was carried out with criteria of (WHO) for hypoplasia, discolorations, gingival-indices (GI), plaque-indices (PI) and dmft and DMF-scores. Collected data was statically analyzed by t-test with ($P < 0.05$).

Result: Enamel hypoplasia, discoloration and PI were significantly greater in the CRF-group, but the prevalence of the caries and salivary levels of cariogenic-microorganisms were significantly lower than in the control group. However, there wasn't any significant difference in GI in both groups.

Conclusion: In CRF-children the levels of cariogenic-microorganisms were decreased due to increased concentrations of antibacterial chemicals as urea in saliva. Also, uremia in CRF children during teething might cause Intrinsic-discoloration, as well as, the use of ferrous-sulfate syrup for anemia treatment which caused black-brown extrinsic-staining. Therefore, although the need of dental treatment was low, these children should receive oral health education and oral hygiene instructions in order to improve their overall oral health.

PR04.48

Oral health of children with Down syndrome in Bosnia and Herzegovina

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Background: Oral health in Down syndrome children has some peculiar aspects that must be considered in the follow-up of these patients.

Aim: The aim of this study is to determine the state of the oral health of children with Down syndrome aged 6–18 years, through dental status, plaque and CPI index, and compare it with the oral health of healthy children in Bosnia and Herzegovina.

Design: This study included 57 Down syndrome children from Tuzla and Sarajevo Canton, Bosnia and Herzegovina, clinically examined and established dental status, CPI and plaque index, according to the rules of the WHO. Subjects were divided into three age groups, for easier data analysis.

Results: The dmft value in respondents aged up to 6 years (group I) is 6.40, DMFT value (first permanent molars) in respondents aged 7–12 years (group II) is 2.05; DMFT value of respondents 13–18 years (group III) amounts to 10.30. Values of CPI index for indexed groups were as follow: 0.10 (group I); 0.17 (group II); 0.40 (group III). There were no statistically significant differences in plaque index subjects with Down syndrome in relation to the set age groups.

Conclusions: Tested sample of children with Down syndrome, has shown dmft/DMFT index extremely high in all age groups, with a high proportion of carious teeth in compared to healthy children, while CPI and plaque index do not differ from healthy individuals.

PR04.49

Parent's knowledge and attitude towards the importance of primary teeth

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Background: Parents have a central affect in implementing proper oral hygiene. Poor knowledge about the child's oral hygiene and primary dentition among parents has a deep implication on the oral health in primary and permanent dentition.

Aim: The aim of this study was to evaluate parent's knowledge about the primary dentition of their children and help them increase their knowledge to prevent problems that may affect the child's permanent dentition in the future.

Design: A cross-sectional study, to assess the knowledge of the parents regarding the primary teeth care, was conducted in the dental clinic of Ajman University of Science and Technology in (U.A.E). One hundred questionnaires were distributed between parents who visited the AUST clinics in the year 2014.

Results: One hundred parents (female: 40%; male: 60%), participated in this study. (51 percent) of participant had no knowledge about the number of primary teeth. Furthermore, about 20 percent had no knowledge around which age, the child starts losing primary teeth. 23 percent believed that it's not necessary to visit a dentist after a trauma to the primary teeth, 24 percent had no

idea that trauma to the primary teeth can affect the permanent teeth.

Conclusion: There is an intensive need to improve the parental knowledge regards to the primary teeth. Thus an educational dental health programs for parents of young children, is required to be established. This step can help in improving the children's oral hygiene and implementing the importance as well as preventing and managing the primary dentition.

PR04.50

Pattern and prevalence of retained primary teeth at the paediatric dental clinic of the University College Hospital, Ibadan, Nigeria

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Background: There is a dearth of studies that have investigated the pattern and prevalence of retained deciduous teeth in literature.

Aim: The aim of this retrospective study was to determine the pattern of presentation of retained primary teeth at the Paediatric Dental Clinic, University College Hospital, Ibadan.

Design: Clinical information relating to retained primary dentition was collected from the records of patients that attended the Paediatric dental clinic between November 2012 and October 2014 and analyzed using SPSS 16.0 and descriptive statistics was applied. The level of significance was taken at P value <0.05 .

Results: One hundred and fifty seven patients presented with retained teeth within the studied period, out which 52.8% was females. Male to female ratio was 1 : 1.1. The mandibular primary central incisors were observed to be the most commonly retained (30%) and the first mandibular primary molars were the least, (4%). The commonest age that presented was 6 years (23%) and 2 teeth were retained most commonly (42.7%). Six teeth were retained in 1.3% of the patients.

Conclusions: Retained teeth were observed to be commoner in females and the mandibular anterior segment is the commonest site. The findings from this study will serve as baseline data for future studies on factors associated with retained teeth.

PR04.51

Impact of indigenous tooth cleaning and normal tooth brushing habits on caries experience in children

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Background: There is a paucity of data comparing the effect of indigenous and tooth brushing practices among children in Indian context. The impact of tooth cleaning practices on dental caries experience varies.

Aim: To evaluate dental caries experience in children with Indigenous tooth cleaning and normal tooth brushing practices.

Design: A community based cross-sectional study was conducted in a field practice area of a South Indian State, Andhra Pradesh. Children between 7 to 14 years of age were included. By stratified cluster sampling technique a desired sample size of 600 was achieved using single population proportion formula with an assumption of 95% confidence level, 8% degree of precision, proportion of dental caries, 70% and design effect of two. Pretested and structured questionnaires that included socio-demographic characteristics, dietary habit, health care seeking behaviour towards oral health problems and oral hygiene practices were

used for data collection. Type-III clinical examination was carried out to all selected children by single dentist to identify the presence of dental caries using DMF index. Data were analysed using SPSS version 20. Bivariate and multivariate analyses were employed.

Result: It was observed that children with indigenous practices are having less caries experience, $P = 0.01$. 60% of the male and 65% of the female children were affected with caries. Children who reported to have regular oral rinsing habit experienced less caries.

Conclusion: Information obtained from this study can be kept as baseline data for planning and developing cost-effective primary caries preventive strategies oriented towards children.

PR04.52

Differentiated approach to preventive dentistry programs in children with special needs

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Background: Dental treatment in children with intellectual disability (ID) is often impeded because of uncooperative behavior, so preventive dental care is a must in this pediatric population group.

Design: To assess the feasibility of oral hygiene education (OHE) we used a modified living skills diagnostics card, which was used to analyze 52 15 years-old children (27 (52%) males and 25 (48%) females) with moderate (40.4%), advanced (44.2%) and severe (15.4%) ID. Survey score varied from 0 (oral habits training impossible) to 32 (normal ability for OHE).

Periodontal disease incidence, OHI-S and PMA index were assessed at baseline examination and 6 months after children and caregivers received OHE sessions.

Twenty-five children (48.1%) having survey score 0 to 12 with good hygienic skills had OHE sessions with dental hygienist, 10 children with score 13–21 may manage controlled oral hygiene procedures. In 17 children with score 22–32 OHE in children was impossible and only caregivers were trained.

Results: Oral hygiene improved in all study groups. The fact is confirmed by statistically significant OHI-S reduction (from 3.51 ± 1.09 to 1.87 ± 0.71 , from 4.35 ± 1.39 to 2.43 ± 0.96 , from 4.01 ± 1.15 to 2.03 ± 0.90 in groups 1, 2 and 3, correspondingly) ($P = 0.01$).

In group 1 PMA decreased from $23.80 \pm 20.42\%$ to $12.10 \pm 11.81\%$ ($P < 0.05$), in group 2 - from $50.20 \pm 34.94\%$ to $36.52 \pm 28.70\%$ ($P < 0.05$). In group 3 PMA reduction was especially significant: from $48.28 \pm 32.13\%$ to $27.54 \pm 21.26\%$ ($P = 0.01$).

Conclusion: In 6 months of differentiated OHE approach satisfactory oral hygiene was observed and statistically significant PMA reduction was seen in all groups of children with ID.

PR04.53

Dental caries in school children at two different Libyan settings: the effects of fluoride level

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Background: Not much attention has been given to study the prevalence of dental caries and the effect of fluoride level among Libyan school children.

Aim: To assess prevalence and severity of dental caries among 6–12 years old children in relation to fluoride concentration levels in drinking water.

Design: Cross-sectional observational study, done in two Libyan cities. Recruited 2000 children (6–12 years old, 969 boys, 1031 girls / distributed into three groups according to the age) from four randomly selected public schools. The WHO diagnostic criteria was used to measure dental caries.

Results: The overall caries prevalence was 61%. The highest caries prevalence was in group III (11–12 years). Overall mean DMFT, deft and dmft indices were 1.01 (SD \pm 1.48), 1.35 (SD \pm 1.84) and 1.45 (SD \pm 2.39) respectively. There was a statistically significantly negative correlation in overall mean of DMFT scores at various water fluoride levels (10.73 \pm 0.36 ppm) ($P = 0.020$). Caries experience was more among girls than boys ($P = 0.021$).

Conclusion: The caries prevalence was very high, there was a negative correlation between caries experience and fluoride concentration; for the entire study population. However, in high fluoride areas, there was a positive correlation between fluoride concentration and dental caries. Water de-fluoridation on an urgent basis is a priority here than water fluoridation, because of the prevalence and severity of dental fluorosis is very high.

PR04.54

The dentition status and treatment needs of children with developmental delay

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Background: To date, most government are very concerning about the social welfare of the children with developmental delay (CDD), but the dental conditions and treatment needs of CDD are not clear.

Aim: To evaluate the dentition status and treatment needs among CDD in Taiwan.

Design: 649 CDD were included by purposive sampling, <6 years old, received dental examination including dentition status, treatment needs, debris index, gingival status and calculus index by four dentists. Informed consent was obtained from the participants' parents and the study was approved by the Institutional Review Board of Kaohsiung Medical University Hospital. The descriptive frequencies were used for statistical analysis.

Results: The deft index of all children was 2.82 \pm 4.26, caries prevalence was 38.83%, debris index was 0.65 \pm 0.69, gingival status was 0.10 \pm 0.31, calculus index was 0.0052 \pm 0.0510. Based on the regional analysis, the deft index in Taipei Region (2.07 \pm 3.51) was lowest, and the deft index in Southern Region (3.55 \pm 4.98) was highest. The caries prevalence in Taipei Region (29.38%) was lowest and the caries prevalence in Southern Region (46.09%) was highest. Although the deft index and caries prevalence in Central Region were not highest, the dt index (2.93 \pm 4.53) was highest and the ft index (0.20 \pm 0.77) was lowest. About the treatment needs, 30.97% CDD needed 1-or-more-surface filling, 11.40% needed pulp treatment and 4.16% needed tooth extraction.

Conclusions: The deft index and caries prevalence in CDD were still high. The treatment needs were mostly about restoration. The rural-urban disparity was still remaining in this study.

PR04.55

Caries experience of 5 year-old Greek children using ICDAS II. A national pathfinder survey

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Background: Epidemiological studies provide information about prevention, dental care and treatment in public and private level and contribute to changes for effective dental care.

Aim: To register caries experience and treatment needs of 5 year-old Greek children, under standardized criteria with calibrated examiners and to correlate the above findings with socio-demographic parameters.

Design: A stratified cluster sample of 1222 healthy preschool children was randomly selected and examined by calibrated examiners. Dental caries was recorded according to ICDAS II criteria. Data about socio-demographic features and the knowledge, attitudes and behaviour related to oral health were retrieved via parental completion of a structured questionnaire. Statistical analysis was performed with SPSS. Uni- and multi-variable (negative binomial regression models and Logistic regression models) were conducted to investigate potential risk indicators for the manifestation of dental caries in this age group.

Results: Dental caries varied considerably between the different geographic districts, with mean $d_{3-6}mft = 1.48$ and $ICDAS_{1+2} = 1.41$. Caries free was 42.4% of the sample, Care Index (CI) was 13.23%. Boys had higher $d_{3-6}mft$ than girls ($P = 0.042$). Children living in rural areas demonstrated slightly lower $d_{3-6}mft$ ($P = 0.434$), while children with highly educated fathers and mothers showed lower $d_{3-6}mft$ values ($P = 0.195$ and $P = 0.932$ respectively). 29% of the children with caries suffer from severe ECC.

Conclusions: The mean $d_{3-6}mft$ was found to be lower than the previous Pathfinder Survey. Tooth-brushing frequency and frequency of sugary snacks consumption found to be the only statistical significant risk factors for the development of caries in preschool children.

PR04.56

To assess the level of parent's satisfaction in a dental setting

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Background: Not many studies have been conducted in the past to determine parent's level of satisfaction in academic dental settings. This parent satisfaction study analyzed the level of parent's satisfaction with the dental setting at Seema Dental College and Hospital, Rishikesh (Uttarakhand).

Aim: The purpose of the study was to determine if there was a statistically significant influence of demographic characteristics of the parent's and the affective behavior of the care providers on level of parent's satisfaction.

Design: Parent's in the Paedodontic department at the Seema Dental College and Hospital were the target population whose perceptions and ideas were collected in the form of a parent's satisfaction survey.

Results: It was found that except for age, other demographic variables did not have any statistically significant influence on parent's satisfaction.

Conclusion: As patient's needs are prioritized in this customer-driven industry, such positive parent's satisfaction data can be used

for the welfare of the patients, the care providers, and the health care organization.

PR04.57

Evaluation of oral health status, practices and treatment needs of children attending special schools

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Background: Oral health forms a major determinant and is an intrinsic part of good health. Children with special care are said to be under high risk in this perspective. Hence, routine dental procedures help to diagnose potential problems at an early stage that could help the Pedodontist to give better services to these children.

Aim: The aim of the present study is to evaluate the total oral health status, prevalence and oral hygiene practices of these children.

Design: A total of 682 children have been screened. Consent was taken from the institutional authorities and the parents. The study population comprised of five different categories.

They are:

- 1) Children with a learning disability
- 2) Down's syndrome children
- 3) Autistic disorder children
- 4) Cerebral palsy children
- 5) children with speech and hearing impairment

Before the start of the study a questionnaire was given to be filled by the parent/guardian of the child regarding the oral hygiene practices and term of delivery.

The following aspects of oral health was recorded:

- Dental caries experience
- Oral hygiene status
- Molar occlusion
- Other findings regarding malocclusion
- Cooperation during examination/ Oral defensiveness

Results: There was a significant difference in the oral hygiene practices, oral hygiene status among the disabled children. Caries experience was high among these children but there was no statistical significance. Prevalence of malocclusion was high.

Conclusion: Preventive services, regular checkups, oral hygiene visits along with education and motivation to the parents would be beneficial to these children.

PR04.58

Molar incisor hypomineralisation: 3-year follow-up of filling status in permanent first molars

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Background: A tooth with yellow-brown opacities is at risk of post-eruptive breakdown and subsequent need of restorative treatment.

Aim: To compare the frequency of dental fillings in permanent first molars (PFMs) with yellow-brown opacities and in PFMs without opacities in 100 subjects affected by molar incisor hypomineralisation (MIH).

Design: The restorative treatment need of PFMs in a subgroup of 100 subjects, being part of a larger epidemiological population study on MIH originally including 3600 9-year old children from

Aalborg Municipality, were reviewed based on data in their dental records.

In these 100 children, we identified 128 yellow-brown PFMs and 194 control PFMs, being PFMs without any sign of opacities. Three years after initial examination, we examined the dental files and recorded whether the PFMs were intact (not filled), filled or missed.

Results: A total of 38 children had one or more filled yellow-brown PFMs, while their control PFMs remained healthy. Two children had had their yellow-brown PFMs extracted, while their control PFMs remained healthy. Six children had had one or more filled yellow-brown PFMs, while their control PFMs were filled as well. One child had an endodontically-treated PMF and had fillings in the control PFMs as well. Of the 128 yellow-brown PFMs, 49 (38.3%) were recorded as filled, two as extracted and one endodontically-treated, whereas among 194 control PFMs, 16 (8.2%) were recorded as filled.

Conclusions: The risk of fillings in PFMs with yellowish-brown opacities is high, and children with this condition should be surveyed thoroughly.

PR04.59

Epidemiological study of extrinsic stain and early childhood caries

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Background: There is no consensus in the literature concerning the prevalence of extrinsic stains and associated caries distribution pattern in children upto 3 years.

Aim: This study was designed to assess the following:

- 1) prevalence of extrinsic stain in preschool children,
- 2) correlation between extrinsic stain and incidence of ECC and
- 3) to compare the distribution of caries in fissures, smooth surfaces or both among children with and without extrinsic stain using ICDAS II index.

Design: A cross-sectional study was carried out in a representative sample of 0–3 year-old children in Tamil Nadu, India. Children were divided into two groups:

- Group I; Children with extrinsic stain,
- Group II; Children without stain.

Both Group I and II were further divided into two subgroups; Ia and IIa: children with ECC and Ib and IIb: children without ECC. The presence of extrinsic stain and the distribution of caries pattern were assessed by two calibrated examiners.

Results: The overall prevalence of extrinsic stain was 6.2%. There was no statistical difference observed with regards to caries distribution pattern (P value = 0.568) between Group Ia and Group II a (control group). However, high significant difference of P value 0.011 was reported with regards to fissure caries among children in both the groups.

Conclusions: The incidence of fissure caries was found to be high in children with extrinsic stain when compared to children without stain.

PR04.60

Traumatic dental injuries among 3 to 17 year old school children

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Background: Anterior tooth trauma has been the most tragic experience for both patient & parents in terms of damage to den-

tion, compromised esthetics, psychological trauma or social stigma.

Aim: To assess the prevalence and distribution of traumatic injuries to the anterior teeth among 3–17 years old children. To correlate the prevalence of the injury to the cause of the trauma and the specific age groups. To ascertain the percentage of those seeking the treatment.

Design: 5000 school going children aged between 3–17 years of Indore, India of both sexes and different socioeconomic status were divided into three age groups 3–5 years, 6–11 years and 12–17 years. Traumatic injuries to the anterior teeth were recorded according to Ellis and Davey classification along with sex, age, cause of trauma, number of the injured teeth, type of teeth, socio-economic status. In addition, the level of unmet treatment need was also be ascertained.

Results: The overall prevalence of trauma among the boys and girls was 23.6% and 15.8%. Class I fracture was the most common followed by class II fracture. Single tooth injury, Upper socio-economic class, children from Private Urban schools were more commonly associated with trauma and maxillary central Incisor was most affected tooth. Fall was the most common etiologic factor. Merely 2.5% of children who experienced trauma had undergone treatment.

Conclusions: This study emphasizes the need for education programs about traumatic dental injuries that should be directed towards the children, parents and school teachers.

PR04.61

A health program strategy for improving the oral health of schoolchildren

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Background: In recent decades it has been observed in Brazil a dental carie incidence decline in children, yet about 50% still need clinical intervention, with a greater emphasis of caries within the population of greater social vulnerability. Given this context, we developed a program for prevention and treatment of oral diseases for children enrolled in the public education system (0–14 years) in low-income areas of the city of Belo Horizonte.

Aim: The goals are: improve oral health in school, promote the integration of school personnel and health services teams; identify vulnerable groups with dental diseases; develop prevention activities in order to promote and restore oral health.

Design: The program has been implemented in all health units in the city in partnership with each school district. Actions are implemented for school personnel, for instance, implementation of daily brushing with fluoride toothpaste and health education activities. An annual epidemiological survey is conducted in schools, referring each case to treatment in the health services system.

Results: Some 170,000 students are monitored in this program. Five years after its implementation there was an increase of 26% of caries-free children, reaching 44% of the total, of which 24% did not require treatment and 32% required clinical support.

Conclusions: The program has demonstrated its effectiveness in improving the oral health of schoolchildren. The partnership of the education and health systems has been fundamental to the change in the epidemiological scenario, and also to promote and maintain oral health.

PR04.62

Children with severe caries may have toothache and requirement for dental care

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Background: There is current discussion about utility of dental interventions in early childhood caries. Toothache can indicate dental intervention, but its assessment in young children through non-validated methods is questionable.

Aim: To evaluate if toothache assessed with validated tool is associated with severe caries and dental treatment needs in pre-school children.

Design: This study observed 56 children (33 girls), mean age of 61.9 months, who participated in randomized clinical trial (NCT02284204). Dental caries and treatment needs were assessed by dental exam, based on WHO criteria (dmf-t and dental treatment needs). Severe caries was categorized as: severe childhood caries ('dmf-t' index ≥ 6), untreated severe dental decay ('pufa' index > 0), and the Significant Caries index (SiC). Dental Discomfort Questionnaire, Brazilian version (DDQ-B) was used to assess caries-related toothache. DDQ-B median score and occurrence of toothache (DDQ-B ≥ 3) were outcome variables (Sample power 95.7% to 99.8%, CI 95%). Data were analyzed by non-parametric bivariate tests ($P < 0.05$).

Results: DDQ-B score correlated with dmf-t ($\rho = 0.45$, $P < 0.001$) and pufa ($\rho = 0.33$, $P = 0.001$) indexes, and with the number of teeth needing dental procedures ($\rho = 0.52$, $P > 0.001$). Median (third-first quartile) of DDQ-B scores were higher in children with pufa > 0 (5.0, 8.0–3.0, $P = 0.007$), dmf-t ≥ 6 (5.0, 8.0–2.0, $P = 0.008$), and in children included in the SiC index (5.5, 8.0–2.3, $P = 0.006$), compared with children without those conditions. 68.9% of children presenting dental treatment needs ($P = 0.01$) and 78.3% with pufa > 0 needing more invasive procedures ($P = 0.02$) had toothache.

Conclusions: Caries-related toothache measured by validated instrument is associated with severe caries and need of dental procedures in children.

PR04.63

Indicators of dental morbidity of children in ecologically unfavorable region of Kazakhstan

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Background: Currently there are no scientific researches on the hygienic assessment of oil-gas fields in Mangistau region impact to dental health of children.

Aim: The aim of the present research was investigating the state of dental health of children in Mangistau region and the development of ways to improve.

Design: Examined for the 2012–2014 period in all 880 children of three key ages. Inspection of children spent a pediatrician. Specialist hygienist conducted the investigate of environmental factors according to the regional SES.

Results: According to the results of the screening of Mangistau region's children dental status prevalence of dental caries – 89.3%, the intensity of caries – 3.8. Comparative analysis of the performance research of the dental status in children following the results of work for 2012–2014 showed a decrease in the prevalence of dental caries by 5.9% and amounted 83.4%, and the intensity 3.4. The survey with pupils revealed that a lot do not possess the fundamentals oral hygiene.

Conclusions:

- 1) Improvement of the situation with dental disease by mass organization dental offices in schools.
- 2) Indicators of dental caries in children is possible to reduce by preparing a dental hygienist and organization of their work in the pre- and schools.
- 3) It is necessary the introduction of a comprehensive program of prevention of dental diseases considering regional features.
- 4) Scientists, teachers of dental faculties medical universities can organize for funding the regions in need research projects aimed at identifying problems, providing scientific and practical assistance to specialists.

PR04.64
Adding xylitol to milk as a pediatric caries prevention strategy: factors associated with caries in a school-based randomized clinical trial in Peru

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Background: Xylitol is known to prevent caries, but no studies to date have evaluated whether adding xylitol to milk is a feasible school-based caries prevention strategy. To test this hypothesis, we initiated a randomized clinical trial among school-aged children in Peru expected to end in December 2014. In this study, our aims are to report baseline characteristics of participants and to identify factors associated with dental caries.

Design: We enrolled 161 school-aged children and collected the following baseline data: age, gender, hygiene status, and mutans streptococci level (log base 10). A pediatric dentist examined each child and collected caries data using the U.S. NIDCR EC4 Protocol. We used linear regression models to examine the relationships between dental caries and the following: age, gender, and hygiene status. We used log-linear regression models to evaluate the association between baseline streptococcus mutans levels and dental caries.

Results: About 50.3% of children were male and the mean age was 7.34 ± 1.99 years. Nearly 80% of children had poor hygiene and 13% presented with an intraoral abscess. Over 93% of children had caries on at least one tooth. The mean proportion of carious surfaces was 14.98% (SD = 13.02). Younger age ($P = 0.002$), male gender ($P = 0.0001$), and poor hygiene ($P < 0.0001$) were significantly associated with dental caries. There was a significant positive association between baseline mutans streptococci level and dental caries (Beta = 0.041; $P = 0.0001$).

Conclusion: Demographic, behavioral, and intraoral factors were significantly associated with dental caries in a population of children enrolled in a xylitol milk trial.

PR04.65
Salivary flow and pH in patients with Down syndrome

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Background: Yucatan is the state with the highest prevalence of Down syndrome (DS) in Mexico with 1 per 550 live births. DS

pediatric patient is predisposed to various systemic and oral diseases due to mental retardation and morphogenetic properties they possess. Saliva is a protective factor in the oral cavity, therefore, the analysis of this physiological liquid is a relevant diagnostic tool.

Aim: Determine the flow and salivary pH in a pediatric population with DS in Merida.

Design: A total of 100 pediatric patients with SD ($M = 50$, $F = 50$) aged 0–18 years old with 2 h of fasting and/or tooth-brushing, from 3:00 pm to 7:00 pm, the flow rate was obtained salivary (TFS) using the technique cotton weighing by Strongin, Hinsie and Peck (SHP) values were classified as: Xerostomy, Pronounced low, Low, Normal and Hypersalivation. Measurement of pH was obtained with portable digital pH meter ATS[®] in intimate contact with the ventral side of the tongue.

Results: 83% of cases TFS had pronounced low (0.1–0.7 mL/min), males had a higher mean TFS 0.458 mL/min, the age range 0–3 years had the highest average of TFS 0.450 mL/min; Most occurred in acid pH, the highest value was female with 6.9 and 7.1 was the highest in 16–18 year age range.

Conclusions: The TSF decreases as the age advances; the female is more affected by hyposalivation. The TFS and pH values change obediently at context of DS pediatric.

PR04.66
The prevalence of childhood dental fear and dental caries in Northern Greece

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Background: There are no previous epidemiological studies in Greece about the prevalence of childhood dental fear and dental caries.

Aim: To present: the normative data on dental fear and the caries status for the children of Thessaloniki, Greece.

Design: 1540 children (48.3% boys and 51.7% girls, 6–13 years old) were selected from 15 public schools, using simple one-stage cluster sampling method on all areas of Thessaloniki. 1484 (96.4%) participated the analysis. Multilevel analysis with schools at level 1 and children at level 2 was performed (statistical significance level: $P < 0.05$). Dental examination performed in the classroom, with single-use mirrors and a penlight. To assess their dental fear all children completed the CFSS-DS.

Results: The overall mean CFSS-DS score was 27.1 ± 10.8 . Age was significantly ($P < 0.05$) related to CFSS-DS, while after 9.7 years, dental fear tended to decrease. Mean differences between boys and girls ($P = 0.467$) were not significant. 45.4% of the children were caries-free. The overall mean DMFS and dmfs were 0.6 ± 1.5 and 3.4 ± 5.9 , respectively. Significant differences were observed between different city parts relating to socioeconomic factors ($P > 0.05$, sequential Bonferroni method). Boys showed greater dmfs values (mean = 4 ± 6.6) than girls (mean = 2.9 ± 5.1), $P = 0.026$. Contrary, girls showed greater DMFS values (mean = 0.75 ± 1.77) than boys (mean = 0.44 ± 1.15), $P < 0.001$. Although a positive association was observed between DMFS and CFSS-DS ($P = 0.001$), dmfs and CFSS-DS was not found to be correlated ($P = 0.298$).

Conclusions: There is a correlation between age and dental fear. Dental fear is related to DMFS but not to dmfs.

PR04.67

Oral health status of preschool Greek children with neurodevelopmental disorders. A preliminary study

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Background: Children with neurodevelopmental disorders have been shown to exhibit more oral health problems and receive less treatment.

Aim: To investigate the oral health status of preschool Greek children with neurodevelopmental disorders and its association to personal and family characteristics.

Design: Children attending ELEPAP preschools in Athens, Giannena and Agrino, ($N = 102$) were examined clinically, after written parental informed consent. Dental caries (dmft), visible plaque (VPI) and presence of gingival hyperplasia were recorded,

by one calibrated paediatric dentist. Mutans Streptococci (MS) levels and Saliva Buffer Capacity (SBC) were assessed using chair side tests. Parents completed a questionnaire on demographic, general and oral health characteristics of their children. Data were analyzed using cross tabulations Spearman correlation coefficients and linear regression modeling ($P \leq 0.05$).

Results: In this sample with mean age 4.3 yo (SD:1.5), 35% of the children had caries lesions, mean dmft index was 2.84 (SD:5.86), VPI was 0.49 (SD:0.25), 14% had detectable levels of MS and 21% had high SBC. Children with inflammatory gingival hyperplasia were 3.12 times more likely to have dental caries. Regression analysis ($R^2 = 0.26$, $P < 0.001$) indicated that factors significantly related to the dmft index were VPI ($P = 0.02$), detectable MS ($P = 0.02$), maternal education level ($P = 0.002$) and family income ($P = 0.02$). Furthermore 63% of the children had never visited a dentist and 44% of the mothers ignored the importance of brushing with fluoride toothpaste.

Conclusion: Results of this study confirm that preschool children with neurodevelopmental disorders have impaired oral health, indicating the need for early intervention and parental education.

Dento-Alveolar Trauma Poster Session – PR05

PR05.01

Intrusive and lateral luxation injuries to maxillary incisors: a rare combination of dental traumatic injury

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Introduction: Unfortunately, DTIs result in fractured, displaced or lost anterior teeth and this could have significant negative functional, esthetic, speech, and psychological effects on children thus affecting their quality of life. The combined occurrence of intrusive luxation and lateral luxation injuries are rare.

Case report: An 11 year old girl met with road accident. Trauma has occurred 1 week before patient 1st visit to our clinic. Immediately after trauma patient has visited local dentist. Dentist has done splinting in a wrong manner without reduction and it was hurting the child by causing ulcer. On extra oral examinations lacerations were seen on upper lip and lower chin. TMJ was normal. Facial symmetry was maintained. On intra oral examinations 11 and 21 were having rare combination of intrusive and lateral (labially) luxation injuries and grade III mobile. 11 has Ellis class III fracture. 12 and 22 have luxation injury and grade II mobile. Posteriors were occluding in class 1 relationship. Intra-oral periapical radiographs and orthopantomogram were advised to rule out roots fracture and bony fracture. Radiographs were normal. Removal of old splinting, proper reduction and placement of splint in correct manner was done. Regular recall visits, vitality tests, radiographs, early root canal treatment with intra canal calcium hydroxide dressing and selection of proper restoration help to bring back the teeth in to aesthetic and normal anatomic position.

Comments: Combinations of intrusive and lateral luxation injuries are rare. Immediate proper treatment, periodic radiographs and regular follow ups are necessary to maintain natural dentition.

PR05.02

An audit of post-operative record keeping following tooth auto-transplantation Leeds Dental Institute, Clarendon Way, Leeds, LS2 9LU

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Introduction: Tooth auto-transplantation has gained popularity in the field of Paediatric Dentistry. The most common complications following tooth auto-transplantation include pulpal necrosis, infection-related resorption, ankylosis and replacement resorption. These potential problems must be identified as early as possible to allow timely management. Therefore a comprehensive assessment is necessary at each review appointments and results should be accurately recorded.

Aims:

- 1) To evaluate whether the current post-operative assessment and record keeping following tooth auto-transplantation at the Leeds Dental Institute (LDI) corresponds to best-practice guidelines.

- 2) To enhance post-operative assessment and record keeping following tooth auto-transplantation.

Design: A retrospective case note audit was undertaken of 57 review appointments for patients who had undergone tooth auto-transplantation at the LDI. Standards were agreed locally in the absence of published guidelines and the gold standard was 100% assessment and documentation of appropriate information.

Results: The most commonly recorded information was patient complaint (70%) and colour of tooth (70%). Sixty percent of clinicians took radiographs as appropriate. The most poorly documented information included the presence/absence of a sinus (10%), percussion tone (10%) and bleeding on probing (10%).

Conclusions: This audit highlights inadequacies in post-operative assessment and record keeping following tooth auto-transplantation. Action plan: Development of a standardised proforma for use in auto-transplantation review clinics. This proforma was introduced to all clinicians involved in the care of auto-transplantation patients. Compliance and effectiveness of the review proforma will be assessed in a second cycle of the audit.

PR05.03

Management of horizontal root fracture associated with complicated crown fracture using MTA

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Introduction: The management of a horizontal root fracture is an arduous task, especially if there is an associated complicated crown fracture. The discovery of MTA has simplified the management of endodontic complications of traumatic injuries. However, the restoration of these teeth remains a challenge. A case of horizontal root fracture concurrent with complicated crown fracture using MTA to endodontically seal the fracture line is presented.

Case report: A 13-year-old girl reported with a traumatic injury to the maxillary anterior teeth. Clinical and radiographic examination revealed a complicated crown fracture and grade II mobility in 21 along with a horizontal root fracture in the middle third. There was no evidence of any alveolar damage or bone loss. Following access opening, cleaning and shaping of the root canal, an intracanal calcium hydroxide dressing was kept for 7 days. An apical barrier using MTA was created. The canal was obturated with a paste of MTA that was ultrasonically vibrated so that it may flow in the fracture line. A sterile endodontic instrument was used as an intra-radicular splint. A core built up was done using composite and the tooth was restored with an acrylic crown. No pathology has been evident ever since.

Comments: The challenges in treating traumatic injuries to anterior teeth are unparalleled. The use of MTA has definitely provided the clinician with more predictable treatment outcomes. However, on occasions, a novel way many have to be considered to salvage those teeth which would otherwise have been considered for extraction.

PR05.04

Simple and effective protection against dental trauma with new generation polyolefin material mouthguards

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Background: Cost and Time prohibit mass production of custom fabricated mouthguards and there are definitely not enough dentists and labs to meet the needs of millions of mouthguards that would be required. Hence, an over-the-counter true mouth-formed mouthguard with comparable properties to a custom fabricated mouthguard would be a more feasible and user-friendly chairside option.

Aim: The present *in-vitro* experimental study was carried out to compare the shock absorption ability of EVA laminate mouthguards with self adapting polyolefin material mouthguards in three different anterior teeth alignments.

Design: Finite Element Analysis (FEA) was performed to simulate the stress distribution due to impact on the respective mouthguards. Customized pendulum device with three interchangeable standard size impact objects was used. Response of grating was monitored using a FBG Interrogation system. Shift in wavelength for each impact was measured. Three Nissin standardized jaw models were subjected to a total of 72 impact strikes with three different balls on two specified sites by releasing the objects from two different heights H₁ – 24 cm H₂ – 48 cm.

Results: Two way ANOVA test was applied. It was found that the percentage shock absorption ability of polyolefin mouthguard was highly significant at <0.001 level in both anterior and posterior regions. The influence of height on the shock absorption ability of both mouthguards was highly significant at $P < 0.001$.

Conclusion: Self adapting polyolefin mouthguards fulfill similar protection requirement as custom fit mouthguards and can be used for millions of athletes if properly fitted chairside by a dentist without requiring laboratory fabrication.

PR05.05

Polish family doctors' knowledge concerning first-aid after dental injuries

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Background: Current literature emphasizes that awareness of appropriate triage procedures following dental trauma is unsatisfactory and that delay in commencing the treatment is the most influential factor affecting prognosis. Polish data are not available in this respect.

Aim: The aim of this survey was to establish the current state of knowledge with regard to first-aid procedures in cases of dental trauma of family doctors.

Design: In order to assess the knowledge, a self-completed questionnaire addressing definitions and first-aid measures in the case of tooth avulsion was developed and distributed. The sample size consisted of 134 family doctors attending a conference.

Results: Results revealed that 53% of all family doctors knew that in the case of dental avulsion tooth replantation could be performed. 55% of doctors were aware, that the time factor after tooth avulsion is the single most influential factor affecting the prognosis. 56% of family doctors knew the recommended transport medium for an avulsed tooth.

Conclusions: In the face of still poor knowledge regarding dental injuries there is an need for adequate education programs on the subject of sport-related orofacial injuries directed at all medical

students and doctors, so they could offer immediate help at the site of an accident.

PR05.06

Healing of horizontal root fracture: a case report with 7 years follow-up

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Introduction: Horizontal root fracture is relatively less common type of dental injuries, which comprise approximately 0.5~7% of all trauma cases and occur mostly in the root middle third. Since transverse root fracture affects dentin, pulp, cementum, and periodontal ligament, the healing process was complicated and involved varying types of tissues.

Case report: This article reports a clinical case of 13Y4M boy with a horizontal root fracture located in the middle third of the maxillary right central incisor with severe extrusive luxation of coronal segment. The coronal segment of fractured tooth was repositioned and stabilized with resin and wire immediately, and the splinting period was 1 months. The case was observed under a regular follow-up regimen. The healing process and pattern between the coronal and apical segments were concerned. The pulp obliteration of both segments occurred about 1 year later by X-ray finding and healing with interposition of connective tissue was diagnosed by CBCT. There was no signs or symptoms for over 7 years.

Comments: Different factors determine the prognosis and the type healing of horizontal root fracture. Proper initial management and pulpal/periodontal evaluation are essential for successful treatment of a root-fractured tooth. The presented case demonstrated that immediate treatment of the transverse root fracture with a severely displaced coronal segment was important for good prognosis.

PR05.07

Traumatic crown-root fractures in multiple primary molar teeth: a case report

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Introduction: In preschool children complicated crown/crown-root fractures of primary molars, though rare, pose a challenge for the clinician requiring early diagnosis and effective treatment. The objective of this report was to present and discuss the case of a child who, following a fall, had many of his primary molars seriously traumatised.

Case report: A 4-year-old boy was referred to the Department of Paediatric Dentistry by a general practitioner, complaining for pain during mastication. Based on history, 2 months before his visit, he felt off a bunk-bed. Clinical and intraoral and panoramic radiographic examination revealed complicated crown-root fractures in four primary molars and an uncomplicated crown fracture in one primary molar while the mandible was intact. Treatment plan consisted of behavioural guidance, oral hygiene instructions, restorative and preventive orthodontic treatment and regular follow-ups. Treatment included an extraction, three pulpotomies, placement of four stainless steel crowns, a composite resin restoration as well as a band and loop space maintenance appliance. Patient was re-examined after 3, 6, 12 and 18 months both radiographically and clinically.

Comments: This case confirms the findings of similar cases in the literature that treatment of dental trauma in posterior primary

teeth is neglected and/or misdiagnosed. After a facial trauma (especially when it involves the chin area) detailed radiographic and clinical examination of the posterior teeth and the mandible should be made. In preschool children with complicated crown-root fractures priority should be given to conservative treatment and not to extractions.

PR05.08

Effect of different storage media on re-attachment of incisal fragment: laboratory study

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Background: Tooth fragment re-attachment represents an important technique in restoring fractured anterior teeth. The strength of the final restoration is dependent partly on correct hydration of the fragment.

Aim: Evaluate and compare the effect of different storage media of the tooth fragments on fracture resistance of re-attached teeth.

Design: A total number of 144 permanent incisor teeth freshly extracted were used. A line was traced on the labial surface of each tooth, 3 mm from the incisal edge and parallel to it. Then, each tooth was embedded in acrylic resin block up to three millimetres away from the marker. The fracturing procedure was done by a blunt chisel and hummer. The fractured fragments were stored in appropriate storage media (dry, tap water, milk and full humidity) for one day, 1 and 2 weeks. As scheduled, the fragments were rinsed by water and re-attached using a flowable composite. All samples were subjected to fracture resistance test using a universal testing machine at a speed of 0.5 mm/min. The force required to fracture each tooth was recorded in Newton (N) and the data were collected and statistically analysed.

Results: One day fragment storing in milk and water was found to be with significantly higher fracture resistance than 1 and 2 weeks storing ($P < 0.001$). No significant differences were detected between the different media in 1 and 2 weeks storing.

Conclusion: Re-attaching the tooth fragment kept wet in milk or water for one day yields the highest fracture resistance.

PR05.09

Management of dental trauma at two Yorkshire, U.K. hospitals - a survey of staff in A&E and OMFS SHOs

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Background: Patients suffering with dental trauma commonly present to A&E departments where staff are expected to diagnose and refer to the appropriate speciality.

Aim: To determine confidence and knowledge of A&E staff and Oral & Maxillofacial Surgery SHOs in the management of dental trauma presenting to two Yorkshire based hospitals.

Design: Two questionnaires were prepared, one for A&E staff which was more general in nature and one more detailed for OMFS SHOs. 'The Dental Trauma Guide 2010' International Association of Dental Traumatology was used as our standard.

Results: It was found that the majority of A&E staff understood the importance of urgent referral of avulsed teeth and an appropriate storage medium. Over half of the staff questioned were not routinely asking or assessing dental trauma in patients with head and neck trauma.

Amongst the OMFS SHOs, the knowledge base was generally good on this topic. There was wide variation in the after-care advice being given and advice about possible complications.

There was the lack of equipment to effectively manage acute dental trauma in A&E.

Conclusion: A&E staff are expected to diagnose and refer dental trauma appropriately, however the majority of them have never had any formal training in this field. OMFS SHOs felt competent in managing dental trauma although the lack of equipment affected their ability to treat these injuries adequately in A&E.

As a result further training has been provided to A&E staff and a patient care leaflet on dental trauma has been recommended.

PR05.10

Management of severe extrusive luxation injury involving segmental cortical bone fracture: 24-month follow-up

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Introduction: Timely management of luxation injuries is crucial for favorable treatment outcome. This case report presents the treatment and 24-month follow-up of severely extruded immature maxillary incisors with segmental buccal plate fracture.

Case reports: A 10-year-old boy was referred to the Paediatric Dentistry Department 1 h after a fall accident. Clinical and radiographic examination revealed severe extrusive luxation of maxillary left central and lateral incisors with open apex. A segmental buccal cortical plate fracture was also evident along with gingival lacerations. Emergency treatment consisted of repositioning of luxated teeth with minimal pressure, reduction of the cortical bone, placement of a semi-rigid splint, suturing of soft tissue lacerations and raising the bite using acid-etch resin-based composite on maxillary permanent first molars. The splint was removed 3 weeks later. Clinical and radiographic examinations were performed at 3, 6, 12 and 24 months. Radiographic evidence of periradicular healing was observed 6 months after the extrusive injury, followed by progressive thickening of the root walls and apical closure. Positive response to cold test and electric pulp test were observed at 12 and 24 months, respectively.

Comments: Early emergency management and adherence to the IADT guidelines provided a favorable treatment outcome as evidenced by continued root development in the absence of pulpal and periodontal complications.

PR05.11

Clinical assessment of dental trauma: ensuring completeness to allow correct diagnosis

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Background: Patients present with dental trauma to the Emergency Department (ED) of Birmingham Dental Hospital following referral by their GDP, or indeed having self referred. Our role is to establish diagnosis and provide emergency treatment.

In cases of trauma a thorough baseline assessment is important as it informs diagnosis, provides a reference at review appointments and may form part of a medicolegal case. Staff members in the ED have varied dental backgrounds and experience levels and hence there is a large disparity in familiarity with dental trauma, its assessment, diagnosis and management.

Aim: To audit initial assessment dental trauma within the ED against assessment standards agreed locally in the Paediatric Department.

Design: The notes of 50 cases of trauma that had been managed in the ED were retrospectively audited against a set of criteria based on national and international guidelines and agreed locally by the Paediatric Department.

Results: This audit showed that the vast majority of histories included the relevant details, the clinical assessment of patients was often inadequate. Specifically, sensibility testing, discolouration, and occlusion were not recorded in the majority of cases.

Conclusions: The recording of trauma in the ED is substandard, leaving the potential of incorrect diagnosis or inaccuracy at review. By implementing the Pediatric Department standard, as expressed in a trauma assessment pro-forma, these failings will be rectified and our assessment and diagnosis improved.

PR05.12

The importance of long-term planning in the management of the tooth with a hopeless prognosis in the developing dentition

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Introduction: Traumatic injuries to anterior teeth are common presenting injuries to all paediatric dental practices. In addition to the acute management of trauma, there is a need to consider long-term outcomes in the developing dentition. When treatment planning for the tooth with a hopeless prognosis, clinicians should anticipate the need for both space maintenance and the preservation of bone.

Case report: A 10-year-old male attended the paediatric dental department at the University Dental Hospital, Manchester on an emergency basis. He reported trauma to his upper permanent central incisor teeth. He presented with multiple injuries to U1 and UR1. Clinical examination revealed a severe intrusion U1 and uncomplicated enamel dentine fracture UR1 on the background of a class II division one malocclusion and dental anxiety. Anterior occlusal and periapical radiographs demonstrated additionally that U1 had uncomplicated enamel dentine and oblique crown root fractures and a horizontal mid-third root fracture. Management included restoration of UR1, removal of coronal portion U1 and the fitting of an immediate partial denture to replace this tooth. Mesial and distal spurs ensured space maintenance. The vital root fragment was left in-situ to maintain bone growth.

Comments: Strategies to conserve bone and space in the developing dentition need to be considered at the initial treatment visit for children presenting with traumatic injuries. Long-term therapeutic options may include pre-molar transplantation or implant placement, both of which require preservation of adequate space and bone. We outline a case where a vital root was maintained in-situ to maximize future treatment options.

PR05.13

A case demonstrating Hertwig's root sheath separation and root dilaceration of atypical aetiology

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Introduction: Hertwig's epithelial root sheath is responsible for guiding root formation in the developing tooth. It projects apically in advance of hard tissue formation. Trauma to an immature tooth may result in separation of the root sheath from the immature root. If proliferation of the root sheath continues after separation the apical portion of the root will continue to develop as a distinct entity.

Root dilaceration can occur in an unerupted permanent incisor following dental trauma to the primary predecessor, especially following avulsion and intrusive luxation injuries. Whilst root dilaceration has other aetiological factors it is unusual for it to result from traumatic impact to an adjacent permanent tooth.

Case report: A 6-year-old male patient presented having sustained an avulsion injury to 11 without re-implantation and lateral luxation of 21, these injuries happened 8-months prior to attendance at our hospital. Subsequent radiographic follow-up demonstrated continued root development of 21 with formation of a distinct apical portion of root giving the impression of a root fracture. In addition, 22 which was unerupted at the time of injury developed severe disto-angular root dilaceration. Interestingly 62 had not knowingly been injured and therefore the typical mechanism for disruption to the succedaneous tooth germ post-trauma was not present in this case.

Comments: The developing root tip consists of two layers of proliferating odontogenic epithelial cells and as such is at risk of damage or disruption from the forces generated during dental trauma. This case demonstrates two possible manifestations of this disruption in neighboring teeth.

PR05.14

Audit of record keeping for trauma cases affecting the permanent dentition in the paediatric patient

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Background: Dental trauma is a common reason for a child to attend a paediatric dental department. A number of factors influence the prognosis of an injured tooth. Information must be recorded and accessible to guide patient care. A method of achieving this is a trauma sheet, capturing key information. Historically, there has been no specific trauma sheet in use in the department.

Aim: To assess current departmental record keeping in relation to dental trauma.

Design: A retrospective review of case notes for patients diagnosed with dental trauma. Cases selected during November 2014, either

- 1) patients on waiting list for trauma review or
- 2) patients who had previous trauma and were attending for an appointment.

A data collection sheet was developed to review information recorded at patient's initial trauma presentation, with data analysed using Microsoft Excel. The expected standard was 100% recording for all items.

Results: 71 case notes were reviewed. Results for information recorded in the case notes: complete date of trauma 42%, mechanism of trauma 83%, venue trauma occurred 51%, service that provided immediate management 99%, history of prior trauma 11%, comment on any non-dental injuries 37%, sensitivity test results 69%, full dental charting 77%, radiographic report 94%, trauma diagnosis 77%.

Conclusions: Overall data recording was inconsistent, with scope for improvement in a number of areas. To address this, a trauma sheet is to be introduced, along with staff training on its use. A second audit cycle will be undertaken to assess its impact.

PR05.15

Delayed replantation of avulsed incisors: inflammatory & replacement root resorption - a clinical review after 2 years follow up

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Introduction: Replantation of avulsed incisors is a routine clinical procedure. Parent compulsion is the reason for delayed replanta-

tion in many cases, even though a poor prognosis is explained to them. In this paper we have discussed the prognosis of delayed replantation of avulsed incisors with extended dry extra oral time, with or without extra-oral endodontic procedures after 2 years of follow up and the quality of bone formed after replacement resorption.

Case reports: Few cases with delayed extra-oral time more than 24 h and no proper storage media were evaluated. In the first case, a 14 year old boy had reported to the department with intra-oral sinus opening and grade II mobility in relation to both central incisors. Both the teeth were replanted 2 years ago and splinted with composites, but no endodontic procedure was carried out. In the second case, a 10 year old boy had reported with a non vital maxillary right central incisor tooth which was replanted 2 years ago after extra-oral endodontic treatment. In the third case, a 12 year old boy reported with non vital maxillary right central and lateral incisor. The central incisor was replanted 2 years ago after extra-oral endodontic treatment. In all the above cases, the IOPA's revealed inflammatory and replacement resorption to such an extent that the entire root was replaced by bone, which was analysed.

Comments: The prognosis of a replanted avulsed tooth is often complicated by ankylosis followed by the process of inflammatory and replacement resorption.

PR05.16

Dental trauma treatment: bio-functional esthetic appliance after an early loss of primary teeth

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Introduction: Premature loss of primary teeth after dental trauma is common. Unfortunately, in most of the cases lost teeth cannot be reimplanted due to 1) poor long term results. 2) poor patient and parent behavior for complex treatments (ie. Endodontics). The pathological sequelae for the premature loss of primary teeth, affects the quality of life. Disorders such as cosmetic problems, eating, language development, integrity of the dental arch, alterations in the development and eruption of permanent teeth and the presence of oral habits have been shown.

The aim of this report is to show a simple, esthetic and functional alternative to the loss of primary teeth.

Case reports: A 4 year old boy was referred to the Pediatric Dentistry Clinic of the Universidad Autónoma de Nuevo León for the management of a dental trauma sustained a few hours earlier. Tooth 61 was avulsed and tooth 51 presented severe mobility, which was exacerbated by root resorption due to previous dento alveolar trauma. Radiographic examination, showed the presence of a supernumerary tooth between the non-erupted central maxillary permanent incisors (11 and 21). The treatment consisted in removing supernumerary and primary central incisor (51). Two weeks later a bio-functional esthetic appliance using the extracted teeth was made giving a greater esthetic and functional appearance.

Comments: Fixed appliances to replace missing teeth are made with acrylic teeth, showing some times a poor aesthetics in pediatric patients. This case shows an alternative to re-set primary teeth and giving a functional with natural appearance.

PR05.17

Intrusive luxation in primary teeth: tooth located in the base of nostril post intrusive dislocation of primary tooth

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Introduction: Intrusion is one of the most severe dental traumas, very complex to deal with and possessing a negative prognosis, involves the complete breakage of periodontal fiber and the displacement of the tooth inside the alveolar bone. All traumatic injuries of a deciduous tooth have the potential to damage the germ of the permanent underlying tooth and the range of this malformation is going to depend on the stage of development of the permanent tooth and the severity of the trauma, being intrusion the one that describes most complications.

Case reports: Patient: 4 year-old boy, non-cooperative. The mother noticed an increase in volume in the base of the right nostril. This is the reason for the medical consultation. The mother reports that the boy suffered a dento-alveolar traumatism about 2 years ago with the avulsion of tooth 5.1. When examining the base of the nostril, a foreign body was found, of a whitish color, rigid consistency and the radiological exam shows the presence of a tooth in the nostril. Exodontia is carried out under deep sedation, through nasal route in order to avoid complications.

Comments: Evaluation is essential, clinical as well as using X-rays. Differential diagnosis between an intrusion and an avulsion is required. If the tooth is not to be found, it is the responsibility of the dentist to seek for the location of the tooth and evaluate the possibility of an aspiration and to warn the parents about the possible consequences.

PR05.18

Management of inflammatory root resorption using biodentine as root filling: 1-year follow-up

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Introduction: Inflammatory root resorption is a serious complication of dental trauma which leads to progressive loss of the root structure. This case report describes the treatment and one-year follow-up of two previously traumatized central incisors affected by inflammatory root resorption.

Case report: A 9-year-old boy was referred to the Paediatric Dentistry Department with a history of fall trauma to the maxillary central incisors 1 month earlier. Reportedly, the left central incisor had been avulsed in a fall trauma and replanted 75 min after dry storage. On clinical examination, the maxillary central incisors presented with extreme mobility and pain. Radiographic examination of both teeth revealed findings of root resorption and periapical radiolucency. Following endodontic access under rubber dam isolation, calcium hydroxide dressing was placed into the root canals, and the teeth were stabilised with a semi-rigid bonded splint. The calcium hydroxide dressing was removed after 4 weeks and the root canals were obturated with tricalcium silicate cement (Biodentine). In the same appointment, the coronal access was restored using acid-etch resin composite, and the splint was removed. After 3 months, both teeth showed signs of periradicular healing and decreased mobility in the absence of infraocclusion. The patient has been attending uneventful control visits for one year.

Comments: Based on short-term clinical and radiographic observations, Biodentine performed successfully as a root filling material after treatment of inflammatory root resorption.

PR05.19

Traumatic dental Injuries in children attending to Yeditepe University Pediatric Dental Clinic, Istanbul

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Background: Traumatic dental injuries can result in a number of different injury types involving the tooth and the supporting structures.

Aim: The aim of this study was to report the distribution of traumatic dental injuries among children attending to Yeditepe University, Department of Pediatric Dentistry in four year period.

Design: The data were evaluated from the standardized dental trauma examination forms of 442 patients referred to Yeditepe University, Department of Pediatric Dentistry after a traumatic dental injury. The etiology of trauma, age, gender, number of injured teeth and type of injury were evaluated.

Results: Of all 442 patients with traumatic dental injuries 57.69% were boys and 42.31% were girls. A total of 711 teeth were evaluated. Among all primary teeth 311 (84.29%) had suffered a luxation injury and 58 (15.72%) had suffered fracture whereas 140 permanent teeth (40.94%) had suffered a luxation injury and 196 (57.31%) had suffered fracture. The maxillary central incisors were the most affected teeth. Subluxation (22.49%) and intrusion (19.51%) were the most commonly occurring type of injuries in primary teeth whereas crown fracture with pulp exposure (31.87%) and crown fracture without pulp exposure (23.68%) in permanent teeth. Injuries were found to occur more frequently during the summer and winter seasons.

Conclusions: Distribution of traumatic dental injuries vary between primary and permanent teeth. Luxation injuries occur more frequently in primary teeth whereas fractures occur more common in permanent teeth, which may be due to the chances in the biological structures associated with age.

PR05.20

Management of a late-presenting extrusive luxation case

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Introduction: Extrusion is a type of luxation injury in which partial or total separation of the periodontal ligament results in loosening and displacement of tooth. Delayed treatment of such a case makes repositioning problematic.

Case report: A 12-year old boy suffered a bicycle accident and sustained trauma to his face. He received emergency treatment for abrasions in his face and lip laceration in a medical facility. A day later, he was presented to pediatric dentistry clinics for treatment of his displaced front tooth. Intraoral examination revealed 4 mm extrusion of maxillary right central incisor and laceration in gingival mucosa. Due to delayed referral, tooth repositioning was not considered. Instead, an intentional replantation was planned.

After extraction, the root surface was irrigated copiously with saline. Following blood clot removal, the tooth was replanted into its socket, positioned and splinted with 0.9 mm monofilament. At first week, endodontic treatment was initiated and the

root canal was temporarily filled with calcium hydroxide paste. After splint removal at 3 weeks, endodontic treatment was completed with gutta percha and sealer. At 12 months, the tooth showed mobility within physiological limits. Radiographically, no signs of root resorption was evident.

Comments: Intentional replantation may be a treatment option for severely extruded tooth with delayed treatment.

PR05.21

Conservative approach of a complex dental and mandibular trauma in a 11-years old boy

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Introduction: Trauma is relatively common among paediatric dentistry patients.

Case report: An 11-years old male patient of our office showed 9 days after having experienced a trauma by falling on his chin while in a summer camp. He had been taken to a medical office immediately after the accident. The chin bruise was cleaned. No symptoms were present and no further examination was performed then. At the time of the dental visit, the boy complained of pain in mastication (dental and on both vertical ramus of the mandible, especially on the left). Clinical examination revealed vertical enamel-dentin crown fractures in 1.6, 2.4 and 4.5 (4.5 with involvement of pulp chamber), asymmetrical mouth opening and slight deviation of lower inter-incisor line to the right. As the patient had undergone orthodontic treatment in our office, records of his status right before the trauma were readily available, so the deviation of the mandible was regarded as a consequence of the trauma and triggered further investigation. Panoramic X-ray suggested bilateral condyle neck fracture, confirmed by CT scan. Treatment: Partial pulpectomy was performed on 4.5. Crown fractures were restored with glass-ionomer cement, subsequently replaced by composite. Condylar fractures were treated by a conservative orthopedic approach, using a functional appliance. After six months, occlusion is corrected, 4.5 continued root development despite some pulp calcification, no symptoms persisted and no complications occurred.

Comments: Dental and condylar fractures may sometimes be overlooked by general examination. Traumatic cranio-facial injuries in children may need complex approaches for diagnostic and treatment.

PR05.22

Conservative approach to intruded immature permanent teeth: a case report

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Introduction: Intrusive luxation is axial displacement of a tooth into the supporting alveolar bone. The injury results in comminution or fracture of the socket and causes remarkable damage in the periodontal ligament (PDL). In immature permanent teeth with minor or moderate intrusion, waiting for spontaneous eruption of the affected teeth is the treatment of choice.

Case report: A 7-year old girl was presented to the pediatric dentistry department for treatment of her front teeth 2 h after a fall accident. In intraoral examination, lacerations on marginal gingiva and bleeding from gingival sulcus of maxillary central incisors were noted. Both teeth were immobile and tender to percussion with metallic sounds. In addition, enamel and dentin fracture of left maxillary central incisor was observed. Periapical radiographs revealed narrowed PDL space around the still-devel-

oping roots. Enamel and dentin fracture of left central incisor was restored and the patient was scheduled for follow-up visits. At 3 weeks, the teeth responded normal to percussion test and their mobility were within physiological limits. The patient continued for regular visits to the clinic. After 15 months, uneventful healing was evident, both clinically and radiographically.

Conclusion: A conservative treatment plan and appropriate follow-up are essential for optimum healing of slightly intruded teeth with immature roots.

PR05.23

Orthodontic and prosthodontic approach to a 12 year-old-girl with traffic accident history

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Introduction: The most common injuries in the permanent dentitions are due to falls, followed by traffic injuries, acts of violence and sports. Its frequency and incidence at a young age, factors related to costs and treatment may be ongoing for future years. The purpose of this case report was to describe the management of dento-alveolar trauma of a child patient who had a traumatic car accident.

Case reports: The 12 year-old-girl was referred to Pediatric Dentistry Department, Marmara University, three months after a horrendous car accident. She had been hospitalized for multiple fractures in the lower limbs and maxillofacial area. Intraoral examination revealed 13, 12, 11, 21 were missing whereas a significant amount of bone loss had occurred in the maxilla with a bilateral cross-bite which made the patient seem as a pseudo-protruded lower jaw.

The first step of treatment involved an upper pediatric partial denture with a central screw to expand the maxilla and a bite plane to disclude the upper anterior teeth for appropriate over-jet for a period of 6 months. A removable Hawley appliance was also given in the lower arch for a period of 5 months to recline the lower anterior teeth. When the proper occlusion was achieved the partial upper denture was renewed. Rx time was 8 months with a 1-year follow-up. The patient is still under our continual observation.

Comments: Patient's face aesthetics, phonetics and function improved along with her self-esteem. Final prosthetic rehabilitation will be implants with fixed prosthetics when the appropriate age is achieved.

PR05.24

Case report: enamel hypoplasia on mandibular permanent central incisors by the trauma of primary teeth

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Introduction: Trauma of primary dentition frequently occurs in 1–2 years old. In complete dislocation of primary teeth, there are reports that some impacts occur to the successor permanent teeth in more than 80% as colored enamel. Here, we showed that the treatment for enamel hypoplasia in mandibular permanent central incisors caused by the trauma of primary teeth using S-PRG filler containing materials.

Case reports: 6-year-2-month-old (female), systemic history; autism.

She fell from the stairway at 1.5-year-old, and her mandibular right and left primary central incisors were lost by completely dislocation. At first visit to our hospital, incisal edge of left central incisor had been slightly erupted with exposed yellowish dentin and small crypt. In the dental X-ray findings, mandibular both central incisors were observed enamel defects of 1/2 of tooth crown, and abnormal incisal edges were close to pulp cavity. She showed air pain, abrasion pain with toothbrush, and cold-water pain. Therefore, we filled in the pit of left central incisor with surface pre-reacted glass ionomer (S-PRG) filler containing sealant (BeautiSealant®) at 6-year-2-month-old. Since 6-year-4-month-old, we applied S-PRG containing hypersensitivity suppression material (PRG Barrier Coat®). After the starting of right central incisor eruption, we covered the region of enamel hypoplasia with S-PRG containing composite resin (BEAUTIFIL Flow®) at 6-year-8-month-old and now she has not complained of pain.

Conclusion: S-PRG filler containing materials are useful for the treatment of teeth with enamel hypoplasia, which have problems for hypersensitivity and oral cleaning, attrition and aesthetics.

PR05.25

Treatment of eruption disturbance of permanent successor after trauma to primary tooth: 2 case reports

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Introduction: Trauma to oral and facial structures is a significant problem that may have serious medial, aesthetic, and psychological consequences on children and their parents. Trauma to primary teeth in 1–3 years of age which developing permanent tooth germ is frequent in patients and can cause problems both to the primary teeth and permanent successor. In these two cases reports, we describe the permanent successor that was erupting disturbance because of trauma to the corresponding primary tooth.

Case reports: Case1, A 7-year-old girl was referred to our department with chief complaint of impaction of the maxillary right permanent incisor. Reportedly, the girl had suffered trauma to primary tooth at 2 years of age, and had root canal treatment at her primary-care dentist. Radiography showed the maxillary right permanent incisor positioned in horizontal and transalveolar as high as the anterior nasal spin. The treatment was operated twice surgical fenestration combined with orthodontic traction.

Case2, An 8-year-old boy came to our department for an unerupted maximally right permanent incisor. Reportedly, a trauma occurred about 2 years of age, and follow-up at his primary-care dentist. Radiography showed that the right incisor positioned as high as root apical of the completely erupted left incisor. The treatment was to wait for spontaneous re-eruption. 10 months after, the right permanent incisor exhibited labial ectopic eruption.

Comments: Clinical and radiographic follow-up is very important after any dental trauma on primary teeth until the permanent successor has completely erupted and root is completely formed.

PR05.26

Management of root fracture in primary dentition

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Introduction: Root fractures are rare in the primary dentition as about %2–4. Due to the elasticity of alveolar bone, luxation injuries are more common in the primary dentition. Clinicians usually prefer not to manage root fracture in primary dentitions due to non-cooperation

Case report: A 3.5-year-old girl was referred to the Paediatric Dentistry Department, with the complaint of pain and abnormal mobility of her maxillary central incisors. Reportedly, the patient had a fall accident at home about 3 weeks ago. Her maxillary right central incisor had displaced palatally and it had been repositioned by her mother at that moment. On clinical examination, the maxillary primary central incisors were mobile. Radiographically there were horizontal root fractures on the apical third of primary maxillary central incisors. Teeth were fixed with a semi-rigid splint for four weeks for patient comfort. The patient was instructed to remain on a soft diet and oral hygiene. At 16 months recall, the patient had no complaint or discomfort with her teeth. And radiographically connective tissue healing was observed.

Comment: Maintaining root-fractured primary teeth by splinting may be regarded as a conservative approach in young children as it may eliminate the need for extraction.

PR05.27

Reposition of a maxillary central incisor due to extrusive luxation

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Introduction: Extrusive luxation is one of the most critical injuries of permanent teeth. Repositioning of the extruded tooth as early as possible is the accepted treatment for extrusive luxation. This case report presents the treatment of extrusive luxation after 6 days of trauma.

Case report: A 13 year-old male patient was referred to our clinic 6 days after having trauma. Intraoral examination revealed a maxillary right central incisor with extrusive luxation and a maxillary left central incisor with enamel fracture. Radiographical examination indicated that the tooth had a closed apex and was extruded approximately 3 mm relative to the cement-enamel junction of the adjacent tooth. Before the repositioning; under local anesthesia the gingiva was gently cleaned and irrigated with saline solution and oxygenated water. Then the right central incisor was gently pushed back into the socket with finger pressure. Teeth were splinted with semi-rigid 0.5 mm orthodontic wire from maxillary right lateral incisor to left central incisor. Chlorhexidine(0.1%) mouth rinse and antibiotic (tetradox 100 mg) were prescribed as a prophylactic aim. One week later, root canal therapy was performed and calcium hydroxide based root canal dressing was placed for ten days. Two weeks later; root canal treatment was performed and the splint was removed at the same appointment. After 6-months follow-up, clinical and radiographical examinations showed no pathological signs.

Comments: In this case report a successful treatment after 6 days of extrusive luxation of a maxillary central incisor was showed, despite of the general view that repositioning of extrusive luxation injury is not possible after 24 h due to blood clot.

PR05.28

A case of eight years follow up of avulsed permanent central incisors

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Introduction: Dental injuries are most frequent in children from 8 to 9 years of age and most injuries involve the upper incisors. Patients with an increased overjet are at a significantly greater risk of dental injury. Tooth avulsion, a total displacement of the tooth out of its socket, ranging from 0.5 to 3% of traumatic injuries.

Case report: A 19 year-old boy had dental injury with tooth avulsion of upper central incisors with open apex when he was 10 years old. The avulsed teeth were replanted 3 h later after the accident. From his 10–12 year of age, he had routine follow up every 3 months. Six months after the replantation, radiographic examination revealed external root resorption of tooth 11, 21 without other clinical symptoms or tooth mobility. However, one year after the resorption was found, a gumboil over tooth 11 was noted, and at the time we performed pulpectomy of tooth 11. Besides, the patient asked for orthodontic treatment due to Class II malocclusion. During the orthodontic treatment, the ankylosis of tooth 11, 21 was noted, increasing the difficulty of the treatment.

Comments: Upper incisors were great influence to the esthetics. However, complications such as external root resorption or ankyloses following tooth avulsion could compromise the prognosis of the injured teeth. Management of avulsed permanent incisors with immature root formation should be attentive and need a long time following up.

PR05.29

Management of severely extruded permanent central incisors

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Introduction: Extrusive luxation is partial or total separation of the periodontal ligament (PDL) which results in loosening and displacement of the tooth in an axial direction.

Case report: A 10-year old patient was presented with severe displacement of her front teeth resulting from a traffic accident, occurring one day earlier. Intraoral examination revealed severe axial displacement of maxillary central incisors (8 mm). In addition, the retrusion of teeth were very pronounced. They were loosely attached to the palatal gingiva and extremely mobile.

Due to late referral, repositioning of teeth was not considered. Instead, an intentional replantation was planned. After extraction, the PDL on root surfaces was removed with a periodontal scaler and teeth were kept in NaF gel for 20 min. Following coagulum debridement of the alveolar sockets, teeth were replanted and splinted with 0.9 mm monofilament fishing line. At this visit, endodontic treatment was initiated for both teeth which were temporarily dressed with calcium hydroxide paste. After splint removal at 3 weeks, root canals were obturated with cold lateral compaction using sealer and gutta percha. Clinical examination at 24 months showed optimal gingival condition but limited physiologic mobility for the traumatized teeth. Radiographically, replacement resorption was evident.

Comments: Proper diagnosis, treatment planning and follow-up care of traumatized teeth in children are critical for a favourable outcome to ensure.

PR05.30

Etiology and prevalence of dental trauma in north Brazilian preschool childrenA. J. NOGUEIRA¹, R. M. NOGUEIRA¹, D. B. CORREA² & M. C. MARTINS²¹*Pedodontic, Federal University of Pará, Belém, Brazil;* ²*Superior School of Amazonia, Belém, Brazil*

Background: The dental trauma represent a public health problem among children and adolescents being studied both nationally and internationally by several researchers.

Aim: The present study aims to analyze the etiology and prevalence of dental injuries in preschool children 0–3 years old in the city of Belém, Pará, Brazil.

Design: The survey was conducted in 10 public and six private nursery schools of city. A total of 426 boys and girls participated in the study. Children were clinically examined for signs of dental trauma according to Andreasen & Andreasen (1990) classification, including concussion. It was verified a prevalence of dental trauma in 29.6% of children.

Results: The highest percentage of trauma occurred in children aged 3 years, with no gender difference ($P > 0.05$). Enamel fracture was the most prevalent type of trauma, followed by concussion. The most frequent etiological factor was a fall, followed by collision, there is no such significant statistical association between these and the gender ($P > 0.05$). The maxillary central incisors were the teeth most affected by trauma. A separate analysis for tooth, shows that enamel fracture are of common occurrence.

Conclusions: Given the traumatic events is important to popularize information about trauma, its consequences and its prevention.

PR05.31

Expression of inflammatory cytokines and MMPs on the periodontal tissue of replanted rat teethS. C. CHOI¹, H. J. AHN¹, H. S. LEE¹, J. E. YOU^{1,2} & G. T. KIM³¹*Department of Pediatric Dentistry, Kyung Hee University, School of Dentistry, Seoul, Korea;* ²*Seoul Children's Dental Center, Seoul, Korea;* ³*Department of Oral and Maxillofacial Radiology, Kyung Hee University, School of Dentistry, Seoul, Korea*

Background: Tooth avulsion is a complex traumatic injury characterized by complete displacement of the tooth from its socket. The preservation of a vital periodontal ligament (PDL) attached to the root is highly correlated with healing of the periodontium.

Aim: This study was designed to evaluate the correlation between different extra-alveolar dry times and inflammatory cytokines and matrix metalloproteinases (MMPs) as part of the PDL gene expression on replanted rat teeth.

Design: The first phase of the study aimed testing human PDL cells *ex-vivo*. Extracted teeth were dried for 15 and 30 min. The PDL cells were extracted and analyzed by qRT-PCR. The second phase was performed *in-vivo*, thirty-six Sprague Dawley rat first maxillary molars were extracted and replanted after 15, 30 and 60 min extra-alveolar time. We tested the levels of inflammatory cytokines and MMPs in periodontal tissue at 3, 7 and 28 days after tooth replantation.

Results: In *ex-vivo* study, pro-inflammatory cytokines such as TNF- α , IL-1 β , and IL-6 showed up-regulated in 30 min dried PDL cells and all tested MMPs showed increased levels after 30 min dry conditions. In *in-vivo* study, the levels of pro-inflammatory cytokines increased as time increased and it was expressed in different patterns with increased extra-alveolar time. Regarding tested specific MMPs, the expression levels of MMP-3 and -9 were increased as extra-alveolar time increased.

Conclusions: Our study showed that pro-inflammatory cytokines such as IL-1 β , IL-6 and TNF- α and MMP-3 and -9 were more significantly expressed in the tissues surrounding the replanted teeth.

PR05.32

Post-operative treatment of severe maxillary deficiency due to trauma on a 7 year old child: a case reportL. PAPAGIANNOLIS¹, N. POLYCHRONAKIS², M. SIFAKAKI¹, D. EMMANOUIL¹, N. THEOLOGIE-LYGIDAKIS³ & I. IATROU³¹*Department of Paediatric Dentistry, University of Athens, Athens, Greece;* ²*Department of Prosthetics, University of Athens, Athens, Greece;* ³*Department of Oral and Maxillofacial Surgery, University of Athens, Athens, Greece*

Introduction: Maxillofacial injuries to children due to traffic accidents are a common cause of mid-facial fractures and lacerations and may influence their life-quality. In the treatment of such injuries an interdisciplinary team of specialties is involved.

Case report: A 7 year old boy was referred by the Department of Oral and Maxillofacial Surgery to the postgraduate clinic of Pediatric Dentistry for dental care. Six months before the child had suffered a severe traffic accident with a Le-Fort I type maxillary fracture resulting to a major defect of the anterior maxilla and loss of his primary and permanent teeth. He had been transferred to the Pediatric Hospital in a life-threatening condition, was operated urgently to fixate fractures. Post-operatively and after stabilization of his condition he developed Post Traumatic Stress Disorder resulting to loss of speech, problems in swallowing, eating and walking as well as refusal to cooperate with the health team. The dental treatment plan consisted first of restoration of his multiple carious lesions under general anesthesia and then a partial denture to improve function and psychological support. For the next two years two sets of different partial dentures were fabricated due to the progressive alveolar bone resorption.

Comments: The child through a desensitization process that involved the Pediatric Dentist and the Psychologist gradually regained his speech and gaiety. The multidisciplinary and immediate approach of these cases is essential in order to eliminate the impact of the accident in the child's quality of life.

PR05.33

Management of luxation injury and associated impacted mesiodens - a case report with 24 months follow up

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Introduction: Lateral luxation injuries are characterized by partial or total separation of the periodontal ligament. In immature developing teeth, revascularization can occur after the trauma. Mesiodens is the most prevalent type of supernumerary tooth. However, as regards surgical removal of mesiodens, ideal timing of intervention remains to be a highly controversial issue.

Case report: This report describes a case of a 8-year-old female who had traumatic injuries at his permanent maxillary incisors. Intraoral examination showed lateral luxation of tooth 21. Because of the patient's age, apex of the tooth 21 was opened. In addition to that presence of an impacted conical shaped mesiodens was observed. The tooth 21 was gently pushed back into its original location and a semi-rigid splint was applied. The patient was monitored about symptoms of the tooth for devitalization.

In addition, to eliminate the risk of devitalization and/or root malformation of adjacent tooth and to prevent affecting the young child psychology with surgical procedure, mesiodens was left without extraction until the root development was completed. At the one year follow-up, there was no evidence about pulp devitalization and root development was completed. Surgical procedure was performed by oral surgeons for extraction of the mesiodens. At 24th follow up, the tooth was clinically and radiographically asymptomatic.

Comments: In case of lateral luxation associated with mesiodens, to prevent potential damages to adjacent teeth, surgical intervention could be delayed until the root formation was completed.

PR05.34

Management of intrusive luxation maxillary incisor by surgical repositioning: a case report

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Introduction: Tooth intrusion is defined as the displacement of a tooth into alveolar bone. Serious damage to the tooth pulp and supporting structures occurs because of the dislocation of tooth into alveolar process. Pulp necrosis, external-internal root resorption, loss of marginal bone support, replacement resorption-ankylosis, disturbance in continued root development, partial-total pulp canal obliteration and gingival recession may occur as a consequence of intrusive luxation. The management of intruded permanent tooth may consist of allowing spontaneous re-eruption, surgical repositioning and fixation, orthodontic repositioning, and a combination of surgical and orthodontic therapy.

Case report: A 9-year-old boy was referred to Gazi University Department of Pediatric Dentistry. On examination, there were no signs of neurological or extra oral injuries. Intra-orally, he presented with severe intrusive luxation of 22 (more than 6 mm). The traumatized tooth was treated by surgical repositioning. Teeth were splinted with wire-composite for 4 weeks. After removal of the splint the tooth responded as vital to electric pulp vitality test. The patient was recalled for 3–6–9 months controls. The tooth remained symptomless. The patient is still under control.

Comments: This case report describes management of a patient with severe intrusive luxation by surgical repositioning. Intrusive luxation is a serious injury that can cause many physiologic problems. Permanent teeth with open apices are more likely to survive even from severe trauma.

PR05.35

Intrusive luxation of primary incisors: a retrospective clinical study

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Background: Intrusive luxation is the displacement of the tooth into the alveolar bone along the axis of the tooth and is accompanied by comminution or fracture of the alveolar socket.

Aim: The purpose of this study was to research about traumatic intrusive luxation of children in aspects of gender difference, age, cause, place of trauma, and severity of injuries, and to evaluate complications to the primary and permanent dentition.

Design: This study involves 176 preschoolers aged 8 months to 7 years and 3 months (mean age: 3.0 ± 1.6), who attended the Department of Pediatric Dentistry, Kyung Hee Dental Hospital for intrusive luxation injuries between January 2003 and Decem-

ber 2012. All the data were statistically analyzed using the ANOVA and chi-square statics.

Results: Most of the intrusions occurred in children who were 1–3 years old. Boys were slightly more prone to the tooth injuries than girls, and the boy/girl ratio was 1.75:1. The most common cause of intrusion was fall down and collision in both sexes. Primary teeth were injured most frequently in the home. The majority of traumatized teeth are the upper primary central incisors (81.6%). Complications were found in 65 of 84 intruded primary incisors (52.8%). Complications in the injured primary dentition comprised: pathologic root resorption (25.2%), crown discoloration (20.8%), periapical abscess (13.2%), and ankylosis(6.3%).

Conclusions: The findings from the present study highlight the importance of the careful attention to children younger than 3 years and the management of childhood dento-alveolar trauma.

PR05.36

Posterior crown fractures due to trauma in both dentitions

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Introduction: As dental trauma prevalence to anterior teeth is high, crown fractures at posterior region are rarely observed. Indirect trauma sustained to the chin increases the risk of posterior teeth fractures.

The purpose of this case report is to describe a series of 3 posterior trauma cases.

Case 1: A 13-year-old boy referred Gazi University Faculty of Dentistry Department of Pediatric Dentistry after an accident happened 7 months before. Intraoral examination revealed all the first permanent molars had uncomplicated crown fractures. All traumatized molars restored with composite-resin restoration one of which required Cvek pulpotomy and stainless steel crown 2 weeks after. The patient is followed up for 21 months.

Case 2: A 7-year-old boy was involved in an accident 2 months prior to attending. Clinically, uncomplicated crown fracture in #74 and radiographically an oblique mid-third root fracture were seen. Root canal treatment and stainless steel crown were applied. The patient is followed up for 9 months.

Case 3: A 9-year-old boy referred after 2 h to posterior trauma. Clinically, vertical complicated crown fracture in #85, mobility in #84 were diagnosed. Treatment planning included root canal treatment and stainless steel crown to #85 and extraction #84. Removable space maintainer was applied to the lower jaw. The patient was followed up for 10 months.

Comment: The posterior crown fractures caused by indirect trauma rarely observed. Stainless steel crowns and resin restorations could be used successfully in the management of indirect trauma cases.

PR05.37

Vitalcem mineral trioxide aggregate (MTA): a new option for regeneration in odontopediatric pulp treatment

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Introduction: The VITALCEM MTA is an odontopediatric and endodontic sealer consisting of mineral oxides, calcium sulphate as hydrophilic particles that stimulate tissue regeneration. Very similar to the MTA Angelus “Brazilian”. Chemical composition: SiO₂, Al₂O₃, Fe₂O₃, SO₃, CaO, MgO, Na₂O, ZrO₂

Properties:

- Alkalinity above 12 (pH values). por encima de 12
- Radiopacity similar as gutta percha
- Resistance to compression suitable for use.

Texture of matter after gritty setting, light gray, odorless

Case Report: Apexification Using Vitalcem MTA. Prior permission of the Ethics Committee. One patient reported (female, born 2004)

Tooth fracture is observed in superior central incisors. On radiograph it was noted that on right superior central incisor (11) the apical root has not been formed.

Diagnoses:

- Coronary trauma fracture for 1.1 and 2.1
- Apex has not been formed.

Treatment:

- Aperture and antibiotics for 72 h.
- VITALCEM MTA placed in apex.
- Endodontic procedure.
- Rehabilitation.

PR05.38

Prevalence and awareness of sports related dental trauma amongst children in New Delhi

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Background: Sports activities have an associated risk of orofacial injuries. The prognosis of traumatized teeth depends on prompt and appropriate treatment, which often relies on knowledge of lay people such as the child's parents, their school teacher and coaches. Prevention of such injuries has become the main focus being included in Preventive Dentistry. Awareness among sportsmen and various international sports organizations has recognized the need of dentistry in sports.

Aim: To evaluate the occurrence of dental injuries in children involved in organized sports, the level of awareness about preventive measures and management of dental trauma during sports.

Design: A cross-sectional study was carried out among 450 children aged 6–16 years attending various sports training programme in summer camps in *New Delhi*. A structured interviewer-guided questionnaire containing 20 questions was used to evaluate the prevalence and awareness of oral injuries sustained during sports.

Results: Mean age of the children participated was 12.6 years. 20.9% children had injured their orofacial region during sports. Maximum type of injury experienced was chipping/fracture of teeth. Awareness about re-implantation of the avulsed tooth was significantly high (58.4%). A significant number of children knew about mouthguards (71.3%) but in spite of being aware, were not using them.

Conclusions: The findings from the present study highlight the importance of awareness of preventive aspects of sports related trauma. Parents, Teachers, Athletic personnel, **Coaches** and Health care providers should be educated on all the aspects of

Prevention of sports-related oro-facial injuries.

PR05.39

Abstract withdrawn.

PR05.40

Demographics, management and long term outcomes for a group of children experiencing permanent tooth avulsions at Glasgow Dental Hospital and School

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Background: Avulsion of a permanent tooth affects between 1 and 16% of children. Extra oral time (EAT), extra oral dry time (EADT) and storage medium play a crucial role in the success of re-implantation.

Aims: To investigate the management and outcomes of avulsion injuries presenting to the Paediatric Department of Glasgow Dental Hospital and School.

Design: A departmental trauma database identified 203 patients with avulsion injuries between 2006 and 2014. Approval was sought from Greater Glasgow and Clyde NHS to conduct a retrospective analysis of case notes.

Results: 119 case notes were available, 68.9% being male. The average age at time of injury was 9.41 years. 79.8% occurred outdoors, 32.6% involved bicycles/scooters. 52% of avulsed teeth were stored in milk, 13.4% were left dry. 36.9% of avulsed teeth had an EADT ≤30 min. Of the teeth with an EADT ≤60 min, 48.3% resulted in pulp death and 31.7% were extracted. In comparison, 71.8% of teeth with an EADT ≥180 min were extracted. There was evidence of antibiotic prescribing in only 29 cases, amoxicillin being the most commonly prescribed (75%).

Conclusion: The results show that over half of avulsions were stored in milk. Whilst this is encouraging, a proportion of avulsions are not being stored appropriately and public awareness needs to be raised. To concur with existing evidence a correlation was identified between the EADT and the final outcome of the tooth resulting in an increased number of extractions. The department needs to develop a protocol with regard to the prescription of antibiotics for avulsions.

PR05.41

Auto-extraction of permanent incisors and self-inflicted orodental trauma in a severely burned child

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Introduction: The aim of this report was to describe the case of a self-inflicted oral injury and auto-extraction of mandibular permanent incisors in a 7-year-old child that may be related to chronic pain caused by a severely burned body. To do best of our knowledge, there are studies report orodental injuries during burn treatment but auto-extraction of permanent incisors hasn't been reported.

Case reports: A 7-year-old boy was admitted to the Intensive Care Department of Adnan Menderes University in Aydın, Turkey, with a diagnosis of severe burn (67%) due to playing with a lighter gas. Burns involved almost all body parts, except the head and face region. Because the patient had tooth clenching, grinding and autoextraction of mandibular incisors, the pediatrician called pediatric dentist for a consultation. The dental examination was performed in the hospital's burn unit. There were deep caries and teeth 31, 41, 42, 73 were extracted by patient. His father reported that he had extracted one or two more teeth before our examination. Because of severe pain maxillary second molar was extracted in hospital under local anaesthesia. And after he was discharged from hospital after five months we notice

that he extracted tooth 42 and 83. After finishing all necessary treatments of the teeth a partial removable denture was prepared for missing teeth.

Comments: Tooth grinding and autoextraction may be related with the severe pain during burn treatment. In such cases, multidisciplinary treatment approaches may be more useful for patients.

PR05.42

Management of Fractured maxilla due to dog bite in a 5 year child

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Introduction: Midface injury is most common in children when animals attack them. The face is the most accessible area for the animals and can result in soft tissue injuries. It is quite rare to have fractures due to animal bite. Children are predisposed to such injuries due to their short stature, increased head to body ratio and lack of awareness of the dangers involved.

Case report: A five year old boy who was playing in the field was suddenly encountered by a barking dog. The boy started crying loudly and this made the dog bite him on the face in return. Clinically soft tissue tears were seen on the cheek and lips, and the child was unable to close his mouth properly.

X ray investigation confirmed fracture of maxilla. Treatment was carried out under General anaesthesia. Open wounds were cleaned and sutured. Fracture of maxilla was managed with customised cap splint and wiring.

Comments: It is of paramount importance to identify and manage the fractures in children to prevent future complications. It requires a team work effort involving pedodontist, oral surgeon, prosthodontist to manage such injuries.

PR05.43

Esthetic reconstruction of avulsed incisor

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Introduction: Trauma in the maxillary *central region* is very common particularly in boys over 8 years old. Removable appliances or fixed soldered metal bands and rings remain to date the most practiced methods for regaining the esthetics and the function properties of a lost tooth.

A *simple method* in which both esthetic and functional purposes are gained is a paramount goal in cases of trauma in the frontal area.

This case report describes a *technique* for achieving both purposes by using a fiberglass splint.

Case report: A 9 years old patient came to our dental office with a *3 weeks old avulsion* of tooth #2.1 and an uncomplicated enamel-dentine crown fracture of tooth #1.1. He has normal occlusal relations with an overjet of 1–2 mm. Sensitivity tests revealed that #1.1 is *vital*, thus reconstructed using the direct composite restoration technique after an *indirect pulp capping*. The missing space of the avulsed tooth #2.1 was restored by building a *composite crown* attached to a *fiber-glass splint* bonded directly on the adjacent teeth.

Clinical and X-ray and follow-ups at 1 month, 4 months, 7 months and 10 months reveals good clinical results, without radiological changes.

Conclusions: 1. Fiberglass splinting seems to be a proper substitute for traditional treatment options in cases of missing teeth

due to trauma in the upper anterior region and can be a proper substitute for removable or fixed appliances used for this reason.

2. This method is fast, simple and efficient and therefore meets also the economical considerations.

PR05.44

Dentofacial injuries in children and adolescents in relation to symptoms of disruptive disorders

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Background: Children with disruptive disorders present with signs and symptoms commonly related with attention deficit hyperactivity (ADHD), oppositional-defiant and /or conduct disorders that potentially constitute predisposing factors for injuries.

Aim: To investigate whether disruptive disorders (ADHD with or without conduct disorders) are related with an increased risk for dentofacial injuries.

Design: The study sample was selected among children / adolescents of school age that showed up for treatment at the postgraduate pediatric dental clinic, University of Athens. The study group included 202 subjects with a history of dentofacial injuries and the control group 207 subjects without a history of dental trauma. Two questionnaires were completed by parents; the first for symptoms of general psychopathology (SDQ, Goodman, 1997) and the second for attention-deficit / hyperactivity symptoms (ADHD Rating Scale IV, DuPaul et al., 1998). A detailed dental trauma record was completed for each patient, followed by a complete clinical examination.

Results: Children and adolescents of study group showed a significantly higher expressivity of attention deficit/hyperactivity symptoms compared to the control group ($P = 0.02$). Regarding the subtype hyperactivity, the study group also showed a higher expressivity that was borderline non significant ($P = 0.068$). No significant differences were found between the two groups regarding the variables indicative of general psychiatric disorders i.e. hyperactivity, emotional symptoms, conduct and peer problems as well as prosocial behavior ($P = 0.11$).

Conclusions: The traumatised children / adolescents showed a tendency for higher hyperactivity without displaying any other symptoms of general psychiatric disorders.

PR05.45

Dental trauma in patients attending at a county hospital emergency room

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Background: Romanian medical emergency services, including dental care, undertook a remarkable transition in the past 10 years. After 2007 in most regions UPU-SMURD (Emergency Room Unit- Mobile Service for Emergency, Reanimation and Extrication) services were founded at the county's hospitals.

Aim: Dental trauma (DT) addressability for this service profile was evaluated.

Design: A retrospective study was conducted at the Dental Department of UPU-SMURD service from „Sf. Apostol Andrei” emergency hospital, Galați. DT records from the registry books

were selected for all patients (aged 2–73 years), for the period 2008–2011 and then prevalence, DT type, distribution, etiology, daytime and season of DT occurrence for patients aged under 25 were analyzed. The statistical analysis was performed in SPSS 17.0 for Windows ($P \leq 0.05$).

Results: 1.84% of patients ($n = 326$) from all age groups suffered DT. DT for the group aged under 25 years (mean age = 16.92 ± 5.95 y): a) 0.71% of patients ($n = 127$ patients with 234 DT, 77.1% boys) from all age groups had DT; b) the prevalence was 38.95% from DT in all age groups; c) distribution –86.61% of DT injured front teeth; d) luxations were more frequent (41.21%); e) etiology - aggression in 67% of cases, boys more affected ($P = 0.004$); f) DT was diagnosed almost in equal variances during night and day (45–55%); g) 28.4% of DT took place during the summer months.

Conclusion: Luxations injuries suffered during the summer months were the most frequent. Aggression was the main cause of DT. Even if the DT addressability was low, emergency service provided continuous care even during off hours.

PR05.46

Evaluation of dental pulp blood flow in immature maxillary incisors with concussion by Laser Doppler Flowmetry

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Background: Detecting the pulp vitality in traumatic teeth is important. However, there are many limitations to decide the pulp vitality in immature teeth because of undeveloped root.

Aim: To explore the relationship between pulpal blood flow (PBF) of immature maxillary incisors with concussion and pulp outcomes for 12 months.

Design: 42 children, aged 7–12 years, were selected randomly from School of Stomatology, Fourth Military Medical University. We treated 69 central incisors and 46 lateral incisors with concussion following IADT guidelines and collected the PBF data with Laser Doppler flowmetry (LDF) every 1, 3, 6 and 12 months. Moreover, we also chose 30 healthy children, aged 7–12 years, to collect the normal PBF data with LDF as control.

Results: We observed the PBF data from the healthy teeth of different ages had no statistics differences. In addition, we observed the PBF data from 61 central incisors and 42 lateral incisors with concussion were in the normal range for the first visit. After one month, all the PBF data turned into the normal range. After three months, the data of 6 central incisors and 2 lateral incisors became lower. After six months, only 4 central incisors' data were lower. After one year, the same 4 central incisors' data became especially low, one crown turned grey and the other 3 teeth had fistula, indicating the pulp is necrotic.

Conclusions: PBF data of immature maxillary incisors with concussion could help the dentists to give proper treatment and get better prognosis.

PR05.47

Abstract withdrawn

PR05.48

Interdisciplinary management of a crown-root fracture in a young permanent incisor: a case report

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Introduction: Emergencies due to dental trauma are highly prevalent among young Chileans. Traumatic crown-root fractures with pulp exposure are often complicated to treat and require an interdisciplinary management, to provide adequate treatment and improving prognosis.

Case reports: A 7 year-old male patient was evaluated at the Dental Clinical Centre at the University of Talca, 5 days after a dental trauma, where he had received emergency treatment, consisting of fragment bonding with a Glass-ionomer restorative cement. No symptoms were present during clinical examination, but mobility of the fragment was present; periapical X-ray showed an open root apex and an oblique crown-root fracture. Treatment plan was discussed by an interdisciplinary team, which performed the clinical procedures. Under local anesthesia, a partial pulpotomy and crown reconstruction with Glass Ionomer was performed by a Pediatric Dentist and Endodontist; the crown-root fragment was stored in saline solution. Fifty days later, the Periodontist lifted a gingival flap and the Prosthodontist placed a rubber dam, removed the restorative material and bonded the fragment using a total etch technique and composite resin cement; small missing fragments were restored using a nanofilled composite. After 6 months, the patient was still symptom-free and the tooth and surrounding tissues had achieved health, function and aesthetics.

Comments: All dental practitioners should be familiar with the protocols regarding management of emergency dental traumas; nonetheless, interdisciplinary approach is often required to provide optimal final treatment and to achieve the best possible clinical outcomes.

PR05.49

Delayed permanent tooth eruption due to the previous trauma and treatment procedure

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Introduction: Trauma to the primary dentition is common. It may cause disorders in the development of permanent successor teeth. The alterations may either occur at the time of accident or be caused by post-traumatic consequences.

Case reports: A 6-year-old healthy girl was presented to the department of pediatric dentistry. Her parents reported that, she had fallen while running and hit her face. In clinical examination, mobility of the maxillary left primary central incisor was observed. After the radiographic examination, root fracture was diagnosed and the tooth was extracted. Clinical control was performed after a week. The parents were informed regarding possible further complications and were reminded of the necessity of clinical controls every year until the permanent tooth erupted. Two years later, the patient returned with the complaint of a missing tooth. The radiographic examination revealed a delay in the eruption of the maxillary left permanent incisor. The patient

was observed monthly for two consecutive months for the eruption of tooth and the mucosal incision indicated the necessity for the removal of thick, fibrous gingiva. Infiltrative local anesthesia was performed and diode laser was used for the incision. After one week, the patient came for a follow-up check and it was observed that eruption of the tooth had started.

Comments: The protocol for patients who had experienced dental trauma is that they must be observed with a systematic clinical and radiographic follow-up and options of alternative treatments for the primary and permanent teeth involved should also be considered.

PR05.50

Revascularization of necrotic, immature permanent tooth: a case report

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Introduction: Standard techniques for apexification involves the use of Ca(OH)₂. However, the absence of root walls development makes the tooth susceptible to fracture. Studies on traumatic injuries to immature teeth have shown promising outcomes of revascularized root canal. This report presents a successful case of apexification with revascularization technique.

Case reports: A 7.5-year-old boy presented intrusive luxation of tooth 11. The tooth did not respond to cold testing, was sensitive to percussion and its mobility was grade 2. Periapical radiograph revealed an incomplete apex. One month later, the cold testing was negative; the diagnosis was pulpal necrosis. The revascularization was undertaken. First, the necrotic tissue was removed; the canal was disinfected with 3% sodium hypochlorite without mechanical preparation and dried with sterile paper points. A creamy paste of metronidazole, ciprofloxacin and cefuroxime was applied to the canal and the cavity remained closed with glass-ionomer during one month. At the second appointment, the cavity was opened and irrigated with NaCl. An intracanal hemorrhage was provoked. Portland cement was placed up to 3-mm cemento-enamel junction and the cavity was closed with glass-ionomer and composite resin. During the 1-year follow-up the radiographic evaluation showed a gradual apical development and the tooth was asymptomatic.

Comments: This case demonstrates the successful revascularization of necrotic root canal system. The use of the revascularization technique has permitted the physiological development of the root walls and apex, improving thus the prognosis of the tooth.

PR05.51

Multidisciplinary approach in treatment of avulsion of both maxillary central incisors

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Introduction: Tooth avulsion is very rare and represents only 0.5–3.0% of all dental traumas. In most cases it affects maxillary central incisors and predominantly only one tooth is avulsed. It represents a great functional and aesthetic problem and treatment options are challenging especially in cases when replantation can not be performed.

Case reports: A 13-year-old boy was referred to our Dental Polyclinic for management of missing both central maxillary incisors, lost due to the bicycle accident. The patient suffered avulsion of both maxillary central incisors (11 and 21) with fractured apical third of the roots left in their alveoli. The day following the

trauma, in the emergency dental office, both remnants of the root were extracted under local anaesthesia and patient was prescribed antibiotics. Four months after the trauma patient presented in our Polyclinic. Clinical and radiographic examination revealed empty sockets. The pedodontist constructed a wire-composite splint (from tooth 12 to 22) with two acrylic central maxillary incisors attached in place of the missing teeth. The orthodontist made complete orthodontic diagnostics including cephalometric analysis and diagnosed the patient with skeletal Class III malocclusion and skeletal open bite. Since the patient is in a skeletal growth pattern orthodontist began the therapy with removable orthodontic appliance-Class III bionator. Future therapy plan includes orthodontic - surgical treatment, and when the facial bone growth is completed, the implant surgery associated with porcelain crowns.

Comments: In such cases it's necessary to have a multidisciplinary approach in order to successfully resolve patient's aesthetic and functional problems.

PR05.52

Environment of traumatic dental injuries in children and adolescents treated at the University Medical Centre Ljubljana, Slovenia

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Background: Prognosis of traumatized teeth depends on appropriate emergency treatment, which often relies on lay people, present at the place of traumatic dental injury (TDI).

Aim: The aim was to analyze TDIs according to the place where they occurred, related activities and persons, who were present at the site of trauma.

Design: Data were collected from TDI-records of children and adolescents under treatment and/or follow-up at the Department of Paediatric and Preventive Dentistry, University Medical Centre Ljubljana, Slovenia, between 2009 and 2014. Age distribution, places of trauma, related activities and persons present at the site of trauma were analyzed.

Results: Relevant data on TDI-related places and activities were available in 543 records. 427 children and adolescents (mean age 10.2 ± 2.8, range 5.8–20.1 years) suffered trauma to their permanent teeth. In 116 children (mean age 2.7 ± 1.3, range 0.8–6.9 years) primary dentition was affected; majority of these TDIs occurred at home (78%). Home was also the main place of TDIs of permanent teeth (43%), followed by road (22%) and school (19%). In general, the most common activities related to TDIs were playing (56%), walking and running (13%) and riding a bicycle (12%). Persons present at the place of TDIs were mostly parents (61%) and teachers/educators (21%); in 5% of analyzed records no person being present at the site of trauma was identified.

Conclusions: Domestic and educational environment were the most common places where TDIs occurred. Instructions for parents and education staff could increase the odds for appropriate emergency treatment of TDIs.

PR05.53

Orthodontic management of traumatically intruded immature upper permanent incisor

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Introduction: Dental injuries are probably the most common orofacial injuries. Intrusion is characterized by the displacement of a

tooth impacted into the alveolus and the alveolar bone by an axially directed impact. This injury is accompanied by comminution or fracture of the alveolar socket.

Case report: Here, we describe the management of an 7.5-year-old patient who suffered intrusion of her immature permanent central incisor following an accident. After 3 months attempt for spontaneous re-eruption of this immature tooth, and in the absence of any signs of necrosis or resorption of the tooth, we opted to facilitate re-emergence. Therefore, we did the choice to an orthodontic repositioning combining expansion and extrusion of the tooth to her right and ideal position. This management was decided according to three main goals: aesthetic, endodontic and bony. It aims at giving back the patient a nice smile, allowing and facilitating endodontic treatment if needed later on on this tooth, keeping satisfactory alveolar bone and periodontal tissues if implant treatment has to be considered in the future.

Comments: The tooth is regularly radiographically and clinically observed to control root development and intercept potential endodontic complications. The first six months of management are shown in this presentation.

PR05.54

The role of paediatric dentists in the management of a complex trauma case

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Introduction: Considerations for management of complex oro-facial traumas include severity of the injuries, aesthetics and financial resources. Paediatric cases present additional challenges due to the on-going growth and development of oro-facial structures.

Case reports: A 15 year old girl with mild attention deficit hyperactivity disorder was referred to us following an oro-facial trauma from a scooter accident. Extra-oral examination revealed irregularity of the anterior mandibular border, limited mouth opening and lacerations of the lower lip and chin. Intra-oral examination revealed gingival lacerations, hematoma of the floor of the mouth, unstable occlusion with an anterior open-bite, debonded lingual retainer and grade III mobility of tooth 42. Multiple dental fractures were observed including eight uncomplicated crown fractures, complicated crown fractures of teeth 11/21, uncomplicated crown-root fractures of 26/27 and a complicated crown-root fracture of 46. Radiographic examination confirmed multiple dental fractures and revealed bilateral intra-articular condylar fractures, right parasymphyseal fracture extending through the 42 ligament space. Multidisciplinary emergency management of the traumatic injuries was undertaken under general anaesthesia including reduction of mandibular fractures, pulpotomies of exposed pulp tissue with mineral trioxide aggregate and temporary restorative treatment. Discoloration of 11/21 was noted at post-operative appointment. Oral rehabilitation with composite restorations done by the paediatric dentistry team provided the patient with an aesthetic interim result whilst awaiting completion of facial growth and endodontic development.

Comments: Although different specialists are involved in the management of complex trauma cases, paediatric dentists are at the epicentre of the multidisciplinary team and should oversee the treatments.

PR05.55

Alveolar trauma with dental replacement and alveolar bone maintenance for dental implant positioning. A case report with a 7 year follow-up

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Introduction: Dental trauma is the second cause of attention in odontopediatrics; it is not characterized by and only etiologic mechanism, nor do they follow a predictable pattern towards extension.

Studies done by Andreasen and Ravn (1972) informed that about 30% of children minor to 6 years of age have suffered temporal dental trauma. These lesions in temporal dentition can have important long term consequences in a biological and emotional point of view. The prognosis of the lesion will depend on the good resolution in the emergency room consultation.

Case reports: This is a case of a 13 year old patient that presents after alveolar trauma due to a fall. Avulsion of dental piece 21 and intrusion of dental piece 11 in alveolar bone was found. The avulsion dental piece was stored in milk 12 h prior to medical attention. Conduct treatment was done on piece 21 and repositioned in infraocclusion for cast during a 10 week period. Endodontic treatment was done on both pieces and external reabsorption was presented, implant replacement was done after bone development. After the placing of bone graft we waited 6 months for its adaption and two dental implants developed the function and aesthetics of the patient.

Comments: The adequate management and follow-up of trauma simplifies future of the patient which is important during the development stage. This case presented has a multidisciplinary 7 year follow-up. During the case follow up the patient was submitted to conservative treatment achieving a good development, function and aesthetics.

PR05.56

The use of regenerative endodontic technique for an unusual presentation of non-vital immature permanent incisor

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Introduction: A rare sequelae of trauma to primary teeth is partial or complete arrest of root formation of the developing permanent successor. An immature root development of such a tooth is challenging to manage particularly if there is a decreased crown/root ratio. Regenerative endodontic therapy can be considered as a treatment option for immature non vital permanent teeth because it could lead to some further root development.

Case report: An 8-year-old girl was referred for management of a non-vital, immature UL1 with uncomplicated crown fracture and chronic periodontal abscess. History taking revealed a previous dental traumatic injury to UL1 about 10 months ago but the history and type of trauma was not clear. Clinical examination revealed partially erupted UL1 with a buccal periodontal abscess and uncomplicated crown fracture. Radiographic examination revealed arrested root development of UL1 with unfavourable crown/root ratio and a periradicular radiolucent lesion. Regenerative endodontic treatment under local anaesthesia was the most appropriate treatment option for this patient. This was carried out with the use of a two antibiotic mixture; ciprofloxacin and metronidazole. Bleeding was induced and clot formation was obtained before coronal seal was placed. Review appointment

has shown resolution of apical radiolucency and bone formation apical to the tooth. Clinically, there are no signs or symptoms of infection.

Comments: Further review appointments will be arranged to assess changes in root width and length.

PR05.57

Molar incisor hypomineralization: two case reports

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Introduction: Molar Incisor Hypomineralization (MIH) is a hypomineralization of systemic origin of one to four permanent first molars frequently associated with affected incisors. The etiology of MIH is unknown, a number of possible causes, such as environmental changes, exposure to dioxin, respiratory diseases and oxygen shortage of the ameloblasts. Enamel defects can range from mild opacities, white or yellow in color, to severe enamel involvement which breaks down rapidly after eruption.

Case reports:

Case 1 is a 6-year-old healthy boy suffered from pain over lower right posterior tooth. During clinical examination, all first permanent molars presented with opacities. The radiographs showed teeth 36 and 46 were affected by deep caries lesions near the pulp. Following removal of carious tissue and porous enamel, all teeth were restored with glass ionomer cement and SSC.

Case 2 is a 7-year-old boy referred due to severe caries of permanent molar. His medical history was ALL during remission stage. Clinical checkup and radiographs showed large cavity of teeth 26, 36, 46 with cusp breakdown, and opacity of tooth 16. Try to perform indirect pulp capping over teeth 26 and 46, composite resin restoration of tooth 46 and preventive sealant of tooth 16. 1-year follow up of case 1 and 6-month of case 2 reveal that the restorations are intact and symptoms free.

Comments: Treatment options of MIH are case dependent, range from preventive fissure sealants, composite restorations, stainless steel crowns, casting restorations, even to extraction. Early intervention is important to prevent further undesirable complications.

PR05.58

Consequences of non-eruption of intruded primary incisors

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Introduction: Two treatment options for intruded primary incisors are suggested:

(1) Extraction – when the intruded tooth is pushed against the bud of the permanent successor.

(2) Leaving the tooth for spontaneous re-eruption. Intruded primary incisors usually re-erupt within 3 weeks, though re-eruption starting after several months has been reported.

As yet, the mechanism that allows re-eruption of the intruded tooth is unknown. In our experience, there are cases in which the primary incisor fails to re-erupt even years after the intrusion.

Aim: To present 4 cases in which the intruded tooth had been extracted shortly close to the eruption of the permanent successor and present the outcomes.

Case reports: The characteristics of 4 cases of intruded primary incisors are reported which all showed different sequelae as follows: irregular resorption of the root; irregular resorption of the root and enamel; complete resorption of the root and partial resorption of the enamel and irregular resorption of the root and enamel.

Comments: We wish to highlight the potential risk of leaving such intruded teeth until the eruption of the permanent successors. Extraction at that time may interfere with the development of the labial bone plate.

PR05.59

Complete root resorption as a consequence of multiple avulsion

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Introduction: Tooth avulsion is a serious dental injury. The blood supply of pulp is interrupted and periodontal ligament cells are exposed to external environment. In this case risk of complications is high. Complications such as pulp necrosis and external root resorption are common. In this case reports we described a multiple avulsion of permanent teeth that resulted in complete root resorption.

Case reports: A 13-year old female visited a Clinical Hospital Center two day after avulsion of three permanent upper incisors. Teeth were replanted and splinted approximately one hour after injury by oral surgeon in emergency. Splint was rigid and inappropriate placed on gingival margin. Gingival and oral mucosa laceration was present too. In our Clinic first treatment was a correction of rigid splint. After splinting period of 15 days, on teeth 12, 11 and 21 was performed a root canal treatment with obturation with gutta-percha. A X-ray follow-up examination show a external root resorption on all teeth, four months after treatment. Six months later a periradicular surgery was performed. The root resorption was continued and 60 months after injury teeth 12 and 11 was extracted and replacement with space maintainer.

Comments: Although the teeth was replanted on the time, sometimes is difficult to prevent a root resorption and loss of teeth.

Orthodontics and Craniofacial Growth and Development Poster Session – PR06

PR06.01

The next big thing in clear aligners therapy

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Background: 3D printing has significantly improved dental industry by fabricating best-fit oral appliances with wide range of hybrid materials and variable properties. Clear aligners could provide proper teeth alignment painlessly, not too lengthy nor costly and effortless compared to conventional braces. The use of 3D printing in clear aligners is limited to fabricating supporting models on which thermoformable sheets are pressed. This process is lengthy and requires human finishing and some material waste. **Aim:** To exploit 3D printing technology in producing clear aligners with easier setup and less time and material waste. To introduce new aligners with properties of the currently used ones and with minimum human intervention in their fabrication.

Design: Specialized software made the orthodontic tooth movements on digital models. Then, the gross movement was subdivided onto submodels. A splint was designed, virtually smoothed and finished as a negative replica for each submodel mimicking the fitting surface of the teeth. The splint was 3D printed with plastics in ≤ 1 mm thickness.

Results: Aligners were fabricated in rigid and soft forms. Rigid aligners had reasonable strength but low elasticity, while the soft ones had better adaptation and resistance to fracture but less strength. The aligners were not clinically tested and still subject to change.

Conclusion: Aligners could be fabricated with direct 3D printing with little effort, time, material and human intervention. Together with material and 3D printing technology providers, we may improve the overall properties of the aligners and substitute the current technique.

PR06.02

Association between feeding duration, non-nutritive sucking habits and occlusal characteristics in Chinese children

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Background: Both maternal breast-feeding for a short period and non-nutritive sucking habits may be related to occlusofacial abnormalities as environmental factors.

Aim: The aim of this study was to assess the effects of feeding duration and non-nutritive sucking habits on the occlusal characteristics in 3–6-year-old children in Beijing city.

Design: This cross sectional study was conducted via an examination of the occlusal characteristics of 734 children combined with a questionnaire completed by their parents/guardians. The following variables were evaluated: deep overbite, open bite, anterior cross bite, posterior cross bite, deep overjet, terminal plane relationship of the second primary molar, primary canine relationship, atresia and spacing.

Results: It was found that a short duration of breast-feeding (never or ≤ 6 months) was directly associated with posterior cross bite (OR = 3.13; $P = 0.031$), maxillary atresia (OR = 1.63; $P = 0.038$) and higher probability of developing pacifier-sucking habits (OR = 4.21; $P < 0.001$). Children who were bottle-fed for over 18 months had a 1.45-fold higher risk of nonmesial step occlusion and a 1.43-fold higher risk of a class II canine relationship compared with those for 6–18 months. A prolonged digit-sucking habit increased the probability of an anterior open bite, while a pacifier-sucking habit associated with excessive overjet and absence of lower arch developmental space.

Conclusions: Breastfeeding duration was shown to be associated with the prevalence of posterior crossbite, maxillary atresia in the deciduous dentition and development of a pacifier-sucking habit. Non-nutritive sucking habits were also found to affect occlusion.

PR06.03

Abstract withdrawn

PR06.04

Management of multiple supplemental mesiodens - a multidisciplinary approach

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Introduction: Mesiodens is a supernumerary tooth present in the mid line between the two central incisors. It usually results in oral problems such as malocclusion, food impaction, poor aesthetics and cyst formation. Etiology remains unclear and could be multifactorial. However, excessive proliferation of the dental lamina, dichotomy of the tooth bud, hereditary and environmental factors are tested as possible etiology.

Case reports: A 10-year-old boy reported seeking treatment for his unesthetic smile. Clinical examination revealed two supplemental supernumerary teeth between maxillary central incisors (Mesiodens). Presence of these mesiodens resulted in facial and distal displacement of teeth #11, 21 and cross bite of tooth #22. Extraction of supernumerary teeth resulted in 12 mm space between maxillary central incisors. Orthodontic treatment was started with a removable appliance containing finger spring for tooth #11 and Z-spring for crossbite correction of tooth #22. The teeth were then strapped up with a 0.018 Roth appliance. Initial aligning of the incisors was done with a 0.016 NiTi wire, followed by 0.016 Australian arch wire. The teeth were brought to the occlusal plane and redistribution of the spaces was done with NiTi open coil springs. Retroclination of incisors reduced the interdental spaces.

Comments: Early diagnosis and prompt treatment for patients with supernumerary teeth is recommended. This would allow sufficient space for the erupting permanent teeth. Influencing factors are the number, type of supernumerary teeth, amount of displacement of adjacent teeth, developmental stages of adjacent permanent teeth and space available within the dental arch.

PR06.05

Management of pre-occlusal tooth eruption with short root

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Introduction: Teeth at the phase of pre-occlusal eruption with inadequate root length may fail to tolerate trauma from normal masticatory load. This case report presents the use of a custom essix appliance to protect mandibular permanent premolars during function and maintain normal root development.

Case report: A 7-year-old boy with congenital kidney disorder was referred to the paediatric dentistry clinic for the management of carious lesions and orthodontic evaluation. The mandibular premolars were at the stage of preocclusal eruption, with about one-third of their roots developed, as verified by panoramic radiography. A custom essix appliance overlaying the entire mandibular teeth was fabricated to protect the developing roots from possible detrimental effects of masticatory load. Following 6 months of appliance therapy, the root length of premolars increased to about one-half of expected final root length without clinical symptoms.

Comments: Occlusal trauma to an erupting permanent tooth may affect proper root development. Here, the custom essix appliance provided a practical and cost-effective solution to enable root development uneventfully.

PR06.06

Impact of three different topical agents on enamel demineralization around orthodontic brackets: a clinical studyA.M. ABDELLATIF¹, S. M. HAMMAD² & A. M. FOUUDA²¹*Pediatric Dentistry, Mansoura University, Mansoura, Egypt;*²*Orthodontics, Mansoura University, Mansoura, Egypt*

Background: One of the serious side effects of fixed orthodontic appliances is the development of white spot lesions.

Aim: The aim of this study was to evaluate the *in vivo* effects of three topical protecting agents on enamel demineralization around orthodontic brackets at two time intervals.

Design: Twenty-eight patients, 13–16 years (mean: 14.06 ± 1.73 years), scheduled to have four first premolar teeth extracted, were divided into four groups: three experimental and one control. SeLECT-Defense™, (Lubbock, TX, USA), Clinpro fissure sealant (3M ESPE-USA) and White Varnish with TCP (3M ESPE-USA) were applied to tooth surfaces around brackets in the experimental groups. After one month, two premolars of each patient; (14 premolars from each group) were extracted. The teeth were stored in a refrigerator in flasks containing gauze dampened with saline. After two months, the other fourteen premolars from each group were extracted and treated similarly. Demineralization of enamel around the brackets was evaluated by a cross-sectional microhardness method with an indentation at two positions (occlusal-cervical), 10 µm depth.

Results: There was no significant difference between the microhardness of either the occlusal or the cervical halves in the two times tested. Statistically significant differences were determined between each of the treatment and control groups ($P < 0.001$). However, no statistically significant differences were detected between the experimental groups ($P < 0.05$).

Conclusion: The findings from the present study highlight the value of the usage of any of the three protecting agents to decrease demineralization around orthodontic brackets.

PR06.07

Treatment of adolescent patients with missing permanent teeth and multidisciplinary therapy with implants insertion: 5-year prospective study

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Background: Dental care of adolescent patients without own teeth is not easy. Anthropological age determination for implant insertion is important and prosthodontic methods can be often applied only after multidisciplinary therapy.

Design: Prospective study of 73 implants was prepared. The patients at implants surgery ranged from 16 to 23 years of age. The aesthetic appearance was checked, loss of bone marginal support, patient satisfaction, and quality of life after patient rehabilitation. Also, the effect of microthread on the maintenance of marginal bone level was evaluated. No remarkable complications were found during the observation period.

Results: Aesthetic optimum was obtained mainly after trauma. Shape and size compromise was necessary in 18%. The influence of fixture diameter on marginal bone level ranged from +0.34 (SD 0.40) (3 mm fixture diameter) to +0.40 (SD 0.33) (4.5 mm fixture diameter). The amount of peri-implant bone was significantly lower with the 5 mm diameter fixture -0.10 (SD 0.25). Marginal bone-level increase for different heights of microthreads from 0.18 (SD 0.43)-microthread 0.14 mm, 0.34 (SD 0.37) microthread 0.16 mm; 0.04 (SD 0.35) microthread 0.22 mm. All twelve Wilcoxon signed-rank tests show significant differences between QoL score before and after implantation, namely $P < 0.05$, except for the one comparing difficult taste sensation before and after implants were applied, namely $P = 0.389$.

Conclusions: Multidisciplinary treatment planning is directly connected with skeletal maturation. More emphasis has to be placed to CAD CAM techniques. Multidisciplinary therapy with implants insertion may result in a much better quality of life.

PR06.08

Oral communication disorders and oral health status of children in daycareL. D. B. C. FONTES¹, F. C. D. FREITAS², A. S.NASCIMENTO³, R. B. DA SILVA³, J. B. MARQUES⁴ & N. S. DE LIMA¹¹*Clínica e Odontologia Preventiva, Universidade Federal de Pernambuco, Recife, Brazil;* ²*Odontologia, Universidade Estadual da Paraíba, Campina Grande, Brazil;* ³*Faculdade de Odontologia, Universidade de Pernambuco, Camarajibe, Brazil;* ⁴*Pós Graduação - Mestrado, Universidade Estadual da Paraíba, Campina Grande, Brazil*

Background: Communication disorders have a significant detrimental effect on a child's development, affecting educational, social and psychological progress.

Aim: Check the possible association between oral communication disorders and oral health status of children linked to daycare in a city of northeastern Brazil.

Design: This was a cross sectional study, quantitative and inductive, with descriptive and inferential analysis of the data, adopting, for such a CI of 95%. A face to face interview with application form and physical examination intraoral represented the instruments used in data collection. The total sample consisted of 374 children aged from two to 5 years, enrolled in five public day care centers, who met the inclusion and exclusion criteria and determined by a sample calculation with predefined parameters.

Results: These children had a mean age of 4.1 years, 59.9% male, with a mean dmft of 3.27, 70.1% carriers arch type I Baume for the primary dentition and with a history of deleterious oral habits, 59.9% of carriers anterior open bite, 79.9% no change in labial or lingual frenulum. A significant association ($P < 0.01$) between the anterior open bite and changes in the lingual frenulum and the phonetic and phonological deviations, for individuals assessed.

Conclusions: There was an association between disorders of speech and language and some conditions related to oral health.

PR06.09

Displaced permanent canines with associated disturbance of primary canines: a case reports with CT and literature review

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Introduction: The two main theories of canine impaction are the guidance theory (local environment) and genetic theory. Extraction of deciduous canines has been proposed as a preventive treatment. The reasons for removing primary canines as an effective option are (1) to remove the inflammatory tissue or primary canine and (2) to decompress any cystic lesions. However, few studies have presented the exact relationship between apical pathosis of primary canines and the displaced permanent canines.

Case report: In this report, we provide some CT images of lesions of primary canines hindering permanent canine eruption.

An 11-year-old boy was referred for management of canine impaction. He received endodontic treatment of that predecessor 4.5 years ago. CT reports showed an enlarged apical lesion of the primary canine hindering the dental follicle of the permanent canine to the palatal side while the root remained over the buccal side.

Another 11-year-old boy was diagnosed with canine impaction. The primary canine was prior-root-canal-filled 3.5 years ago. CT examination revealed that the permanent canine root tip was located buccally while the crown was pushed palatally by the radiolucency of the primary canine.

Comments: Infection of primary canines should be monitored carefully. Apical lesions may hinder the eruption process of permanent canines. Thus, extracting infected primary canines can be an effective preventive treatment. Some other etiologies, such as genetics and other local factors, however, require different interventions. Furthermore, the possible interaction mechanisms of permanent dental follicles and primary apical pathosis are discussed in more detail in this report.

PR06.10

Three-dimensional assessment of facial soft-tissue modification in children with crossbite before and after early correction

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Background: Three-dimensional computerized system with landmark representation of the soft-tissue facial surface allows noninvasive and fast quantitative study of facial change.

Aim: The aim of the present investigation was to quantify changes in soft-tissue facial morphology of cross-bite children before and after correction in comparison with children without any malocclusion.

Design: Thirty four children 3–4 years old treated in pediatric department of Peking University Hospital of Stomatology from 2013 to 2014 were recruited in this study and divided into two groups. Group A included 14 subjects (6 boys and 8 girls) had

no apparent facial anomalies with normal-bite, and group B included 20 subjects (13 boys and 7 girls) with anterior crossbite. Three-dimensional facial images were acquired by using the portable FaceSCAN^{3D} System from each child at the first visit and 6 months later, and imaged matching point on auricula. During this period, children in group B completed crossbite correction. Data were analyzed using Mann-Whitney Test.

Results: The change of facial morphology was most evident in the lower third of the face in group B, significant differences occurred in the area of lip (up lip: 2.75 ± 0.44 mm, $z = -3.16$, $P < 0.01$, low lip: 2.40 ± 0.75 mm, $z = -2.17$, $P < 0.05$.) at the end of observation after crossbite correction, whereas group A showed no obvious changes in these 6 months.

Conclusions: Early crossbite correction effectively improved children's facial contour. The facial changes occurred mainly in the area of lip. The three-dimensional facial morphometry allowed noninvasive evaluation of facial changes at any time during and after orthodontic treatment.

PR06.11

Development of sucking function of infants with cleft lip and palate

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Background: Cleft lip and palate (CLP) is the most frequent cleft malformation seen in maxillofacial region and morphological changes have been observed when evaluating treatment. However, few studies were reported about changes of oral function.

Aim: The aim of the present study was to investigate changes in physiological characteristics of sucking function along with perioral muscles' activity and sucking pressure in infants with CLP.

Design: Twelve infants with unilateral CLP underwent to a cheiloplasty procedure at the clinic of cleft lip and palate at Fujita Health University Hospital. Measurements were performed before, 1 week and 3 months after the cheiloplasty. Electromyogram (EMG) findings from bilateral temporal (L-R, TM), masseter (L-R, MM) muscles, as well as oris (OM) of healthy side and suprahyoid (SM) muscles were recorded. Values for sucking pressure and EMG findings obtained from healthy infants at the age of 3 months were used as a control.

Results: Sucking cycle time and negative pressure duration during sucking were significantly longer following the operation. Activities on both side of TM, MM, OM and total muscle activities were significantly increased after operation. Sucking pressure also significantly increased at 3 months after the cheiloplasty.

Conclusions: Sucking cycle was increased following the operation, which seemed to be effective for formation of negative intraoral pressure. However, as EMG activity of SM for the CLP was still small after the operation, indicating that tongue movements of infants with CLP during sucking was weaker than in full-term normal infants.

PR06.12

Using dental age by estimation chronological age in Czech children aged 3 - 18 yearsK. GINZELOVA¹, T. DOSTALOVA¹ & H. ELIASOVA²¹Department of Stomatology, Charles University, 2nd Faculty of Medicine and Motol University Hospital, Prague, Czech Republic;²Institut of Criminalistics Prague, Prague, Czech Republic

Background: The Demirjian methods to determine the dental age are based on analysis of the orthopantograms. Dental age estimation is based on the establishment tooth development stages.

Aim: The purpose of this study was to assess the accuracy of estimation the dental age by Demirjian in the use of his all four methods.

Design: 505 Czech healthy boys and girls aged 3–18.99 were radiographic examined at the Charles University, 2nd Medical Faculty, Department of Stomatology, Prague. It was mentioned the factors influence of underlying diseases on the accuracy of the estimate dental age. For statistical evaluation used descriptive statistics to compare deviations of the mean values chronological and dental age in each age group.

Results: The results of difference dental age - chronological age are not significant in both genders only by both Demirjian 7 teeth methods of 1973 and 1976. Therefore they may be most appropriately used for forensic age estimation. They are shown standard deviation difference in different countries.

Conclusions: Demirjian original method 7 teeth 1973 and Demirjian revised method 4 teeth 1976 appear to be the best methods for calculating the dental age of healthy Czech children of both genders. *This research was supported by IGA MZCR 13351-4 and 00064203 (FN Motol).*

PR06.13

Maximal interincisal distance in healthy children in IstanbulF. SEYMEN¹, M. KORUYUCU² & K. GENÇAY²¹Department of Pedodontics, Istanbul University, Istanbul, Turkey;²Istanbul University, Istanbul, Turkey

Background: Assessment of mandibular function is performed by means of several diagnostic tests. One of the elementary tests to evaluate tmj function is measurement of the range of motion of the joints during maximum mouth opening. A reduced mouth opening capacity may be one of the first clinical signs of TMJ involvement.

Aim: The purpose of this study was to create age related percentiles for the maximal inter-incisal distance of healthy children.

Design: Children who fulfilled the following criteria were included in this study: sound and immobile primary maxillary and mandibular central incisors, no caries, no history of facial and dental trauma, no anterior open-bite and no restorative materials that influenced the incisal edges, and no orthodontic appliances that could influence the position of the central incisors. The interincisal measurements were performed with metallic caliper and also malocclusions were recorded for all children. Oneway Anova test, Tukey HDS test, Tamhane's T2 test and Student *t* test were used for statistical analysis.

Results: The study population comprised of 1059 (569 M, 490 F), 3-to 15-year-old (mean age 8.82 ± 3.06) children. The mean score of maximal inter-incisal distance was found 33.24 ± 5.54 (females); 33.32 ± 5.71 (males). The mean score of maximal interincisal distance was found 28.63 ± 4.34 for 3–5 years; 33.52 ± 4.84 for 6–11 years; 37.35 ± 5.52 for 12–15 years. Significant differences were found between age groups and between malocclusion groups ($P: 0.001$; $P < 0.01$).

Conclusion: The result of this study indicated that positive relationship between the maximum mouth opening and age and malocclusion.

PR06.14

Assessment of functional therapy influence on facial proportionsA. MUNTEAN¹, A. MESAROS², C. COSTEA¹, D. FESTILA³ & M. MESAROS¹¹Paediatric Dentistry, University of Medicine and Pharmacy 'I.Hatieganu', Faculty of Dental Medicine, Cluj Napoca, Romania;²Dental Propaedeutic and Aesthetics Department, University of Medicine and Pharmacy 'I.Hatieganu', Faculty of Dental Medicine, Cluj Napoca, Romania;³Orthodontics, University of Medicine and Pharmacy 'I.Hatieganu', Faculty of Dental Medicine, Cluj Napoca, Romania

Background: Presently facial aesthetics is synonymous with social acceptance and success.

Aim: Aim of this study was to evaluate the effect of functional therapy on facial aesthetics, in class II/1 patients, treated in mixed dentition.

Design: Evaluate facial proportions on standard orthodontics photographs for 60 patients with class II/1 malocclusion, aged between 6 and 12 years, treated with functional appliances. We used anthropometric index (Farkas and Munro, 1987): F2-Lower face-face height, F3-Mandibulo-face height, F4-Mandibulo-upper face height, F5-Mandibulo-lower face height. This items were selected because functional treatment act mainly on lower an in a smaller ration on the middle area of the face. Data were statistically analysed and the results were considered significant for $P < 0.05$.

Results: When the treatment initiate the difference significant between the 2 genders was for F4. The mean value for F4 (0.83 ± 0.17) for girls was higher than the value F4 (0.71 ± 0.07) for boys ($P = 0.001$). At the end of the treatment the differences according to gender were not significant related to analysed indices. For the group 6–9 years the initial and the final values differed significantly for F4 ($P = 0.001$) and F5 ($P < 0.001$). For the group 9–12 years the differences between initial and the final values were significant for F4 ($P = 0.006$) and F5 ($P = 0.005$).

Conclusions: Functional therapy must be used during active growth period in order to achieve a well-balanced face in harmony with muscular complex. Patient compliance is essential in functional therapy success and for this reason treatment can initiate in the second period of mixed dentition.

PR06.15

3-D image measurements of facial growth in children with thalassaemiaK. ALMUKHTAR¹, J. FEARNE¹ & L. ZOU²¹Centre Oral Growth and Development/Paediatric Dentistry, Queen Mary University of London/Barts & The London School of Medicine and Dentistry, London, UK;²Clinical Oral Biometric, Queen Mary University of London/Barts & The London School of Medicine and Dentistry, London, UK

Background: Thalassaemia is a Haematological disorder that affects the amount of production of the haemoglobin leading to chronic anaemia. This may lead to hyperactivity of the bone marrow and bone expansion, consequently facial bones grow into so called thalassaemia faces. These facial features are well recognised but poorly documented or quantified.

Aims: This study looked at 3-D facial changes in children with thalassaemia using a facial scanner based on stereo-photogrammetry (3DMD, USA), as a non-invasive method, and to assess whether these changes can be used as an indication for further medical intervention.

Design: A total of 26 children with thalassaemia (14 thal. major and 12 thal. intermedia) were included in the study. The ages at the first scan are from 7 months to 15 years 7 months. Scans

were carried out once in every 6 months using the facial scanner. The consecutive 3-D images were superimposed using software “Cloud” and the differences between the images at three time points were measured on the areas of frontal, nasion, nasal tip, cheeks, and chin.

Results: The initial results of 1 year from three cases (2 thal Major and 1 thal intermedian) showed area growth at frontal: 1.7–3.2 mm, nasion: 1.5–2.4 mm, nasal tip: 1.8–2 mm, cheek prominence: 0.3–1.7 mm and chin 2.6–4.3 mm.

Conclusions: The 3-D facial scans, as a non-invasive tool, is capable to accurately identify facial growth, further work with a control group is underway to assess clinical indications for its use.

PR06.16

The management of a patient with fibrodysplasia ossificans progressiva suffering from a dental abscess

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Introduction: Fibrodysplasia ossificans progressiva (FOP) is an autosomal dominant genetic disorder which leads to bone deformation and heterotrophic ossification of connective tissues. FOP affects 1 in 2 million people with the ossification of connective tissue beginning in the first two decades of life. Anaesthetic management for FOP patients is challenging. These patients are high risk for general anaesthesia (GA) due to their complicated airway management. Flare ups may occur spontaneously but can be precipitated by the injection of local anaesthetic during dental procedures.

Case report: MB, 4-year-old girl was referred to the department for the management of severe dental pain from the lower left quadrant. MB had an abnormality of the ACVR1 gene, which classically presents in patients suffering with FOP. Clinical examination revealed a dental abscess associated with the LLE, and caries affecting the LRD secondary to a highly cariogenic diet. A multi-disciplinary approach was undertaken for MB to have dental treatment under GA for the extraction of the LLE and restoration of the LRD. Preformed metal crowns were placed prophylactically on the remaining deciduous molars. Due to the patient’s complicated medical condition and the risk of surgery, the GA was safely administered by a specialised anaesthetist. Following dental treatment, MB will be reviewed annually within the department to reinforce preventative advice and monitor dental development.

Comments: This case highlights the important role of the paediatric dentist in liaising with all multi-disciplinary team members for patients with complex medical conditions. Prevention of dental disease is paramount in such cases.

PR06.17

An interesting case of an enormous cervicofacial neurofibroma

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Introduction: Neurofibroma is a benign tumour that originates from either nerve sheath cells or subcutaneous peripheral nerves. Large neurofibromatosis, as in this case, can result in functional disfigurement and disability. Usually these tumours are present from birth and can often progress slowly during childhood. Complete excision of the tumour is usually not possible due to the infiltrating nature of the vital structures of these tumours. The risk of neurological and functional destruction upon resection is

high. Facial neurofibroma is commonly associated with osseous changes and can cause severe disfigurement.

Case report: An 8 year-old girl was referred into the dental department by the Head and Neck Surgeon. A comprehensive dental examination was difficult due the presenting enormous left cervicofacial neurofibroma and a macroglossic tongue. Asymmetry features was evident on the left side with hemi-facial hypertrophy. A tracheostomy (and gastrostomy) was in situ. Dental examination was difficult and it was almost impossible to manipulate the left sided soft tissues. Gross calculus deposits were evident covering the whole dentition. The OPG showed severe crowding, impaction and immature roots of the upper left dentition. The maxilla and mandible showed severe hypoplastic intra-osseous lesions with an increased risk of mandibular fracture. The aim of our treatment, in this difficult case, was to deliver intensive oral hygiene and scaling and to ensure the patient is caries free.

Comments: This case highlights the role of a paediatric dentist in managing the difficulties associated with rare complex medical conditions.

PR06.18

The mouth breathing children, their characteristics and the possible relation with their academic performance

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Background: The mouth breathing syndrome is an inadequate way of breathing that leads to a series of changes such as body posture, respiratory, behavioral and functional changes on the entire Stomatognathic System. In students, this inadequate breathing this syndrome, acting on the maxillary and dental processes, and their disorders, as well as alerting the childrens’ teachers and parents about the learning alterations that may occur. The data contained refer to the research executed in a municipal public school from Belém-Brazil.

Aim: The research aimed to identify carriers of the Mouth Breathing Syndrome at the public schools of Belém and the possible influence in their academic performance, it also aimed to alert their parents about the possible interferences and the adequate treatment.

Design: The selection was a visual and clinical examination performed at the schools. The students data and other alterations that characterized them as mouth breathers were annotated on specific charts. After that, a questionnaire regarding the students performance and behavior was submitted to the parents and teachers.

Results: Once the syndrome was detected, the parents were alerted to the problem when 237 students from 4 to 11 years old were examined. 79 carry the Mouth Breathing Syndrome corresponding to 33.3% of the examined patients. 29% of the patients with the syndrome presented a regular academic performance, 62% presented a good academic achievement and 9% presented insufficient academic performance.

Conclusions: There is a relation between the presence of the Syndrome and the academic performance of the examined children, when identified, we can intervene early contributing to improve these students’ performance.

PR06.19

Modification of overjet and overbite in children with tongue thrusting after cementation of palatal buttons for the reeducation of the tongue

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Background: Tongue thrusting habit is a condition in which the tongue makes contact with any teeth anterior to the molars during swallowing. Tongue thrust seems to affect the soft-tissue and dental characteristics causing lip incompetency, mouth-breathing habit, hyper-active mentalis muscle activity, open-bite, and proclination of maxillary incisors.

The 38.29% of Chilean children in early mixed dentition have dentomaxillary anomalies. In one study, the 66% had dysfunctional oral habits, of which 15% had tongue thrust. And 16% of dentomaxillary anomalies that produces this habit were diagnosed with anterior open bites.

Aim: The present study aims at finding an alternative interceptive treatment easy to apply to patients in early mixed dentition with anterior open bite due to tongue thrusting in function and rest.

Design: A group of 20 healthy children between 6 and 9 years were selected. The inclusion criteria was early mixed dentition with anterior open bite only due to tongue thrusting in function and rest.

An oral exam and a Ricketts cephalometric study were performed. A metallic button was cemented in teeth 1.1 and 2.1. Patients were controlled every two weeks to check for dislodgement of the button. Measurements were taken after three months.

Results: We observed a statistically significant ($P < 0.01$) decrease of overjet but there was no decrease of overbite ($P > 0.05$). The interincisive angle increases significantly ($P < 0.01$).

Conclusion: Metallic buttons in palatine of teeth 1.1 and 2.1 indicate to patients the proper position of the tongue allowing reeducation in function and rest, correcting anterior open bite.

PR06.20

Early treatment in primary dentition of a class III malocclusion with the trainer (EF Class III): a cases report

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Introduction: The prevalence of dentomaxillary anomalies in 4 year old children in Chile is 33.3%. This is why an early treatment is recommended in the primary or mixed dentition. The main objective is to improve the dental and skeletal development before the eruption of the permanent dentition. To achieve this, one of the therapeutic tools used is the pre-orthodontic appliance called “Trainer”, which are low cost, silicon appliances characterized by their standard dimensions according to the age and pathology of the child. The Trainer is also complemented with myofunctional education.

Clinical reports:

Case 1: A 2 year’s 5-month-old child with primary dentition, anterior crossed bite and maxillary compression. Class III with family history and atypical swallowing, she uses baby bottle and pacifier. The treatment is initiated with the removal of the suction habit, when she is 3-year-old the Trainer is implemented (EF Start) accompanied with a bite elevation with glass ionomer stops to facilitate normal development and complemented by breathing a tong positioning exercises. When she is 4-year-old, the treatment with the trainer continues (EF Class III standard).

Case 2: A 3 years 2 month old child with anterior crossed bite. The treatment starts with Trainer (EF Class III petit) and bite elevation with glass ionomer stops and functional education.

Comments: The early treatment intervention used in these 3-year-old patients produced facial and occlusal favorable changes and fast corrections. These modifications can be seen in the mandibular position and the stimulation of the maxillary development.

PR06.21

Early orthopedic treatment with fixed appliances

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Introduction: Hybrid orthopedics, consists in combining the principles and techniques of mechanical orthopedic therapy utilizing fixed devices with heavy forces and applying the fundamental principles of functional therapy, neural stimulation with chewing oriented therapies and providing the patient with physical therapy when needed, this will let us optimize the therapies improving results and shortening times.

Case reports: Male patient, 5.8 years in apparent good health. Has a straight facial profile. Intraoral inspection shows an anterior cross bite, super mesial terminal and lingual inclination of the lower incisors and tendency toward class III malocclusion. Treatment: upper and lower fixed appliances with buccal arms for traction elastics up to 500 g, accompanied by planas direct tracks. After improving occlusion relations, selective tooth wear is done and diet changes. It’s maintained until adequate incisal guide is achieved.

Male patient, 5.2 years in apparent good health. Has a convex facial profile. Intraoral examination revealed a distal terminal and a large overjet is observed. Cephalometrically presents class II values for retrognathism. Treatment: upper fixed appliances with buccal arms for traction elastics, modified in order to slightly touch the upper incisors and align them, the lower fixed appliances is converted into “lipbumper”. Accompanied by selective tooth wear and diet changes.

Comments: The interceptive treatment by orthopedics in early ages is more important because the growth potential is greater, shortening treatment times with stable and lasting results.

PR06.22

The effects of rapid palatal expansion with facemask on permanent successor by finite element analysis

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Background: Recently, rapid palatal expansion with facemask is widely used for anterior movement of maxilla and mesial movement of maxillary tooth. There were many studies about cephalometric changes of dentoalveolar composition but quantitative studies of permanent successor were small.

Aim: The purpose of this study was to evaluate the stress distribution and displacement patterns of permanent successors at anterior movement of maxilla by orthopedic treatment in patient with class III malocclusion using finite element analysis.

Design: The subject was consisted of 15 children who had skeletal class III malocclusion and were taken rapid palatal expansion with facemask. The controlled group was composed of children who had no orthopedic treatment. Maxillary dentoalveolar mea-

surements of cephalometric data were analyzed by finite element analysis.

Results: When the maxilla moved to anterior, there was more anterior and inferior displacement in the anterior portion of permanent successor than posterior portion. In successor, the incisal edge showed more anterior displacement than the root apex.

Conclusions: It is thought that the results from this finite element analysis will help to comprehend the effects to permanent successor which affected by orthopedic treatment.

PR06.23

Oral manifestations of twin sisters with pseudohypoparathyroidism type Ia

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Introduction: Pseudohypoparathyroidism (PHP) is a rare heterogeneous disease with a prevalence of 3–4 per million births. PHP type Ia is characterized by resistance to multiple hormones, including parathyroid hormone, and causes hypocalcemia. It is generally associated with Albright's heredity osteodystrophy, which is characterized by a short stature, obesity, round face, brachydactyly, brachymetacarpia, subcutaneous ossifications, and, in some cases, mental retardation or developmental delay. The oral features include enamel hypoplasia, hypodontia, short roots, and delayed eruption. However, the craniofacial characteristics in patients with a deciduous dentition have not been discussed in detail.

Case report: We describe two cases involving 11-year-old Japanese monozygotic twin sisters with PHP type Ia. Both patients exhibited a short stature, obesity, brachydactyly, brachymetacarpia, basal ganglia calcification, and subcutaneous ossifications. Craniofacial findings included a thick cranium, a small cranial base angle, an acute posterior cranial base, enamel hypoplasia, short roots, malformed pulp cavities, and submerged deciduous molars. In addition, five premolar tooth germs were congenitally missing in both patients. One patient also exhibited impaction of the deciduous maxillary left second molar in the maxillary sinus and mesial and horizontal tipping of the permanent maxillary left first molar.

Comment: Both patients showed the typical systemic and oral features of PHP type Ia. On the other hand, it is suggested that not only the disease itself but also environmental factors may disturb the normal growth of the dentition, such as deciduous tooth exfoliation and permanent tooth eruption.

PR06.24

Palatal training therapy - a team approach to management of intractable speech disorders

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Introduction: Sussex Community Trust operates clinics for ENT and Oral difficulties. The aim is to optimise potential for developing oral skills for speech, eating, drinking and saliva control. Children with intractable speech disorders, unresponsive to conventional speech therapy, are commonly referred.

Case report: Georgia, a 14-year-old girl was referred and seen for a consultation by paediatric dentistry and speech and language specialists. Georgia is profoundly deaf from birth and currently aided bilaterally with a hearing aid and radio aid. She presented with chronologically normal dental development, good oral hygiene and a caries free dentition. Georgia attends a special

school for young people with a wide range of special needs and specific learning difficulties. She uses speech to communicate; she uses lip reading together with her limited hearing to understand what others say to her. She was highly motivated to improve the intelligibility of her speech. The first step in treatment was to increase tactile feedback and sensori-motor learning around tongue placement using a palatal training appliance (PTA), which incorporated a small bead on the alveolar ridge to encourage Georgia to lift her tongue tip to a specific target site on the palate. After 6 months of PTA use, Georgia was introduced to electropalatography which provides a visual display of tongue contact with the roof of the mouth providing Georgia with speech feedback.

Comments: Dentists and Speech and Language Therapists working together can help children reach their full potential by enabling learning of new motor patterns that transfer skills to speech.

PR06.25

Influence of adhesives and different methods of enamel pretreatment on the bond strength of orthodontic brackets

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Background: Two-component composite resins or glass ionomer cements are used for bracket bonding in fixed orthodontics. Glass ionomer cements chemically bond to tooth structure, while resins bond micromechanically. The aim is always to use materials with optimal working time, with increased resistance to moisture and sufficient bond strength of brackets to teeth.

Aim: The objective of this study was to examine bond strength of brackets to enamel, with respect to the type of adhesive material and methods of enamel pretreatment.

Design: The experimental sample consisted of 80 extracted human first molars, with intact vestibular surface. The sample was divided into four groups with the same number of specimens, and the brackets were bonded with different materials, beside various enamel pretreatments: group A - GC Ortho LC (Ortho Conditioner); group B - GC Ortho LC (37% orthophosphoric acid etching); group C - Unitec Trans-bond Plus SEP, Trans-bond XT; group D - Unitec MIP, Trans-bond XT. Metal brackets were used (Discovery, Edgewise brackets, Dentaaurum, Germany). Bond strength of brackets to enamel and ARI index were measured.

Results: The highest bond strength was found in groups C and D, and a statistically significant difference ($P < 0.05$) was found in relation to group B. There was no difference in the results of ARI index.

Conclusions: Transbond XT adhesive systems showed better bond strength compared to GC Ortho LC. GC Ortho LC achieved better bond strength in case of enamel pretreatment with Ortho Conditioner (10% polyacrylic acid) in relation to 37% orthophosphoric acid.

PR06.26

Occlusal characteristics of primary dentition and the prevalence of malocclusion in preschool children

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Background: The identification and interception of dento-maxillary anomalies by simple orthodontic interventions leads to correcting anomalies or to ensuring a favourable prognosis.

Aim: Clinical evaluation of occlusal relations in a group of pre-school children with primary dentition and early diagnosis of dento-maxillary anomalies in order to initiate an interceptive orthodontic treatment.

Design: 372 children, aged 3–6 years, with primary dentition from Mureş County, were included in the study. Based on clinical and photographic examination, we identified the main parameters of development of the dental arches: terminal plane, sagittal relationships in canines, overbite, overjet, the presence or absence of scissor bite, crowding or spacing. We highlighted the percentage distribution of changes in occlusion and obtained correlation with aetiological factors, age and gender of the child.

Results: The ratio of children with terminal plan in a mesial step is 25% at the age of 3 years, 30% at 4 years, 44.5% at 5 years, and 63.3% at 6 years. Of all children aged 5, 26% had distalization relationships in the canines, 15% had overbite, and 19% had an overjet of >5 mm. Scissor bite was identified in 16% of boys and 14% of girls. In addition, 85% of children aged 4 had clinical signs of insufficient transverse development of the upper jaw.

Conclusions: The results highlight the importance of early orthodontic examinations in children and of monitoring risk groups to establish an optimal interceptive treatment.

PR06.27

Planas direct tracks for early anterior crossbite correction

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Introduction: The anterior crossbite is described when the anterior teeth are in reverse relation occlusion, involving a tooth, several teeth or all anterior teeth. Among the various possibilities of treatment of anterior crossbite is making Planas direct tracks, which is an apparatus made with light-cured composite resin in the vestibular of deciduous teeth and it is responsible for returning the patient to an occlusal harmony, uncrossing them artificially and restoring vertical dimension, because it stimulates the premaxilla to the vestibular development, and corrects the inclination of the upper incisors.

Case reports: An infant girl of two years old was seen in the extension project “Health Education in Maternal Child Area” of the Regional University of Blumenau. She was referred to routine dental care and clinical examination and it was found that she had anterior crossbite. In anamnesis the mother reported that the father and the eldest brother of the girl had full cross-bite. The treatment consisted of making Planas direct tracks on teeth 51 and 61. The girl is currently six years old and carries out regular monitoring in the pediatric dentistry clinic University.

Comments: The malocclusion when diagnosed early with the collaboration of the child, should have an intervention as soon as possible to obtain a good prognosis. The dentists should use the knowledge of occlusal neuro rehabilitation, preventive orthodontics, interceptive orthodontics and functional orthopedics, to have more chances of successful treatment.

PR06.28

Accuracy and reliability of tooth size and arch width measurements using conventional and three-dimensional digital models

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Background: Three-dimensional dental system offers many advantages, including elimination of storage problems and model breakage, instant retrieval of models. However, as with any new method, accuracy must be assessed by comparison with existing gold standard.

Aim: The aim of this study was to evaluate the accuracy of dental measurements taken with calipers on plaster dental casts and those from digital 3-dimensional models.

Design: Ten dental casts of primary dentitions were selected. Three-dimensional images were obtained with a surface laser scanner and analyzed by original software (DORA; Digital Process, Tokyo, Japan). Measurements, including mesiodistal widths of teeth, dental arch widths were made with a caliper directly on the dental casts and also digitally on the digital models. Dependent *t* tests were used to evaluate measurement accuracy on the digital models.

Results: Tooth-width values obtained from 3-dimensional digital models were greater than those obtained from the plaster dental casts. However, the differences never exceeded 0.36 mm and no statistically significant differences were found between the 2 methods. Dental arch width measurements on the digital models did not differ significantly from those on the plaster dental casts. Interexaminer reliability was consistent for both the plaster and the digital models.

Conclusions: Three-dimensional dental measurements are valid, reliable and reproducible method to obtain dental measurements for diagnostic and also research purposes.

PR06.29

Alternative preventive treatment for high-risk maxillary canines impaction

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Introduction: The maxillary canine it's fundamental for the facial esthetics and occlusion. It's very important the germ's early location so a preventive treatment can be performed. Traditional treatments include: serial extractions initiating with the temporary canines, eliminate interference, space maintainer, even the extraction of the permanent canine or surgical exposure when impaction is present.

Case reports: A Nine-year-old male patient with high-risk diagnosis of impaction of maxillary canines. The treatment of choice was the extraction of the first temporary molars, selective carving and functional orthopedic appliance class I. Afterwards, periodical appointments for an X-ray following to observe the germ's eruption and decrease of the angle created by the canine in relation to the middle line, until it's correct eruption. Unlike common treatments, in the present case keeping the temporary canine for maintaining a guide for the permanent canine was preferred over extracting it, and to use methods that promote the transversal development of maxillaries, mainly on the canine zone, and eruption guides that allow the eruption of the first premolar giving space for the relocation of the canine's eruption guide.

Comments: The early diagnosis of the canine's eruption guide is imperative to prevent impaction and thus a much more invasive treatment.

PR06.30

Long-term Space changes after premature loss of a primary maxillary first molar

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Background: Many factors may be involved in the consequences of premature extraction of primary maxillary teeth. It appears that many situations exist clinically, which seems to have different conclusions.

Aim: The aim of this study was to use established longitudinal data to investigate ongoing (81-month) dental-arch space problems arising as a result of premature loss of a primary maxillary first molar.

Design: Nine children (mean age at time of tooth extraction: 6.0 ± 0.74 years) with unilateral premature loss of a primary maxillary first molar were selected. Maxillary dental study casts were obtained from participants within 3 days after the tooth was removed, as well as at a follow-up appointment averaging 81 months later. The contralateral intact primary molar served as a control. Five reference lines were measured: arch width/length, intercanine width/length, and arch perimeter. A paired *t* test was used to compare the cast measurements.

Results: Eight out of nine cases (88.9%) showed no crowded permanent successors or canine block-out on the extraction site. A significantly greater arch width, arch length, and intercanine width were found after 81 months compared with the initial parameters. No significant differences were found in intercanine length and arch perimeter.

Conclusions: The 81-month space changes in the maxillary dental arch showed significantly increased arch dimension. It is suggested that there is no need for the use of space maintainers in cases of premature loss of a primary first molar around the time the permanent first molar is about to erupt or has erupted.

PR06.31

Comparative evaluation of OnyxCeph^{3tm} software and Demirjian method for estimating dental age of 6–13 year-old children

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Background: Dental maturation is the most common used parameter in estimating chronological age. Various methods are developed to estimate dental age. However, Demirjian method is distinguished due to its wide spread use and reliability.

Demirjian method, requests the evaluation of panoramic radiography of the first seven mandibular teeth on the left side for calcification, maturation, and apex closure stages. Maturity scores calculated of each teeth are summed to obtain the overall maturity score. Then, this score is converted to dental age using conversion tables.

Aim: OnyxCeph^{3tm} software is a cephalometric analyze software that calculates dental age according to Demirjian method. There are numbers of studies about Demirjian method. On the contrary, no or limited research is present on accuracy of dental age calculations by utilizing OnyxCeph^{3tm}. The purpose of this study is to compare dental age calculations done with the conventional Demirjian method and OnyxCeph^{3tm} and to determine the accuracy of the software.

Design: Panoramic radiographies of 100 healthy patients, aged between 6 and 13 were examined and were retrospectively evaluated. Dental ages of these children were calculated with both, Demirjian method and OnyxCeph^{3tm} software.

Results: Mean dental ages calculated with Demirjian method and OnyxCeph^{3tm} software are 9.57 ± 2.28 and 9.56 ± 2.26 respectively. The results are almost matching ($P = 0.128$).

Conclusion: The outcomes of the software are close to the outcomes of the conventional Demirjian analysis. So, it can be mentioned that OnyxCeph^{3tm} software is reliable as the conventional Demirjian method and can be employed as a replacement in dental age calculations.

PR06.32

Acute otitis media and the need for myringotomy tubes among paediatric cleft lip and palate patients

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Background: Cleft lip and palate is the most frequent congenital anomaly occurring in the craniofacial region. While acute otitis media is very common for small children, it is even more common in children with clefts.

Aim: The aim of this study was to investigate the association of cleft lip and palate patients and the development of middle ear diseases and need for myringotomy tubes.

Design: Patient records of 204 cleft patients treated in Oulu University Hospital, Finland during the period 1997–2014 were analysed. The analyses were carried out using cross-tabulation and Chi-square testing. Differences between the groups were considered statistically significant with *P* values <0.05.

Results: Almost four in five (79.4%) had excretory products in their middle ear. Purulent secretions referring to acute otitis media was detected in 27.9% of the all cleft lip/and palate patients. Mucous secretion referring to glue ear was detected in 92.1% of the cleft lip and palate patients, 73.8% of the cleft palate patients; and in 18.1% of the cleft lip patients. Almost all patients in the study group (88.3%) had had one or more myringotomy tubes placed during the follow-up period. There was a difference in the need of tubes according to the cleft type - all cleft lip and palate patients had had tubes placed (≥ 1); 95.7% of those with palatal involvement, but only 18.2% of cleft lip patients.

Conclusions: Among other problems cleft patients have frequent ear infections needed myringotomy tubes; especially the more severe clefts are associated with frequent infections.

PR06.33

To keep or not to keep the space following the premature loss of primary molars?

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Background: the premature loss of primary molars can disrupt the eruption of permanent teeth and cause malocclusions. It is common to place space maintainers (SM) to prevent these potential consequences. However, their indications vary according to the authors and no scientific evidence are available.

Aim: To reflect on the need for SM, by an assessment of the loss of space (LS) and its consequences (C) in patients, according to the clinical context.

Design: 430 files were collected. Those reporting one or more molar extractions were selected. Before the visit: the gender, birthday, extracted tooth/teeth, 1st permanent molar (1MP) position, diastema/crowding, Angle classification, time since the extractions were noted. At the consultation, the LS was measured and the C (presence of malocclusion) registered. Student and Anova tests, then logistic and linear regression were performed.

Result: 75 extracted teeth in 35 patients were included. The LS and C were more pronounced when the 1MP was in eruption and in cases of crowding, but not correlate with the initial occlusion. The LS and C remained constant after a few months. The LS was more frequent after the extraction of 2nd molar or 1st and 2nd molars, in particular at the mandible. The quantity of LS was not related to the arcade. The higher LS it was, the more there was C.

Conclusions: Following the premature loss of primary molars, the SM should be thoughtful and non-systematic. An orthodontic assessment is essential to adopt the suitable management: monitoring, SM placement, orthodontic treatment.

PR06.34

Prevalence of and relationship between malocclusion and orofacial dysfunction in children and adolescents - an epidemiological study

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Background: Although a close relationship between form and function is recognized, the degree of interplay remains a matter of conjecture.

Aim: This study aimed to determine the prevalence of and relationship between orofacial dysfunction and malocclusions.

Design: 1561 (aged 4–14 years) subjects were divided in four groups: Primary dentition (PRD, $n = 387$), Intermediate mixed dentition (IMD, $n = 387$), Late mixed dentition (LMD, $n = 402$) and Permanent dentition (PD, $n = 385$). The orofacial dysfunction was assessed using the Nordic orofacial test-screening (NOT-S). Malocclusion was assessed considering morphological occlusal characteristics and Dental Aesthetic Index (DAI). The sample was subdivided in malocclusion and no malocclusion groups. Statistical analysis constituted of descriptive analysis, chi-squared partition and independence tests, and Mann-Whitney and Kruskal-Wallis tests.

Results: Malocclusion prevalence was 64.9% in PRD, 83.2% in IMD, 80.4% in LMD and 90.7% in PD, being increased overjet the most common malocclusion found. Orofacial dysfunction prevalence was 86.6% in PRD, 88.1% in IMD, 91.3% in LMD and 89.6% in PD, being the presence of deleterious oral habits the most frequent one. Malocclusion groups of bilateral class II (in PRD), frontal open bite (in PRD and PD), unilateral class III and unilateral and bilateral posterior crossbite (in PD) presented significant more orofacial dysfunction compared to no malocclusion group.

Conclusions: The prevalence of malocclusion and orofacial dysfunction were high and it was detected a positive interrelation between higher impacts on orofacial dysfunction and the presence of malocclusion.

PR06.35

Alternative and simple technique for prosthodontic oral rehabilitation of patient with dystrophic epidermolysis bullosa: a clinical case report

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Introduction: Epidermolysis Bullosa is a rare genetic disease characterized by the formation of blisters and erosions on the skin and mucous membranes following minor traction or trauma. Oral manifestations of the disease include obliteration of the vestibule, ankyloglossia and microstomia.

Case reports: An 18-year-old girl diagnosed with Dystrophic Epidermolysis Bullosa at born, with social risk and geographically isolated, without dental care history; at 16-year-old was referred to the Special Care Clinic at University of Chile.

Due to severity of bucal pathology the first step was eradicate any infection focus with extractions of twelve residual root of permanent teeth. This consequent partial edentulous condition with just six remained maxillar teeth present a great challenge owing to the absence of vestibule, severe microstomia and extreme fragility of oral mucous.

Second step was design a transitional prosthesis made with vacuum forming plate system, tested and use it for six months without lesions.

Third step was progress treatment making an acrylic prosthesis with metal retainers, regularly controlled on time and discontinue it use at minimal appear of soft tissue injuries.

Patient has used it for the last 10 months with no damage at all, improving oral health, oral functions and self-esteem.

Comments: Oral rehabilitation, and in particular prosthetic rehabilitation is a challenge. This article describes a simple, effective and inexpensive removable prosthetic alternative for a partially edentulous patient with Recessive Dystrophic Epidermolysis Bullosa.

PR06.36

Early correction of Classe III malocclusion: a systematic review and case reports

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Aim: The purpose of this systematic review was to identify the appropriate timing for the correction of Class III malocclusion.

Design: We searched in the electronic databases Scopus and Medline. The selection criteria was: French and English language, children in the primary or mixed dentition with a confirmed skeletal Class III malocclusion.

Clinical trials, systematic reviews, meta-analysis, cohort studies, case-control studies, and cross-sectional studies were included, whereas literature reviews, case reports, case series, symposiums, compendiums, pilot studies, and expert opinions were excluded. Only articles in duplicate by two investigators was checked.

Results: A total of 143 articles were identified following electronic and hand searching and checking reference lists. Following examination of titles, abstracts and, where applicable full articles, 4 articles were included. Owing to the low levels of evidence.

Conclusion: This review has established evidence for the efficiency of Early correction of Class III malocclusion in children. High level studies are required before definitive conclusions can be made. Clinical cases will be presented to demonstrate the amelioration of esthetics and function.

PR06.37

Simultaneous correction of the posterior unilateral cross bite, anterior open bite and sucking digital habit using a modified hyrax breakerP. JARA¹ & H. ORREGO²¹Ministry of Health, Lima, Peru; ²Universidad Nacional Mayor de San Marcos, Lima, Peru

Introduction: The habits and alterations in the transversal plane, establish alterations in the orthodontic clinic with the indication of early treatment if they are not intercepted in the right moment and with efficacy, this will condition in the patients clinical situations more serious with no desirables functional and esthetic consequences. The cross bites with skeletal origin, the ones that indicate a transversal deficiency in the superior basal, are treated by the palatine disjunction procedure. The sucking digital habit has more relation to the open bite, gap between the anterior superior teeth, high and narrow palate, increased overjet and the presence of additional habits.

Case report: A 09-year-old girl with sucking digital habit, at the extra oral clinical examination revealed asymmetric with the jaw turned to the right, good labial seal, balanced facial thirds and straight profile. Intraoral examination revealed mixed dentition with malocclusion class I, unilateral posterior cross bite, anterior open bite and deviation of the lower dental midline. The addition of a circuit breaker was performed at grid welded so as not to interfere in the activation of the apparatus so was possible to make the cross correction. Applying this modification the problem of sucking habit is blocked and simultaneously open bite is corrected.

Comments: The modification of the Hyrax breaker presented in this article was able to give a simultaneous therapy blocking the sucking digital habit, correction of the anterior open bite and the elimination of the posterior cross bite.

PR06.38

Stages in third molar development and eruption to estimate 18-year thresholdM. Y. P. MOHD YUSOF^{1,2}, R. CAUWELS¹ & L. MARTENS¹¹Department of Pediatric Dentistry and Special Care, PAECOMEDIS Cluster, Ghent University, Ghent, Belgium;²Centre of Oral & Maxillofacial Diagnostics and Medicine Studies, Faculty of Dentistry, Universiti Teknologi MARA, Shah Alam, Malaysia

Background: Age 18 is considered as the age of majority by most countries. By using the same radiograph of the same individual, both third molar development (TMD) and eruption (TME) staging scores can be obtained to reach certain age of interest.

Aim: To assess the chronological course of third molars development and eruption in a Malay sub-adult population and evaluate the prediction when specific stage(s) of TMD and TME has been attained pertinent to the age group of interest (18 years).

Design: A sample of 705 digital panoramic radiographs of Malay sub-adults aged between 14.1 and 23.8 years was collected. The techniques described by Gleiser and Hunt (modified by Kohler) and Olze were employed to stage the TMD and TME, respectively. A binary logistic regression was performed to predict the 18-year threshold with staging score as predictors.

Results: Stages 7–10 (TMD) and C-D (TME) in males and stages 5–10 (TMD) and B-D (TME) in females were found to be correlated in discriminating 18-year-and-more group. In both genders, the stages 9–10 (TMD) and D (TME) are accountable to be used as reference stages to estimate whether the subject is likely to be equal or above age 18, with 94.74–100% and 85.88–96.38% of correct predictions, respectively. Stage 4 (TMD) and A (TME)

can also be used to identify children (<18-year) with high degree of correct prediction, 100%.

Conclusions: The 18-year threshold is easily identified by attaining specific staging scores of both third molar variables (TMD and TME) without complex calculations.

PR06.39

Early treatment of anterior crossbite in children under 3 years: clinical casesG. REDONDO SANTIAGO¹, R. MAYNÉ ACIEN^{1,2}, S. YUSTE^{1,3} & J. MARISTANY I VILANOVA¹¹Dr. Maristany Private Practice, Barcelona, Spain; ²Universidad de Barcelona, Barcelona, Spain; ³Universidad internacional de Catalunya, Barcelona, Spain

Introduction: Anterior crossbite in primary dentition causes adverse growth on the mandible and premaxilla and an altered function of the masticatory pattern. If this situation is not solved as soon as possible the anteroposterior relationship between the mandible and maxilla becomes worse and it will make the child a candidate for more invasive treatments and prolonged orthodontics.

The lack of cooperation of children as well as the lack of the clinician's skill to treat infants, is a problem that delays early treatment.

Case reports: Three infants between 21 and 30 months with anterior crossbite are presented.

Anterior composite strip-crowns in the central and lateral incisors were used in order to correct the anterior crossbite. The corrected axial inclination of the composite crowns created a temporary occlusal interference which guided the mandible to adopt a new posterior position.

In the 2-month follow-up visit the anterior crossbite was corrected in all three patients.

Comments: Early treatment of the anterior crossbite provides clear benefits for patients. Correcting advanced mandibular position and providing stimulus to premaxilla for growth. Masticatory function is rehabilitated.

In all cases the correction of crossbite was very quick and parents could see visible changes in the mandibular position and masticatory efficiency, also improving the aesthetics of the patient.

The pediatric dentist has the advantage of seeing children from babies and be the first to diagnose this type of bite. It is also the ideal professional for correction, used to treat very young patients and have the confidence of parents.

PR06.40

A longitudinal radiographic study of tooth eruption

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Background: The time taken between eruption levels is not well documented.

Aim: The aim of this study was to investigate tooth eruption from archived longitudinal panoramic radiographs.

Design: This was a retrospective study of panoramic radiographs taken in the course of diagnosis and treatment. The sample was 426 individuals from London and 12 from Japan aged 4.44 to 14.92 years. Selection criteria were two or more radiographs with erupting permanent mandibular teeth. Left first (M1) and second (M2) mandibular molars were scored for eruption level (cusp tips at the alveolar bone level (AE) or partially erupted (PE) halfway to the occlusal level). The mean time between AE and PE for M1 and M2 was calculated and compared using a *t*-test.

Results: The time interval between radiographs ranged from 0.19 to 8.60 years. Five individuals were observed with M1 first at

alveolar eruption and secondly at partial eruption and 18 with M2 at these eruption levels. The mean time between AE and PE for M1 was 1.08 year (standard deviation 0.58, range 0.50–2.03 years) and slightly longer for M2 at 1.23 year (standard deviation 0.67, range 0.22–2.96 years) and these were not statistically significant ($P > 0.05$).

Conclusions: Time between eruption levels in M1 and M2 showed considerable variation in speed of eruption.

PR06.41

Defining normal eruption in terms of root stage

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Background: Delayed eruption is usually expressed in terms of age but little is documented in terms of root formation stage.

Aim: The aim of this study was to describe root stage of mandibular teeth at alveolar eruption and partial eruption levels.

Design: Root stage of mandibular teeth with cusp tips at the alveolar level (AE) and partially erupted (cusp tips half way to the occlusal level PE) were assessed. Deciduous tooth eruption

was assessed from 225 juvenile skeletal remains from the Natural History Museum, London. Permanent tooth eruption was assessed from 3208 archived panoramic radiographs from dental patients aged 2–25.

Results: The modal tooth stage for most teeth at alveolar eruption was R1/4 and at partial eruption was R1/2 although there was some variation of root stage particularly for later erupting teeth. The modal root stage for the deciduous teeth and permanent central incisor, first and second molars at alveolar eruption was R1/4. The permanent lateral incisor, canine, premolars and third molars reached eruption levels with relatively more root formed. By root half, most central incisors, first and second molars had reached alveolar eruption. Most other mandibular teeth reached alveolar eruption when root equalled three quarters length, although some third molars only reached AE at root complete. This suggests that mandibular teeth that have failed to reach alveolar eruption at these root stages could be considered to be delayed.

Conclusion: Root stage when cusp tips reach the alveolar bone level can be used to predict abnormal eruption.

Periodontology and Microbiology Poster Session – PR07

PR07.01

Aggressive periodontitis in a 5-year old child without any systemic diseases

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Introduction: Aggressive periodontitis comprises a group of rare, often severe, rapidly progressive forms of periodontitis often characterized by an early age of clinical manifestation and a distinctive tendency for cases to aggregate in families. Cases affecting the primary dentition that leads to tooth exfoliation early in life are usually interpreted as periodontal manifestations of systemic (hematologic) diseases, such as leukocyte adhesion deficiency. We describe a child with features of aggressive periodontitis that wasn't associated with any other systemic disease.

Case reports: A 5-year-old girl presented to dental school of Tabriz University of medical science. Clinical signs was intense gingival inflammation, Bone resorption, attachment loss, extreme mobility of some of the primary teeth. Periodontal probing depth ranging from 3 to 8 mm. Furcation involvement was seen in mandibular left first molar. Mobility grade II was seen in mandibular incisors and first molars also maxillary incisors. Patient was referred to a specialist. Laboratory tests was performed. No symptoms of systemic disease was found. Sampling and PCR was performed. Presence of highly leukotoxic strains of *A. actinomycetemcomitans* was shown. Loose and painful teeth was extracted. Metronidazole in combination with amoxicillin was used as a treatment. After 2 year follow up there was no signs of Aggressive periodontitis in permanent teeth.

Comments: In this case the patient has no systemic disease, but some cases affecting the primary dentition and leading to tooth exfoliation early in life are usually interpreted as periodontal manifestations of systemic diseases. So we must rule out systemic diseases.

PR07.02

Early loss of primary teeth as the presenting feature of hypophosphatasia

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Introduction: Hypophosphatasia is a disorder of mineralisation affecting the teeth and bones characterized by low levels of tissue non-specific alkaline phosphatase. There are six reported types which present with early exfoliation of primary teeth as a result of defective cementum. Odontohypophosphatasia describes such cases where there is isolated dental involvement.

Case report: A two year old girl was referred by her general dental practitioner to the department of paediatric dentistry following the premature exfoliation of 71 and 81 at approximately 12 months of age. Her parents described increased mobility rapidly followed by exfoliation without root resorption.

Medical history was significant for three hospital admissions with unexplained metabolic acidosis. Following these episodes she was reviewed by a paediatric metabolic consultant and discharged following normal investigations.

There was no known family history of early tooth loss or periodontal disease.

Examination revealed a full primary dentition with the exception of 71 and 81. 51 and 61 were mobile. There was no gingival inflammation and oral hygiene was good.

Haematological investigations requested demonstrated reduced serum alkaline phosphatase. Following referral to the paediatric endocrinologist, further haematological, urinary, radiological and genetic testing confirmed a diagnosis of odontohypophosphatasia. Other features of odontohypophosphatasia include reduced alveolar bone height, enlarged pulp chambers and root canals.

Comments: Early exfoliation or abnormally loose teeth may be the first or only presenting feature of hypophosphatasia. Hence the paediatric dentist plays a vital role in the identification of this disease.

PR07.03

Comparison of Streptococcus mutans in saliva before and after dental caries filling with resin-based composite

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Background: It has been proved that dental caries is a bacterial infectious disease. *Streptococcus mutans* (*S.mutans*) is one of the most important cariogenic bacteria in oral cavity. With the development of oral microbiology, there is increasing interest in comprehensive approaches to managing caries over the conventional surgical approaches.

Aim: This study was undertaken to evaluate the level of *S.mutans* in saliva before and after dental caries filling with resin-based composite without fluoride.

Design: In sum, 20 volunteers (19–25 year old; mean 22.3 ± 1.43 year) were enrolled in this study, all caries were removed and filled with resin-based composite without fluoride. Non-stimulated saliva samples were collected before and 1, 2, 3, 4 weeks after filling. 100 μ L saliva sample was transferred, plated on mitis salivarius with bacitracin agar (MSB) and incubated anaerobically at 37°C for 48 h. Treatments were carried out by specialist pediatric dentists.

Results: The *S.mutans* level in saliva sample one week after filling decreased apparently while compared to the level before filling ($P < 0.05$). However, the level of *S.mutans* in saliva sample two, three and four weeks after filling had no significant differences ($P > 0.05$).

Conclusion: Caries removal and resin-based composite filling could reduce the level of *S.mutans* in saliva during a certain period of time. However, the level of *S.mutans* in saliva would gradually regained to the status before treatment as time went by. Sole filling of dental caries can not change the level of *S.mutans* in saliva, which is highly stable after colonization in oral cavity.

PR07.04

Oral microbiome analysis in children with colored dental biofilms

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Background: Mature dental biofilms usually show yellow or yellowish-brown in adults. Also in children, colored biofilms are occasionally observed but children with colored biofilms do not always have poor oral hygiene or dental status. There's little knowledge about differences of bacterial composition between white and colored biofilms in children.

Aim: We tried to compare the bacterial composition of colored and white biofilms in children.

Design: Colored and white biofilms were collected from 38 children participated in this study. As a control group, white biofilms were also collected from children without colored biofilms. Cariogenic and periodontopathic pathogens were detected by PCR and real-time PCR. Microbiome analysis by 16S rRNA sequencing was also performed.

Results: By PCR and real-time PCR, *S. mutans* was most frequently detected among 11 bacterial species, followed by *S. sanguinis*. Although colored biofilms contained slightly more species than white ones, there were no significant differences. Children who had decayed or filled teeth had significantly abundant species than those who were free from dental caries. Bacterial compositions had much variety among biofilms from children with many caries experiences.

Conclusion: In children, there is no significant difference of the number of detected bacteria between colored and white biofilms. It was supposed that colored biofilms did neither have abundant bacteria nor show their maturity, compared to white biofilms. As well as matured biofilms in adults, colored biofilms from children with caries experience might contain complicated microbiome including periodontopathic pathogens and these children might need long-term and careful oral check-up throughout life.

PR07.05

Potential role of MMP-13, MMP-12 and ameloblastin in a new type of gingival fibromatosis

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Background: The biochemical events involved in idiopathic gingival fibromatosis (IGF), also known as gingival hyperplasia and gingival overgrowth, are not well understood and the mRNA expression in IGF has not been assessed.

Aim: The aim of this study was to compare the gene-expression profiles between a new type of IGF and normal gingiva in order to clarify the nature of the gingival overgrowth mechanism and related gene expressions that might be responsible for dental anomaly.

Design: Gingival tissue was collected from an IGF patient and from nine healthy subjects. Gene-expression profiles were compared between normal and IGF gingiva using cDNA microarray analysis and quantitative real-time reverse transcription-polymerase chain reaction (RT-PCR). Histological analysis was carried out on hematoxylin-eosin and immunohistochemical (IHC) staining.

Results: Microarray analysis revealed that genes related to the regulation of cell proliferation, and resistance to proteolytic degradation were expressed more strongly in IGF. Especially, the expressions of *MMP-13* and *MMP-12* were lower in IGF, and

the difference was 119.55 times and 96.45 times, respectively. The expressions of AMBN associated with amelogenesis imperfect were markedly higher in IGF and the difference was 79.32 times. The results of RT-PCR and IHC staining supported well with those of microarray analysis.

Conclusions: Reduced proteolytic activity by the low expression of *MMP-13* and *MMP-12* appeared to be a potential mechanism to gingival overgrowth. Genetic investigations such as expression level of *MMP-13*, *MMP-12* and AMBN may clarify the defect behind this new syndrome characterized by gingival enlargement with abnormal root development.

PR07.06

Generalised aggressive periodontitis in the primary dentition: a case report

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Introduction: Generalized aggressive periodontitis (GAP) in pre-schoolers is an exceptionally rare disease in primary dentition. The cause of this disease is not completely understood but seems to be associated with a peculiar subgingival microbiota or a manifestation of a systemic disease. This report describes a 4-year follow-up case of GAP in a 5-year-old girl with lead intoxication.

Case reports: A 5-year-old Chinese girl, without sibling, was referred to the hospital due to early loss of incisors, gingivitis, tooth mobility in her primary dentition and frequent occurrences of oral ulcer. Intraoral examination revealed GAP involving the entire primary dentition. Dental plaque samples from the tooth surfaces, gingival sulcus, and mucosa were collected. *F. nucleatum*, *P. intermedia* and *P. gingivalis* were identified as the dominant bacteria through the PCR-DGGE and Sanger's sequence. Systemic examination revealed the content of lead in blood (Pb) reached up to 603 µg/L. No obvious abnormality was detected from her parents. Comprehensive treatment plan were developed, including systemic and oral treatment. The oral treatment plans consisted of the extraction of the severely affected primary teeth, periodontal scaling, caries prevention, dental home, occlusive guidance and follow-up care. After a 4-year follow-up, the patient's periodontal status remains stabilized, facilitating the eruption of permanent teeth.

Comments: Even the etiology of the lead intoxication in this case was still unknown. This case report demonstrated prompt diagnosis and comprehensive treatment regimen may provide an effective therapeutic management of GAP.

PR07.07

Effect of ozone on bacteria related to early childhood caries

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Background: Currently, there are few studies proposing the use of ozone gas in pediatric dentistry.

Aim: Investigate the action of ozone on *S. mutans* (SM), *Lactobacillus* (LB), and *E. faecalis* (EF).

Design: Three ozone generator were tested: G1-HealOzone X4[®]; G2-OL8A; G3-OL80W. G1 was only tested in SM suspended in liquid. A microtiter plate was used to receive 10 µL of 10⁶ CFU/mL of SM treated with O₃ (2.100 ppm/1-4 min). Then, bacteria were again re-suspended and incubated at 37°C. After 18 h, the optical densities were determined. For G2 and G3, bacteria's

dilutions ranging of 10^8 – 10^0 CFU/mL were performed. A drop of 10 μ L of each concentration of bacteria was applied on the surface of sheep blood agar plates and treated with O₃ (2, 20, 200 and 2000 ppm/4 min). The plates were incubated at 37°C. After 18 h, recovery analysis of colony formatting units verify the reduction of bacterial activity using positive control (no treatment) as the standard plate.

Results: Data were submitted to Wilcoxon ($P < 0.05$), ANOVA and Tukey's test ($P < 0.05$). The optical density ($\lambda 610$ nm) of G1 showed no statistical difference ($P = 0.53$). G2 e G3 showed death $>3\log_{10}$ (99.9%) for all bacteria in one application of ozone ≥ 20 ppm.

Conclusion: G1 showed no efficiency in the death of SM, and G2 and G3 showed effective in controlling the bacterial growth of SM, LB and EF.

PR07.08

Acute necrotizing ulcerative gingivitis in primary denture: a proposal of treatment

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Introduction: Acute Necrotizing ulcerative gingivitis (ANUG) is a gum disease characterized by the involvement of the interproximal papillae and the presence of a pseudomembranous necrotic covering of the marginal tissues. This infectious disease is rare among preschool, healthy children. There should be no difficulty in the diagnosis of ANUG, however, the treatment of very young children is often a challenge for the dental practitioner. This presentation aims to describe a treatment fit for preschool children, through the description of two cases.

Case reports: Two 3 years old children, were referred for management of a gum disease by their physicians. The oral examination shows a painful, bleeding gingival tissue, fetid odor and pseudomembranous necrotic cover. Those patients do not present any related general disorder.

Due to the difficulty to use mouth rinses on young children, the management include local treatment by parent's patients, use of antibiotics and professional cleaning of the teeth. After ten days, this procedure produced a dramatic recovery from the infection, and the patients are monitored for several month.

Comments: This presentation aims to propose a simple, policies based treatment (AAPD guidelines; HAS guidelines) of acute necrotizing ulcerative gingivitis on primary denture. Due to the young age of patients, the procedure should be adapted, and the parents should be involved in the treatment. Further investigation is required to determine if it is adaptable to other age conditions, and to validate the better product to use.

PR07.09

Agreement of two molecular methods for the oral anaerobes detection in children

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Background: Anaerobic bacteria constitute a significant part of the indigenous oral microflora. However, results obtained with various methods differed between each other.

Aim: The aim of this study was to compare the frequency of the occurrence of oral pathogens in plaque detected by two different PCR methods and assess the degree of their mutual agreement.

Methods: Twenty-five preschool children (mean age 4.06 years, SD 1.39) were involved into this study. Dental plaque samples were taken from the periodontal region both in localities with and without gingival inflammation. These samples were assessed by the StomaGene[®] (Protean s.r.o. Czech Republic) and ParoCheck[®] 20 (Greiner bio-one GmbH, Germany) systems. The differences in the detection of individual periodontal bacteria between inflammatory and healthy sampling sites were tested by the Pearson's chi square test. The agreement between results detected by both PCR methods was tested by kappa statistics.

Results: *P. gingivalis* was revealed only by the StomaGene[®] system. Both methods detected the presence of other bacteria at least in the inflammatory areas. The agreement between StomaGene[®] and ParoCheck[®] 20 methods was substantial for *A.a.* and *F.n.* in the samples taken from the inflamed localities. In the clinically healthy sites the agreement between both methods was substantial only for *F.n.*

Conclusions: The results of our study imply that the PCR-based techniques using similar but not identical primers bring, at least in some bacterial species, congruent results.

PR07.10

The metagenome analysis of salivary microflora in Japanese children with early childhood caries

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Background: Recently oral flora was well analyzed by using 16S rRNA gene probe. However, the metagenome sequencing analysis has not yet been employed in children with early childhood caries.

Aims: The purpose of this study was to investigate oral bacterial flora of children with early childhood caries.

Design: The whole saliva samples were recovered from three caries affected children (age range 2–5 years old) and three caries non affected children (age range 3–4 years old). Bacterial DNA was extracted and the 16S rRNA gene fragments were amplified by PCR using 16S rRNA gene universal primers. The amplicons were sequenced by Roche 454 GS FLX+ next-generation sequencer. The obtained data were analyzed by BLAST search and were classified in every genus.

Results: About lactic acid bacteria, genus *Lactococcus* was detected from a caries non affected child. However, other lactic acid bacteria such as the genus *Enterococcus*, *Lactobacillus*, *Bifidobacterium* and *Pediococcus* were not detected. The average detection ratio of the genus *Streptococcus* in caries affected children was higher than in caries non affected children. On the other hand, the average detection ratios of the genus *Porphyromonas*, *Prevotella*, *Neisseria*, *Veillonella*, *Rothia*, and *Lautropia* in caries non affected children were higher than in caries affected children.

Conclusion: In the microorganism community analysis, the composition of salivary bacterial flora in caries active children would differ from that of caries free children.

PR07.11

A case of advanced periodontitis with palmo-plantar keratoderma and its 3-year comprehensive management

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Introduction: Periodontitis with Palmo-plantar keratoderma is a rare autosomal recessive condition. More than 300 cases have

been reported worldwide. The skin lesions are usually found when the patients are <3 years. The uncontrollable periodontal destruction leads to the premature loss of both dentitions and reduces the quality of life. The functional failure of the cathepsin C gene might contribute to the clinical manifestation of the disorder.

Case reports: A 7-year-old male, mentally and physically normal, complained of toothache upon mastication. White and pinkish plaques on palms and soles were prominent with a few scatter lesions on the knees and elbows. No superimposed infection was found on the defective skin. Finger and toe nails were normal.

Premature loss of all primary teeth, loose erupted permanent molars, lower incisors with deep pockets and edematous gingivae, traces of calculus and debris on the lingual and labial surfaces of the lower incisors were found. Panoramic radiograph revealed alveolar bone loss close to the root apices of the molars and lower central incisors. No intracranial calcification was found. Blood tests differential and serum alkaline phosphatase were within normal range.

Positive family history and consanguineous marriage was denied. Non-surgical periodontal scaling and root planing, plus two-week antibiotic application and three-year traditional medication were given to the patient; all the erupted permanent teeth function normally except for the upper second bicuspid malocclusion.

Comments: Even advanced periodontitis with Palmo-plantar keratoderma is difficult to cure, chances of saving those affected teeth are high given active management timely.

PR07.12

Antibacterial effect of ozone water on periodontopathogens *in vitro*

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Background: Bacteria are recognized as key etiologic factors in periodontal diseases. Controlling periodontopathogens is a prerequisite for successful treatment of periodontal diseases. Ozone, as a quickly, effectively and broad spectrum antibacterial agent, has been widely used in the medical field. However, its antibacterial activity on periodontal pathogens has not yet been elucidated.

Aim: To investigate the effect of ozone water on four major periodontal pathogens and detect the effective concentration.

Design: Four standard periodontal pathogens strains were chosen, including *Porphyromonas gingivalis* (*P.g.*), *Fusobacterium nucleatum* (*F.n.*), *Porphyromonas intermedia* (*P.i.*) and *Actinomyces viscosus* (*A.v.*). Three concentrations (1.02 ppm, 2.03 ppm and 3.88 ppm) of ozone water were used, pure water without ozone as negative control, and 3% H₂O₂ as positive control. All groups were treated with 60s. Quantitative suspension method was used to count the colony of periodontal pathogens.

Results: All three concentrations of ozone water groups have a less colony counts of *P.g.*, *P.i.*, *F.n.*, *A.v.* than negative control ($P < 0.01$). 1.02 ppm ozone water group on *P.i.* was no significant difference compared with 3% H₂O₂ group, and 2.03 ppm ozone water group on *P.g.* and *P.i.* was also no significant difference compared with 3% H₂O₂ group. Otherwise, the colony counts of 3.88 ppm ozone water on four periodontal pathogens were comparable with those in 3% H₂O₂ group.

Conclusion: Ozone water has an antibacterial effect on the major periodontal pathogens, and it appears to be an alternative antibacterial agent of treating periodontal disease. 3.88 ppm is the effective concentration.

PR07.13

Evaluation of effects of four combinations of root canal irrigants on microflora in the infected root canals of primary teeth: an *in vivo* study

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Background: Successful root canal treatment partly depends on thorough root canal irrigation. There is few reports about irrigants used in infected primary root canals treatments.

Aim: Evaluate four combinations of root canal irrigants group used in canal treatment of infected primary root canal treatment, in order to provide a scientific basis for clinical doctors to choose the appropriate irrigants.

Design: 25 infected primary teeth were chosen as subjects and randomly divided into 5 groups: A 1% NaOCl +17% EDTA; B 1% NaOCl +6% CA; C 1% CHX +17% EDTA; D 1% CHX +6% CA; E 0.9% NaCl. Root canal fluid and infected dentin were collected before and after root canal irrigation. RT-PCR was applied to determine total number of bacterial cells, quantities and proportions of *Porphyromonas gingivalis* before and after root canal treatment.

Results: The quantities of total bacteria and *Porphyromonas gingivalis* were significant lower than used before ($P < 0.05$) irrigant in all groups. The total bacteria and *Porphyromonas gingivalis* reduction(%) in the five group in descending order was B > D, A > C > E and A = B = C = D > E.

Proportions of *Porphyromonas gingivalis* showed increasing trend in group A, C, D, E ($P < 0.05$) after the irrigation, while no obvious change in group B ($P > 0.05$).

Conclusions: The ability of removing the total bacteria and *Porphyromonas gingivalis* in 1% NaOCl + 6% CA group was the best in this study, which can be used as a recommended combination in the endodontic therapy of the infected primary teeth.

PR07.14

Analysis of effectiveness of triterpenoid compounds for prevention of dental caries

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Background: Oleanolic acid (OA) and ursolic acid (UA) are triterpenoid compounds. They have many beneficial effects, such as reducing inflammation and inhibiting tumor growth. It was also reported that they inhibit GTF for *Streptococcus mutans*, which is the principal causative agent of dental caries.

Aim: Our aim of this study is to investigate the effect of OA and UA on cariogenic microorganisms with revealing related gene control mechanism.

Design: We selected 3 different *S. mutans* strains which are UA 159, MT8148R and NCH105. At first, 3 strains were checked the minimum inhibitory concentration (MIC) which was determined using a microtitre plate dilution assay. Second, the effect of OA and UA on the biofilm formation of strains was evaluated using the biofilm assay by Loo et al. At last, RNA expression levels of some target genes with MIC of OA or UA were evaluated using real-time PCR.

Results: The MIC of OA and UA against 3 strains was 6.25 and 3.13 µg/mL. Biofilm formations were inhibited with the similar concentration as MIC. RNA expression levels of *gtfs* and *enolase* were observed change of two or more times compared with control.

Conclusion: It was shown that OA and UA inhibited growth and biofilm formation of *S. mutans* by changing expression levels of related several genes. It is possibility that OA and UA contribute as antibacterial agents for prevention of dental caries.

PR07.15

Role of glucan-binding domain of GbpC in biofilm formation by *Streptococcus mutans*

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Background: *Streptococcus mutans* implicated as a primary causative agent of dental caries in humans, produces multiple glucan-binding proteins (Gbps), which presumably promote formation of biofilm on tooth surfaces. In our previous study, we identified the sequence DPTKTIF, located in the middle of the *gbpC* gene encoding GbpC, as the glucan binding domain.

Aim: In this study, we examined the role of the DPTKTIF domain of GbpC in *S. mutans*.

Design: Rabbit anti-DPTKTIF serum (anti-serum) was generated using a commercially available peptide of the DPTKTIF sequence. To examine biofilm formation by *S. mutans* MT8148, staining with SYTO[®] 9 green was performed, then absorbance of the 600 nm was adjusted to 0.1 with chemically defined medium including 1% sucrose. The resulting bacterial solution was mixed with dextran labeled with Alexa Fluor[®] 647 in the presence or in the absence of anti-serum, then inoculated onto chamber slides and grown under an anaerobic condition at 37°C for 24 h. Formed biofilms were observed using a confocal scanning laser microscope.

Results: Confocal microscopic observations revealed that the thickness of biofilm in the presence of the anti-serum was significantly lower than that in its absence. Furthermore, the quantity of glucan bound to bacterial cells in the presence of the anti-serum was significantly lower than that in its absence.

Conclusions: Our results suggest that the DPTKTIF domain of GbpC may be a crucial factor for biofilm formation by *S. mutans*, while anti-serum against that sequence may be effective for inhibiting biofilm formation.

PR07.16

Assessment of gingival thickness in children

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Background: The gingival biotype (gingival width and thickness) is genetically determined, but changes over time, especially during growth. Its regular assessment is important to establish preventive measures, in case of unfavorable biotype. The gingival width is easy to quantify, but its thickness is more difficult. In adults, the probe visibility through the marginal gingiva was considered as a reliable criterion to describe a thin gingiva. However, probing may be difficult in children.

Aim: To test the clinical relevance of the whitening of the attached gingiva with labial traction in coronal direction and the visibility of the gingival blood supply to evaluate gingival thickness.

Design: In 69 children and adolescents, gingival thickness of primary and/or permanent central incisors and lateral incisors, first primary molars and/or first premolars was assessed with three tests: the probe visibility through the marginal gingiva, the whitening of the attached gingiva with labial traction, the gingival blood supply visibility. The odds ratio between the two latter tests and probing were calculated to determine their correlation, their sensitivity and specificity.

Results: To view the probe through the gum were 3.05 times more likely when the gingiva whitens and 5.98 in case of gingival blood supply visibility. These two tests provided a reliable assessment (specificity respectively 84 and 96%), but a poor screening test (sensitivity 37 and 19%) of gingival thickness.

Conclusions: Whitening of the attached gingiva with labial traction or gingival blood supply visibility may be useful when clinical examination is limited or to confirm/reverse the probe visibility.

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PR08-1.01

Patient-reported outcomes for pre-formed metal crowns: a dental therapist-led audit

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Background: Preformed metal crowns (PMCs) are part of a dental therapist's normal scope of practice and have become increasingly popular since the introduction of the non-invasive Hall Technique.

Aim: To assess patient-reported outcomes for PMCs placed by a dental therapist in a hospital setting.

Methods: This was part of an on-going prospective study (2009-present). All children who had received a PMC for a carious primary molar were reviewed at 3–6 monthly recall intervals by a dental therapist.

Results: Data were obtained for 452 PMCs provided for 173 children, whose mean age was 7.5 years (range = 2–12 years). Each child received an average of 3 crowns (range = 1–8). 74% of PMCs were placed on teeth with caries extending less than half way through the dentine. The majority of PMCs (98.2%) were placed using the Hall Technique, and very few (1.8%) had involved conventional tooth preparation. Only 256 PMCs had a follow-up period of ≥6 months or greater (mean = 14 months; range = 7–73 months) and of these, no patient complaint was reported for 95.3% ($n = 244$) of crowns. For the few children who did say that their PMC was problematic: 1.6% complained of jaw pain; 2.3% complained of difficulty eating; 2.7% said they had toothache, and 0.8% said they had a gum swelling/bleeding.

Conclusions: These findings support the growing evidence-base for the use of PMCs, using the Hall Technique, as they appear to cause few problems for young children. Therapists clearly have a role in achieving these high quality outcomes.

PR08-1.02

Short-term outcome of endodontically treated permanent teeth in a paediatric population

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Background: In contrast to adults, data regarding outcomes of orthograde endodontics performed on children is sparse. That available focuses on outcomes of trauma, but to date no studies specifically examine endodontic quality and associated clinical outcomes.

Aim: To investigate endodontic quality and short-term clinical outcomes of permanent teeth in a paediatric subpopulation.

Design: Radiographs and records of patients undergoing endodontic treatment or review between Sept 2013 and July 2014 at a UK dental hospital's paediatric department, were analysed retrospectively. Apical status, technical quality and clinical outcomes were graded using the periapical index (Orstavik, 1986) and the European Society of Endodontology (ESE) Guidelines.

Results: Sixty-four cases were examined with a median follow-up of 7 months (range 2–36). Mean age at treatment was 13.8 years (range 8–18). Non-vitality predominantly resulted from trauma (93.75%). Survival at most recent follow-up was 100%. Outcomes, using ESE guidelines, were predominately 'successful' (40.6%) or 'uncertain' (46.9%), with 12.5% classified as 'failure'. Of the 'uncertain', 66.7% were asymptomatic and demonstrated radiographic healing, giving a short-term success rate of 71.9%. 57.8% of treatments were technically satisfactory; common issues included obturation voids (25.0%) and incorrect length (10.9% extruded, 4.7% >2 mm short). No significant difference was found between technical quality and outcome, but apexification method (MTA) and lesion size (<5 mm) increased likelihood of success ($P < 0.05$).

Conclusions: Short-term outcomes of endodontic treatment in paediatric patients appear positive. However, results suggest that apexification method and lesion size may influence healing. Further research is required to assess long-term prognosis in this subpopulation.

PR08-1.03

Partial pulpotomy of two carious primary molars using bioactive tricalcium silicates as a pulp dressing material. A Case report

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Introduction: The classical approach for pulp therapy in primary molars has been paradoxical in the past decade due to the carcinogenic potential exhibited by formocresol. In this case report its clearly shown that the use of bio-active materials as pulp capping agents not only could help in the preserving the pulp vitality but also can conserve the tooth structure in primary molars.

Case report: This report introduces an innovative technique in which Bioactive Tricalcium silicates (Biodentine™) are used in cariously exposed primary molars as a pulp dressing material. The teeth were selected according to a settled criterion. Caries removal was performed with the implementation of moisture control procedures. Pulp exposure was widened to perform slight pulpal amputation to ensure the removal of the superficially inflamed tissues. Bioactive tricalcium silicate was applied. Two days later final resin restorations were utilized as an enamel substitute above Biodentine™.

The primary molars have been followed up for a total period of 18 months using periapical radiographs. Neither evidence of pulpal necrosis nor periapical pathosis has been detected.

Comments: In the near future, this technique could replace the use of formocresol and complete coronal pulp amputation in primary molars. Therefore, direct resin restorations can be used instead of nickel chromium crowns to restore the function in addition to the valuable esthetics which is nowadays in growing demand.

PR08-1.04**Evaluation of the mechanical properties of a newer universal flowable composite for applications in pediatric restorative dentistry**

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Background: The choice of material in pediatric restorative dentistry should not be merely based on technical considerations but other factors such as age, cooperation of child and durability of material are equally important in choice of material.

Aim: Invitro evaluation of flexural strength and wear resistance of a universal flowable composite for applications in pediatric restorative dentistry.

— To evaluate the flexural strength and wear resistance of two flowable composites - G-aenial universal flo(GC- Corp.),Tetric-N-flow(Ivoclar Vivadent) and resin modified glass ionomer cement- GC fuji II LC(GC-Corp).

— To compare the flexural strength & wear resistance of these flowable composites and — GC fuji II LC.

Design: FOR WEAR RESISTANCE-30 specimens were prepared using customized mould. 2 body wear test is performed by wear testing machine.

FOR FLEXURAL STRENGTH- 30 specimens were prepared using customized mould.. This test is conducted as per ASTM D 790 standard and is performed in 3 point bending test device.

Result: By using ANOVA test and Tukey's test, the mean flexural strength of G aenial was found to be highest followed by Tetric N flow and RMGIC. Final weights between G aenial and GC fuji II LC is nonsignificant. Moreover there is no significant difference in weight loss of tetric n flow group.

Conclusion: Flexural strength of G-aenial universal flow is highest, followed by Tetric N Flow and GC fuji II LC.Wear resistance of Tetric N flow was highest, and there was no significant difference between GC fuji II LC and G-aenial universal flow groups.

PR08-1.05**Bleaching of traumatized discolored anterior tooth using walking bleach technique**

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Introduction: Discolored anterior teeth are often perceived as an esthetic deformation. Discoloration of endodontically treated teeth after trauma originates from intrinsic discoloration of the pulp chamber. Hemorrhage, calcification of the pulp and endodontic filling materials are the most common causes of internal discoloration following trauma.

Case report: A 17 years old male patient was referred to the Dentistry Faculty of Near East University with a complaint of a discolored upper front tooth. According to patient's history, he had a bicycle fall seven years ago. Clinical examination of the teeth revealed severe discoloration in tooth 21. It was non-sensitive to percussion and palpation tests. The radiographic examination showed a complete root canal treatment without periapical pathology. The patient was informed about the bleaching procedure. During his first appointment, the root canal filling material was shortened 2 mm surgically. Stains in the pulp chamber were removed using round bur with minimal invasion. 1 mm glass ionomer cement was inserted over gutta percha. The pulp space was cleaned with alcohol. Following this, 35% hydrogen peroxide bleaching gel was placed in the pulp chamber and the access cavity was sealed. The bleaching gel was replaced every

3 days for one week. Finally the tooth was restored using composite veneer.

Comments: Different treatment options like bleaching, crowns and laminate veneers are used in the treatment of discolored teeth. The major advantage of this approach is, it is a conservative and non- invasive method in stain removal. Bleached tooth should be followed for the cervical root resorption.

PR08-1.06**Color changes of S-PRG tooth-coating material****“Barrier Coat” applied on white spot lesion in primary tooth enamel: *in vitro* and clinical studies**Y. HOSOYA^{1,2}, H. OTANI³, M. MIYAZAKI¹ & F. GARCIA-GODOY⁴*¹Department of Operative Dentistry, Nihon University School of Dentistry, Tokyo, Japan; ²Division of Pediatric Dentistry, Department of Oral Health and Development Sciences, Tohoku University Graduate School of Dentistry, Sendai, Japan; ³Otani Dental Clinic, Nayoro, Japan; ⁴Department of Bioscience Research, University of Tennessee Health Science Center, College of Dentistry, Memphis, TN, USA*

Background: To arrest incipient caries lesion without tooth discoloration, esthetic coating materials are recommended.

Aim: This study evaluated the color of S-PRG Barrier Coat (Shofu Co.) applied on white spot lesion in primary tooth enamel.

Design: Artificial white spot lesions were produced in 12 extracted sound primary canines. Teeth were divided into PRG group (white spot lesion was coated with Barrier Coat) and control group (no coating), and soaked in artificial saliva for 12 weeks. Color images with a color-matching sticker were taken with a digital camera in each of the 8 stages of before test, after lesion produced, after coating, after 1, 4, 8 and 12 weeks soaking in artificial saliva, and after coat removal. Spectrophotometric color measurements were also attempted. Barrier Coat was applied on 30 primary anterior teeth and the color change was clinically observed.

Results: Neither *in vitro* nor clinical observation, color changes of Barrier Coat applied to lesions were not different during the tested period. The total color difference (DE*ab) of each stages in the PRG group were 6.9, 6.3 5.5 5.0 5.7, 5.9 and 7.0, and those in the control group except for after coating and coat removal stages were 4.2, 5.4, 4.1, 6.2 and 4.9. In both groups, there was no significant difference of the DE*ab among the measuring stages.

Conclusion: The color change of the Barrier Coat applied on white spot enamel lesion was imperceptible to the naked eye. Barrier Coat was color-stable and effective to use for white spot enamel lesion.

PR08-1.07**Microleakage and dentine surface after chemomechanical caries removal versus drilling**K. KITSAAHAWONG¹, A. L. SEMINARIO², P.PUNGCHANCHAIKUL¹, A. RATTANACHAROENTHUM¹ & W. PITIPHAT³*¹Department of Pediatric Dentistry, Khon Kaen University, Khon Kaen, Thailand; ²Department of Pediatric Dentistry, University of Washington, Seattle, WA, USA; ³Department of Community Dentistry, Khon Kaen University, Khon Kaen, Thailand*

Background: Nowadays, various techniques have been used for dental caries management. Papacarie[®] has been introduced as a new technique for caries removal. However, only a few studies reported the efficacy of Papacarie[®] on caries removal.

Aim: To compare the performances of a chemo-mechanical method of caries removal using Papacarie® and conventional drilling on morphological changes of surface dentine and micro-leakage of subsequent restorations.

Design: Forty-six carious deciduous molars were randomly divided into two groups: caries removal using

- (1) Papacarie® and
- (2) drilling.

After completion of caries removal, 40 teeth were restored with glass-ionomer(GI) and subjected to thermo-cycling. Subsequently, teeth were immersed in 0.5% methylene blue dye solution and sectioned through the restoration. Sectioned teeth were examined with a light diffraction microscope to evaluate dye penetration. Three unrestored teeth per group were prepared for scanning electron microscopy (SEM) and polarized light microscopic analysis.

Results: There was more microleakage in the Papacarie® (mean \pm standard deviation, 2.1 ± 0.9 mm) than the drilling (1.2 ± 0.6 mm; mean difference = 0.8 ± 0.2 ; 95%CI = 0.3–1.3 mm; $P < 0.001$). The morphology of residual dentine in the Papacarie® showed a rough and irregular surface with smear layer while the drilling showed less irregularity and a thin smear layer. After restoration, pictures of polarized light microscope showed that GI adapted well to the dentine surfaces in both groups and no interfacial gap was observed. However, the dentine-GI interfaces in the drilling were smoother when compared to that of the Papacarie®.

Conclusions: Cavity preparation using Papacarie® resulted in more roughened dentine surfaces and more microleakage compared to conventional drilling.

PR08-1.08

***In vitro* evaluation of the antibacterial effects of various agents and systems used for cavity disinfection**

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Background: Cavity disinfection has been recommended to prevent the occurrence of residual caries, postoperative sensitivity, and pulp inflammation caused by bacteria.

Aim: The aim of this study is to evaluate antibacterial effect of Corsodyl, Cervitec, Cervitec Plus, Flour Protector agents and FotoSan, diode and Er,Cr:YSGG laser systems on *S.mutans* and *L.acidophilus*.

Design: A cavity tooth model test was used to determine antibacterial activity. Eight cylindrical cavities were prepared on dentin surface of 24 bovine incisors and 12 of them were left in contact with *S.mutans*, others were left in contact with *L.acidophilus* for 72 h to allow bacterial invasion. Test agents and systems were applied on one of the eight infected cavities, eighth was left untreated for control. Standardized amounts of dentin chips were obtained from cavity walls, and the number of bacteria recovered was counted. Statistical analysis was carried out using Kruskal Wallis and Mann-Whitney U test with Bonferroni correction ($P < 0.05$).

Results: All of the tested agents and systems showed significantly higher antibacterial effects compared to the control group ($P < 0.01$) on both of two microorganisms. Cervitec ($P < 0.001$) and Fotosan ($P < 0.001$) showed significantly lower antibacterial effects compared to Fluor Protector on *S.mutans* and also Fluor Protector revealed significantly decreased effects compared to the Corsodyl ($P < 0.001$) on *L.acidophilus*. No significant differences

were found between the other pairwise comparisons for agents and systems ($P > 0.05$).

Conclusion: The findings from the present study showed that all of the tested materials and systems can be used for cavity disinfection irrespective of their antibacterial contents.

PR08-1.09

Effectiveness of gingival retraction methods: a systematic review

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Background: It is essential to properly manage the gingival tissues for obtaining accurate impressions when fabricating fixed restorations in which the finish line is near the gingival sulcus. The retraction of the gingiva creates sufficient space between the preparation finish line and the gingiva to allow for the injection of impression material into the gingival crevice. There are various gingival retraction methods to choose from including mechanical, chemomechanical and surgical methods.

Aim: The purpose of this systematic review was to see which gingival retraction method was most effective in terms of amount of gingival retraction achieved and minimal trauma to the gingiva as assessed by clinical parameters.

Design: PubMed, CINAHL plus (Ebsco), COCHRANE were searched along with hand search using the key terms and different permutations of gingival retraction* AND displacement method* OR technique* OR agents OR material* OR medication. Our initial search results yielded 142 articles which were narrowed down to final 7 after a strict eligibility of including clinical trials or experimental studies on gingival retraction methods with the amount of tooth structure gained and assessment of clinical parameters as the outcomes, conducted on human permanent teeth only.

Results: The total number of teeth assessed in all 7 studies were 336. Most commonly used gingival retraction method was mechanical. 3/7 studies reported the amount of gingival retraction achieved whereas 4/7 studies assessed the clinical parameters.

Conclusions: There are just seven studies available on the retraction methods. The studies were heterogeneous in terms of reporting the outcomes. No single method (mechanical/chemomechanical/surgical) appeared superior to the other. Clinical parameters such as PI, GI, PD, AL, BOP etc. were not significantly affected with gingival retraction.

PR08-1.10

Abstract withdrawn

PR08-1.11

The effect of chlorhexidine 2% application on shear bond strength of different dentin adhesives in deciduous teeth: an *in vitro* study

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Background: Composite restoration materials have gained increased attention because of the type of cavity preparation and maintaining healthy dental tissue. The strength of adhesive bond to dentin is one of the most important parameters for evaluating efficacy of bondings.

Aim: We aimed to evaluate the effect of chlorhexidine 2% on shear bond strength of different dentin adhesives in primary teeth.

Design: Sixty human primary molars were selected and sectioned bucco-lingually (120 cases) and were divided into 12 groups:

(normal and caries affected), bonding, SE Bond(SE), Clearfil S³ Bond(S³), SingleBond2(S2) and treatment (with chlorhexidine [CHX 2%], without CHX 2%). In S2 group, after etching, CHX were applied for rewetting of dentin and In SE and S³ were applied before use of bonding system. The samples were maintained in distilled water at 37 °C in the incubator for 24 h and placed under thermocycles in the next stage (500 heat cycles of 5–55°C). Shear bond strength was calculated with testometric machine running at a crosshead speed of 0.5 mm/min, and mode of failure was examined with stereomicroscope.

Results: No significant difference in shear bond strength between the different types of adhesives ($P = 0.9$), use of chlorhexidine ($P = 0.22$) and type of dentin ($P = 0.9$). The mean shear bond strength of the different groups. The failure distribution percentage after shear bond strength test. The dominant fracture pattern was mixed followed by cohesive.

Conclusion: This study showed that CHX 2% had no effect on the shear bond strength of adhesive systems to normal dentin and caries affected dentin in primary molars.

PR08-1.12

Dental treatment of patients with hemophilia A: a case report

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Introduction: Hemophilia A is a congenital bleeding disorders caused by deficiency of factor VIII. The severity of the disease depends on the level of clotting factor activity. Patients with factor levels <1% of normal are classified as severe hemophilia. Some dental treatment may risk prolonged bleeding to these patients; therefore, be attentive to the systemic condition of the patients and modify the treatment protocol, would reduce the unfavorable outcomes in practice.

Case report: A 5-year-old boy with severe type of hemophilia A visited Pediatric Dental Clinic of NTUH for caries examination and treatment. Previous lab data showed excessively prolonged aPTT (153.6 s), which was consistent with the extremely deficiency of the factor VIII level (< 1%). He has been undergoing primary prophylaxis with recombinant factor VIII 2–3 times a week since he was 1-year-old. Accordingly, his dental treatment was performed about 1 h after factor replacement. He received composite resin filling on tooth 51, 61, 64, 65, 84; pulp therapy plus stainless steel crown restoration were performed on tooth 54, 55, 74, 75, 85. In any way, we saved the teeth and avoided dental extraction in such patients as possible. Then he was scheduled for periodic follow-up at 3-months intervals.

Comment: Dental treatment of patients with bleeding disorders is challenging, in that many procedures involving oral soft tissues may lead to unexpected hemorrhage. It is shown that with little more consideration and preparation, even severe hemophilic patients can also experience harmless dental treatment at dental clinic.

PR08-1.13

Development of radio-opaque resin for white spot lesion

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Background: White spot lesion is an early sign of caries characterised by subsurface demineralisation. Though the lesion could be remineralised, it is usually found superficially. Resin infiltra-

tion (ICON) claims to provide full depth protection *in vitro*, it is hard to detect clinically due to its lack of radiopacity.

Aim: To develop a smart radiopaque infiltrating resin that has the potential to re-mineralise the initial carious lesion in full depth.

Design: Strontium Bioglass (SrBG) and the Strontium hydroxyapatite (SrHAP) were added to BIS-GMA based resin as radiopaque agents at concentration of 10, 20 and 30 wt%. The materials were photo-polymerised to form 6 × 1 mm² discs using a blue LED light. An enamel disk and resin-only disk were used as standards. Each sample and an aluminium wedge were placed side by side on a dental radiographic sensor and digital radiographs were taken with 0.6 ms exposure at 70 kV and 8 mA. The mean grey values (MGV's) of each sample and aluminium (Al) step wedge were measured by using the histogram function of a computer graphics program.

Results: The equivalent Al thickness radiopacities for resin only and enamel were 0.7, 2.1 mm respectively, for 10, 20, 30% SrBG-resin were 0.6, 0.9, 1.1 mm respectively, and for 10, 20, 30% SrHAP-resin were 0.7, 0.9, 1.8 mm respectively.

Conclusion: 30% SrBG and 30% SrHAP - resins have radio-opacity equivalent to >1 mm which is the ISO standard as a radiopaque dental material.

PR08-1.14

Comparative clinical of adhesives systems used in primary teeth

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Background: Previous studies suggested that single component self-etching adhesive systems showed to be a good alternative in Pediatric Dentistry with less operative time than conventional systems and similar clinical performance but with lower enamel bond strength values.

Aim: Compare clinical performance of restorations placed in primary dentition using a single component self-etching adhesive system Adper™ Easy One with and without previous enamel acid conditioning.

Design: Experimental Design. Data obtained from 42 patients (5.47 ± 1.67 years.) with one or more small and moderate carious lesions in vital deciduous teeth were restored using resin composites and Adper™ Easy One previous enamel etching with phosphoric acid 37% during 30" (Group AAG $n = 67$) and compared with results obtained in 24 patients (5.16 ± 0.11 años) using the same system without previous conditioning (Group AA $n = 44$). 111 composite resin restorations were placed by 3 calibrated operators (Kappa: 0.96) and assessed at baseline and after 6 and 12 months following the modified Ryge criteria.

Results were statistically analyzed with Fisher's Exact Test. Project was approved by Ethics Committee.

Results: Failure rates over 6 month period were 6% in both groups and 7% in AA in 12 month period. No significant differences were found between AAG vs AA $P = 0.576$ at 6 months and 12 months $P = 0.058$.

Conclusion: In this study clinical performance of restorations using a single component self-etching adhesive system with and without previous enamel acid conditioning showed similar results with less need for replacements after 12 months in the group of selective enamel etching.

PR08-1.15**Caries experience and treatment of children with special health care needs (CSHCN)**

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Background: CSHCN have an elevated need for preventive and operative care of caries. For an extensive treatment need, the use of general anaesthesia (GA) is indicated.

Aim: This retrospective study aimed to retrieve information about the caries experience and treatments performed in a population of CSHCN with regards to invasive and preventive care.

Design: A total number of 795 patients (m:f = 1.4:1) had been treated at the Paediatric Division of the Department of Operative dentistry from 2004 to 2012. All included children were younger than 14 years and suffered from at least one ICD-10 relevant medical condition. Statistical analysis was performed with Microsoft Excel and “R”.

Results: The mean age of sample patients was 6.8 (± 3.3) years with a dmft/DMFT of 5.6/0.9 at the initial visit. The major medical diagnoses were mental/chromosomal malformations (ICD Q00-09) and mental/behavioural disorders (ICD F00-09). First treatment under GA was necessary in 41.6% with a second GA in 50 cases and third GA in 11 patients with a significantly higher dmft than for the remaining population treated chair-side. Time-span between 1st and 2nd GA was 28.9 ± 13.9 months. At the end of the observation period (mean 22.4 months), 45.5% of patients received solely preventive care, 41.5% chair-side treatment and only 6.5% a treatment under GA.

Conclusions: CSHCN have a high treatment need that may demand for a treatment under GA. With a preventive oriented recall, the numbers of repeat treatment are relatively low. Minor problems may be solved chair-side without GA despite the underlying medical condition.

PR08-1.16**Comparison of morphology of Taiwanese lower primary molars with related stainless steel crowns**T. T. CHAO¹ & H. H. TSAI²*¹Dentistry Department, Mackay Memorial Hospital, Taipei, Taiwan; ²School of Oral Hygiene, Taipei Medical University, Taipei, Taiwan*

Aim: The first choice of restoration for a decayed primary molar is a stainless steel crown (SSC). The lower primary first molars (Palmer notation code D $\bar{7}$ or $\bar{7}$ D) have not only unique shape but also more variations in morphology than any other teeth. The aim of this study was to examine significant and clinical relevant aspects of the lower primary first molars in Taiwanese children and the related SSC (3M ESPE, No.2–No.7).

Design: The materials comprised dental casts of 63 children (33 girls, 30 boys) who have intact clinical crowns of all molars. The right lower D of dental casts and SSC were scanned by Microscribe G2 Digitizers (Immerion Inc., US) to build 3D data set. Standardized photographs of the occlusal surfaces of dental casts and SSCs were obtained. The 3D data sets were translated by software Graph-R (Graph-R Project, Japan) for 3D drawing and calculated by Microsoft Excel 2013 and software Keynote 6.1 (Apple Inc., US) for data analysis.

Results: The MD distance of lower D showed a statistically significant difference between boys (7.75 mm) and girls (7.41 mm) ($P < 0.01$). The BL distance showed no significant difference among the genders. Boys (1.17) had statistically significant

greater MD/BL ratio than girls (1.10) ($P < 0.05$). The average of MD distance is near to No.4 SSC in boys and No.3 SSC in girls.

Conclusions: The crown size of lower D was greater in boys than that of girls in Taiwan. Understanding the morphologic characteristics of lower D is important for dentists to prepare the tooth and apply SSCs.

PR08-1.17**Minimal invasive potential of three caries excavation methods in children**M. K. ZAYET¹, S. B. ELTAWIL², S. A. MAHMOUD² & S. A. ABDELMONIEM²*¹Oral Radiology Department, Faculty of Oral and Dental Medicine, Cairo University, Cairo, Egypt; ²Pediatric Dentistry and Dental Public Health, Faculty of Oral and Dental Medicine, Cairo University, Cairo, Egypt*

Background: Recently, the concept of minimally invasive (MI) dentistry has emerged. MI calls for the selective removal of heavily infected and irreversibly denatured dentin caused by carious lesions while preserving dentin that is demineralized but not infected.

Aim: To compare the minimal invasive potential (MIP) of fluorescence aided caries excavation (FACE), caries detection dye (CDD) and conventional caries excavation methods in children.

Design: A total of 105 carious primary molars in 43 children were included in this study. The teeth were randomly divided into three groups according to the caries excavation method. Preoperative evaluation of the carious teeth was performed using digital radiography after sealing the cavities with a radiopaque material. Caries excavation was performed using FACE, CDD or conventional caries excavation method. The teeth were restored using self-cured resin-reinforced glassionomer. Postoperative radiographic examination was then performed. Pre and postoperative widths and depths for the cavities were assessed. MIP was determined by comparing the prepared-cavity width and depth relative to the initial width and depth of the caries lesion, respectively.

Results: There was no statistically significant difference between the MIP of examined groups neither after comparing cavity widths at $P = 0.253$ nor depths at $P = 0.06$. FACE showed the highest mean values of MIP potential for cavity widths (1.41 ± 0.36) and depths (2.04 ± 0.74).

Conclusions: FACE, CDD, and conventional caries excavation showed comparable MIP in children.

PR08-1.18**Shear bond strength and microleakage of a sealant containing S-PRG filler (BeautiSealant)**

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Background: Recently, self-etching fissure sealant containing S-PRG filler have been introduced to reduce technical sensitivity. However, their efficacy should be assessed.

Aim: The aim of this study was to compare self-etching primer and conventional acid etching on shear bond strength (SBS) and microleakage of fissure sealant containing S-PRG filler *in vitro*.

Design: Forty-five non-carious premolars were randomly divided into three groups ($N = 15$). (Group1) 37% phosphoric acid etching + Clinpro™ sealant (3M ESPE, St.Paul, USA), (Group2) 37% phosphoric acid etching + BeautiSealant (Shofu, Kyoto, Japan), (Group3) self-etching + BeautiSealant.

For the SBS test in each group ($N = 10$), microcylinders of fissure sealant were bonded to prepared buccal and lingual surfaces. The samples were subjected to 500 rounds of thermocycling and

shear bond testing using a universal testing machine with a cross-head speed of 1 mm/min.

For the microleakage test in each group ($N = 5$), sealants were adjusted on each occlusal fissure of teeth. All teeth surface were coated with nail varnish, with the exception of a 1.0 mm window around the restoration margins. The teeth were immersed in 2% methylene blue solution for 24 h and then rinsed in water.

Results: The mean of SBS (MPa) and occurrence of microleakage (score) of the groups were as follows. Group 1:17.08 MPa, 1.2, Group 2:16.04 MPa, 1.3 and Group 3:12.42 MPa, 1.6.

Sealant using phosphoric acid etch application prior to BeautiSealant application demonstrated more SBS in comparison with that of self-etching primer application. There was no statistically significant difference in occurrence of microleakage among three groups.

Conclusions: In order to obtain adequate bonding strength and lower microleakage, it is recommended to use acid etching prior to BeautiSealant application.

PR08-1.19

Could mini-head hand-piece optimize operator's convenience & patients' behavior in minimally invasive procedures?

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Background: Child behavior in dental clinic remains challenging to the pediatric dentist. Efforts should not be spared to reduce patients' anxiety and increase their satisfaction. NSK S-Max air-turbine Pico Mini-Head was claimed to offer wider visibility and more convenience -especially when operating in Minimally Invasive (MI) procedures- because of its ultra mini-head and slim body shape. However knowledge gap still exists supporting its use in everyday pediatric dental practice when compared to the regular sized hand-piece.

Aim: To assess the convenience of Pico Mini-Head vs the regular sized hand-piece on the operator and patient levels.

Design: Thirty 6–8 years old patients received conservative CP. Split-mouth technique was randomly employed where Pico Mini-Head and the regular sized hand-piece were utilized to treat different quadrants. Bieri-Modified Scale-six cartoon-faces starting from a neutral state to tears/crying- was recruited to assess dental anxiety. Subsequently, the operator's convenience, patients' satisfaction and behavior were analyzed.

Results: On operator level, compared to regular sized hand-piece, Pico Mini-Head showed high dentists' satisfaction, expanded operational visibility, more convenience as well as accessibility in children, less mean operator time (18 compared to 20 min) and less need for local anesthesia during CP. On patients' levels less discomfort and fear from Mini-Head hand-piece were noted. Children welcomed its appearance even more.

Conclusion: Mini-Head hand-piece provided greater patient-dentist comfort and cooperation. Based on its design, it is well suited to pediatric patients and may open novel horizons in fields of MI and pediatric dentistry.

PR08-1.20

Revascularisation of immature permanent teeth: 9-month follow-up

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Introduction: Regenerative endodontics is a promising alternative treatment to conventional endodontic therapy for immature teeth with necrotic pulp. The aim of this case report was to demon-

strate the treatment of immature, necrotic, permanent incisor by using regenerative endodontic therapy.

Case report: A 12 year-old boy was referred to the dental pediatric clinic with a chief complaint of unsuccessful endodontic treatment of his upper right incisor. He had a history of trauma from his upper central incisors after a fall of 2 years ago. After several failed treatments the patient was directed to our dental pediatric clinic. In intraoral examination, there was an access cavity related with oral cavity. The tooth was hypersensitive to percussion. The radiographic examination revealed apical radiolucency. Following disinfection of the canal space with calcium hydroxide paste, regenerative endodontic treatment was performed. The root canal was sealed with mineral trioxide aggregate and the tooth crown was restored permanently with composite resin. Clinical examination at 1, 2, 3, 6 and 9 months revealed an asymptomatic tooth. Radiographic examination revealed resolution of periapical radiolucency, increased thickening of the canal wall, and lengthening of the root, which demonstrated the continual development of the tooth root at recall appointments.

Comments: Regenerative endodontic techniques may enhance continued root development and, therefore, offer an alternative approach to the management of traumatized immature permanent teeth with pulp necrosis and periradicular infection.

PR08-1.21

Comparative evaluation of the effect of 10% α -tocopherol solution and 5% grape seed extract on the micro hardness and shear bond strength of bleached dentin

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Background: The bleaching of nonvital teeth is a minimally invasive intervention conserving tooth structure with side effects like alterations in tooth structure, external root resorption and decreased bond strength.

Aim: To evaluate the effect of 10% α -tocopherol and 5% grape seed extract on the micro hardness and shear bond strength of bleached human dentin.

Design: Two hundred extracted premolars decoronated and grinded to get flat dentin surface occlusally. Twenty samples as control and remaining 180 samples were bleached with 35% H₂O₂ gel. The 180 bleached dentin surfaces were divided into three groups of 60 each depending upon type of antioxidants used. Groups were further sub divided into sub groups I & II ($n = 30$) based on storage period before building with composite. Fifteen samples from each sub groups were used for determination of microhardness and the remaining 15 samples were stored in distilled water for 24 h before shear bond strength determination.

Results: Study revealed bleaching decreases the microhardness & bond strength of the dentin. Shear bond strength was more in all groups after 15 days. Application of 10% alpha-tocopherol and 5% grape seed extract was effective in reversing the adverse effects of bleaching over the dentinal surface microhardness & shear bond strength & also 5% grape seed extract proved to be better than alpha tocopherol.

Conclusion: Adverse effects of bleaching can be reversed with application of 10% alpha tocopherol & 5% grape seed extract over the dentinal surface microhardness & shear bond strength.

PR08-1.22

Histologic evaluation of the short term response of primary dental pulp to a biodegradable propolis preparation. An experimental study on dogsA. N. ABD EL-LATIF¹, M. A. MATAR², G. M. MAHMOUD³ & G. F. BALATA⁴¹Oral Pathology, Pharos University in Alexandria, Alexandria, Egypt; ²Pediatric Dentistry, Pharos University in Alexandria, Alexandria, Egypt; ³Pediatric Dentistry, 6th October University for Modern Science and Arts, Cairo, Egypt; ⁴Department of Pharmaceutics, Faculty of Pharmacy, Zagazig, Egypt**Background:** Recent trends in pulp therapy depend on tissue regeneration rather than fixation or preservation. Propolis is a natural nontoxic resinous material collected by *Apis mellifera* bees from various plants. It has antimicrobial, anti-inflammatory, antioxidant, anesthetic and cytotoxic properties, Ethanol extract of propolis has the ability of inducing hard tissue formation.**Aim:** The aim of the present study was to evaluate the effect of a resorbable preparation of propolis on primary dental pulp.**Design:** Resorbable propolis was prepared by composing 10% PE, 1.8% chitosan, 0.2% HPMC, 5% Propylene glycol & 2% acetic acid To 100. Vital pulpotomy was performed in 36 primary molars of dogs. 18 teeth were treated with a biodegradable propolis preparation (group A), and 18 were treated with formocresol (group B). Animals were sacrificed after two and six weeks and histologic evaluation were performed for both inflammatory response and hard tissue formation.**Results:** Propolis specimens showed significantly less pulpal inflammation compared to formocresol at two and six weeks. All specimens of propolis (100%) showed hard tissue formation at six weeks compared to four out of nine specimens (44.4%) in the formocresol group.**Conclusions:** A resorbable propolis preparation results in less inflammatory response than formocresol, and is more effective in promoting hard tissue formation when used as a vital pulpotomy agent in primary dental pulp.

PR08-1.23

Revitalisation of previously traumatized root-filled incisors: 24-month follow-up

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*Department of Pediatric Dentistry, Faculty of Dentistry, Hacettepe University, Ankara, Turkey***Introduction:** Revascularisation/Revitalisation of open-apex incisors has become a viable treatment option, particularly in cases of traumatic injuries. This case report presents revitalisation of previously traumatized and root-filled incisors.**Case reports:** A 10-year-old girl was referred to the Paediatric Dentistry Department for retreatment of poorly obturated maxillary central incisors that had experienced traumatic injury two months earlier. Radiographic examination of the clinically asymptomatic incisors revealed root canal fillings of unacceptable quality along with periapical radiolucency. The root fillings were removed under rubber dam isolation with minimal debridement, which revealed open apices of approximately 1 mm diameter. The root canals were medicated with triple antibiotic paste for 3 weeks, after which a revitalisation procedure involving removal of the antibiotic paste, induction of apical bleeding and placement of MTA coronal barrier was performed. Following a two-week temporisation with conventional glass ionomer cement, a final restoration was placed using acid-etch resin-based composite. The patient was recalled every six months for clinical and radiographic examinations, which revealed resolution of periapical radiolucency, complete

apical closure in one root and thickening of root walls in both incisors after twenty-four months.

Comments: In previously root-filled, open-apex teeth which require endodontic retreatment, the revitalization procedure may facilitate apical closure and to some extent, thickening of root walls.

PR08-1.24

Obtaining exfoliated teeth for research purposes: a feasibility study

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*School of Clinical Dentistry, University of Sheffield, Sheffield, UK***Background:** Clinical outcomes support the success of preformed metal crowns (PMCs), using the non-invasive Hall Technique (HT), for carious primary molars. However, the underlying pulp-dentine responses have not yet been elucidated as tooth samples are difficult to obtain.**Aim:** To determine the feasibility of obtaining naturally exfoliated primary molars, previously restored with a HT PMC.**Design:** A single-page questionnaire was posted to parents of 100 children, aged between 8 and 12-years, seeking information about their child's exfoliated primary teeth. All children had been previously treated at Sheffield Dental Hospital, UK, and had received one or more PMCs using the HT.**Results:** 24 questionnaires were returned, giving a low response rate of 24%. 58% ($n = 14$) of respondents stated their child usually placed exfoliated teeth under a pillow and the parent kept them indefinitely. 96% ($n = 23$) gave their child money for exfoliated teeth (mean = £1; range = £0.5-£5). Seven parents had saved an exfoliated tooth with a PMC and 86% ($n = 6/7$) said that they would be happy to donate it for research purposes. Of those whose child's PMC tooth had not yet exfoliated, 77% ($n = 10/13$) said they would definitely give the tooth to further research and 23% ($n = 3/13$) said they may be prepared to do so.**Conclusions:** Although the response rate was low, parents were found to be very happy to provide their child's exfoliated teeth for research purposes. It would therefore be feasible, with forward planning and ethical approval, to collect exfoliated teeth that had previously received a HT PMC for histological examination.

PR08-1.25

Cytotoxicity and regenerative potential of three different tricalcium silicate-based cements

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*Department of Restorative Dentistry & Periodontology, University of Munich, Munich, Germany***Background:** Recently there are an increasing number of indications for the use of tricalcium silicate-based cements in Dentistry, most of them in direct contact to oral tissues that should remain intact and in fact regenerate.**Aim:** To investigate a possible cytotoxic effect and osteogenic regenerative potential of three tricalcium silicate-based cements (ProRoot MTA, Dentsply; MedCem MTA, MedCem; Biodentine™ Septodont).**Design:** Cement eluates (cement specimens incubated in medium for 24 h followed by filtration to remove particulates) were produced. Three cell lines (human gingival fibroblasts HGF-1, primary human osteoblasts HOB, primary human periodontal ligament fibroblasts hPDLF) were exposed to serial eluate dilutions (undiluted, 1:2, 1:5, 1:10 in medium) over 24 h with medium as negative and Triton-X-100 1% as positive controls. Cytotoxicity was analysed by WST-8-Assays ($n = 3$) and survival rates given as % of negative control. To assess possible osteo-

genic regenerative potentials, Western blots from nuclear protein cell extracts incubated with undiluted cement extracts for 24 h were performed. A monoclonal antibody was used to show up-regulation of RUNX2 transcription factor responsible for expression of important osteogenic proteins like osteocalcin or osteopontin.

Results: No significant differences were observed between the three cement types, with none showing any degree of toxicity. RUNX2 Western blots showed higher levels of RUNX2 in treated cells compared with untreated and no significant differences between cements.

Conclusion: These cements can therefore be used without hesitation when indicated and when direct contact with oral tissue occurs, while the exact mechanisms of their osteogenic potential need further elucidation.

PR08-1.26

A comparative study of Biodentine™ and MTA Angelus on adhesion of human periodontal ligament fibroblasts

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Background: Biocompatibility is the property of a material to perform with an appropriate host response to a specific application. Numerous materials have been used to seal the root-end cavity during periradicular surgery. A root-end filling material functions as a 'physical seal' to prevent microleakage from the root canal system into adjacent periradicular tissues.

Aim: The aim of this study was to evaluate the cellular adhesion potential as well as *in vitro* biocompatibility of Biodentine™ compared to MTA Angelus.

Design: Human periodontal ligament fibroblasts (PDL) were prepared from the extracted roots of two impacted mandibular third molars. Biocompatibility was assessed by 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide salt (MTT) assay. Stereomicroscopy was used to observe cellular attachment, sprouting, and survival.

Results: The results of this study are in process of evaluation.

Conclusions: The biocompatibility and adhesion of these materials is important when considering use for root-end endodontic microsurgery. Further investigation is required in order to reveal the wound healing capabilities *in vivo*.

PR08-1.27

Effect of penetrating resin on the penetration depth of early artificial enamel caries at different penetrating time

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Aim: The purpose of this *in vitro* study is to evaluate the effect of different permeating time on enamel permeating depth when applied enamel with GermanDMG penetrating resin.

Design: 50 healthy premolars without caries extracted for orthodontic reason were selected, then artificial enamel caries was prepared, randomly divided into 5 groups ($n = 10$). Samples were penetrated with penetrating resin for 1 min, 2 min, 2.5 min, 3 min, 4 min, respectively, then light curing 60s. Specimens were prepared after the teeth being sliced and polished, observed with inverted fluorescence microscope, measuring caries damage depth

of LD (Lesion Depths) and penetration depth of PD (Penetration Depths), calculating penetration percentage of PP ($PP = PD/LD \times 100\%$), multisample rank test analyzing of the relationship between the penetration depth and time.

Results: Penetration depth of penetrating resin in 1 min was <3 min .90% of maximum demineralization depth can be achieved when the resin penetrating for 2.5 min; the maximum demineralization depth can be achieved after 3 min penetration, but there was no significant effect on penetration depth after more time and there was no statistically significant difference.

Conclusion: 3 min penetration time can basically achieve maximum demineralization depth of early enamel caries.

PR08-1.28

In-vitro antibacterial activity of innovative endodontic medicaments and different vehicle combinations

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Background: Dental caries is the most common chronic disease and one of the most expensive diseases to treat. The National Oral Health Survey and Fluoride Mapping 2002–2003 in India, revealed a high proportion of untreated caries. The reasons being the cost of treatment, myths about the primary dentition that they shed off and do not require treatment. Additional influencing factors were that dental treatment for children is multi-visit and causes loss of pay on part of the parents to avail treatment at educational institutions. Hence, Lesion Sterilization and Tissue Repair with the combination of antibacterial agents for disinfection of pulpal and periapical lesions of primary teeth might be a simple and economical treatment with more patient acceptance.

Aim: The aim of this study was to evaluate antibacterial activity of innovative endodontic medicaments and different vehicle combinations using well-plate method.

Design: In-vitro study on *Streptococcus mutans* (ATCC 25175), *Staphylococcus aureus* (ATCC 12598) and *Enterococcus faecalis* (ATCC 35550).

Results: 2% Chlorhexidine gluconate was consistently effective of all endodontic medicaments especially in combination with propylene glycol ($P < 0.05$) amongst all vehicles followed by a mixture of propylene glycol and polyethylene glycol.

Conclusions: 2% Chlorhexidine gluconate in combination with propylene glycol could be also used as an endodontic medicament instead of the routinely used antibiotic pastes in Lesion Sterilization and Tissue Repair. Chlorhexidine gluconate is a safer alternative to the routinely used Triple Antibiotic paste and Double Antibiotic Paste due to its inherent advantage of not developing resistance in micro-organisms and low toxicity.

PR08-1.29

Preliminary research of Er:YAG laser used on pulpotomy of dogs

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Background: With many advantages such as painlessness, low thermal effects and effective cutting of enamel and dentin without damaging the pulp, Er:YAG laser has gained more and more attention in handling dental diseases. It will not cause irreversible

damage by virtue of its low thermal effect when used for cavity preparation or on pulp directly. Furthermore, the inflammation response can be weakened and the formation of reparative dentin accelerated with Er:YAG laser. With all these properties, the Er:YAG laser shows a promising potentials on pulpotomy. But the studies are limited.

Aim: Explore the effects of Er:YAG laser used on pulpotomy of teeth of beagle dogs, observing the clinical and radiological results, as well as the inflammation level of apical area of pulp and the formation of dentin bridge.

Design: 1-year-old Beagle dog premolar teeth were used. The coronal pulp were removed by traditional bur or Er:YAG laser. Then, they were dressed with MTA and sealed with resin. Clinical, radiological and histological analysis was performed 1 day, 2 weeks, 4 weeks and 8 weeks after treatment. The samples were assessed by an independent observer for calcified bridge formation and radicular pulp inflammation.

Results: The clinical and radiological results show no differences between laser and control group. The histological examination show no difference of radicular pulp inflammation between laser and control group. Dentin bridge formation of laser group was better than control group in 2 weeks.

Conclusion: The laser pulpotomy show no harm to radicular pulp and can promote the formation of dentin bridge.

PR08-1.30

Pulp-dentin complex regeneration by using a new modified treated dentin matrix agent

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Background: Pulp capping has proven to be more effective than root-canal therapy for pulp-dentin regeneration. Given the low success rate of conventional methods, new materials should be developed. Our previous studies suggested treated dentin matrix (TDM) could promote the odontogenic differentiation of dental stem cells.

Aim: The pulp capping agent derived from TDM would induce pulp stem cells differentiate to odontoblasts and would achieve better dentin bridge and slighter pulp reaction than Dycal in direct pulp capping experiment.

Design: In this study, TDM is treated to powder by two kinds of technology then mixed with gelatin (G) and propylene glycol (PG) separately to contribute the new bioactive pulp capping agent (TDMA) that compare with Dycal *in vivo* and *in vitro*.

Results: TDMA shows good handling properties, as well the non-toxicity and dentinogenesis inducibility to human pulp stem cells *in vitro*. Gelatin (G) and propylene glycol (PG) both help improving the plasticity of pulp capping agent and keep their characteristic respectively. In the mini swine pulp exposure model, the quality of TDMA groups' regenerative pulp-dentine complex is better than Dycal group.

Conclusions: TDM is expected to an excellent bioactive materials in pulp-dentin complex regeneration.

PR08-1.31

Regional odontodysplasia: report of a case

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Introduction: Regional Odontodysplasia (ROD) is a rare developmental anomaly that usually presents as a localized condition involving a few adjacent teeth in a single maxillary or mandibular quadrant. Clinical and radiographic findings of ROD include delayed or failed eruption, abscess formation, early exfoliation and

a fuzzy silhouette known as “ghost teeth”. This case report presents oral and radiographic features of a child patient with ROD and the prosthetic approach utilized to preserve the developing jaw.

Case report: A 12-year-old girl was referred to the Paediatric Dentistry department with a chief complaint of unerupted permanent maxillary left central, lateral and canine teeth. The affected region had no visible swelling or fistula. Radiographic examination revealed hypoplastic crowns with abnormal morphology and absence of contrast between enamel and dentin, with a fair demarcation between enamel and dentin. Owing to the asymptomatic nature of the condition, a non-surgical conservative treatment plan involving fabrication of a custom removable prosthetic appliance overlaying the affected area until cessation of jaw development was made. The patient has been attending regular control visits for 12 months.

Comments: In child patients with ROD, the treatment plan should be tailored according to the age of patient; the extent of involvement, and the functional and aesthetic needs of each individual case.

PR08-1.32

Hall technique preformed crowns-a survey of specialist paediatric dentists in the UK

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Background: The use of Hall technique preformed crowns (HTPCs) to restore primary teeth has been suggested as an alternative to conventional treatments. Little is currently known about specialist use of this technique.

Aim: To assess the use of HTPCs amongst specialist paediatric dentists in the UK.

Design: This was a prospective questionnaire-based study. An online questionnaire was distributed to all specialists registered on the British Society of Paediatric Dentistry email list between July and September 2014.

Results: Ninety four questionnaires were completed. The majority of respondents work in teaching hospitals, followed by community dental services. Out of the 90 individuals who use HTPCs, 15% use them as treatment of choice for symptomless carious primary molars, with 58% using them as a treatment option, and 23% using them only when unable to provide a conventional restoration. 60% have been using HTPCs for over 5 years. 15% always use separators prior to fitting HTPCs and 67% sometimes use them. 76% will consider placing HTPCs under inhalation sedation, and 26% under general anaesthesia- with 46% who would fit HTPCs on a patient who is due to have general anaesthesia for extraction of other teeth. Over 90% believe that HTPCs are suitable for: undergraduate teaching, general practice, postgraduate training and specialist practice. Reasons given for not using the technique include lack of: training, confidence and evidence of their effectiveness.

Conclusion: HTPCs are widely used amongst specialist paediatric dentists in the UK, with the vast majority believing they should be used in all settings.

PR08-1.33

Treatment of a large endodontic lesion caused by chronic mechanical trauma due to the unusual habitual behavior

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Introduction: Harmful parafunctional oral behaviors including grindings, nail biting, and finger nail scratching may cause serious

problems such as endodontic lesion, tooth wear, occlusal trauma, and gingival recession. This case report presents the treatment of permanent mandibular molar having severe mobility (grade3) with diffuse endodontic lesion due to chronic mechanical trauma.

Case reports: 12-year-old male patient with a chief complaint of swelling in relation to the lower left mandibular first molar was referred to the Pedodontics Department. Careful anamnesis revealed that he had been moving his tooth by his fingers for 2 years to fasten its exfoliation due to his misinterpretation of its being deciduous tooth. Clinical and radiographical examination verified an occlusal decay on #36 without pulpal involvement, a large and diffuse endodontic lesion with buccal fistula, severe mobility (grade3), sensitivity on percussion, negative vitality test, and no periodontal involvement. He, primarily, was encouraged to give up this habit. Then, endodontic treatment was initiated without any antibiotic usage including repeated irrigations with 5% NaOCl, intracanal dressings with non-setting CaOH, and completed with Gutta Percha and sealer (AH Plus) after four dressing sessions. No periodontal treatment and occlusal adjustment were performed. 18-month of follow up proved complete recalcification of the lesion with no complication.

Comments: It is crucial to use multidisciplinary diagnostic approach to determine whether it is originated from pulp or periodontium in the successful treatment of mandibular first molars with large and diffuse endodontic lesion caused by chronic mechanical trauma to prevent needless periodontal treatment and antibiotic abuse.

PR08-1.34

Bioactive glass versus tri-calcium phosphate in the treatment of dentin hypersensitivity: a short-term clinical trial

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Aim: The aim of this study was to evaluate the success of two different commercial pastes in the treatment of cervical dentin hypersensitivity in permanent teeth of children.

Design: A randomized controlled clinical trial was conducted with a total of 32 teeth. Nupro sensodyne prophylaxis paste with fluoride and novamin (*Dentsply DeTrey*) and Vanish % 5 sodium fluoride white varnish with tri-calcium phosphate (*3M-ESPE*) were applied onto the cervical dentin surfaces. Distilled water was used as the placebo group. The baseline measurement of hypersensitivity was made by using visual analog scale (VAS). Twenty-four hours and 7 days after the application of desensitizer pastes and the placebo group, a new VAS analysis was conducted for the patients' sensitivity level.

Results: The mean pain scores of placebo group was significantly higher than the desensitizer pastes' mean scores (ANOVA, $P < 0.05$). The VAS analysis revealed a significant decrease in dentin hypersensitivity in 7 days with the use of the desensitizer containing pastes. No statistically significant difference was observed between these two treatments ($P > 0.05$). Although novamin and tri-calcium phosphate containing desensitizer pastes present distinct modes of action, they caused a significant reduction of dentin hypersensitivity.

Conclusions: While desensitizer pastes' 'action difference' in tubule occlusion may reflect the differences in the acid resistance of the compounds; their application had displayed similar effectiveness in reducing immediate dentin hypersensitivity.

PR08-1.35

Evaluation of two iodoform-based root canal filling materials for pulpectomy of primary molars: an *in vivo* study

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Background: Pulp therapy aims to maintain the integrity and health of teeth and their supporting tissues. Pulpectomy is the technique of choice for the treatment of primary molars diagnosed with irreversibly inflamed pulp. Various root canal filling materials for primary teeth have been used. Unfortunately, the ideal root canal filling material has not yet been identified. The most popular root canal filling materials used are zinc oxide eugenol (ZOE), iodoform paste, and calcium hydroxide. Iodoform-based pastes fulfill most of the requirements of an ideal filling material for primary teeth.

Aim: To evaluate the clinical and radiographic success of two iodoform-based pastes for pulpectomy of primary molars.

Design: Thirty carious primary molars in 27 children aged 4–7 years, were treated with pulpectomy and were divided randomly into 2 groups according to the root canal filling material; Group A: canals were obturated with Zical and Group B: canals were obturated with Metapex. Stainless steel crowns were placed as a final restoration. Clinical and radiographic evaluations of pulpectomized molars were performed immediately, 3 and 6 months following treatment using specific criteria.

Results: Clinical evaluation showed complete resolution of presenting signs and symptoms in both groups. Radiographic evaluation revealed an insignificant difference between tested groups for furcation pathology at 3 and 6 months ($P = 0.061$, $P = 0.116$) respectively.

Conclusion: Both Zical and Metapex gave encouraging clinical and radiographic success rates.

PR08-1.36

In vitro evaluation of the effect of ozone treatment on fissure sealant

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Background: Ozone treatment could be used to provide alkalinity and antimicrobial activity on fissure sealant applications.

Aim: The aim of this *in vitro* study was to evaluate the effect of ozone treatment on micro-leakage, micro-bond strength and adaptation of Clinpro™ Sealant and Teethmate F-1 fissure sealants.

Design: 120 extracted third molar teeth were divided into 4 groups. In Group-1; Clinpro™ Sealant and in Group-2, Teethmate F-1 were applied without ozone treatment. In Groups 3 & 4 ozone treatment was applied before fissure sealant applications.

Micro-leakage was scored using a stereomicroscope and micro-bond strength was measured by Universal testing machine. The adaptation between sealants and enamel was evaluated by SEM. Student *t*, Chi Square and Fisher's Exact Chi Square tests were used for statistical analysis.

Results: 63.3% of the teeth in Group-3 showed no micro-leakage. The results of bond strength tests showed that bond strength of Teethmate F-1 was statistically lower than that of Clinpro™ Sealant ($P < 0.05$); and that even if the ozone treatment has decreased the micro-tension bond strength, it had no statistical effect ($P > 0.05$). The adaptation of the sealant to the enamel surface was higher in group-3 (100%) and group-4 (100%) than group-1 (85.7%) and group-2 (85.7%).

Conclusions: Within the limits of this study, ozone treatment could be used with fissure sealant applications. Even though

ozone treatment had no statistically effect on fissure sealant's success, its antibacterial efficiency might be beneficial.

PR08-1.37

The use of PRP in treatment of an immature tooth with a large periapical lesion: a case report

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Introduction: Regenerative endodontics refers to biologically based treatment aimed at restoring normal physiologic function in necrotic immature permanent teeth. This case report describes the use of platelet-rich plasma (PRP) in the treatment of an immature maxillary lateral incisor with a large periapical lesion over a 24-month clinical and radiographic follow-up period.

Case report: A 14-year-old boy was referred to the pediatric dentistry clinic with the chief complaint of pain in the maxillary left lateral incisor. The patient had a history of an untreated traumatic injury 4 years prior to presentation. Clinical examination showed tenderness to percussion and palpation, and radiographic examination revealed an immature root and a large periapical lesion. Following disinfection of the canal space with triple antibiotic paste (1:1:1: ciprofloxacin, metronidazole and cefaclor), revascularization treatment was performed using a PRP scaffold. The final restoration was completed with white mineral trioxide aggregate and composite resin. The patient was recalled for clinical and radiographic evaluation every 6 months. After 24-months of follow-up, complete radiographic healing of the periapical radiolucency was observed; however, apical closure had not been achieved. Follow-up examinations are continuing.

Comments: PRP was found to be useful in constructing a scaffold for successful regenerative endodontic treatment of a periapical lesion; however, a longer follow-up period is needed to observe apical closure.

PR08-1.38

Pulp canal obliteration after revascularization treatment: a case report

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Introduction: Pulp canal obliteration is an undesirable outcome of revascularization treatment that stems from the osteoinductive activity of mineral trioxide aggregate. This case report describes the total obliteration of the canal space over a 3-year follow-up period after revascularization of a premolar tooth.

Case report: A 12-year-old boy was referred to the Department of Pediatric Dentistry for a routine dental examination. There was no significant medical history. Intraoral examination revealed a deep carious lesion in the maxillary left second premolar tooth. The tooth did not respond to electric or cold sensitivity testing, and responses to percussion, palpation and probing pocket depths were all within normal limits when compared to adjacent and contralateral teeth. Radiographic examination of the tooth revealed an immature root and open apex, although no periapical radiolucency, internal/external root resorption or other pathosis was found. The tooth was diagnosed with a necrotic pulp. The canal space was disinfected with triple antibiotic paste (1:1:1: ciprofloxacin, metronidazole and cefaclor), and revascularization treatment was performed using a PRP scaffold. The final restoration was completed with white mineral trioxide aggregate and composite resin. At the end of a 3-year follow-up period, complete apical closure was observed; however, although the

tooth remained asymptomatic, the entire root canal was obliterated. Follow-up examinations are continuing.

Comments: Pulp canal obliteration is a serious disadvantage of revascularization treatment that can be observed over the long-term, thus requiring regular follow-up of patients.

PR08-1.39

Disinfectant effects of sodium hypochlorite on pulpotomies in primary teeth: clinical, radiological and histopathological study

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Background: Sodium hypochlorite (NaOCl) can be used as an antibacterial agent to promote pulpal healing in vital pulpotomy treatment.

Aim: The aim of this study was to evaluate the effects of %5 NaOCl as cleansing agent on calcium hydroxide (CH) and mineral trioxide aggregate (MTA) pulpotomies for 24 months follow-up.

Design: 128 primary molars were divided into 2 main groups according to pulpotomy agents (CH-MTA), into 2 subgroups according to cleansing agents (NaOCl-Saline) and followed clinically and radiographically. After 24 months, 20 extracted teeth were evaluated histologically for hard tissue bridge formation, pulpal inflammation, odontoblastic layer continuity, tubular structure and internal resorption. Fisher's exact, Pearson's chi-square and Mann Whitney U test with Bonferroni correction were used for statistical analysis.

Results: Clinically and radiographically, no significant differences were observed between the NaOCl and saline subgroups of either CH or MTA groups ($P < 0.0042$). However, success rate of MTA subgroups were statistically higher than CH subgroups independent of the cleansing agent ($P < 0.0042$). In histological results, lack of pulpal inflammation, hard tissue bridge formation and odontoblastic layer continuity were higher in MTA subgroups compared to CH subgroups.

Conclusions: Regardless of cleansing agent, success rate decreased dramatically over time in CH. In both CH and MTA groups, NaOCl did not affect clinical, radiographical and histological success compared to saline. Based on these results obtained in this study, it is confirmed that the pulpotomy material is more important than the cleansing agent in vital pulpotomy treatment.

PR08-1.40

Polyactic acid absorbable intracanal post and films in restoring primary anterior residual root of early childhood children

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Introduction: Severe early childhood caries can lead to residual root, when restored with composite resin, it's easy to fall off. If using polyactic acid absorbable intracanal post and films can improve the retention and allow physiological root absorption of primary teeth. The posts we used were absorbable screw implants used in bone fractures, produced by Inion Oy. The polyactic acid absorbable films were formed by evaporating of polyactic acid solution.

Case reports: A 4-year-old girl was referred for early childhood caries. Clinical examination revealed that 51 had caries, 61 was

residual root. X-ray showed that 51, 61 had root inflammation and there was a high density image in the root canal of 61. Comprehensive dental treatments were finished under general anesthesia, 51, 61 were treated with root canal therapy, and then 51 was restored with composite resin. The post-space of 61 was prepared by special equipment, then absorbable screw post was enwound by absorbable films and screwed into the root canal. Finally the crown was formed using composite resin. After that, every 3 months the patient was called back to give an examination, including clinical and periapical radiograph examination to evaluate clinical effects. Meanwhile, to detect the absorption of the residual root and the development of 21. After 3 years' follow up, 21 was found to have erupted normally.

Comments: The short - term effects of the residual root restored by polyactic acid absorbable post and films were favorable, but long - term effects need further research.

PR08-1.41

Biological response of dental pulp cells derived from human deciduous teeth for PRG cement (The second report)

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Background: PRG cement contains S-PRG filler, has fluoride release and recharge ability as well as the ability to release various ion species.

Aim: The purpose of this study is to investigate the biological response of dental pulp cells derived from human deciduous teeth (HDPC-D) to evaluate the possibility, that PRG cement can be used for pulp capping.

Design: We studied four materials: two kinds of PRG cement, PRG(1) and PRG(2) (Shofu, Kyoto, Japan), Dycal (Dentsply Sankin, Tokyo, Japan), and Fuji Ionomer Cement Type II (GC, Tokyo, Japan). After each materials were mixed according to the manufacturer's instruction. Each cement were hardened, then placed in medium. Each material extracts were assessed ICP ion analysis and ion meter measured fluoride. We adjusted to the medium, which contained fluoride (F) ion or aluminum (Al) ion or F + Al ion. HDPC-D were cultured the medium, and we performed MTT assay and ALP assay.

Results: Ion analysis showed PRG cement multiply released F and Al ion compared with sample. MTT assay showed F ion and Al ion has no cytotoxicity compared with control. Both ions simultaneous were added in medium, both ions promoted cell proliferation. All sample increased ALP activity. In particular PRG (1) and (2), Both ions showed more increased compared with respective ion added.

Conclusions: Al ion and F ion in PRG extract may have stimulated proliferation of HDPC-D. We found out that PRG cement promotes proliferation of HDPC-D and dentin formation. We suggest that PRG cement has a good potential as pulp capping material.

PR08-1.42

Clinical evaluation of pulpotec as treatment options for pulpally involved primary anterior teeth

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Background: The primary objective of pulp therapy is to maintain the integrity and health of the teeth and their supporting tissues.

The indications, objectives, and type of pulpal therapy depend on whether the pulp is vital or nonvital, Formaldehyde derivates have been used as acceptable capping material for the fixation of the pulp for many years. Success rate of pulpotomy with formocresol has been comprised with electrosurgery, glutaraldehyde, mineral trioxide aggregate and vitapex .Pulpotec obturating paste (Produits Dentaires S.A., Switzerland) is radiopaque, non resorbable paste for the treatment of pulpitis by pulpotomy in vital molars, both permanent and deciduous.

Aim: The aim of this study was to compare the clinical and radiographic success of pulpotec and Mitapex for root canal treatment of pulpally involved primary anterior teeth.

Design: Thirty teeth from 20 healthy children aged 3–4 years with pulpally involved primary anterior 10 child were treated with pulpotec (group A) and 10 child were treated with Mitapex (metabiodent) (group B) The subjects were followed up clinically and Radiographically at 3 and 6 months, respectively.

Results: Clinical and radiographical examinations carried out on follow up visits revealed that all cases showed considerable clinical and radiographic success. There was no significant difference between grup A and B. However, group A rapid relief of pain and infection in comparison with group B.

Conclusion: Simplicity in use, absence of pain symptoms during the treatment, minimal instrumentation are positive outcome of clinical trials of 'Pulpotec' preparation enable to recommend it for use in extensive clinical practice.

PR08-1.43

A randomized controlled trial of ProRoot MTA™, OrthoMTA™, and RetroMTA™ for pulpotomy in primary molars

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Background: Mineral trioxide aggregate (MTA) pulpotomy of primary teeth has been conducted successfully for decades. Despite several clinical studies measuring the effects of MTA, as yet there has been no comparison of the clinical applicability of RetroMTA and OrthoMTA.

Aim: The aim of this study was to determine the clinical efficacy of the newly developed OrthoMTA and RetroMTA compared to conventionally used ProRoot MTA for pulpotomy in primary teeth.

Design: In this randomized clinical trial, 143 teeth were deemed suitable for pulpotomy, having met the tooth inclusion criteria, and were divided in a randomized, double-blind manner into three groups according to the planned treatment: RetroMTA ($n = 49$ teeth), OrthoMTA ($n = 47$ teeth), and ProRoot MTA ($n = 47$ teeth). Clinical and radiographic follow-up examinations were conducted at 3, 6, and 12 months postoperatively.

Results: By the end of the study period, 34 teeth had been lost to follow-up, so that 109 teeth were evaluated at 12 months ($n = 33, 38, and 38$ teeth in the ProRoot MTA, OrthoMTA, and RetroMTA groups, respectively). The radiographic success rates in these three groups were 100% (33/33), 94.7% (36/38), and 94.7% (36/38), respectively; the corresponding clinical success rates were 100% (33/33), 97.4% (37/38), and 100% (38/38). The Kaplan-Meier survival function curves relative to clinical and radiographic cumulative survival rates did not differ significantly between the three groups.

Conclusions: The success rates of RetroMTA, OrthoMTA, and ProRoot MTA are indistinguishable, indicating that pulpotomy can be carried out successfully in primary molars with the newly developed materials.

PR08-1.44**Comparison of cytotoxicity between resin infiltrant, Icon and novel radiopaque resin infiltrant**

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Background: Resin infiltrant, Icon® is not radiopaque on radiograph. The radiopacity has improved after addition of tin methacrylate, SnM which blends well with the resin monomer. However, there is cytotoxic concern regarding the usage of SnM.

Aim: The aim of this study is to compare the cytotoxic effect between resin infiltrant, Icon® and the novel radiopaque resin infiltrant.

Design: Three mixture of resin infiltrant, Icon® and SnM were prepared by weight, by the ratio of Icon®: SnM of 4:1, 2:1 and 1:1. The three mixtures of radiopaque resins and Icon® only underwent three cytotoxic tests, the MTT, Neutral Red (NR) uptake and DNA fluorometric assay. Degree of conversion (DC) of the materials was also determined, using Fourier Transform Infrared (FTIR) spectrometry. *T*-test was performed to test the null hypothesis that there is no statistically significant difference between Icon® and radiopaque resin infiltrant for all the tests performed.

Results: All three cytotoxic tests showed that all the resin materials were cytotoxic to the cell lines. The mixture of Icon®: SnM = 1:1 was the most toxic, followed by 4:1, 2:1 and Icon® respectively. Icon® has the highest DC, followed by Icon®: SnM = 4:1, 2:1 and 1:1 respectively. No significant difference was noted when compared the cytotoxicity and DC of radiopaque resin infiltrant to Icon®, except for Icon®: SnM = 1:1 ($P < 0.05$).

Conclusion: The Icon®-SnM compound did not have significant increase in cytotoxicity in concentration lower than 50%. Further research is needed to explore the potential usage of SnM as a radiopaque material.

PR08-1.45**Microleakage of endodontically treated teeth restored with polyactic acid absorbable screw post and film**

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Background: To date, all of the luting cement materials are not absorbable. When used to restore primary teeth, it may not allow subsequent smooth transition to permanent teeth.

Aim: To assess the sealing capability of polyactic acid absorbable posts and films in restoring primary teeth, using the method of microleakage.

Design: Fifty extracted maxillary central incisor were chemomechanically prepared, filled with gutta-percha and sealer. Then randomly divided into five groups,

group A: restored with polyactic acid absorbable posts and films. The posts were absorbable screw implants used in bone fractures, produced by Inion Oy. The absorbable films were formed by evaporating solvent of chloroform;

group B: using fiber posts cemented with ResiLute;

group C: using metal screw posts cemented with glass ionomer cemen;

group D and E were positive and negative controls.

After that, the teeth were immersed in Indian ink for 72 h separately. A buccolingual section was made through the vertical axis of specimens and a stereomicroscope was used to evaluate the deepest length of dye penetration. The *Kruskal-*

Wallis H nonparametric test was used to determine intergroup difference.

Results: A statistically significant difference of microleakage was observed among the three tested groups ($P = 0.002$). Group B was the lowest (0.50 ± 0.45) mm, followed by Group A (1.30 ± 0.77) mm and Group C (1.47 ± 0.41) mm. But no significant difference was observed between Group A and Group C ($P = 0.246$).

Conclusions: The sealing capability of polyactic acid absorbable film is as better as glass ionomer cement, it can be used to restore primary teeth with screw post.

PR08-1.46**Microtensile bond strength between polyactic acid absorbable post and composite resin core**

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Background: Polyactic acid (PLA) has been proved to be a good material as the post for the restoration of residual root and crown of the primary teeth.

Aim: To evaluate the effect of different surface treatments on the microtensile bond strength between PLA post and the composite resin core.

Design: Twenty-five PLA posts were randomly divided into 5 groups based on the surface treatments. Group A was coated with total-etch adhesive Prime&Bond NT (PB). Group B was coated with chloroform and then with PB. Groups C, D and E were coated with the mixture of chloroform and PB in proportion as 1:1, 1:2, 2:1, respectively. Group F with five quartz fiber posts was set as the control group, and was coated with PB. All treated posts were cemented with composite resin cores and shaped as rod-like bonding specimens and subjected to the microtensile bonding strength test. Failure modes of specimens were evaluated under a stereomicroscope ($\times 40$). Surface morphologies of two fractured specimens from each group were assessed by scanning electron microscopy.

Results: The microtensile bond strength of the five groups was (5.03 ± 1.48) MPa, (10.91 ± 1.61) MPa, (20.58 ± 3.35) MPa, (12.80 ± 2.77) MPa, (13.35 ± 3.21) MPa, (12.24 ± 1.40) MPa, respectively. The microtensile bond strength differed significantly among all the groups ($P = 0.000$), and was highest in group C. The fracture mode showed differences among all the groups ($P = 0.000$).

Conclusions: Coating the surface with the mixture of chloroform and PB in proportion as 1:1 showed better effect on improving the adhesive strength between resin core and PLA post.

PR08-1.47**Effect of calcium hydroxide medicaments on the anti-fracture strength of immature permanent teeth *in vitro***

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Background: According to some researches, the possibility of fracture on tooth cervical raises long after root canal filled with calcium hydroxide. Recently, researches into its influence on the intensity of dentin mostly focus on long-term root effects, but not short-term effects.

Aim: To compare the short-term effect of three different root canal filling medicaments with $\text{Ca}(\text{OH})_2$ on the anti-fracture strength of immature permanent teeth.

Design: This study included 140 human premolars extracted for orthodontic reasons, who were equally randomized to four groups: three trial and one control. The premolars in trial groups were respectively filled with mixture of Ca(OH)₂ and distilled water, Metapex and Vitapex as designed, those in the control were used to be blank. The anti-fracture strength of the teeth in experimental groups was tested at the time of 14 days, 1 month and 3 months, while the control group was tested at the 3rd month. Data were analyzed by S-N-K test.

Results: At the time of 14 days, the change of the anti-fracture strength of the teeth in experimental groups was not obvious. But it decreased statistically after the teeth filled with the three calcium hydroxide products for more than 1 month. After 3 months, the anti-fracture strength decreased 32.20%, 35.75% and 33.42% respectively.

Conclusions: The anti-fracture strength of immature permanent teeth decreased statistically after the treatment with calcium hydroxide-distilled water, Metapex or Vitapex for more than 1 month. It seemed that using of calcium hydroxide products should be limited in 2 weeks when they were used clinically.

PR08-1.48

Functional and aesthetic oral rehabilitation of hypohydrotic ectodermal dysplasia with severe oligodontia

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Hypohydrotic Ectodermal Dysplasia (HED) is a rare inherited multisystem disorder that typically affects the skin, hair, nails, eccrine glands, and teeth. This case report presents the conservative and prosthetic management in a case of HED with severe oligodontia.

A 4-year-old boy was referred to the Paediatric Dentistry Department for prosthetic management of multiple missing teeth. The patient had been previously diagnosed for HED and was followed by several Paediatric departments. Extraoral examination of the patient revealed typical features of HED including: dry, darkly pigmented skin, sparse hair and eyebrows, low facial height and unusually thick lips. Only two conically-shaped maxillary primary incisors were observed on intraoral examination. The treatment plan included aesthetic restoration of the maxillary primary incisors using monochrome composite resin, followed by fabrication of removable dentures for both dental arches. After 4 years, gingival recession and some mobility was evident which called for renewal of the dentures as well as the existing composite restorations using layered nanohybrid composite.

Growing HED patients with severe oligodontia cannot benefit from the advantages of dental implants, which in turn renders prosthetic and conservative treatment extremely difficult for both the patient and the clinician. Since natural abutment teeth can be exposed to excessive forces by the dentures, these patients should be recalled regularly. In the present case, the treatment provided a good outcome in terms of aesthetics and function.

PR08-1.49

Dental attendance of patients after treatment under general anaesthesia (DGA) - a data-based follow-up study

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Background: Most common self-reported causes for DGA are dental fear and dental caries - which both are associated with poor dental attendance.

Aim: The aim of this study was to monitor dental attendance of patients treated under DGA as well as procedures at follow-up visits.

Design: The study population comprised 66 patients, who received DGA during September 2010 - May 2011. The data were collected from electronic patient files covering the follow-up period September 2010 until June 2013. The data comprised the participants' age (years) and gender, number of appointments, type of the procedures (prevention/restoration/endodontic treatment/extraction) and missed/cancelled appointments. Associations of the variables were analysed using cross tabulation and means, frequencies and distributions were calculated; statistical significance between groups was determined by khi square test. SPSS 20.0 software was used for analyses.

Results: The group was slightly dominated (56.1%) by females. The mean age among the participants was 15.7 years SD12.8. On average, the participants had 4.4 visits during the follow-up (SD 3.21; min 0, $n = 3$ and max 17, $n = 1$). The proportion of missed/cancelled appointments was 14.9%. Missed/cancelled appointments occurred mostly on appointments 1–3 after DGA ($P = 0.011$). Most common procedures were dental restorations (mean 0.6 SD 1.04), followed by prevention (mean 0.3 SD 0.63) and extractions (mean 0.2 SD 0.58). On average, females had more preventive procedures ($P = 0.012$) but also more frequently sedation compared to the males (15.1% vs 10.9% of appointments).

Conclusions: Individuals commonly still need dental treatments after DGA. The proportion of missed/cancelled appointments is considerable.

PR08-1.50

Oral rehabilitation in pediatric dentistry patient

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Introduction: Dental caries is still one of the most common diseases that affect people around the world. It's a multifactorial disease. Biofilm accumulation in contact with the tooth during a period of time should determinate the white spot. Others factors are responsible to established the severity as modulating factors (biological and social). The International Caries Detection and Assessment System (ICDAS) has been constructed to auxiliary the dentist to define the correct treatment. Oral health has impact of quality of life, can affect physical and psychologic the patient, influencing how speak, chew, taste and socialize. In relation to the restorative material used in Pediatric Dentistry, composite resin and glass ionomer cement are the most usually.

Case reports: A 5-year-old boy reported a Pediatric Dentistry Clinic of Bahia School of Medicine and Public Health with complain of cavity in his anterior and posterior teeth. Clinical and radiographic examination revealed cavities in 51, 52, 54, 55, 61, 62, 63, 73, 74, 83 and 84. Treatment plan was propose to the

stepmother to authorize it. In every visit oral health orientation and fluoride has been applied. Were used composite Z350 (3M) in 51, 52, 61, 62, 63, 73, 83 and RIVA glass ionomer cement (SDI) in 55, 54, 64, 74 and 84. Patient and stepmother were satisfied with the result.

Comments: Pediatric dentist may evaluate oral conditions to make correct diagnosis and treatment plan. The professional is co-responsible to the patient quality of life.

PR08-1.51

An audit of general dental practitioner registration for patients in the department of paediatric dentistry

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Background: It is important for paediatric patients to continue to see their General Dental Practitioner (GDP) whilst receiving secondary care to ensure appropriate delegation and continuity of and access to ongoing care. During shared care, good communication is vital. Registration and communication with GDPs had

previously been audited but there were anecdotal concerns that this had become a problem again.

Aim: To determine the proportion of paediatric patients who are registered with and continue to see their primary care dentist. Secondly, to ascertain if communication between the dental hospital and primary care was adequate.

Design: A third cycle of an audit was undertaken in 2014 in Newcastle Dental Hospital. The first 2 cycles were in 2006 and 2007. The standards set were for 100% of patients to be registered with/attending a GDP and for 100% of GDPs to have received a letter. A consecutive sample was taken of all patients attending during a two week period. Parents were asked about GDP registration and other information was derived from retrospective review of the notes.

Results: The results showed that 90% of patients were registered with a GDP with only 46% being seen regularly. A letter of correspondence was found in 80% of cases. Results were always better for staff's patients than students'.

Conclusions: None of the standards were fully met. This aspect of practice should be re-audited in 6 months after all relevant staff members are made aware of the changes required.

Restorative Dentistry Poster Session Two – PR08–2

PR08-2.01

Effect of different parameters of Er:YAG laser irradiations on class V composite restorations: a microleakage study

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Aim: The purpose of this *in vitro* study was to compare different parameters of Er:YAG laser irradiations on the marginal microleakage of Class V resin composite restorations.

Design: Cavities prepared on both buccal and lingual surface of 50 premolars by Er:YAG laser or bur and divided into nine groups. The occlusal margins were in enamel and the cervical margins were in cementum.

Group 1: bur preparation;

Group 2: laser preparation (lp) (600 mJ/5 Hz);

Group 3: lp (300 mJ/10 Hz);

Group 4: lp (200 mJ/15 Hz);

Group 5: lp (150 mJ/20 Hz);

Group 6: lp (200 mJ/20 Hz);

Group 7: lp (300 mJ/14 Hz);

Group 8: lp (400 mJ/10 Hz);

Group 9: lp (700 mJ/5 Hz).

All teeth were stored in distilled water at 37°C for 24 h, then thermocycled 1000 times (5–55°C). Teeth which were prepared for the microleakage test, immersed in 0.5% methylene blue dye for 24 h. After immersing, the teeth were sectioned and observed under a stereomicroscope for dye penetration. Data were analyzed by Kruskal-Wallis and Mann-Whitney U tests ($P < 0.05$).

Results: More microleakage was observed in cervical regions compared to occlusal regions in all groups ($P < 0.05$) except for Group 6 ($P > 0.05$). No significant difference was observed among all groups in terms of occlusal and cervical surfaces, separately ($P > 0.05$).

Conclusion: It may be concluded that the cavities prepared by Er:YAG laser showed higher degree of microleakage than bur prepared at cervical regions. Different parameters of Er:YAG laser irradiations did not affect microleakage.

PR08-2.02

Response of pulp to MTA and N-hexyl cyanoacrylate in pulpotomies of rat's teeth

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Introduction: The treatment chosen for exposed pulp in primary teeth with reversible pulpitis, or after a traumatic injury, is pulpotomy. Numerous agents have been used for pulpotomies. To date, MTA (mineral trioxide aggregate) is the most used material, but its cost is still high. N-Hexyl Cyanoacrylate is an adhesive material used as an alternative during surgery to staples, sutures

or any other form patch. It has a long anti-bacterial effect, adhesiveness, haemostatic and rapid repair tissue.

Aim: To evaluate the response of the pulp in rats' teeth when N-hexyl Cyanoacrylate is used as an agent for pulpotomies, and to compare its histological effect with histological effect of MTA.

Design: 12 female Wistar rats with an approximate weight of 150 g were used. Two groups were established, MTA and N-hexyl Cyanoacrylate. Pulpotomies were carried out in the upper first molars of each rat and the material was applied. After 30 days the rats were killed and the fragments with teeth were extracted from the maxilla. These were decalcified and studied histologically. The degree of pulp inflammation was studied, any dentinal bridge and reparative dentin in the root canals, the presence of the odontoblastic layer and pulp fibrosis.

Results: Inflammation was not observed in the groups studied. The MTA group was associated with a greater number of dentinal bridge. In the N-hexyl Cyanoacrylate group we found an irregular odontoblastic layer calcifications in other localization and absence of pulp fibrosis.

Conclusions: Although the results obtained with N-hexyl Cyanoacrylate are acceptable, more studies are required to determine its behavior regarding dental pulp.

PR08-2.03

Clinical performance of compomer strip crowns in primary incisors, in children with high risk caries who underwent GA

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Background: Esthetic restoration of primary incisors is challenging. Teeth with multiple-surface carious lesions, when pulpal therapy is indicated usually are extracted in children with high risk caries. In children treated under GA, even when there is inadequate tooth structure, strip crown restorations allowed to restore esthetic and function.

Aim: The purpose of this retrospective study was to evaluate the longevity of compomer strip crowns restorations placed in primary incisors after pulpectomy in children who underwent GA.

Design: Dental records of 72 children who underwent GA at a specialized practice during 2010–2014 were studied. Only children who report on recall visits were included.

Results: In group of 72 children, who underwent 74 GA, in age from 21 to 152 months (mean 52) 601 teeth were restored, 152 extracted, 96 pulpotomies and 63 pulpectomies were performed. In this group 49 primary incisors after pulpectomy were restored with full coronal, compomer strip crowns with one step adhesive. All procedures were performed by one operator. Mean observation period was 30 months. 86% (43) of strip crowns were completely retained. 6% (3) were partially lost (2 in lateral incisors and 1 in central incisor) and 8% (4) were completely lost (3 in lateral incisors and 1 in central incisor).

Conclusions: Full coronal restorations with strip crowns in extensively decayed primary incisors, after pulpectomy were successful treatment. When there is minimal tooth structure remaining after preparation, especially in lateral primary incisors, there is more risk of total or partial loss of restoration.

PR08-2.04

Bonding of self-adhering flowable composite-resin versus total-etch to dentin surface of permanent molarsM. A. RASHED¹, F. K. ABDEL GAWAD¹, M. A. MOHAMMED² & R. M. ABDELRAOUF³¹*Pediatric Dentistry and Dental Public Health, Faculty of Oral and Dental Medicine, Cairo University, Giza, Egypt;* ²*Pediatric and Community Dentistry, Faculty of Oral and Dental Medicine, October 6 University, Giza, Egypt;* ³*Biomaterial, Faculty of Oral and Dental Medicine, Cairo University, Giza, Egypt***Background:** A unique self-adhering flowable composite-resin combines resin technology of composites and adhesives, eliminating the need for separate etching and bonding steps.**Aim:** Evaluation of bond strength of self-adhering flowable composite-resin vs total-etch to dentin surface of permanent molars.**Design:** Twelve-freshly extracted sound human permanent molars were used. The teeth were embedded in acrylic blocks, such that their buccal surfaces were shown and aligned with the acrylic surfaces. The teeth surfaces were subjected to grinding till exposing dentin. The teeth were randomly divided into two groups, Group I: Self-adhering flowable composite-resin (Dyad™-flow, Kerr, USA);

Group II: Total-etch flowable composite-resin necessitate etching and bonding (Filtek™Z350-XT, 3M-ESPE, USA).

Specially designed holed-split Teflon mould was used for constructing composite-resin cylinders (3 × 3 mm) over the buccal surfaces of the mounted teeth.

For group I, the composite-resin was applied in the mould upon tooth surface and light-cured for 20 s.

For group II using the mould the following steps were performed:

- 1) acid etching (30 s),
- 2) bonding-agent (light-curing 20 s) and
- 3) composite-resin (light-curing 20 s).

The teeth were stored in 37°C distillate-water for 72 h. The shear bond strength was recorded blindly by a different assessor using universal-testing-machine and statistically analyzed. Modes of failure were studied using digital-microscope.

Results: Mean values of shear bond strength for groups I and II were 4.3 and 6.7 MPa respectively with significant difference $P = 0.03$ (P value ≤ 0.05). Modes of failure for both groups were 100% adhesive.**Conclusions:** Bonding to dentin still represents a challenge. However, self-adhering Dyad™-flow needs modifications to be comparable to total-etch Filtek™ Z350-XT.

PR08-2.05

Shear bond strength of two different types of flowable composite-resin to enamel surface of deciduous molarsM. A. MOHAMMED¹, M. A. RASHED², F. K. ABDEL GAWAD² & R. M. ABDELRAOUF³¹*Pediatric and Community Dentistry, Faculty of Oral and Dental Medicine, October 6 University, Giza, Egypt;* ²*Pediatric Dentistry and Dental Public Health, Faculty of Oral and Dental Medicine, Cairo University, Giza, Egypt;* ³*Biomaterial, Faculty of Oral and Dental Medicine, Cairo University, Giza, Egypt***Background:** Self-adhering flowable composite-resin reduces application time, but its bonding is still questionable.**Aim:** Evaluation of bond strength of a self-adhering flowable composite-resin vs total-etch and bond to cut enamel surfaces of deciduous molars.**Design:** Twelve-freshly extracted sound human deciduous molars were used. The teeth were embedded in acrylic blocks, such that their buccal surfaces were shown and aligned with the acrylic surfaces. The enamel surfaces were subjected to minimal grinding. The teeth were randomly divided into two groups, Group I: Self-adhering flowable composite-resin (Dyad™-flow, Kerr, USA); Group II: Total-etch flowable composite-resin necessitate etching and bonding (Filtek™Z350-XT, 3M-ESPE, USA). A specially designed holed-split Teflon mould was used for constructing composite-resin cylinders (3 × 3 mm) over the buccal surfaces of the mounted teeth. For group I, composite-resin was applied on tooth surface using the mould and light-cured for 20 s. For group II, using the mould the following steps were performed:

- 1) acid etching (60 s),
- 2) bonding agent (light-curing 20 s) and
- 3) composite-resin (light-curing 20 s).

The teeth were stored in 37°C distillate water for 24 h. The shear bond strength was recorded blindly by a different assessor using universal testing machine and statistically analyzed. Modes of failure were studied using digital microscope.

Results: Mean values of bond strength for groups I and II were 5 and 21.6 MPa respectively with highly significant difference $P = 0.005$ (P value ≤ 0.01). Modes of failure for groups I and II were [100% adhesive] and [16.7% cohesive within tooth +83.33% mixed] respectively.**Conclusions:** The bonding performance of Dyad™-flow composite-resin still needs further enhancement.

PR08-2.06

Clinical evaluation of microabrasion and resin infiltration applications on white spot lesions

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*Pediatric Dentistry, Gazi University Faculty of Dentistry, Ankara, Turkey***Background:** White spot lesions (WSLs) are enamel lesions that look white and opaque. Several techniques have been proposed to improve the appearance of arrested WSLs.**Aim:** After the application of microabrasion paste (Opalustre®) and resin infiltrant (Icon®) on WSLs, masking of the lesions, changes in their color and structure of the lesions were evaluated clinically.**Design:** The procedure applied to 68 permanent anterior teeth of 13 children with symmetric WSLs on their vestibular surface. ICDAS criteria and L*, a*, b*, ΔE values were used for evaluation of performance of the materials on masking WSLs. By using DiagnoDent Pen®, structural changes which occur inside the lesions in time were examined. Measurements were performed before and right after the application, and were repeated at 1st week, 3rd month and 6th month after the application.**Results:** According to the ICDAS scores, L*, ΔE values and VITA scores, after 6 month of the application, findings which are statistically insignificant ($P > 0.05$) shows that Icon® was more effective in comparison to the other group in masking WSLs. Considering to the Diagnodent Pen® scores which are statistically insignificant as well ($P > 0.05$), improvement of the WSLs in Icon® group was appeared to be more distinctive than the other group. As a result, both materials found to have effectiveness in masking WSLs, whereas after 6 months later their effects were diminished.**Conclusions:** Icon®, which found to be more successful in masking the WSLs on the children's permanent teeth, is recommended to be applied in every 6 months repeatedly.

PR08-2.07

Pediatric preformed crowns in a dental school clinic: parents' preference and reasons for choice

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Background: Optimal restorative treatment for primary molars following endodontic treatment should fully cover tooth surfaces, usually via pediatric preformed crowns. These crowns, initially available in stainless steel material, exist now as pre-veneered stainless steel or zirconia preformed crowns, allowing a choice for primary molars. The latter crowns present a more esthetic alternative but necessitate more tissue removal for preparation and are more costly than stainless steel preformed crowns, therefore parents' choice may depend on several factors.

Aim: To determine the criteria upon which parents choose pediatric preformed crown types as restorations for their children's endodontically treated primary molars.

Design: In this prospective study conducted at the Pediatric Dentistry department clinic - Saint Joseph University - School of Dental Medicine (Beirut, Lebanon) over 24 months, parents of children necessitating endodontic primary molar treatment answered a questionnaire regarding their preference for post-endodontic restoration of treated teeth, before and after an information session on restorative options types (filling or crown), materials (composite, stainless steel, zirconia), and characteristics (esthetics, durability, type of tooth preparation, cost).

Results: Of 1814 crown restorations, 3.74% were esthetic (year 1: 0.22%, year 2: 3.52%), chosen mostly for "pleasant aspect" and "child self-esteem". Stainless steel (96.26%) was chosen foremost for "cost", followed by "expected tooth lifespan" and "less tooth structure loss". Choices were statistically similar before and after the information session.

Conclusions: Parents' choice appears financially motivated; however an increased demand for esthetic crowns noted over time suggests the need for further investigations to ascertain the results.

PR08-2.08

Healing with incomplete root development after 40 months following revascularization: a case report

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Introduction: For both patients and dentists, endodontic treatment of an immature permanent tooth with pulp necrosis is very difficult and time consuming. In recent years, the concept of 'Pulp Revascularization' therapy has been developed that employs the use of a mixture of antibacterial drugs for disinfection of infected root canals.

Case reports: A 13-year-old girl with an immature permanent premolar tooth (#35) with pulp necrosis, was referred to our clinic. After clinical and radiographic examination it was observed that the tooth had a deep carious lesion and had an immature apex with periapical radiolucency. According to vitality, percussion and palpation exams the tooth was diagnosed with pulp necrosis and chronic apical abscess. Revascularization treatment with triantibiotic mix (including ciprofloxacin, metronidazole, minocycline) was administered for 2 weeks. Then a blood clot was created in the canal, over which mineral trioxide aggregate was placed. After 40 months follow up, the tooth was asymptomatic, there was radiographic evidence of healing of periapical lesion with a positive response to the pulp test.

Although long term follow up, no evidence of root development was observed.

Comments: In spite of numerous reports of revascularization treatment in literature, no incomplete root development was reported after long term follow up. The disinfection of root canals may have provided healing periapical lesion however incomplete root development may be the reason of insufficient remaining vital tissue for regeneration. Although incomplete root development, positive response to the pulp test is controversial.

PR08-2.09

Regenerative endodontic treatment of an immature permanent molar with a necrotic pulp: a case report

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Introduction: Loss of vitality in an immature tooth due to deep caries or trauma affects development of the root negatively and cause leaving the tooth with thin root canal walls and open apex.

Case reports: A 7-year-old male patient presented with deep caries on the mandibular right first molar tooth with a necrotic pulp. Radiographic examination revealed that an incompletely developed root with an open apex. The tooth was clinically asymptomatic. Under local anaesthesia and rubber dam isolation, the access cavity was prepared. After the necrotic pulpal remnants were removed, the canal was irrigated with 5.25% NaOCl solution without mechanical instrumentation. A triple antibiotic mixture (metronidazole, ciprofloxacin and doxycycline) was packed in the canal and left for 14 days. At the next appointment, after removal of the antibiotic mixture, a blood clot was created inside the canal, and then white mineral trioxide aggregate was placed into the coronal third of the canal. Two days later the tooth was restored with stainless steel crown. The patient was recalled for further examinations during 1, 3, 6, 12 months of clinical/radiographic follow-up. At 12 month follow up, the tooth was clinically and radiographically asymptomatic and length of the root had increased.

Comments: Regeneration is an effective and viable treatment method that allows continuous root development of immature teeth with necrotic pulps.

PR08-2.10

Clinical and radiographic evaluation of MedCem Portland Cement in pulpotomies of primary molars: a pilot study

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Background: An ideal pulpotomy agent for primary molars has been sought for many years, but no good alternative to Formocresol has been identified.

Aim: To compare the preliminary results of MedCem Portland Cement (MedCem PC) and Mineral trioxide aggregate (MTA) when used as pulp agents in pulpotomies of primary molars.

Design: The study involved 30 healthy male and female patients from 4 to 9 years of age with at least one or more cavities in their primary teeth that needed pulp treatment. Thirty primary molars that required pulp treatment were allocated randomly to the MTA and MedCem PC groups. Clinical and radiographic evaluations were performed 6 months after treatment. All teeth were restored with a reinforced zinc oxide-eugenol base and stainless steel crowns. Statistical analysis using Fischer's exact test was performed to determine significant differences between the groups.

Results: Both of the MTA and MedCem PC groups showed 100% clinical and radiographic success after 6 months of follow-up.

Conclusions: MedCem PC may be a promising alternative for use in pulpotomies of primary molars although studies with longer follow-up times are required to confirm this.

PR08-2.11

Immature permanent teeth with apical periodontitis treated with apexogenesis technique: a report of case

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Introduction: Most apical periodontitis of immature permanent premolars are come by deformities secondary pulp infection after central cusps broken. This report will introduce a clinically successful for treatment of immature with apical periodontitis treated with apexogenesis method.

Case reports: A healthy 12-year-old boy was referred to our hospital with lingering pain on chewing on the right side of his upper jaw. Clinical examination revealed a broken central tip on the upper right first premolar, with notable localized swelling in the buccal mucosa and also sensitivity to percussion and palpation. The teeth showed serious mobility. The teeth had immature roots and apical pathosis in the radiographs. Considering our clinical tests, our treatment plan considering the immaturity of the tooth was apexogenesis. During recall results, we observed necrotic immature permanent teeth can achieve continued buccal and palatal to divide two root structure development after 22 months after treatment.

Comments: Immature permanent teeth as a special stage in the process of tooth development, apical Zone dental papilla organization has a strong ability of anti infectious and tissue repair.

PR08-2.12

The effect of Er:YAG laser irradiation on the bond strength of fiber-reinforced composite with various adhesive systems to dentin

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Background: Er:YAG lasers have been used for conditioning the dentin surface for increasing bond strength of composite to dentin. There are many studies evaluated the effect of Er:YAG lasers on microtensile bond strength of various composites and adhesive systems to dentin. However, there is no study conducted with fiber-reinforced composites(FRC).

Aim: This study was designed to compare microtensile bond strength of a fiber-reinforced composite to dentin conditioned by Er:YAG laser and conventional techniques in human molars.

Design: This in-vitro study was conducted on freshly extracted 48 caries-free human molars. Teeth were divided randomly into 12 following groups: **G1:** TE + FRC; **G2:** SE + FRC; **G3:** UAS + FRC; **G4:** TE + UR; **G5:** SE + UR; **G6:** UAS + UR; **G7:** Er:YAG laser + TE + FRC; **G8:** Er:YAG laser + SE + FRC; **G9:** Er:YAG laser + UAS + FRC; **G10:** Er:YAG laser + TE + UR; **G11:** Er:YAG laser + SE + UR; **G12:** Er:YAG laser + UAS + UR.

(TE: Total etch, SE: Self etch adhesive system, UAS: Universal adhesive system, UR: Universal composite, FRC: Fiber-reinforced composite).

Restorations were thermocycled and samples (1 × 1 mm²) were tested on universal testing machine. The data was analyzed by three-way ANOVA and Bonferroni tests ($P = 0.05$).

Results: There was a significant difference between the groups (laser and control) and adhesives and the overall bond strength

of restorative materials ($P < 0.05$). As restorative materials were compared, there was a significant difference between G2-G5 and G9-G12. According to the adhesives, G1-G3, G5-G6, G10-G12 and G11-G12 were significantly different. A significant difference was found between G5-G11 and G6-G12 in comparison with laser and control groups.

Conclusions: Bond strength was effected by Er:YAG laser based on restorative materials and adhesive systems used.

PR08-2.13

Effect of Er:YAG laser irradiation after silver-diamine-fluoride and ammonium hexafluorosilicate applications on the microtensile-bond-strength in sound and caries-affected-dentin and changes in the structure of dentin

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Background: Cariostatic and preventive agents are applied to create caries-resistant dentin surfaces and may affect subsequent resin bonding.

Aim: The aim of this study was to investigate the effect of different agents with/without Er:YAG laser irradiation on the microtensile bond strength (μ TBS) of resin composite to sound dentin (SD) and caries-affected-dentin (CAD), and to assess morphological and chemical changes in the specimens.

Design: 84 extracted molars were divided into a control (deionized water) and two experimental groups [ammonium hexafluorosilicate (AHF), silver diamine fluoride (SDF)] that subdivided according to different conditions (SD, CAD, SD + laser irradiation, CAD + laser irradiation). After surface treatment procedures, the teeth were restored and the μ TBS was tested with a universal testing machine. Moreover, twelve teeth for each group were prepared to analyze the surface morphological changes after application of preventive agents with/without laser irradiation. Morphological changes of the surface and elemental analysis were investigated using SEM-EDS. The data were analyzed using Kruskal-Wallis and Mann Whitney-U tests.

Results: SDF and AHF applications reduced the μ TBS values in both SD and CAD groups ($P < 0.05$). Laser irradiation increased the μ TBS values in AHF groups, the values was adversely affected in SDF groups ($P < 0.05$). Fluoride content of the specimens increased in all of the treatment groups compared with control group. Silver content was detected only in SDF groups and silicon was detected only AHF groups.

Conclusions: The μ TBS values of resin composite, surface morphology and chemical characteristics of dentin were affected by the material type, dentin condition and laser irradiation.

PR08-2.14

Analysis of the composition and maturation of a new tricalcium silicate cement - Medcem MTA[®]

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Background: Medcem MTA[®] GmbH (Weinfelden, Switzerland) is a second generation MTA consisting of pure Portland cement and zirconium oxide as radiopacifier.

Aim: To evaluate the maturation of the setting cement using Medcem MTA[®] powder as reference and to monitor the formation of calcium hydroxide at different time intervals.

Design: Energy-dispersive X-ray (EDX), Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD) and Fourier Transformation Infrared spectroscopy (FT-IR) analysis was performed on Medcem MTA[®] powder for composition analysis and baseline reference. The cement was mixed according to manufacturer's instructions. Samples were randomly divided and stored in either water or 100% relative humidity (RH). XRD and FT-IR analysis were performed after 12 min, 3 h, 1, 7, 14, 21 and 28 days.

Results: Predominantly homogenous distribution of calcium and silicon was observed in SEM and EDX analysis of the powder. Back scattered analysis highlighted the homogenous repartition of zirconium oxide over the cement surface. Elemental presence of calcium, silicon, zirconium and aluminium were confirmed by EDX analysis. XRD analysis of the powder enabled identification of all major components mentioned by the manufacturer. XRD and FT-IR analysis at different time intervals of maturation revealed the formation of calcium hydroxide in samples stored in water. Calcium hydroxide formation was absent when stored in RH.

Conclusions: During maturation, Medcem MTA[®] requires moisture in the surrounding for the formation of calcium hydroxide. Chemically, Medcem MTA[®] and ProRoot[®] white MTA are tricalcium silicate based hydraulic cements with almost similar constituents and setting reaction barring few exceptions.

PR08-2.15

Density and tubular diameter in different dentin depths associated with bond strength

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Background: The influence of the density and diameter of the different dentin depths has been reported in the dentin bond strength (BS) related with two high viscosity glass ionomer cement.

Design: 20 permanent molars were divided into 6 groups according to the dentin depth and GIC. Slices were obtained from Proximal Dentin (P), occlusal surface (OS) and deep occlusal (DO) 1 mm thick each. Then topographic analysis was performed to obtain diameter and density by tubular confocal microscopy (100×). Polyethylene cannulae were positioned on the sections pretreated with dentin and filled. The specimens were stored in distilled water for 24 h at 37°C and subjected to microshear Test (0.5 mm/min). Data were analyzed by ANOVA and Tukey's test ($\alpha = 5\%$).

Results: Significant differences were found between the tubular density at different depths (P: 30036.46 ± 4472.14; OS: 29665.35 ± 6232.00; OP: 43942.88 ± 10039.69). On the other hand, there was no difference in relation to tubular diameter (P: 19.6 ± 0.84; OS: 19.1 ± 0.67; OP: 18.8 ± 1.36). It was also verify that OS dentin provided highest bond strength, regardless of the GIC, while the OP caused lower, especially for Ketac Molar (P - FUJI IX: 3.6 ± 1.0; Ketac Molar: 3, 4 ± 1.6; OS - FUJI IX: 4.7 ± 1.8; Ketac Molar: 5.0 ± 1.2; OP - FUJI IX: 3.2 ± 1.0; Ketac Molar: 2.8 ± 1.2).

Conclusions: The density of the dentin tubules at different depths is inversely proportional to BS of high viscosity GICs.

PR08-2.16

Fracture resistance of two types of full ceramic crowns restoring primary teeth

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Background: Restoration of mutilated primary teeth has been always a challenge. Recently, esthetic crowns have facilitated these restorations to quite an extent. Fracture and dislodgment are the main causes of failure.

Aim: To compare fracture resistance of full ceramic restorative systems by two manufacturers (NU-Smile and Zirzk crowns) and to determine the maximum load to failure using an *in vitro* test.

Design: A total of 24 full ceramic crowns, 12 from each type were used and inspected using light microscopy at 10× to determine any pre-existing cracks. Natural primary incisors were prepared and rounded allowing a passive fit of the crowns. Each crown was individually cemented with glass ionomer to the underlying abutment. Each crown/abutment system was axially loaded with a dynamic load applied at a position one-third of the way down the inciso-palatine surface by mean of a specially designed stainless steel pointed tip in a universal testing machine. The load at which failure occurred was recorded in kilograms. The data were analyzed using one-way analysis of variance (ANOVA) and Tukey HSD test (P -value <0.05).

Results: There was no significant difference in fracture resistance of both types of crowns. The Mean load in Kg for Nu-Smile was 29.6 ± 5.5 and that for Zirzk was 27.3 ± 18.4 ($P = 0.178$). However higher prevalence of cracking occurred within Zirzk crowns ($P = 0.016$).

Conclusion: Both tested types of crown restoration showed almost comparable fracture resistance values. Nu-Smile crowns showed better resistance to cracking under load than Zirzk crowns.

Keywords: Esthetic Primary Crowns, Zirconia Crowns, Fracture Toughness

PR08-2.17

Revascularization treatment of necrotic immature permanent tooth - a case report

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Introduction: Pulp revascularization is a regenerative endodontic procedure which allows continued root development in nonvital immature permanent teeth. The ability of residual pulpal, periodontal and apical stem cell to differentiate and growth in the canal space with blood clot as a scaffold rich in growth factors, generate vital tissue and promote root maturation.

Case reports: A 12-years-old boy was referred to our Department for evaluation of the upper right permanent incisor. The patient had a tooth avulsion 4 years ago. The tooth was replanted and splinted within 30 min of trauma. After splint removal the patient was not followed-up. Clinical examination showed discoloration of the crown, infraocclusion and the presence of sinus tract in the apical area. Radiographic examination showed incomplete root development and a periapical lesion. Revascularization was achieved through multiple procedures. During the first visit the necrotic pulp tissue was removed, the canal was irrigated with 5.25% NaOCl and an antiseptic was set in the pulp chamber. Seven days later a mixture of metronidazol, ciprofloxacin and doxycyclin was placed into the canal. After 7 days periapical bleeding was induced and blood clot in the first third of the root canal was stabilised with

paste of Ca(OH)₂. Finally, after one week MTA was placed over coagulated blood. A 9-month follow-up showed radiographic evidence of periapical healing and root development.

Comments: Revascularization could be useful procedure in treating immature permanent teeth with necrotic pulp providing further growth and development of the root.

PR08-2.18

Fixed aesthetic appliance for replacing lost anterior primary teeth: a case series

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Introduction: Anterior primary teeth provide aesthetics to a child. They are important part of the oral cavity for providing proper speech and psychological well being of the child. Early loss of these anterior primary teeth can happen due to extensive Early Childhood Caries or dental trauma. This loss in turn can affect the child's aesthetics, phonetics and psychological well being. This case series describes clinical cases with a fixed aesthetic appliance for replacing lost anterior primary teeth.

Case reports: This case series describes the utilization of a fixed aesthetic appliance which incorporates composite resin strip crowns attached to a metal framework made of 0.032 round stainless steel wire soldered together with preformed metal bands over the posterior primary teeth. The appliance is cemented on the primary molars utilizing a glass ionomer luting cement. All the children were followed up for review at frequent intervals during which they showed excellent gingival health and gingival adaptation. The regenerated gingiva and interdental papilla in between and around the composite resin strip crowns attached to the appliance showed natural aesthetics of the children.

Comments: The case series described provide a simple and easy design for fixed replacement of lost anterior primary teeth in children. The utilization of composite resin strip crowns and the excellent gingival health and adaptation further increases the natural aesthetics of the children.

PR08-2.19

Treating early loss of primary teeth: effectiveness of fixed prosthesis

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Background: The early loss of primary teeth is not only a functional problem for children, we have to face psychosocial problems. There are many solutions to restore dental function, but there are not many studies that investigate the effectiveness of these devices.

Aim: The aim of this retrospective, longitudinal study is to evaluate the effectiveness of fixed prosthesis with metallic crowns in temporary molars, used to restore teeth that were early lost. To evaluate this we studied:

-Etiology of the loss.

-Time that the device was carried.

-Problems with the device, and other variables.

Design: A total of 83 children attending a private dentist consult in Madrid were invited to enter the study. Clinical information relating to the child's dental information was collected from patient records. This includes radiographic and photographic images during and after treatment. A descriptive analysis was conducted and a cross sectional analysis was made in order to evaluate the relation between the variables.

Results: The most common reason of the early tooth loss was a traumatic cause (93%), being more common this loss in males

than females (63%). The mean time carrying the device is 2.5 years. The fracture of the weld in the prosthesis was the most common problem with the devices (31%), followed by the fracture of the crowns (25%).

Conclusions: We suggest, in the results of this study, that more studies of this type of devices should be conducted in order to evaluate their effectiveness.

PR08-2.20

Success rates of pulp protection with either Dycal[®] and Vitrebond[™] or Biodentine[™] in young permanent teeth with deep caries of patients 6–18 years old

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Background: Calcium hydroxide and glass ionomer cement were commonly used as a liner and base in deep cavity. New calcium-silicate based cement (Biodentine[™]) was recently introduced as a dentin substitute. At present, there have been no studies comparing the success rates of pulp protection with Dycal[®] and Vitrebond[™] to Biodentine[™] in young permanent teeth with deep caries.

Aim: To compare success rates of pulp protection with either Dycal[®] and Vitrebond[™] or Biodentine[™] in young permanent teeth with deep caries.

Design: Nineteen teeth with deep caries diagnosed with normal pulp or reversible pulpitis from 19 subjects (mean age 9.5 years old) were available for 6 months follow up. Four percent articaine with 1:100,000 epinephrine was administered and rubber dam was placed. Dental caries was removed until the hardness of dentin was felt. The cavity was irrigated with 2% Chlorhexidine. Then, the teeth were randomly assigned into 2 groups of pulp protection: Group Dycal[®] and Vitrebond[™] and Group Biodentine[™]. The tooth was finally restored with composite resin or stainless steel crown. After 6 months, all teeth received the clinical and radiographic evaluations.

Results: The overall success rates of pulp protection with Dycal[®] and Vitrebond[™] was 100% (8/8 teeth) and was 90% (10/11 teeth) in Biodentine[™] (mean follow up 9.7 months). There was no statistically significant difference between the success rates of both groups ($P = 0.38$).

Conclusions: Dycal[®] and Vitrebond[™] or Biodentine[™] can be appropriately used as pulp protection in young permanent teeth. However, more samples and follow up are needed.

PR08-2.21

Effect of nitrous oxide/oxygen inhalation sedation on the success rate of pulpal anesthesia in subjects with irreversible pulpitis premedicated with ibuprofen

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Background: To increase success rates of pulpal anesthesia in irreversible pulpitis teeth, several methods have been reported with wide range of success. However, there have been no studies that evaluate the success of the combination of pre-emptive NSAIDS and nitrous oxide sedation.

Aim: To compare the success rates of pulpal anesthesia between the groups using either nitrous oxide or oxygen in subjects with irreversible pulpitis premedicated with ibuprofen.

Design: Forty seven asymptomatic and symptomatic irreversible pulpitis teeth from 39 subjects (mean age 10.4 years old) were included into the study. All subjects were premedicated with ibuprofen. Subjects in both groups were randomly assigned to either the nitrous oxide or oxygen group. Four percent articaine with epinephrine 1:100,000 were administered and treatment was performed. Participants used Wong Baker Faces Pain Rating Scale

(WBFPS) to self-report their pain during the procedure. WBFPS score higher than 4 indicated the failure of pulpal anesthesia.

Results: In all studied teeth, the success rate of pulpal anesthesia were 68% (17/25) and 45% (10/22) in the nitrous oxide and oxygen groups respectively and there was no statistically significant difference between them ($P = 0.119$). However, in the group of symptomatic irreversible teeth, the success rates of pulpal anesthesia were 63% (10/16) and 18% (2/11) in the nitrous oxide and oxygen groups respectively. There was statistically significant difference between them ($P = 0.047$).

Conclusions: Nitrous oxide can increase the success rate of pulpal anesthesia in subjects with symptomatic irreversible pulpitis pre-medicated with ibuprofen.

PR08-2.22

Smile for life: management of dental anomalies in a child with acute myeloid leukemia in Sri Lanka

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Introduction: Acute myeloid leukaemia is a genetically heterogeneous group of malignant bone marrow neoplasms of myeloid precursors of white blood cells. It is rare and presents approximately 5% of all childhood leukaemias with an incidence of 1.6–2.2 per million per year. The treatment modalities involve chemotherapy, radiotherapy, and/or bone marrow transplant contributing to significant improvement in survival of children with an overall survival rate of 60–70%. However, there is a considerable impact on quality of life of affected children compounded by oral health problems and dental anomalies such as enamel hypoplasia, microdontia and dental agenesis. We describe dental management in a 12-year-old girl presented at the age of 6-years from Sri Lanka.

Case reports: A 6-year-old girl presented to the Restorative Clinic with brownish, hypoplastic permanent teeth with the diagnosis of acute myeloid leukaemia -N7. She was on chemotherapy from the age of 10 months to 4 years. Her oral hygiene was improved and stainless steel crowns were placed on four first permanent molars. Enamel hypoplasia was present in 11, 21, 26, 36, 32 and 31, 41, 42 and 46. They were treated with composite fillings over a period of 6 years as intermediate management; the definitive treatment would be porcelain veneers. She has been referred for orthodontic treatment for anterior open bite.

Comments: Long term, interdisciplinary management of dental anomalies involving restorative and orthodontic care is essential to ensure *smile for life* of a surviving adolescent of acute myeloid leukaemia. This case-report highlights the context in a developing country.

PR08-2.23

Effect of curing depth on polymerization of light-cured composite resins

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Background: All resin constituents hinder the passage of incident light through uncured resin. As a result, incident light does not reach the bottom surface uniformly and then, polymerization differs through resins. Furthermore, these different degrees of polymerization affect the densities of cured resins.

Aim: The purpose of the present study was to investigate the degree of polymerization with respect to specimen thickness to understand the effect of exponentially attenuating incident light within specimens.

Design: Ten differently classified (flowable, microhybrid, and nanohybrid) composite resins were chosen and specimens of three different thicknesses (1, 2, and 3 mm) were made. Numbers of photons passing through specimens, microhardness, refractive index, and color of specimens for different backgrounds were measured at different thicknesses.

Results: Within specimens, numbers of photons exponentially decreased with different attenuation coefficients for each resin products. Filler content was high linearly correlated with microhardness, but poorly correlated with refractive index and the translucency parameter (TP). Microhardness and refractive index, microhardness and TP, and refractive index and TP were found to be linearly correlated. Microhardness, refractive index, and TP values were inversely related to specimen thickness.

Conclusions: The linear correlations found in the present study for the resin products tested can be applied to other resin products to estimating these properties regardless of filler content.

PR08-2.24

Microleakage of newly developed glass carbomer cement in primary teeth

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Background: Glass Carbomer is a new generation restorative material developed from glass-ionomer cements with possibility of gradual mineralization into fluorapatite.

Aim: The aim of this study was to compare the microleakage of a newly developed glass carbomer cement with a compomer and a resin modified GIC in primary molars.

Design: Standardized cavities were prepared on extracted human primary molars, and the teeth were randomly assigned into the following groups ($n = 15$ /each): (1) Dyract XP (LD Caulk/Dentsply, USA); (2) resin modified GIC (RMGIC) (R&D series Nova Glass LC Imicryl), Konya, Turkey); (3) glass carbomer cement (GCP); (Glass Carbomer Products, Leiden, Netherlands). The restored teeth were then stored in distilled water at 37°C for 24 h. Following thermocycling at 5–55°C for 1000 cycles, the specimens were immersed in 0.5% basic fuchsin solution, sectioned, and microleakage was evaluated with a magnification of 30×. For comparative evaluation of microleakage scores between the groups, Kruskal-Wallis statistical analysis was done.

Results: The greatest amount of dye leakage was observed in the glass carbomer specimens, followed by the RMGIS. However; there was no significant difference between the microleakage values of GCP and RMGIC ($P > 0.05$).

Conclusion: Within the limitations of this *in vitro* study, new glass carbomer cement restorations did not perform better than compomer material in class V cavities in terms of microleakage assessment.

PR08-2.25

Success of sodium hypochlorite versus formocresol pulpotomy: a 30-month study

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Background: Formocresol (FMC) has been one of the most popular medicaments for pulpotomy in primary molars. However, the continued searching for alternatives is growing due to its toxicity concerns. Sodium hypochlorite (NaOCl) has several interesting characteristics to be used as pulpotomy medicament and only few short-term studies of NaOCl pulpotomy have been reported.

Aim: To compare long-term success of pulpotomy in primary molars between using 5.25%NaOCl and 20% FMC.

Design: Sixty four primary molars that met the inclusion criteria were randomized into 2 treatment groups. There were 33 and 31 teeth in the NaOCl and FMC groups respectively. After 30 s of NaOCl and 5 min of FMC cotton pellet applications in each group, IRM base and stainless steel crowns were used as final restorations in both groups. Clinical and radiographic results were evaluated at 6 and 30 month-periods. Chi square test was used to compare their successes.

Results: At 6 month-periods, there were 61 teeth remaining for recall. The clinical success rates were 100% in both groups and the radiographic success rates were 90.3% and 86.7% in the NaOCl and FMC group respectively. At 30 month-periods, there were 39 teeth remained for recall. The clinical success rates were 100% in both groups and the radiographic success rates were 77.8% and 76.2% in the NaOCl and FMC group respectively. There were no statistically significant differences in the success rates between the two treatment groups at both 6 and 30 month-periods.

Conclusion: NaOCl may be recommended as an alternative pulpotomy medicament.

PR08-2.26

Treatment outcome of primary molars' restorations placed under general anesthesia: long-term result

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Background: General anesthesia (GA) allows dental treatment to be rendered under optimal conditions, theoretically ensuring ideal outcomes. The most common restorations in primary molars placed under GA are amalgam fillings and stainless steel crowns.

Aim: The aim of this study is to appreciate the lifetime and quality of restoration and compare stainless steel crowns and amalgam fillings for primary molars with diagnosis pulpitis.

Design: 52 patients attending Institut of Stomatology of Riga Stradins University for dental treatment under GA in 2010. - 2012. were invited to participate in the study. Mean age at the time of GA were 31.8 months and mean age at the follow up visits were 71.4 months. Treatment information was collected from patient notes. New dental status, radiographics and intraoral photos were made in follow up visit. The restorations were evaluated using radiographics and intraoral photos. Outcome measures were clinically rated in two groups, minor failure and major failure were merged into one group. The other group was successful restorations.

Results: 182 restorations were assessed. 76 amalgam restorations and 106 steel crown restorations. Clinically successful amalgam fillings were 56.57% ($n = 43/76$) and failure 43.42% ($n = 33/76$). Successful restorations with steel crowns were 48.11% ($n = 51/106$) and failure 51.88% ($n = 55/106$).

Conclusion: There is no significant difference between amalgam and steel crowns restorations for tooth with pulpitis ($P < 0.05$).

PR08-2.27

A study on the penetration ability of early deciduous teeth caries with resin infiltration

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Aim: To determine the effects of different resin infiltration, of different sorts of acid etching, of different etching time, and of different penetration time on the penetration ability of resin infiltration.

Design: A total of 48 extracted deciduous lower incisors were immersed in a demineralized solution for 45 d to form the early artificial caries and then were randomly divided into 16 3-teeth groups. Infiltration treatment with different resin infiltration, acid etching, etching time and penetration time, then making specimens. Penetration ability was examined after sectioning specimens were observed under CLSM, measuring the depth of penetration of the resin (PD) and the depth of lesion (LD) and calculating the percentage penetration (PP).

Result: There was no statistically significant differences between treatment groups ($P > 0.05$). But the difference of comparison of own different levels of two factors, namely resin infiltration and penetration time were statistically significant respectively ($P < 0.05$). Penetrating materials main effect is greater than the infiltration time main effect.

Conclusion: Combination of resin infiltration and penetration time of 3 min has proved to be a better solution.

PR08-2.28

Prefabricated composite veneers: an interesting treatment option for the pediatric dentist

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Introduction: Restoration of anterior permanent teeth in young patients could be a challenge in different situation. The presence of a dental anomaly or extensive caries could complicate our treatment. When the patient is a child or an adolescent we must restore the function and the esthetic using conservative approaches. Preservation of tooth structure must be considered when selecting a restorative material or technique. Direct composite resin restorations are mostly used, even in case of extensive defect or destruction, waiting full coverage restorations when the patient becomes an adult. Prefabricated composite veneer systems have been recently developed. They are not widely used but they provide an alternative therapeutic option.

Case report: Trough 4 case reports we will develop the clinical procedure and present a long time follow up during at least 2 years. Prefabricated composite veneers restore esthetic and function.

Comments: This technique can be used to restore anterior permanent teeth in case of amelogenesis imperfecta, dentinogenesis imperfecta and extensive caries. This new treatment option may open new opportunities for pediatric dentist.

PR08-2.29

Treatment of infected primary molars with lesion sterilization and tissue repair: a case seriesA. AKBAY OBA¹, S. ALP¹, I. ŞAROĞLU SÖNMEZ² & L. ÖZER³¹*Pediatric Dentistry, Kırıkkale University Faculty of Dentistry, Kırıkkale, Turkey;* ²*Pediatric Dentistry, Adnan Menderes University Faculty of Dentistry, Aydın, Turkey;* ³*Pediatric Dentistry, Ankara University Faculty of Dentistry, Ankara, Turkey*

Introduction: In primary dentition, the tooth with infected root canals and periradicular lesion is a common problem. In recent years, the Cariology Research Unit of the School of Dentistry Niigata University has developed the concept of “lesion sterilisation and tissue repair” (LSTR) therapy. A mixture of antibacterial drugs are used in this technique to disinfect the dentinal, pulpal and periradicular infections by non-instrumentation endodontic treatment. In this case report, LSTR therapy was used for treating infected primary molar teeth with periradicular lesions.

Case reports: After dental examinations with appropriate radiographs were completed, the clinical diagnosis were determined and three primary molar teeth with pulpal infections and periradicular lesions were chosen for treatment. The teeth were treated with 3Mix-MP paste which contains Metranidazole, Minocycline and Ciproflaxacin without enstrumantation (LSTR therapy). All teeth were restored with resin-modified glass ionomer cement. After the restorative treatment, Stainless Steel Crowns were applied. Patients were recalled periodically and success of the treatments were considered clinically and radiographically. The teeth were asymptomatic, the periradicular lesions have become smaller in size after 12 months.

Comments: Compared to traditional root canal therapy, taking less treatment time is the main advantage of LSTR therapy. This advantage makes LSTR therapy more comfortable for both patients and dentists. Further clinical research is needed in order to evaluate the success of LSTR therapy in infected primary teeth.

PR08-2.30

Regenerative endodontic therapyJ. S. C. HEIJDR^{1,2}, M. E. C. ELFRINK^{3,4}, J. B. KRIKKEN^{5,6}, W. H. KOUWENBERG-BRURING^{7,8}, H. C. KOUWENBERG^{7,8} & K. L. WEERHEIJM^{6,9}¹*Tandartspraktijk Puntgaaf, Barneveld, Netherlands;* ²*Paediatric Research Project (PREP), Barneveld, Netherlands;* ³*Mondzorgcentrum Nijverdal, Nijverdal, Netherlands;* ⁴*Paediatric Research Project (PREP), Nijverdal, Netherlands;* ⁵*Kindertand-West, Amsterdam, Netherlands;* ⁶*Paediatric Research Project (PREP), Amsterdam, Netherlands;* ⁷*Mondmaatjes & Dental Care Clinic Kouwenberg-Bruring, Doetinchem, Netherlands;* ⁸*Paediatric Research Project (PREP), Doetinchem, Netherlands;* ⁹*Kindertand, Amsterdam, Netherlands*

Background: Treatment of teeth with wide open apex is challenging. Treatment mainly focuses on stabilization of the largely weakened tooth. These teeth easily show early root fractures or possible apical inflammation. Since 2004 the Regenerative Endodontic Therapy (RET), (Leeds University), is a promising treatment-method. It focuses on continuation of the root growth by revitalization of the pulp tissue.

Aim: The aim was to collect series of cases treated with RET in different practices, according to the same protocol.

Design: The seven dentists from PREP meet 2–3 times per year and additionally discuss cases and problems by e-mail (e.g. treatment protocol and strategy of data collection). RET treatments started and cases were collected by the PREP dentists in their five different secondary dental care clinics in the Netherlands.

Treatments resulting in pain complaints, apical problems, fistulae, resorption or fracture are considered as failure of treatment.

Results: A total of 37 teeth were treated between January 2009 and December 2014. We excluded 7 teeth, one because no bleeding could be achieved and 6 because the follow-up time was < 6 months. The mean follow-up time of the remaining teeth was almost 24 months. No failures were reported. Everyone adhered to the protocol and the collaboration between the dentists was good. The data are considered comparable and reliable.

Conclusions: RET seems to be a promising treatment method for teeth with wide open apex. Well documented case series, as described here, contribute to the development and improvement of the clinical procedure.

PR08-2.31

Changes in dental rehabilitation treatment options for children with disabilities

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Background: Dental rehabilitation performed under general anaesthesia has become an important alternative for treating disabled children. This young patient group with special-needs requires not only up to date dental skills and empathy, but also special medication for pain and anxiety control such as inhalation and intravenous sedation agents.

Aim: The purpose of the present study was to present changes in the dental treatment needs of young patients with disabilities treated at the Department for Paediatric Dentistry and Orthodontics, Semmelweis University Budapest, for the period 2005–2014.

Design: 451 Special-needs patients, aged 2–18 years, (male/female ratio = 1.37; $P = 0.03$), undergoing paedodontic treatment under general anaesthesia were analysed. The changes in the basic diagnosis of the disorders and the treatment needs presented by these patients between January 2005 and December 2014 were evaluated. Chi-Quadrat-Test, Graph Pad Prism[®] 2014 was used for statistical analysis.

Results: A total of 29 diseases and syndromes were recorded, the most frequent were mental (93.15%), autistic (51.3%), emotional and behavioral disorders (14.4%), epilepsy (12.6%) and Down syndrome (7.65%). For primary dentition extractions (68%) and glass ionomer fillings (20%) were the most preferred treatment options ($P < 0.0001$, $df = 3$). Permanent teeth ($P < 0.0001$, $df = 9$) required frequently extractions (30%), composite fillings (30%) and calculus removals (22%).

Conclusions: The number of disabled children requiring dental rehabilitation under special conditions is increasing. Considering treatment options, the continuous increase of the conservative approach is important for the improvement life quality, even if extractions are still predominant.

PR08-2.32

Treatment outcomes for direct pulp capping procedures with calcium hydroxide and MTA: 12 months evaluation period

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Background: Without pulp inflammation signs, the pulp capping procedure may provide protection for the pulp, continued pulp vitality and apexogenesis.

Aim: Of the study was to verify the long-term results after pulp capping procedure in deep carious teeth using calcium hydroxide and MTA, compare clinical outcomes.

Design: In prospective clinical study participated 53 children 7–17 years old with deep carious lesions, showed no history of pain in response to temperature or biting. Children were divided randomly into two groups. Control group treated with calcium hydroxide; research group - with MTA. Clinical and radiographic outcomes were evaluated. Success rates were accepted when tooth was asymptomatic, with positive response to sensitivity testing. Criteria for lack of healing included: tooth pain or necrotic pulp as indicated by clinical and radiographic observations.

Results: 53 children participate in the study. Mean age was 12.8 (± 4.5) years. Over the observation period 48 of 53 teeth were followed. 89.58% was success rate for all followed teeth. For control group - 88.00% ($n = 22/25$), for research group - 91.30% ($n = 21/23$). There were 9/16 occlusal/aproximal cavities for control group, and 13/10 - for MTA group. Only approximal restorations had failures (3 for calcium hydroxide; 2 for MTA). There were 10 immature teeth. One tooth from research group with immature root development had failure, no apexogenesis and endodontic treatment needed.

Conclusion: Both materials could be used for direct pulp capping procedures, with better results using MTA.

Only pulp capping's in occlusoproximal cavities failed.

Teeth with open apices continue root formation.

PR08-2.33

Following the aesthetic pediatric crowns: the CAD/CAM composite resins for primary teeth

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Introduction: In cases of multi-surface caries and/or following pulpotomy/pulpectomy on primary teeth, a full coronal coverage restoration is conventionally performed to ensure a sustainable survival. Stainless steel crowns are a simple and reliable option, but unsightly. Zirconia crowns or others veneered with tooth-colored material constitute more aesthetic alternatives. However, all these techniques remain substantially invasive. The aim of this communication is to present a new management, using CAD/CAM technology and composite blocks.

Case reports: Four primary molars with deep caries (on three patients) were treated by pulpotomy. Occlusoproximal composite onlays were performed. The material used was a CEREC Omni-Cam (without powder) (Sirona) and LAVA Ultimate composite blocks (3M ESPE). The tooth preparation consisted: in supra-gingival margins (if possible) at the proximal area; and, in an occlusal reduction of buccal and lingual walls, over a length of 3 mm, until a flat surface of 2 mm. The proximal finitions were made with a diamond insert. Then, the optical impression was taken, the virtual restorations were designed and manufactured in the session. A self-etching resin cement was selected for bonding the restorations (the rubber dam is not mandatory).

Comments: The use of CAD/CAM technology to restore extended caries on primary teeth is a very interesting and promising technique. The latter combines: high strength, excellent aesthetic and good biocompatibility; minimally invasive technique; strengthening of dental tissues; respect of surrounding tissues; rapid implementation; patient and parent satisfaction. However, the acquisition of equipment is fairly expensive.

PR08-2.34

Treatment of special patient with Opitz Frias syndrome

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Introduction: Opitz Frias syndrome is a genetic condition that affects several structures along the midline of the body. The most common features of this condition are wide-spaced eyes, defects of the larynx, trachea, and/or esophagus causing breathing problems, dysphagia, intellectual disability and structural defects in the brain. Maxillofacial abnormalities that may be seen in this disorder include a flat nasal bridge, thin upper lip, low set ears, cleft lip with or without a cleft palate. Opitz Frias syndrome is thought to affect 1 in 100,000 males.

Case report: An 8 year old boy was referred by the Department of Genetics to the postgraduate clinic of Paediatric Dentistry for dental care. He presented with multiple occlusal and interproximal carious lesions, two supernumerary teeth in the area of the upper left central incisor and an impacted left central incisor. Treatment plan consisted of restoration of his multiple carious lesions and the surgical removal of the supernumerary teeth as well as the surgical exposure of the tooth #21 under general anesthesia. Brackets were bonded on the anterior teeth as soon as it was possible, and the traction of the impacted central incisor started.

Comments: Two years later, the central incisor has fully erupted with no signs of clinical pathology. Interdisciplinary care among health providers in a patient with Opitz Frias syndrome is essential for a successful outcome.

PR08-2.35

A retrospective longevity private practice-based study of the posterior composite resin restorations

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Aim: The aim of this retrospective longitudinal study was to evaluate the clinical performance of 562 composite resin posterior restorations placed on 1st and 2nd permanent molars in patients with a regularly follow up in a private dental practice.

Design: Dental records of 206 patients, totaling 562 teeth. Clinical examination was done by a calibrated examiner, accessing the restoration retention, marginal integrity, and presence of secondary caries. Including selection criteria were patients who received class I restorations, returned semiannually for clinical exam and annually for radiographic exams, and who were inserted on a health program. The excluded criteria were patients who received other kind of material and who had their teeth treated by other professional.

Results: According to the multivariate regression analysis, considering both 1st and 2nd permanent molars and repair as a dependent variable, the study did not show any variables statistically significantly associated with the repair cases ($P < 0.05$). At the patient's records analysis, proximal caries lesions were reported in 4.64% on the first molars and 12% on the second molars; the presence of restoration repair was 6% for 1st molars and 1.6% for the 2nd molars. At the clinical exam, the restoration's retention was 100% for the 1st molars and 2nd molars. Concerning

longevity, each year of follow-up the chance of a patient to have repair increases 1.05%.

Conclusions: Occlusal restorations of permanent molars present an excellent clinical performance especially when patients are inserted in a health promotion program by means of a regular follow up.

PR08-2.36

Resin infiltration of mild to moderate idiopathic white spot lesions - a case presentation

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Introduction: Resin infiltration is a relatively new method for arresting non-cavitated proximal caries and for improving aesthetics of white spot lesions (WSL), occurring after fixed orthodontic appliance removal. Based on the capillary effect, a low viscosity light-curing resin penetrates the affected enamel area until the outer $\frac{1}{3}$ of the dentin. Previously, the surface is conditioned with a 15% HCL etching agent. This diffusion barrier arrests the incipient caries and, due to light refraction properties the tooth surface regains its initial colour. Initially resin infiltration indications did not include idiopathic WSL.

Case report: A 12-year-old boy was referred for treatment of idiopathic WSL localized on the vestibular surfaces of the permanent upper incisors and canines. On the right upper incisors the alteration was mild to moderate, with white-yellowish linear discolorations. On the left side clinical examination showed moderate to severe alterations, with deeper brownish, minimally cavitated defects. As first treatment step teeth 1.1 and 1.2 were chosen for treatment. ICON® (DMG) infiltrant was applied respecting the manufacturer's recommendations. Due to the nature of the treated alterations, it was decided to repeat the etching procedure for another 2 and resin application for 1 min. After light-curing, and polishing, a picture was taken for cosmetic result follow-up. After 6 months no alteration was observed.

Comments: Resin infiltration significantly improved the clinical appearance of WSLs of unknown aetiology. Despite aesthetic results were not perfect, patient and relatives were extremely satisfied with the improvement and decided for further treatment.

PR08-2.37

Management and three-year follow up of dens invaginatus. A report of two cases

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Background: Dens invaginatus is a rare morphologic developmental disorder characterized by the infolding of the enamel organ into the dental papilla. The etiology is still controversial. Diagnosis is based on radiographic examination. Teeth may exhibit many variations in size and form. Oehlers-classification is used commonly to describe the type of invagination. Until the 1970's extraction was suggested. Since then other treatment options have been proposed depending on the type of invagination. Proper preparation and cleaning of root canals during endodontic treatment of these teeth are challenging for the dental professional. Occasionally apexification may be indicated due to early pulp infection and necrosis, or because of the malformation itself (Oehlers class IIIB).

Case reports: In the first case we present the treatment of an invaginated upper central incisor (Oehlers IIIB) with symptomatic irreversible pulpitis in a 14-year-old girl. In our second case

invagination (Oehlers IIIA) and periapical radiolucency were diagnosed in the upper lateral incisor of a 12-year-old girl.

The endodontic treatment of the teeth were carried out under dental operating microscope aided by ultrasonic cleaning and preparation. Different obturation techniques were used during management. The root canal in Oehlers IIIB malformation was filled with thermoplasticized, injectable guttapercha after obturation of the apical foramen with glass ionomer cement. The lateral incisor was obturated with warm lateral compaction technique.

Comments: Three-year radiographic follow up of these cases show normal periapical morphology, suggesting that teeth with severe morphologic abnormalities can be treated successfully with proper treatment planning and technique.

PR08-2.38

Dental laser applications for children: which wavelength for which tissue?

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Introduction: Dental lasers are widely used in many areas in pediatric dentistry from prevention to diagnosis, from cavity preparation to pulp vitality tests and from endodontics to trauma cases and even apnea reduction. Laser technology and different wavelengths can be used as an alternative instrument that sometimes completes and at other times substitutes and assists for the traditional techniques.

Case reports: In this presentation the dental lasers with different wavelengths, soft and hard tissue applications in our clinic and acceptance of dental lasers both for children and parents and advantages and laser safety subjects will be reviewed with many cases.

Comments: Reduction in the use of anaesthetics, analgesics and antibiotics, and in intra-operative and post-operative bleeding, elimination the need sutures and producing faster wound healing and less scar tissue are some advantages of dental lasers in pediatric dentistry. With the developing technology dental lasers are becoming more important in pediatric dentistry and children should be considered as the foremost patients for having laser-assisted dentistry.

PR08-2.39

Mesenchymal stem cells homing to the root canal of immature permanent teeth during apical periodontitis and regenerative endodontic treatment

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Background: Regenerative endodontic treatment (RET) or revascularization is a new option for treating immature permanent teeth that have infected or necrotic pulps. During RET, induced bleeding introduces mesenchymal stem cells (MSCs) into the root canal for tissue repair; however, it is unclear whether stem cells can arise from other sources.

Aim: This animal study aimed to explore whether stem cells can arise from other sources and what the important role of induced bleeding was in tissue regeneration.

Design: Eighteen immature premolars from three 6-month-old Beagle dogs were randomly assigned to normal control (NC), apical periodontitis (AP), RET-baseline, -1 week, and -2 weeks (RET-0, RET-1, RET-2), and gelfoam-1 week and -2 weeks (GE-1, GE-2) groups (3 teeth/group). Root canal contents were collected by irrigation for a cytopsin smear after teeth were extracted and split, and MSCs were identified by immunocytochemistry using antibodies against STRO-1 and CD 105.

Results: The number of MSCs was higher in the AP than in the NC group. MSC markers were detected in both RET and GE groups.

Conclusions: Endogenous stem cells that home to the root canal after blood clot formation are involved in RET.

PR08-2.40

A simple technique modification to prepare zirconia crowns on primary teeth

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Introduction: Stainless steel crowns (SSCs) in primary teeth have been historically used to restore anterior primary teeth. Unfortunately, these restorations fail to meet the esthetic demand of patients' parents. Recent developments in restorative materials with zirconia crowns in primary teeth have been introduced for anterior and posterior teeth. Tooth preparation is technique sensitive and needs excessive tooth reduction, increasing possibility of pulp exposures and damaging the adjacent teeth.

Aim: Propose a more conservative tooth preparation for posterior teeth for zirconia crowns.

Design: Evaluation of a conventional SSCs preparation technique was conducted and modified for zirconia crowns. The recommended modifications included an occlusal reduction of 2 mm, subgingival depth of 1–1.5 mm, no retentions and labial-lingual reduction of 1.5–2 mm. We also recommend a wooden wedges (2 mm wide) in the proximal mesial and distal surfaces to prevent possible damage the adjacent teeth.

Conclusions: Prefabricated zirconia crowns could be a promising replacement of the conventional SSCs, working time and technique must be the main considerations to choose this aesthetic alternative.

PR08-2.41

Application and comparison of diode laser pulpotomy and formocresol pulpotomy

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Introduction: Formocresol (FC) is considered the risk of its toxic effect and carcinogenic effect. The application of this material in pediatric dentistry was worried by the dentists. Recently, the researchers found many different methods to perform primary tooth pulpotomy with less complication, such as laser pulpotomy.

Aim: The aim of this study was to determine whether diode laser is a suitable alternative for FC in the pulpotomy treatment.

Design: This study included 70 children from 2 to 8 year-old. The boys were slightly more than girls. There are 90 primary molars in diode laser group (2W; 915 nm) and FC group. These teeth were calculated success rates and radiographic images from 3 to 12 months follow-up X-rays.

Results: The radiographic success rates were slightly higher in diode laser group than in FC group, but there were no statistically significant differences. Both groups had the teeth with canal calcification. In radiographic failure, the highest proportion of diode laser group was periradicular lesion and the highest proportion of FC was internal root resorption. But it's still no significant difference between these two groups.

Conclusions: According to these data, diode laser pulpotomy had similar success rates to FC pulpotomy. It may consider that diode laser could become an appropriate substitute for FC. However, long-term follow-up study with histologic findings of diode laser pulpotomy will be expected in the futures.

PR08-2.42

Deminerlized bone matrix(DBM) used for direct pulp capping in rats

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Introduction: Demineralized bone matrix (DBM) is mainly comprised of collagen and bone morphogenetic proteins (BMPs). The two main component are favorable for the formation of dentin, it suggests the possibility of its application as a pulp capping material compared with calcium hydroxide(Ca(OH)₂).

Design: Pulpotomy was performed on maxillary first molars of one side in each rat, and left another side as the blank control. After 1, 3, 7, 14 and 28 days, HE and Immunohistochemical stained for observing the changes of pulp tissue after capped with the two materials.

Results: DBM could induce reparative dentin formation, although the pulp tissue below the calcified dentin bridge exists inflammatory reaction, the pulp tissue necrosis and pathological calcification were fewer than Ca(OH)₂ group. Generally, the expressions of relate factors during the dentine forming in DBM group are higher than the same time in Ca(OH)₂ group.

Conclusions: DBM could start the physiology wound healing in pulp, the pulp tissue below the calcified dentin bridge was well-preserved. At the early stage of reparative dentinogenesis, DBM have the ability to induce odontoblasts differentiation and to promote reparative dentin formation. Therefore, DBM can be used for direct pulp capping as a biological material.

PR08-2.43

An audit of the materials used to restore the primary molars of children at Barts Health NHS Trust Community Dental Service

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Background: The Scottish Dental Clinical Effectiveness Programme (SDCEP) suggests that glass ionomer cements (GIC) should not be used in class II cavities; stainless steel crowns (SSC) are recommended as "gold standard" in this clinical situation. A baseline audit conducted in 2010 identified that GIC was the restorative material of choice for class II cavities in deciduous molars.

Aim: To assess compliance with best practice guidance for the restoration of Class II cavities in deciduous teeth and identify barriers that prevent the use of SSCs.

Design: Retrospective audits were carried out in 2010 and 2013 to compare the materials used to restore primary molars against those recommended by the SCDEP guidelines. Additionally, open-ended questions were used in a semi-structured interview process to establish what clinicians felt about the use of SSCs.

Results: The baseline audit found that GIC was used for 73% of class II restorations; very few SSCs were placed (5.0%). The corresponding figures for the re-audit were 72.4% for GIC and 21.1% for SSCs. Clinicians were reluctant to use SSCs, predominantly due to greater familiarity and confidence with conventional restorative techniques.

Conclusions: Although there has been a significant increase in SSCs placed to restore deciduous molars, GICs are frequently being placed inappropriately. Clinicians requested further hands-on training in the placement of SSCs.

PR08-2.44

Effect of additional acid etching for single-step self-etch adhesives on dentin bond strength in primary teeth

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Background: Little information is available regarding bonding characteristics of the newly developed single-step self-etch adhesives to primary dentin.

Aim: The aim of this study was to evaluate bond strength of single-step self-etch adhesives to primary dentin with and without acid etching, by means of microtensile bond strength tests.

Design: Total 154 specimens were prepared on extracted primary molars. Four commercial single-step self-etch adhesives (Scotchbond™ Universal, All-bond Universal®, Adper™ Prompt™ L-pop™, Clearfil™ S³ Bond) were used in this study. Two etch-and-rinse adhesives (Prime & Bond NT, Scotchbond™ Multipurpose) served as controls. Microtensile bond strength tests have done to single-step self-etch adhesives with and without additional acid etching and two etch-and-rinse adhesives.

Results: All single-step self-etch adhesives except for Adper™ Prompt™ L-pop™ exhibited increased microtensile bond strength values ($P < .05$) under additional acid etching condition and there was no statistically significant interaction between the type of adhesive system and subsection of prior acid etching ($P = 0.056$).

Comparison of microtensile bond strength of single-step self-etch adhesive groups without additional acid etching and etch-and-rinse adhesive groups, Prime & Bond NT gave higher values than All-bond Universal® ($P < .05$). Meanwhile, comparison of microtensile bond strength of single-step self-etch adhesive groups under prior acid etching and etch-and-rinse adhesive groups, Clearfil™ S³ Bond obtained higher values than Adper™ Prompt™ L-pop™.

Conclusions: Additional acid etching can increase bond strength of most single-step self-etch adhesives to primary dentin, except for the adhesive with very acidic property.

PR08-2.45

Infiltration of proximal caries in a primary molar: two years clinical and radiographic follow-up

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Introduction: Caries infiltration is an alternative of minimum intervention technique that uses a low viscosity resin for non-cavitated lesions on proximal surfaces of primary and permanent

teeth. It is considered an option between preventive and invasive approaches to treat these lesions.

Case report: The aim of this case report is to present the clinical and radiograph follow-up of a primary molar treated with caries infiltration. A girl, 7 years old, was referred to the Pediatric Dental Clinic at the Federal University of Rio de Janeiro for dental treatment. Clinical examination did not reveal cavitated lesions. The radiographic examination showed a non-cavitated proximal lesion on the distal surface of the tooth 74, reaching the outer third of dentin. Caries risk was achieved by the Cariogram and was considered high. The treatment plan included dietary and oral hygiene instructions and caries infiltration using Icon® (DMG, Hamburg, Germany) on the primary molar. Treatment time was suitable; the child did not report pain and no short-term side effects were observed. This patient was recalled 6/6 months for evaluations. After 2 years of follow-up, no caries progression was observed either by radiographic or clinical examinations. In the present case, the caries infiltration showed to be a feasible, effective and safety technique to control proximal caries in a primary molar.

Comments: The infiltration of proximal caries lesions seems to be a promising non-invasive approach to treat carious lesions and so, it should be considered an effective alternative to invasive restorations.

PR08-2.46

Microbial evaluation of immature permanent teeth with necrotic pulp with triple antibiotic paste or calcium hydroxide with 2% Chlorhexidine gel in pulp revascularization

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Background: The treatment of immature permanent teeth with necrotic pulp constitutes a challenging situation for pediatric dentists. Regenerative endodontics is a promising alternative treatment for immature teeth with necrotic pulps. Revascularization outcome depends on microbial elimination because apical repair will not happen in the presence of infected tissues.

Aim: The aim of this study is to investigate how two different types of antiseptical solutions work against the main strict and facultative anaerobic microorganisms in deciduous teeth with necrotic pulps. The two types of medical antibacterial activity were Calcium Hydroxide with 2% chlorhexidine gel and modified antibiotic paste of antibiotic (Ciprofloxacin, Metronidazole, Clindamycin).

Design: The study is carried out with a plantation of E. Coli in petri plates with their anaerobic environment and conditions. At the same time a susceptibility exam was done with the antibiotic paste and Calcium Hydroxide with 2% chlorhexidine gel by the Agar diffusion method.

Results: The results of this study are in process of evaluation.

Conclusions: The findings from the present study highlight the importance of eradication of bacteria from the canal space for successful regenerative endodontic procedures.

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PR09.01

Impact of dental caries and its treatment on the quality of life of 12–15-year old adolescents in Benin, Nigeria

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Aim: To assess the impact of caries and its treatment on quality of life (QoL) in 12–15-year-old children in Benin, Nigeria.

Design: This was a cross-sectional study involving 1790 children. Clinical examinations were conducted using the WHO criteria for diagnosis and coding of caries. The Decayed Missing Filled Teeth (DMFT/dmft) score of each child was calculated. The child Oral Impact on Daily Performance questionnaire was used to assess the QoL of children with caries pre- and post-treatment. Associations between age, sex and socioeconomic status and caries were analysed using bivariate and multivariate logistic regression analysis.

Results: The prevalence of caries in the study population was 21.9%. Approximately 57% of children with caries reported negative impact on their QoL pre-treatment. Eating (47.6%), was the most affected domain. The mean pre-treatment QoL score was 8.40 ± 10.34 . Four weeks post-treatment, only 1.12% of participants reported negative impact of caries treatment on their QoL. The mean post-treatment QoL score was 0.22 ± 0.91 . There was a significant difference between pre- and post-treatment QoL scores

($P = 0.0001$). Age, sex and socioeconomic status had no significant impact on QoL pre and post-treatment.

Conclusions: Caries had a significant impact on the QoL of adolescents. Its treatment resulted in marked improvement in QoL.

PR09.02

A comparative study of oral health status and oral health related quality of life in children with autism

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Background: The risk for oral disease is known to increase in individuals with special health care needs. Studies in Saudi Arabia on oral health related quality of life (OHRQOL) in children with autism are lacking.

Aim: This study assessed the parental perception of OHRQOL and oral health status of children with autism in Jeddah, Saudi Arabia.

Design: The study included 75 autistic and 99 healthy children, ages 6–12 years. Parents filled out a questionnaire including personal data and the Franciscan Hospital for children Oral Health-related Quality of Life (FHC-OHRQOL) instrument including four sections: I-child's oral symptoms, II-daily life problems, III-parental concerns, and IV- oral well-being. Oral examinations of children were done to assess caries, oral hygiene, gingival health and extra- and intra-oral abnormalities.

Results: Autistic children showed significantly more mean number of symptoms ($P = 0.041$), daily life problems and parental concerns ($P = 0.000$). They also exhibited higher mean summary scores for sections II and III ($P = 0.004$ and 0.008 , respectively). In section IV, children with autism had lower scores for oral well-being ($P = 0.000$ – 0.001). These children had higher caries prevalence ($P = 0.013$) and severity ($P = 0.003$).

Conclusions: Children with autism have significantly lower OHR-QOL and more caries prevalence and severity than healthy children.

PR09.03

Can mHealth dental 'Apps' help disadvantaged parents establish children's oral hygiene routines?

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Background: There are regions in New Zealand where there is a poor uptake of fully funded children's oral health services; and an unsurprising relationship between parents not being engaged with these services and children's oral health.

Aim: To explore the efficacy of a mobile health (mHealth) oral hygiene App in a disadvantaged area, for teaching and establishing children's tooth brushing routines.

Design: A quasi-experimental design included pre intervention individual interviews with seven mothers and three fathers, who, between them, had 14 children (1–11 years old). Following the interview the (MacLean's) Nurdle Time App was downloaded and demonstrated a mobile device that the participant owned. They were to try to use the App to establish a recommended tooth brushing routine with their children, over a three week trial period. Following the intervention the mothers met as two focus groups to discuss their experiences. Interview and focus group data were subjected to thematic analysis.

Results: None of the parents had heard of or used any mHealth Apps, although they all had devices that could run them. They confirmed various difficulties accessing oral health information. All participants reported that their families were motivated to work on oral health because the fun educational component was reinforced via a virtual token economy. Parents suggested ways to improve the programme especially for older children, and to include parents "in finishing the job off".

Conclusions: Classic behaviour modification principles did elicit and strengthen children's tooth brushing behaviour. Parents suggested using oral health Apps in early childhood centres.

PR09.04

Pain behaviour among children with juvenile idiopathic arthritis (JIA) and orofacial painE. LEKSEL^{1,2}, M. ERNBERG³, B. HEDENBERG-MAGNUSSON⁴, B. MAGNUSSON⁵ & U. HALLBERG⁶¹*Pediatric Dentistry, Umeå University Hospital, Umeå, Sweden;*²*Pediatric Dentistry, Blekinge Centre of Competence, Karlskrona, Sweden;*³*Dental Medicine, Karolinska Institutet, Stockholm, Sweden;*⁴*Oral Physiology, Folkhälsan, Stockholm, Sweden;*⁵*Paediatric Rheumatology Unit, Karolinska University Hospital, Stockholm, Sweden;*⁶*Nordic School of Public Health, Göteborg, Sweden*

Background: Orofacial pain among children with juvenile idiopathic arthritis (JIA) are frequent, mostly of moderate character but severe among some. The pain takes a fluctuating course and can sometimes be linked to increased disease activity. As it was found that children endure their symptoms in silence, expecting adults to understand their needs, children's pain behaviour is important to learn more about.

Aim: To investigate children's behaviour when they have orofacial pain and dysfunction.

Design: Fifteen children aged 6–16 years with JIA and 15 parents to children with JIA attending the department for paediatric dentistry were interviewed. The children were asked to describe in their own words their symptoms and how they act when in pain. The parents were asked to describe how they find their children's behaviour when in orofacial pain.

Results: Children described that the orofacial pain made them avoid to eat and chew, meet friends and that it made them struggle with sleeping problems. (They used their occlusal appliance, made jaw exercises, used a hot pillow at the cheek or contacted the dental care providers.)

For the parents the orofacial pain behaviour was not so easy to differ from the general pain behaviour. Parents found their child in a bad mood, avoiding social contacts or in need of analgesics and avoiding ordinary food.

Conclusion: Orofacial pain affected the behaviour for the child, it was often difficult for parents to recognise and differ from pain in general.

PR09.05

Responsiveness of the Brazilian early childhood oral health impact scale (B-ECOHIS) to dental treatmentJ. ABANTO¹, S. M. PAIVA², F. M. MENDES¹, T.CORDESCHI¹, E. A. VIDIGAL¹ & M. BÖNECKER¹¹*University of Sao Paulo, Sao Paulo, Brazil;*²*Federal University of Minas Gerais, Minas Gerais, Brazil*

Background: To test oral health-related quality of life measures as outcomes in clinical trials, the instrument must be responsive.

Aim: To assess the responsiveness of the Brazilian ECOHIS (B-ECOHIS) to dental treatment for dental caries.

Design: One hundred parents of 3–5-year-old children completed the B-ECOHIS prior to their children's treatment and 7–14 days after the completion of treatment. The post-treatment questionnaire also included a global transition judgment that assessed parent's perceptions of change in their children's oral health following treatment. Change scores were calculated by subtracting post-treatment scores from pre-treatment scores. Longitudinal construct validity was assessed by using one-way analysis of variance to examine the association between change scores and the global transition judgments. Measures of responsiveness included standardized effect sizes (ES) and standardized response mean (SRM).

Results: The improvement of children's oral health after treatment are reflected in mean pre- and post-treatment B-ECOHIS scores

that declined from 17.4 to 1.6 ($P < 0.0001$), as well as for individual domains scores ($P < 0.0001$). Mean change scores showed a gradient in the expected direction across categories of the global transition judgment. There were significant differences in the pre- and post-treatment scores of those who reported improving a little ($P < 0.0001$) and those who reported improving a lot ($P < 0.0001$). The ES and SRM based on change scores mean for total scores and for global transitions judgments were large.

Conclusions: The B-ECOHIS is responsive to dental treatment and can be used as an outcome indicator in clinical trials.

PR09.06

The care, cause we treasured - multi-win pattern of oral care of Aboriginal children in remote areaR. S. TANG^{1,2}, Y. T. LIN^{1,2} & H. SHUN-TE¹¹*Kaohsiung Medical University, College of Dentistry, Kaohsiung, Taiwan;*²*Baby Tooth Family Dental Clinic, Kaohsiung, Taiwan*

Aim: The aim of this study was to evaluate the oral care and the relationship establishment with children effect of oral health status of aboriginal children in remote area in Taiwan.

Design: This was a 2-year longitudinal study. We collected oral health data of children from 2 elementary schools and 4 kindergartens in remote area of Kaohsiung in Taiwan for 2 years. Oral care of children include preventive and dental carious treatment and routine oral hygiene instructions. Data were analysed by *t*-test and ANOVA ($P < 0.05$ was statistically significant).

Results: The average DMFT index improved from 3.59 to 1.82 and deft index improved from 4.74 to 2.11. No caries was noted over the first permanent molar in children from kindergarten to 1st grade and 2nd grade elementary school. Extra finding was that children were more likely to keep oral hygiene habits when we established a good relationship with them. Lower grade student showed better performance than higher grade students.

Conclusion: Children care their teeth, because we treasure them. Dentists, children, schools, and caregivers were benefit from our care in the process.

PR09.07

Oral health condition of preschool children liver transplant candidates and its impact on oral health related quality of life (OHRQoL) - a pilot study

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Background: Preschool children liver transplant candidates tend to suffer from dental problems, which can negatively impact their oral health-related quality of life (OHRQoL).

Aim: The purpose of this study was to assess the prevalence of oral diseases and their impact on OHRQoL in preschool children candidates for liver transplant.

Design: Oral examinations were conducted on 17 preschool children with biliary liver atresia aged 12–36 months. Presence of gingivitis, dental plaque (OHI-S), dental caries (dmf-t), dental hypoplasia (DED-Index) and hyperbilirubinemic stain of teeth were evaluated by one trained and calibrated examiner. Parents answered the Brazilian version of the Early Childhood Oral Health Impact Scale (B-ECOHIS). Descriptive analyses were performed.

Results: Hyperbilirubinemic stain (70.6%), presence of dental plaque (47.1%) and dental caries (41.2%) were the most prevalent dental problems. The mean (standard deviation) B-ECOHIS score was 6.52(4.74). Parent's distress domain showed the highest mean score (3.41(2.26)).

Conclusion: Hyperbilirubinemic stain was the most frequent oral problem in preschool children liver transplant candidate and may be responsible for a negative impact on the OHRQoL.

PR09.08

Interprofessional study of oral health in primary care

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Background: Caries is the most common chronic condition of childhood. Primary care providers are well positioned to support dental preventive care in their practices/clinics.

Aims: 1. Identify drivers of oral health services in primary care settings
2. Determine which caries-risk assessment tools are being used in primary care

Design: Utilizing membership rosters, selection criteria identified potential participants. Surveys were sent electronically requesting specific information on practices and procedures. Six focus groups were conducted by following a structured guide related to oral health promotion. Twelve practice observations were conducted in primary care facilities providing oral health promotion for children 0–6 years old.

Results: The focus groups participants:

Mostly female (68%); mean age of 50;

71% pediatricians; 29% family medicine physicians.

66% practiced in urban areas.

71% of all participants had been in practice more than 10 years; 44% in private practice.

40% of the practices saw 26–75 children under age 3 per week;

32% saw <25 children under age 3. The practice observation sites:

66% urban pediatric private practices

42% included an oral health program for more than one year;

42% over 5 years.

Conclusion: • Incorporating oral health activities into existing primary care workflows is difficult.

• Visual inspection was the most commonly identified caries-risk assessment tool by primary care providers.

• Caries-risk assessment tools not utilized in their original versions.

• Integration of caries-risk assessment tools and preventive strategies into the electronic health record makes implementation much easier; is an essential step for consistency, implementation, quality assurance and documentation.

PR09.09

Family related factors of children treated under dental general anesthesia (DGA) - a pilot survey

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Background: About 5–10% of children in Finland have serious caries problems occasionally requiring DGA.

Aim: The aim was to investigate associated factors leading healthy children to DGA.

Design: Guardians escorting their children to DGA ($n = 25$) were asked to answer a structured questionnaire given to them after DGA in the recovery room, while they waited for their child to be released from the clinic. Material of this pilot study was collected between Nov/2014 and Jan/2015. All the children were ≤ 12 years. Outcome was analysed and presented in frequencies, proportions and means.

Results: The majority (16/23) of the respondents were children's biological mothers. Families were mostly two-parented (76%). The mean age of the respondents was 38.5 years (SD 6.21). Almost half (4%) of the families had only one child, 76% had 2–

4 children, whereas 20% had ≥ 5 children. For three in four (76%) of the children, DGA was the first one. In 8% of the cases also siblings had been treated under DGA. More than half (64%) of the parents did not report dental fear; while 28% reported fear; 16% of the parents had DGA themselves. For 48% of the families DGA was a good experience, 74% reported it as a relief. For 13% of the cases the experience was frightening, but not a bad one for anyone.

Conclusions: The findings highlight the importance of the entire family in association with children's DGA. The influence of the family-size and parents' experiences on children's need for DGA requires further investigation.

PR09.10

The contribution for life quality of a social-educative programme

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Background: The understanding of social determinants of health, and not only biological conditions, is fundamental to achieve health promotion. Assuming that the scholar environment is appropriate to health promotion, offering a more supportive structure, a social-educative program, thought having a broader scope, may contribute to growth of children within a life quality context.

Aim: The goal of this work is to analyze the contribution of this social-educative program undertaken in a few Social Service of the Commerce units of the Sao Paulo State aiming the oral health of the participating children.

Design: For the analysis of oral impact on daily activities of the children, an adapted index (Child-OIDP), that considers life quality as a variable of clinic indicators, was applied. A questionnaire was also directed to the educators that followed the program to verify the behavior and oral health knowledge level. The researcher visited company operational units and applied the questionnaires to persons involved in the study (620 children and 60 educators).

Results: The results show that the more prevailing oral impacts on daily activities were observed during feeding, oral hygiene and emotional state ($P = 0.05$).

Conclusions: The importance of children's participation acknowledgement during their development, within a structure that provides an adequate support, followed by capable educators, reinforces this kind of approach. Nevertheless, initiatives aiming at an increase of knowledge in oral health, including this subject in the program curriculum, may contribute to reinforce an effective partnership, enabling a healthy development with enhanced life quality for the participating children.

PR09.11

Patient with ectodermal dysplasia: how to improve their quality of life from childhood to adolescence?

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Introduction: Hypohidrotic ectodermal dysplasia is a genetic disease that affects the development of the ectoderm and presents with the classic triad of hypohidrosis, hypotrichosis and dental anomalies.

Survival in childhood and adolescence is associated with dental alterations in number and shape and with total anodontia in extreme cases. This implies the presence of problems in chewing,

swallowing and phonation that influence the development of the child, as well as psychological problems due to unfavorable aesthetics. Therapeutically, there are different types of prosthetic treatments that allow early oral rehabilitation, in order to ensure the function during growth.

Case report: We present a case report of follow-up of a 15 years old teenage girl, which was referred by her paediatrician to our department at the age of two and a half years due to lack of eruption of some deciduous teeth. After clinical and radiological examination of the paediatric dentist, we established a suspicion diagnosis of Hidrotic Ectodermal Dysplasia that we confirmed after genetic testing profile.

We started an early oral therapy with the main purpose of recovering functionality and improving her quality of life, based on space maintenance, control of tooth eruption and maintenance of oral health.

Currently the patient carries on treatment with the goal of final rehabilitation with dental implants.

Comments: Dental anomalies can alert of systemic disorders with a genetic basis.

Early diagnosis, proper treatment and early multidisciplinary oral rehabilitation are keys to improving the quality of life in these patients and the restoration of oral functions.

PR09.12

Quality of life of Brazilian children with cleft lip and palate

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Background: The use of quality of life assessment in routine of clinical practice might contribute to the communication with patients and the identification of oral problems that affect patients.

Aim: The aim of this study was to evaluate the oral health-related quality of life and malocclusion of Brazilian children with cleft lip and palate.

Design: Sixty-nine children, aged 8–10 years, were selected and divided into groups according to the cleft type:

Group I - cleft lip and alveolus;

Group II - cleft lip and palate;

Group III - cleft palate.

Each child filled in a questionnaire comprising 29 multiple-choice questions on the impact of oral diseases on the quality of life (*Child Perceptions Questionnaire*₈₋₁₀). Then, a visual examination of dental occlusion was carried out. Kruskal-Wallis and Mann-Whitney tests were used to statistical analysis ($P < 0.05$).

Results: The results did not show statistically significant differences in the impact of oral health-related quality of life for cleft lip and palate and malocclusion.

Conclusions: In conclusion for this study, at this age range, the cleft lip and palate and malocclusion had no influence on the impact of oral health-related quality of life.

PR09.13

Parents/caregivers perceptions of the impact of malocclusion on adolescents' quality of life

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Background: Oral health-related quality of life (OHRQoL) measures the impact of oral outcomes on individuals' quality of life.

Parents/caregivers are the main decision makers regarding adolescents' health and their perceptions exert a major influence on treatment choices.

Aim: To evaluate parents'/caregivers' views of the impact of malocclusion on the OHRQoL of Brazilian adolescents using the Parental-Caregiver Perceptions Questionnaire (P-CPQ).

Design: A sample of 280 parents/caregivers of adolescents, aged 11 and 12 years, was selected for this study. Participants answered the Brazilian version of the P-CPQ. Malocclusion was evaluated using the Dental Aesthetic Index. Adolescents' gender and age as well as family monthly income were also recorded and considered as confounding variables. Data handling consisted of descriptive statistics, Mann-Whitney test, and multiple regression analysis.

Results: A total of 262 individuals completed the P-CPQ providing a response-rate of 93.5%. The multivariate model demonstrated that parents/caregivers of adolescents diagnosed with malocclusion were more likely to report a negative impact on the overall P-CPQ score [rate ratio (RR) = 1.21; 95% confidence interval (CI) = 1.14 - 1.29] as well as on the functional limitations [RR = 1.19; CI = 1.06 - 1.34], emotional well-being [RR = 1.28; CI = 1.14 - 1.44] and social well-being [RR = 1.36; CI = 1.21 - 1.52] subscales compared to those parents/caregivers of adolescents with no malocclusion.

Conclusions: Parents/caregivers of adolescents with malocclusion were more likely to report a negative impact on the OHRQoL with significant repercussions on the functional limitations, emotional well-being, and social well-being subscales.

PR09.14

Psychosocial impacts on children following dental injury: a systematic review

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Background: Traumatic dental injuries (TDIs) are common in childhood and may be associated with numerous impacts, mostly unfavorable, on young people's daily lives.

Aim: To determine the psychosocial impacts associated with untreated and treated TDIs in children.

Design: A systematic review, using six electronic databases, was conducted on the dental literature (2004–2014) to identify any studies which had recorded patient-reported outcomes following TDIs, including Oral Health-Related Quality of Life (OHRQoL). Four calibrated reviewers independently examined selected papers to extract the following data: population studied; setting; study design; nature of the TDI or related treatment, and any reported impacts.

Results: The initial search found 231 papers but only 35 met the inclusion criteria. Inter-examiner agreement was good ($\kappa = 0.81-1.0$). 69% of studies ($n = 24$) took place in school settings, and the majority were cross-sectional (71%; $n = 25$). Only two investigations sought longitudinal data. In 49% ($n = 17$) cases, impacts were actually sought from a proxy not children themselves. Only one paper involved a qualitative approach, the remaining 34 studies (97%) employed OHRQoL questionnaires. Key findings were that untreated TDIs in children resulted in significant negative impacts, mainly relating to daily function and psychosocial well-being. OHRQoL was found to improve following clinical interventions.

Conclusions: The use of existing OHRQoL measures has revealed significant negative impacts on children, and their families, following TDIs, especially where they remain untreated. However,

it is recommended that future studies also employ qualitative approaches to gain more meaningful insights into the short and long term impacts of sustaining TDIs during childhood.

PR09.15

Does obesity increase risk of dental caries? Cross-sectional study at Taif University

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Background: Obesity is a growing health problem internationally. Dental caries and obesity are multifactorial diseases and are associated with dietary and lifestyle habits. Few data showed association between BMI and caries in children/adolescence but limited data about such association in adult.

Design: We conducted a cross-sectional study at Taif University outpatient clinic, Taif, Saudi Arabia. Any individuals ≥ 18 years who had a visit to the Dental clinic from Mar-Jun 2014 were asked to participate. Baseline characteristics were obtained by the participated physician. We used the Decayed, Missing, and Filled (DMF) index (range 1–18) to determine the total number of teeth or surfaces that are decayed (D), missing (M), or filled (F) in an individual.

Information about healthy eating, smoking, exercise, sleep pattern and teeth brushing were collected. We also measured the media consumption by hours that include watching TV, using computer, video game and using smart phone for entertainment. We used SPSS to analyze the data.

Conclusions: The primary goal of this study is to assess the relationship between obesity and the prevalence of dental caries

PR09.16

Pattern of presentation of common oral conditions and their impact on quality of life of preschoolers in Lagos, Nigeria

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Background: Children may have one or more dental concerns which could be mildly or severely discomforting. The consequences of oral conditions in preschoolers are of significant interest as the effect is not only on the child but also on the quality of life of their parents/caregiver.

Aim: To evaluate the pattern of presentation of common oral health conditions, their impacts and related treatment experiences on the quality of life of young children and their parents/caregivers.

Design: It was a prospective interventional study carried out on children aged 2–5 years and their parents in two hospitals in Lagos. Information was obtained from parents/caregivers by means of interviewer administered Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire.

Results: A total of 208 children with a mean age of 4.14 (± 0.99) years; 100 (48.1%) males and 108 (51.9%) females participated in the study. One hundred and eighty-eight (90.4%) parents/caregivers reported one form of impact on their children's oral health related quality of life. Acute herpetic gingivostomatitis and chronic marginal gingivitis had the greatest and the least negative impact, respectively on the quality of life of children although 55% of the study population presented with one or more carious lesions. There was a reduction in the subjects' total ECOHIS scores after related treatment of their oral conditions.

Conclusion: Dental caries was the commonest oral condition; however, acute herpetic gingivostomatitis and chronic marginal gingivitis had the greatest and least negative impact respectively on the children's quality of life.

PR09.17

Sublingual administration of atropine eye drops in children with excessive drooling

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Background: Drooling can be a severe disability and have high impact on daily life. Reversible treatment is preferable.

Aim: To analyse if sublingual administration of atropine eye drops is a useful reversible treatment option for severe drooling in children with disabilities.

Design: The study had a prospective, single-system research design. The participants served as their own controls. The study period was three weeks without treatment, four weeks with atropine eye drop solution 10 mg/ml one drop a day followed by four weeks of one drop twice a day. Parents' rating of their child's drooling assessed on a 100 mm VAS scale and unstimulated salivary secretion rate measurement was performed together with notations about side effects and practicality.

Results: Parents' VAS assessment of drooling decreased from a median (range) of 74 (40–98) at baseline to 48 (18–88) ($P = 0.05$) and 32 (12–85) ($P = 0.004$) after four weeks of atropine once a day and another four weeks of atropine twice a day, respectively ($n = 11$). Unstimulated salivary secretion rates decreased from baseline to end of study ($P = 0.032$). Several parents complained about difficult administration. No irreversible side effects were noted.

Conclusion: Sublingual atropine eye-drops is an alternative for treatment of severe drooling in children with disabilities.

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PR10.01

Role of Er, Cr: YSGG lasers in pediatric dentistry

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Background: Many soft and hard tissue pathologies in children can be treated by Paediatric dentist. New technologies such as lasers enable us to carry out treatments with greater ease and patient comfort than the conventional techniques.

Aim: The aim of this paper is to review the literature about the use of Er,Cr:YSGG lasers in Paediatric Dentistry.

Design: The advantage of Er,Cr:YSGG laser over various other group of lasers is that these can be used for both soft and hard tissue procedures as these are well absorbed by chromophore water as well as hydroxyapatite crystals. Laser therapy is the therapy of choice in Paediatric Dentistry due to its known advantages especially safety and gentle approach due to minimal invasive cavity preparation, reduction in post operative discomfort, pain and infection; bactericidal and haemostatic effects and faster soft tissue healing. Er,Cr:YSGG lasers are the world's most advanced dental lasers, which are ideal for the multidisciplinary dentist who performs a broad spectrum of procedures involving the various dental tissues as all dental tissues contain water. These deliver the highest level of clinician control, operating efficiency, flexibility in tip and accessory selection. For optimal clinical results and patient comfort in hard and soft tissue procedures, the erbium lasers have set a new standard of clinical performance.

Conclusion: Laser technology improves efficiency and quality of treatment in paediatric patients, but it is essential to have a good knowledge of laser technique and which type of laser is most indicated for each oral lesion.

PR10.02

Management of dystrophic epidermolysis bullosa: a rare case report

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Introduction: Epidermolysis bullosa (EB) is a group of hereditary diseases affecting 1 in 17,000 live births worldwide. It consists skin and mucous membrane blistering in response to minimal trauma. The genes that cause EB are also involved in development and maintenance of a variety of oral tissues. The specific oral manifestations and their severity are defined by the expression of genes that are important in cell adhesion and integrity. Proteins such as Kindlin-1 are important in maintaining mucosal integrity but appear not to affect tooth formation. Diagnosis of EB is based on clinical findings, Immunofluorescence and Electron microscopy. Out of the three major types of EB, Dystrophic EB is caused by the defect in the anchoring fibril protein that is located below the basal lamina at the dermal-epidermal basement membrane zone. Although specific therapies are not yet available for the prevention of blisters in any of the EB types, these diseases can certainly be controlled.

If treatment is instituted at an early age, it can retain a functional dentition through the use of a combination of aesthetic, restorative, and preventive measures. Proper maintenance of oral structures not only reduces the possibility of oral soft tissue trauma but may also provide proper nutritional support and alleviate systemic complications due to nutritional deficiencies.

Conclusion: Possible treatment modalities for EB will be discussed in order to educate the dental fraternity regarding clinical manifestations and their individualized treatment options. We present a case of dystrophic EB with oral manifestations and its management.

PR10.03

Conservative treatment of dentigerous cyst associated with primary molars

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Introduction: Dentigerous cyst is the most common type of developmental odontogenic cyst that is associated with the crowns of permanent teeth. The cyst is a well-defined radiolucency lesion with fluid accumulation between the epithelium and tooth crown. The clinical features are craniofacial asymmetry, cortical bone expansion, adjacent permanent tooth displacement, and root dilacerations. However, those arising from primary teeth are rarely seen. It usually occurs with a nonvital primary tooth spreading to involve the permanent tooth bud. Marsupialization are the best options to treat a dentigerous cyst, it can reduce the cyst cavity and preserve the tooth involved with the cyst, and physiological eruption of the impacted permanent teeth in the dentigerous cyst after treatment is observed.

Case report: Three cases complaining painless swelling and buccal bony expansion were referred to Pediatric department at Peking University Dental Hospital for inspection. Radiographic examination revealed well-defined radiolucency under the lower primary molar teeth, and the successive premolars were displaced. According to previous dental records, the primary molars had received pulp treatment. The therapeutic approach included extraction of the primary molar involved and marsupialization of the lesion. Iodoform gauze packing were inserted into the cystic lesion to prevent spontaneous closure. After 3–6 months of treatment, spontaneous eruptions of the impacted premolars were observed.

Comment: Marsupialization might be the first treatment option for conservative management of dentigerous cysts in children. Cyst enucleation was discarded to avoid possible damage to the adjacent teeth and mainly in the unerupted permanent premolars.

PR10.04

Recovery of dentigerous cysts in two pediatric patients following decompression by a modified space maintainer

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Introduction: A dentigerous cyst is seen as a well-defined radiolucent lesion of alveolar bone in preadolescents and inhibits the eruption of the involved permanent tooth. Dentigerous cysts are detected primarily as incidental findings on radiographs. Decompression is a technique that relieves the pressure within the cyst by making a small opening in the cyst and keeping it open. This case report presents four cases of dentigerous cyst in children associated with primary molars. The preferred treatment for these cases is decompression followed by a conservative approach using modified space maintainer.

Case reports: Two patients referred to our clinic because of a painless swelling on the mandible. Radiographic examinations of all patients showed an unilocular radiolucent area associated with unerupted premolar and roots of primary molars. The lesions are extending to the lower border of the mandible and caused displacement of the permanent premolar. At first visit non-vital primary molars were extracted and a modified space maintainer, which suits the cyst lumen, is prepared. Two times in a week the lesions are irrigated with saline until the lesion is healed. Every week the lesion depth and the long part of modified space maintainer measured with a periodontal probe. According to the measurements space maintainer is shortened and replaced again. After 6 months panoramic radiographs revealed that the cyst size decreased and the position of the premolar is improved.

Comments: This case report shows making decompression on a dentigerous cyst by modified space maintainer is a new and effective conservative technique. Patients must understand the importance of good oral hygiene for successful treatment.

PR10.05

Nationwide survey of dental problems in patients with osteogenesis imperfecta

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Background: Osteogenesis imperfecta (OI), an inherited skeletal disorder characterized by various degrees of bone fragility, is caused by modification of the type I collagen gene. OI is associated with a variety of manifestations such as growth disturbance, blue sclera, and hearing impairment, with dentinogenesis imperfecta (DI) a well-known dental manifestation.

Aim: In a nationwide survey conducted in Japan, we collected clinical records to analyze oral manifestations of patients diagnosed with OI.

Design: A total of 534 clinics were invited to participate, including 69 registered to train pediatric dentist specialists by the Japanese Society of Pediatric Dentistry and 465 registered to train oral surgery specialists by the Japanese Society of Oral and Maxillofacial Surgeons. We sent questionnaires regarding the number of OI cases and clinical dental findings of the associated patients.

Results: Two hundred twenty-two clinics (42 pediatric dentistry, 180 oral surgery) participated, of which 39 (14 pediatric dentistry, 25 oral surgery) experienced a total of 82 OI cases (43 males, 37 females, 2 unknown), with DI recognized in 52 (63.4%).

Conclusions: OI presents various oral problems, including DI, which was reported in many of the cases noted in our survey. Periodic oral health management is recommended for OI patients, especially those with DI. We hope to collect additional cases for development of better dental approaches.

PR10.06

Dental management of patients with type I spinal muscular atrophy

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Introduction: Spinal muscular atrophy type I is an inherited neuromuscular disease (Werdnig-Hoffman). It is characterized by a weak muscle tone with severe feeding, movement and breathing difficulties. It requires medical care from birth and hospitalization.

Case reports: At social risk 10 years old male hospitalized patient who is at general biological risk due to Spinal muscular atrophy type I. He is with invasive mechanical ventilation because of an unobtrusive airway granuloma.

Tracheostomy and gastrostomy were done. He has secondary undernourishment to pathology base, cephalic pelvic discrepancy, recurrent suppurative otitis, acne and seborrheic dermatitis.

The patient also presents second phase mixed dentition, altered growth of facial cranium, lip incompetence, incapable of swallowing, lingual interposition at rest, hyper salivation, eruption and exfoliation mechanisms altered, gingivitis associated to biofilm, hard deposits and persistence of primary teeth in the mouth that are in poor position, mobility and risk of aspiration. Without caries lesions.

Emergency: Abscess in relation to 5.5 retained tooth.

Dental treatment received: Prophylactic antibiotic one hour before the dental procedure. The patient is sedated with midazolam and ketamine.

Bimaxilar supragingival tartar removal was conducted under double suction.

Local anesthetic was infiltrated, primary teeth extractions next to be exfoliated. Abscess drainage retained tooth.

Comments: The pediatric dentist along with a multidisciplinary team of health professionals, should prevent life-threatening situations for patients with muscle disorders and swallowing disorders such as aspiration of the primary teeth next to be exfoliated and of hard deposits fragments. This should be prevented with thorough clinical exams and periodic controls.

PR10.07

Management of a jaw cyst on a paediatric patient with alpha-mannosidosis: a case report

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Introduction: Alpha-Mannosidosis is a rare inherited disorder caused by lysosomal alpha-mannosidosis deficiency. This progressively leads to extensive storage of mannose containing oligosaccharides which accumulates in the lysosomes and cause cells to malfunction. Subsequently, the clinical manifestations include characteristic skeletal and facial features, immune deficiency, intellectual disability and hearing impairment.

Case report: A 9-year-old boy was assessed for a routine review. The patient was diagnosed with Alpha-Mannosidosis and had undergone bone marrow transplant at the age of 3 years. A panoramic radiograph revealed hypodontia, microdonts and a unilocu-

lar radiolucent area on the left mandible. The radiolucent lesion extended from the lateral incisor region to the first premolar region on the same side with a corticated border and associated with unerupted lateral incisor, canine and first premolar teeth with displacement. Under general anaesthetic retained primary teeth in the region of the radiolucency were removed along with a biopsy of the lesion. Following surgical debridement, primary closure was achieved. The patient recovered uneventfully following the general anaesthetic and was discharged the same day. The tissue specimen was sent for histopathological examination which confirmed a diagnosis of a dentigerous cyst.

Comments: Acute toxicity induced by chemotherapy for myeloblastoma may have resulted in defects of the developing teeth leading to hypodontia, microdontia and possibly the complication of an unexplained radiolucent lesion of the mandible. Secondary malignancies including oral solid tumours have been reported post bone marrow transplantation thus highlighting the importance of investigation and management of unusual radiolucent lesions post chemotherapy.

PR10.08

Regional odontodysplasia: a case report

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Introduction: Regional Odontodysplasia is a rare, severe disorder of dental development of unknown aetiology. In this condition all dental tissues are affected. Diagnosis of this condition is by clinical and radiographic appearance. In regional odontodysplasia the teeth affected are usually confined to one quadrant where both primary and secondary teeth are affected. Teeth tend to have a delayed eruption or fail to erupt completely. We describe a child with an interesting initial presentation of this disorder.

Case report: A 3-year-old female was referred by her general dental practitioner following a 2-month history of recurrent pain from the lower right quadrant (LRQ). Clinical examination revealed the dentition was caries free. The LRD and LRE appeared yellow with grossly hypoplastic, hypocalcified enamel and dentine and LRE had an associated sinus. The LRC and LRB appeared to have very thin enamel with the pulp hue visible. Radiographic examination showed enlarged pulp chambers, reduced radiodensity and poor contrast between enamel and dentine in LRQ. They displayed the typical image of 'ghost teeth'. The permanent tooth germs in this quadrant were also affected. Extraction of LRD and LRE was carried out under general anaesthesia. Histopathology confirmed regional odontodysplasia.

Comments: Regional odontodysplasia is a rare disorder that can cause severe dental, growth and development anomalies. Treatment aims to preserve the affected teeth, however severely affected teeth have a high risk of infection that may necessitate extraction.

PR10.09

Compliance with UK national guidelines for the oral management of oncology patients

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Background: In the UK, over 1500 children are diagnosed with cancer each year. Cancer therapy may cause oral complications

and untreated dental disease may potentially cause severe infection. Dental intervention and arrangements for on-going oral care should be co-ordinated in accordance with recognised clinical guidelines. The first audit cycle highlighted challenges in attaining these standards in two paediatric dental departments in Sheffield and Liverpool.

Aim: The second cycle assessed compliance with clinical guidelines from the Royal College of Surgeons of England (2012) following liaison with the respective oncology teams and provision of training to dental staff.

Design: Data were collected prospectively over a one-year period. The standards were: children should have a dental assessment as soon as possible after cancer diagnosis, with the majority being seen within one month of diagnosis; and that the routine dental care provider should be informed of the dental management plan.

Results: Eighty-six children were included in the second audit cycle. The time from cancer diagnosis to dental assessment decreased in both centres. The majority of children were seen within one month of diagnosis. Although correspondence to the dentist increased in both centres, no letter was provided for 27% of patients.

Conclusion: Using a co-ordinated approach with oncology teams, improvement in the timely dental management of children with cancer was achieved. To further optimise patient safety and experience, education of dental staff and liaison with the respective oncology teams has taken place to address those standards which have not yet been fully met.

PR10.10

Juvenile ossifying fibroma: presentation in two paediatric patients

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Introduction: Ossifying fibromas are benign bony neoplasms that occur almost exclusively in the facial bones with a spectrum of clinical and radiographic presentations. Patients are often asymptomatic, however, lesion behaviour can vary and lead to tooth displacement and facial asymmetry. Juvenile ossifying fibromas (JOF) occur within the first two decades of life, and may be locally aggressive with a high recurrence rate of 30–60%. It is important to distinguish JOF from conventional OF and other fibro-osseous lesions, as well as malignant lesions such as osteosarcoma. We describe two cases of juvenile ossifying fibroma.

Case reports: Patient A was a 12 year-old female referred for histopathological diagnosis of a slow growing, bony maxillary lesion causing proptosis. Histology showed a cellular lesion with focal calcifications. It was focally positive for CDK4, but MDM2 was negative.

Patient B was an 11 year-old male with a 6 month history of an enlarging left mandibular swelling. Clinical examination revealed buccal expansion with multiple tooth displacements. Imaging showed an expansile, corticated, multilocular radiolucent lesion with central ossifications perforating the superior cortical plate. Histopathology showed superficial woven bone, fibrous tissue and calcifications.

In both cases, a diagnosis of juvenile trabecular ossifying fibroma was made. Treatment by complete excision and curettage was advised.

Comments: Juvenile ossifying fibromas are uncommon benign bony neoplasms that are locally aggressive and have a high rate of recurrence. In children they can show rapid growth and must be distinguished from other fibro-osseous lesions, and from osteosarcoma.

PR10.11

Dental treatment patients with bleeding disorders- prospective study

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Background: Children with congenital coagulopathy mostly suffer haemophilia which is characterized by blood coagulation defect. Haemophilia is a recessively hereditary disease with link to chromosome X, disease is transmitted by females but males fall ill. Substitute preparations FVIII and FIX are the main treatment means before dental therapy.

Aim: The aim of contribution is prospective study 78 children with hemophilia in the years 2007 - 2014.

Design: Haemophilia is relatively uncommon disease - despite is the most frequent congenital coagulopathy. The number of child hemophilic patients in Czech Republic is 200 in our study we take care about 78 patients with varying degrees of involvement in congenital bleeding disorders. Based on ADA recommendation a special card was prepared for every patient containing health information, the type of tooth treatment, mainly hematologic therapy including special materials (fibrin glue, antibiotic), photo and X-ray documentation. Baseline examination followed one week after therapy.

Results: Preventive examinations mainly dental calculus removing, restorative treatment including endodontics, surgery in local or general anesthesia (155 extractions, labial frenectomy), and orthodontic therapy were evaluated.

Conclusion: Comparison of guidelines (2013) and our prospective study show step by step the hematological and dental treatment options.

PR10.12

An unusual case of pathological primary tooth mobility

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Introduction: Abnormal mobility of primary teeth can be caused by trauma, sepsis, early onset periodontal disease, localised pathology and underlying systemic disease; the cause must be determined so that optimal treatment can be provided. Here, we describe the management of a young boy presenting with a sound but mobile primary lower incisor.

Case reports: A four year old boy was referred to the Paediatric Dentistry Unit in Cardiff by his general dental practitioner regarding a tender and mobile lower left primary central incisor (71). There had been a gradual increase in mobility of the tooth over the past few months and the area was difficult to clean. There was no history of trauma or sepsis and his medical history was unremarkable.

Clinical examination revealed 71 to be caries-free but grade 3 mobile, with calculus formation and associated localised gingivitis. No other teeth were similarly affected. Radiographic examination revealed marked alveolar bone loss localised to 71. A gingival biopsy was undertaken and 71 extracted under local anaesthesia. On extraction, a foreign object (a small clear plastic cylinder) was found around the root of 71. Histological analysis revealed inflammatory changes in the apical tissues, most likely related to the foreign object.

Comments: This case demonstrates the need to consider foreign objects as a cause of localised tooth mobility and alveolar bone loss in children.

PR10.13

Management of tooth extraction presenting in a patient with severe haemophilia A

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Introduction: HAEMOPHILIA is a congenital bleeding disorder characterized by a malfunction of blood coagulability. Haemophilia A is characterized by a deficiency of factor VIII (FVIII) and accounting for approximately 85% of all cases (incidence 1:5000 live male births). It is a hereditary blood disorder that is transmitted as an X-linked recessive feature, thus, predominately affecting males over females. This disease can be divided into three grades, defined as mild, moderate and severe according to the percentage of factors (standard range over 40%) and their plasma levels (standard range 50–100 IU/dL).

Case report: An 11-year-old boy with severe Haemophilia A (percentage of factor FVIII <1%) was referred for management of toothache. Clinical examination - tooth 84 - revealed: mobility, non - vital reaction on cold, symptoms of pain, sensitivity to palpation. Before the treatment patient was examined by hematologist and became substitution of factor FVIII - Advate (Antihemophilic Factor (Recombinant), Baxter). Dental treatment under application of local anesthesia (2 ml Supracain 4%, Zentiva) was undertaken including extraction of tooth 84. Wound was sutured and fibrin glue (Floseal haemostatic matrix©, Baxter) was applied. The cover plate was not necessary to use.

Comments: The management of patients with Haemophilia A and other congenital bleeding disorders has caused a considerable number of problems to the dental profession. There is a need to simplify planning dental care especially extraction of teeth for this group of patients and remove number of myths concerning their management.

PR10.14

Hand-Schüller-Christian disease presenting with recurrent, bilateral, symmetrical mandibular lesions in an 8-year old boy. Report of a case

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Introduction: Hand-Schüller-Christian disease (HSC) is the unisystem multifocal form of Langerhans Cell Histiocytosis (LCH) and is primarily seen in infants and children. Head and neck lesions are found in 70–90% of patients with LCH, mostly in the temporal bones, jaws, and skin of the auditory meatus. Recognition of early, non-specific signs could facilitate early diagnosis of the disease.

Case report: An 8-year-old boy was referred to the postgraduate Paediatric Dentistry Department, Dental School, University of Athens for acute mandibular pain. His medical history included otic LCH and diabetes insipidus, consistent with HSC, at age of 11 months and was treated with systemic chemotherapy. Intraoral examination revealed a pressure sensitive swelling on the buccal and lingual area of the lower second primary molars. Radiographic examination revealed extensive bone loss around the primary molars, without the presence of dental pathology. The primary molars were extracted and part of the lesions were

removed for histological examination, which confirmed the final diagnosis of HSC disease. The patient was treated with chemotherapy (vinblastine/prednisone). Symptoms improved and the lesions decreased considerably. In the two year- follow-up visit, recurrent lesions were recorded in the area of the mandibular permanent molars bilaterally. Biopsy was performed confirming again HSC disease and the patient entered an alternative chemotherapy protocol. Six months later, improvement of the clinical and radiographic appearance of the mandibular lesions was revealed.

Comments: Paediatric dentists can contribute to a timely and valid identification of HSC disease by correctly differentially diagnosing lesions of head and neck.

PR10.15

Extraoral lesion evaluation in patient with acute lymphoblastic leukaemia

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Introduction: Acute lymphoblastic leukaemia (ALL) is a malignant disorder of lymphoid progenitor cells that affect both children and adults, with prevalence children age 2–5 years, representing 24% of all childhood malignancies. The clinical manifestations of the disease are inhibition of hematopoiesis by leukemic cells and leukemic infiltration in several organs. The treatment includes multi-agent chemotherapy (QT) and marrow bone transplantation. These therapies and immune suppression make children more prone to infections with severe stomatologic complications. Mucositis is the most common oral findings precipitated by the side-effects of the antineoplastic agents but others manifestations were detected as sensitivity of teeth and pain, xerostomia, ulceration, gingival hemorrhage and impaired taste sensation.

Case reports: A 6-year-old girl was first diagnosed with ALL and treated according to the QT protocol BFM 2002. She had no cavities or gingival bleeding. Fifteen months after the end of the treatment, ALL relapsed and then the ALL-St Jude XV chemotherapy protocol started. After two months and eight days the child had swelling and pain in the oral cavity, in the left maxilla (61, 62 region). He had fever with hematological signs (thrombocytopenia and neutropenia). The swelling extended further into cervical area. Computed tomograph of sinusitis were negative for local cellulite. The histological diagnosis confirmed oral mucosa inflammation and presence of *Pseudomonas aeruginosa*. She was medicated with antibiotics, corticosteroids and antifungal agents. The teeth 61, 62 presented mobility and were extracted.

Comments: Oral lesion control and dental hygiene monitoring are important to care ALL relapsed children.

PR10.16

Benign cementoblastoma - a rare case report in a young child

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Introduction: Cementoblastoma is defined as a tumor of odontogenic ectomesenchyme. It is a slow-growing, benign neoplasm originating from cementoblasts with unlimited growth potential. It represents <1% of all odontogenic tumors. Very few cases have been reported in association with primary teeth.

Case reports: A 7 year old female child presented with pain and swelling in the lower right back tooth region since 1 month. Clinical examination revealed dental caries with pulpal involvement and firm swelling in relation to 84 and 85. There was sulcus obliteration indicating cortical bone expansion resulting in facial asymmetry. Radiographically, the lesion was a radiopaque, well-defined homogeneous calcified mass surrounded by a radiolucent halo. A diagnosis of benign cementoblastoma was made. Comprehensive dental care under general anesthesia was undertaken including surgical excision of the lesion along with 84 and 85, followed by placement of PRP in the excised cavity. Mandibular immobilization was done for 3 weeks. Histopathologic picture confirmed benign cementoblastoma. Patient is under evaluation and has shown no signs of recurrence since 1 year.

Comments: Given the rarity of benign cementoblastoma in children, a circumspect vision of paediatric dentists is required to detect, diagnose and manage such lesions.

PR10.17

An 18 months review of paediatric oral biopsies at the Dental Centre, Lagos University Teaching Hospital, Lagos, Nigeria

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Background: Oral and dento-facial pathologic lesions are rare in children, so are reviews of such lesions in Nigeria. However, their study is useful in assisting the paediatric dentist in diagnosing and managing these lesions appropriately.

Aim: The aim of the study was to review the pediatric oral biopsies done between June 2013 and November 2014 from the Dental Centre in Lagos, Nigeria based on age, sex, site and type of lesion.

Design: The biopsy records of patients aged 16 years and below which were processed at the Dental Centre over a period of 18 months (June 2013 - November 2014) were retrieved and an evaluation of the biopsy result was carried out. The lesions were grouped into categories according to age, sex, anatomic site and pathologic diagnosis.

Results: A total of one hundred and seventy biopsy reports were reviewed, of which 26 (15%) cases were from pediatric patients, the majority (88%) of which were benign. The distribution of the pathologies were 9 odontogenic lesions, 4 salivary gland lesions, 7 fibro-osseous lesions and 2 malignant connective tissue lesions. The most common pathology was ossifying fibroma. There was a slightly higher male predilection (1.2:1). The ratio of the lesions in mandible to maxilla was 3.3:1 and was predominantly on the left side.

Conclusions: Most of the pathologies in this population were benign, the most common being ossifying fibroma. The lesions were more common in the mandible with a male predilection.

PR10.18

A retrospective study of biopsied oral lesions in Thai pediatric patients

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Background: The incidence of oral diseases found in children and adults are different. Only a few studies were carried out to collect and analyze the data of biopsied oral lesions in children.

Aim: To study, retrospectively, the paediatric oral lesions in Thailand in order to provide epidemiological standpoint and diagnostic consideration.

Design: The biopsy records from 1984–2013 were collected from the Department of Oral Pathology, Faculty of Dentistry, Chulalongkorn University, Thailand. Patients age of 0–16 years were included and divided into three groups according to the dentition period. The lesions were classified into 11 diagnostic categories.

Results: Specimens of 1918 patients were recruited. Five most common categories are odontogenic cysts (31.1%), salivary gland disease (14.8%), odontogenic tumors (13.9%), gingival and periodontal pathology (11%) and bone pathology (8.6%). Ten most common paediatric lesions are dentigerous cyst (18.4%), mucocele (12.4%), pyogenic granuloma (7.4%), radicular cyst (6.2%), ameloblastoma (5.4%), odontoma (4.3%), odontogenic keratocyst (4.2%), fibroma (3.1%), normal dental follicle (2.9%), and fibrous dysplasia (2.2%), respectively.

Conclusions: The detailed information was different from previous studies, both in Thailand and other countries. This may be due to the different in criteria, age range, and classification of the lesions.

PR10.19

A review of three cases to demonstrate the value of coronectomy in reducing postoperative neuropathy in the management of “high risk” mandibular teeth

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Introduction: Coronectomy, or partial odontectomy is a conservative surgical technique in which the crown of a tooth is removed but its roots or (root) are deliberately left in situ. In carefully selected cases this alternative to the complete removal of a tooth may represent the treatment of choice in a number of clinical scenarios. To date the use of coronectomy to reduce the risk of neuropathy following the extraction of teeth other than mandibular third molars has not been widely explored. This paper highlights the value of this procedure in other carefully selected clinical scenarios and reviews the management of three paediatric patients who underwent this procedure at King's College Hospital.

Case reports: We present the cases of three children who were managed by a multidisciplinary team and underwent a coronectomy procedure. All had cone beam computer tomography imaging as part of their assessment. The surgery was performed under general anaesthetic. None of the children experienced postoperative neuropathy.

Comments: The three cases presented demonstrate how coronectomy can be used as an effective alternative to the removal of teeth in situations where extraction would be associated with an unacceptably high risk of postoperative neuropathy. Coronectomy should be considered a risk reducing, but not risk free procedure and the preoperative counselling of patients and their carers regarding this is essential.

PR10.20

Use of diaries to identify the impact of recurrent aphthous ulceration in children

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Background: Recurrent aphthous stomatitis (RAS) commonly affects children with potential to cause significant pain and morbidity. Solicited diaries can be used to contemporaneously record symptoms and impacts to tailor patient management.

Aim: Identify the impact of RAS on children.

Design: A consecutive sample of 25 new patients attending the joint paediatric oral medicine clinic were given a 28-day diary. The diary, developed with children's involvement, contained open and closed questions. Quantitative data were analysed regarding frequency, site, size and discomfort from the ulcers. Thematic content analysis was undertaken for the open questions.

Results: Completed diaries from 25 children with a mean age of 10 years (range 4–14) were analysed. Participants experienced a mean of 1.8 ulcers per week (range 0–8). Seventy-two per cent of patients

($n = 18/25$) suffered multi-site ulcers. Ulceration most frequently affected the lips (35%, $n = 41/116$), tongue (22%, $n = 25/116$) and cheek (21%, $n = 24/116$). Ulcers were reported moderately painful in 32% of participants ($n = 8/25$) and severely painful in 32% ($n = 8/25$). Participants reported their largest ulcer as follows; size of a grain of rice (30%, $n = 30/100$), size of a Smartie (29%, $n = 29/100$), size of a pound coin (11%, $n = 11/100$). Qualitative analysis highlighted impacts on daily activities and basic functions. Coping mechanisms included watching television or playing games. Some relief was reported from the use of prescribed medications.

Conclusion: This service evaluation has highlighted that children are able to provide detailed reports of their ulcers. Further research is needed to evaluate whether treatment can reduce impacts.

PR10.21

A case of eruption of the impacted first molar associated with the compound odontoma in mandible

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Introduction: In this paper, we introduced an interesting case of the induction of eruption of the impacted first molar associated with the compound odontoma by using a brand new method.

Case report: A 7 years and 5 months old boy was referred by a local private dental clinic to the Department of Paediatric Dentistry of Showa Dental Hospital. His panoramic X-ray findings showed the impacted mandibular left side first molar near the lower border of mandible and the missing second molar. The dental germ of the mandibular left side second molar was not detected. Dental cone beam CT images appeared a cyst cavity extended from the first molar to the original part of the second molar. And there were several calcified mass of the cyst detected. We diagnosed as a compound odontoma according to the examination of oral pathology.

We enforced enucleation of the odontoma followed by a fenestration operation of the first molar under general anesthesia on Feb 22, 2014. We adhered the orthodontic button on the occlusal plane of the first molar by using Super bond resin[®] in order to pull up the impacted tooth through the fenestration. We could confirm the complete eruption of the first molar on Nov. 22 2014.

Comments: When we use an orthodontic button introduced in this case, since the wound is not covered by gingival tissue, we can keep fenestration and the tooth can erupt smoothly through the fenestration. Therefore, this method is effective for the eruption guidance of the tooth.

PR10.22

Severe external root resorption in a 13 year old boy with primary hyperoxyluria

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Introduction: Primary Hyperoxyluria is an autosomal recessive metabolic disease in which there is excessive urinary oxylate excretion. It is estimated to occur in 1–3 per 1,000,000 people. It is defined as a defect in the glyoxylate metabolism pathway in the liver. Crystal deposition is prominent in the kidneys and bone but uncommon in oral tissues.

Case reports: A 13 year old Syrian boy was referred to Birmingham Dental Hospital due to mobile anterior teeth. He complained of pain on eating localised to his upper anteriors. There was no history or evidence of trauma. Medically, he has Primary Hyperoxaluria and had undergone liver and kidney transplants in 2010 at the Birmingham Childrens Hospital. The kidney transplant was unsuccessful and currently remains on dialysis.

Clinically, the attached gingivae had well defined and discreet yellow deposits localised to the anterior region. In addition, the upper incisors were mobile. Radiographically, the bone had a generalised mottled appearance. There were crestal radiolucencies involving the lower premolars, loss of lamina dura of the mandibular incisors and evidence of extensive root resorption of the upper anteriors.

Opinions from the periodontology and radiology department were sought and a diagnosis of severe external root resorption due to oxylate crystal deposition was made.

After liaising with his medical team, the plan is for preventive therapy, extraction of mobile teeth and provision of a removable appliance.

Comments: This case highlights the importance of taking a multi-disciplinary approach in tackling a difficult and rare dental presentation in a child.

PR10.23

Abstract withdrawn

PR10.24

Oral & maxillofacial pathological lesions in children managed at the Department of Paediatric Dentistry Kuala Lumpur Hospital

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Background: Studies have been done worldwide to analyse the type of lesions seen in children who present with various oral and maxillofacial lesions, with clinical signs and symptoms sometimes differing from those in adults. Physiological and anatomical factors may influence their management.

Aim: This study was to identify oral and maxillofacial lesions seen and managed at the Paediatric Dental Department, Kuala Lumpur Hospital and to compare the epidemiological data with other centres.

Design: This was a retrospective study involving records of children who presented with oral and maxillofacial lesions from year 2000 until 2014. Apart from patients' demographic data, diagnosis and management of the lesions were also recorded. Descrip-

tive statistics were used, the data analysed using Microsoft Office Excel 2003.

Results: 434 complete records were retrieved. Fifty-five percent of lesions occurred in the 6–11 year-old group (55.3%), followed by 12–16 year-old (29.0%) and 0–5 year-old groups (15.7%), with female predilection (58.3%). Cystic lesion gave the largest number of specimens (62.4%), followed by neoplasm (16.4%), inflammatory lesions (12.7%) and others (8.5%). 83% of 271 cystic lesions were mucous extravasation cysts. The lesions were managed accordingly such as excision, marsupialisation, resection and referral for chemotherapy and other adjuvant treatment.

Conclusions: A majority of the lesions were benign, requiring minimal intervention. Although malignant lesions in children are rare, early detection and diagnosis are important. Recognition of the clinicopathological features should alarm the clinician that growth and anatomy of the maxillofacial structures may have been altered by the pathology or even the treatment received.

PR10.25

A preventive approach to two non-syndromic pediatric patients with oral self-mutilation

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Introduction: Self-mutilation (SM) describes a form of behavioural disorder characterised by an intentional damage to a part of the body without a conscious purpose to commit suicide. This case report presents the treatment planning of two non-syndromic patients with SM.

Case report: The first patient referred to the clinic with complaining of swelling of the buccal mucosa. An irregularly shaped, well-defined lesion was noted on the right side of buccal mucosa surrounded by keratotic areas. An acrylic resin appliance was designed firstly. After a month, similar lesions were appeared on surface of the left side of buccal mucosa and lower lip, then SM was confirmed. The patient consulted to psychiatry clinic. It was decided to use a thermoplastic retainer for maxillary arch. The injuries were healed with no evidence of additional trauma. On recall examination after 12 month, there was no sign of SM.

The second patient was applied with a lesion on left buccal area. The lesion appeared to be nodular, elliptical, localised and painless. Preliminary intervention was performed with a thermoplastic retainer for all day use. The patient was also referred to the oral surgery clinic for biopsy. Fibroepithelial hyperplasia was detected which contributed with chronic trauma and SM was diagnosed. 3 weeks later, lesion has almost completely healed. The patient was followed-up for 12 months and no signs of recurrences occurred. Patients are still under control.

Comments: Dentists can play an important role in diagnosing SM and appropriate preventive methods must be developed for each individual patient.

PR10.26

Ameloblastic fibro-odontoma: a case report

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Introduction: The ameloblastic fibro-odontoma (AFO) is an unusual mixed odontogenic tumor comprising of ameloblastic fibroma (AF) and ameloblastic odontoma. This tumor exhibits

progressive growth and causes considerable deformity and bone destructure.

Case reports: A 11-year-old male was referred to our institution due to delay erupted left permanent molars. Neither dental history reported local trauma or infection at lesion site, nor medical history revealed remarkable systemic diseases. Panoramic radiography showed an impacted left lower first molar with an well-defined, radiolucent lesion enclosed the crown. It contained a radiopaque mass of apparently calcified material close the alveolar mucosa. Under general anaesthesia, the tumour was removed through intra-oral approach. Microscopically examination of sections stained with hematoxylin and eosin showed scattered cords of odontogenic epithelium in a loose primitive-appearing stroma that resembles the dental papilla. The calcifying element is characterized by foci of enamel and dentin matrix formation in the close relationship to the epithelial structures. Histologic examination made diagnosis of AFO.

Comments: This lesion appears to be true neoplasms. The nature and the relationships between mixed odontogenic tumours and related lesions are still controversial. However, distinguishing between a developing odontoma and an AFO may be difficult based on histopathologic grounds alone.

PR10.27

Uncommon gingival sulcus bleeding following full mouth rehabilitation in a 3-year old child with severe iron deficiency: a case report

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Introduction: Iron deficiency anemia (IDA) is the most common cause of anemia worldwide and results from inadequate iron supply. The clinical manifestations of iron deficiency anemia can be subtle, but irreversible delayed cognitive and emotional development may occur if the anemia is severe and prolonged. In this case I describe an unusual bleeding following full mouth rehabilitation due to severe iron deficiency anemia.

Case report: A 3-year-old girl diagnosed as mild mental retardation and developmental delay was referred for management of full mouth rampant caries. Pre-operational complete blood data showed iron deficiency anemia (Hb 7.4 g/dL) with higher platelet count. Comprehensive dental care without extraction under general anesthesia was performed. After dental treatment, blood continuously oozed from the gingival sulcus around stainless steel crowns with little blood clot formation. Gauze packing with 1:100,000 epinephrine was performed for localized hemostasis. The Hb concentration dropped to 4.7 g/dL and controlled by PRBC transfusion. The prescription of ferrous gluconate was for iron supplement. The girl kept on iron supplement treatment and periodic follow-up at pediatric clinic. Now, the girl is 10 years old. Her cognitive and physical development has caught up with the normal range and her oral health is stable.

Comments: The uncommon prolong bleeding could not have foreseen. Subtle bleeding manifestations can occur in patients with IDA with delay in platelet aggregation and adhesion which can be reversed by iron therapy. Regarding the severe IDA patients as bleeding disorder patients is suggested.

PR10.28

Comparison between sleep history, pain in head areas and masseter bite force between children with and without sleep bruxism on primary and mixed dentition

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Aim: This study compared the sleep history, pain in head areas and masseter bite force (MBF) between children on the primary (P) and mixed (M) dentition (D), with and without bruxism.

Design: Children were classified as bruxers according to the America Academy of Sleep Medicine criteria; and the children's dentition was evaluated by clinical exams. Sample ($n = 66$; mean age = 5.33 ± 1.10) was divided into groups (G): G1 = bruxers on PD ($n = 17$); G2 = non-bruxing children on PD (control, $n = 16$); G3 = bruxers on MD ($n = 17$) and G4 = no bruxers on MD (control, $n = 16$). A questionnaire about sleep history (nightmare, drooling, snore, sleeptalking and enuresis nocturna) and pain in head areas (face, ear and head) was applied to parents. The MBF was assessed through electromyography.

Results: Children on PD (G1 and G2) did not differ from those on MD (G3 and G4) considering drooling, snore, sleep talking and enuresis. However, we observed more nightmares in G3 than in G1 ($P = 0.001$), without difference among G2 and G4 ($P = 0.758$). No difference was detected between the dentitions, both for bruxers and non-bruxing children, related to ear and facial pain ($P > 0.05$). Although bruxers on PD and MD presented similar headache percentages ($P > 0.05$), controls had more headache during the MD ($P = 0.025$). We observed that the MBF of G1 was lower than in G3 ($P < 0.05$), but it was not detected in controls ($P > 0.05$).

Conclusion: In conclusion, nightmares are more prevalent on bruxers with MD. Apart from the type of dentition, the headache episodes are similar only in bruxers. However, the dentition exerts difference on MBD patterns between the groups.

PR10.29

Lateral periodontal cyst in a 8 year old male: a case report

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Introduction: Lateral periodontal cyst (LPC) is an odontogenic cyst of developmental origin on the lateral surface of the root of a vital tooth. It has characteristic histopathological features and is generally asymptomatic. LPC appears on radiographs as a round or teardrop-shaped, well circumscribed radiolucency that can be misdiagnosed as a lesion of endodontic origin. The most common treatment for LPC is surgical enucleation. LPC arise preferentially in individuals aged between 40 and 70 years and irrespective of gender. We describe a young male patient with a LPC in the upper central incisors, a rare case for his age.

Case reports: An 8-year-old boy was referred to the Paediatric Dentistry Department of Aristotle University of Thessaloniki with a 10 month history of pain and swelling on the buccal surface of the upper left central incisor (#21). The patient was in good oral health with no history of trauma. Clinical examination

revealed a gingival enlargement labially to #21 and mobility of the four upper incisors with positive vitality tests. Radiographic examination revealed a well defined solitary oval-shaped radiolucency between the roots of the displaced upper central incisors. Dental treatment was performed under local anesthesia and included the surgical enucleation of the lesion. The histological examination of the specimen confirmed that the lesion was LPC.

Comments: The appropriate clinical and radiographic examinations aided to the correct diagnosis and treatment approach of a young boy's LPC.

PR10.30

Compound odontoma and delay eruption of mandibular right 1st permanent molar in a seven-year old boy

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Introduction: The mean age of the time in diagnosis an odontoma is 14 years. Odontoma occur somewhat more frequently in maxilla than in mandible. The compound type is more often seen in the anterior maxilla; complex odontoma occur more often in the molar regions of either jaw.

Case reports: This seven-year-old boy was a regular-dental-follow-up patient in Division of Paediatric Dentistry of Kaohsiung Medical University Hospital for more than 3 years. From the regular dental examination in July 2013, the bilateral mandibular 1st permanent molars were unerupted while maxillary 1st permanent molars were starting eruption. The mandibular left 1st permanent molar erupted after 5-month follow up, but the mandibular right 1st permanent molar was found delay eruption. The panorex showed an odontogenic like lesion between mandibular right 1st permanent molar and 2nd primary molar. The operation was done in February 2014 with enucleation of odontoma and operculectomy for mandibular right 1st permanent molar eruption, 2 main odontogenic-like segments were sent for histopathological examination. Histopathology confirmed compound odontoma. The mandibular right 1st permanent molar was partial eruption in April, full crown exposure in July, and full eruption in November 2014. The patient still keep regular follow up at our OPD.

Comments: This is a rare compound odontoma case founded in very early age. The paediatric dentists are very important for those children who are in mixed dentition, and regular dental follow up is also important. In this way, any delayed tooth eruption can received further examination in early age.

PR10.31

Melanotic neuro-ectodermal tumor of infancy

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Introduction: MNTI- Melanotic Ectodermal Tumor of Infancy is relatively a rare neoplasm with osteolytic character. Less than 500 cases were reported world wide. Going by the literature, it is known to affect Maxilla during infancy in 90% of the cases. It's peculiar nature of early onset, rapid growth, affect oral intake and result in gross disfigurement.

Case reports: A 4 month old child presented at Pediatric Dentistry of Rainbow hospital for women and Children with a swollen gum on left posterior Maxilla. In spite of advice for

diagnostic biopsy parents differed intervention. Child reported back after 8 months with gross swelling of the face and disfigurement and inability to take solid because of intraoral maxillary growth. Incisional Biopsy confirmed diagnosis of MNETI and CT scanning revealed the extent of hard tissue involvement.

Based on the histopathological report the Surgical intervention involved resection of the tumor and reconstruction. Considering the Margins of the surgical specimen for the presence tumor cells and owing to the tumor size, Child was subjected to chemotherapy. Prosthetic rehabilitation was done post chemotherapy.

Comments: Timely intervention with aggressive management is prudent owing to its rapid growth and high recurrence rate.

PR10.32

Acquired toxoplasmosis of a cervical lymph node in a seven-year old boy: a case report

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Introduction: Toxoplasmosis is a parasitic infection divided into congenital and acquired forms. The latter form may be asymptomatic, or present with lymphadenopathy, fever, fatigue and malaise. In children the cervical lymph nodes are most commonly affected. This report describes a case of a seven-year-old boy who presented with a five-year history of cervical lymphadenopathy. A brief review of the literature on toxoplasmosis has also been noted.

Case reports: Following urgent referral from GP to regional Oral and Maxillofacial Surgery Department, seven-year-old boy presented with five-year history of mass in right posterior triangle of neck. Initially presented age two with a history of slow growth. Clinical examination revealed two by one centimetre soft and freely mobile mass right posterior triangle, with further one centimetre lymph node inferiorly. Management included ultrasound imaging and excision of lymph nodes under General Anaesthetic. Following histopathology and referral to Paediatrics, patient and mother were advised diagnosis of toxoplasmosis entirely benign in males, with no further treatment advised.

Comments: Toxoplasmosis is a disease with mild symptoms. The clinical picture is not specific, but suggestive features include a relatively short history, presence of cervical lymphadenopathy and relative lymphocytosis in peripheral blood. However this disease is often not considered in patients with unexplained cervical adenopathy. The majority of these patients attend operating theatres with a suspected diagnosis of malignant neoplasm, generating anxiety and, at times, unnecessary surgery is performed. Toxoplasmosis should be included in the differential diagnosis of patients with cervical lymphadenopathy.

PR10.33

Long term effects of radiation therapy and chemotherapy in tooth formation and development. A case series report

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Introduction: The age of the patient, the stage of crown/root formation and the radiation and/or chemotherapeutic drug dose received are the most important risk factors for dental developmental disturbances. The objective of this report is to present five cases of paediatric cancer survivors with developmental dental anomalies and their long term follow up.

Case reports: 1st case: 11 years old male treated with radio/chemo therapy (R/CT) for brain tumor when 5 years old. Follow up time (FUT): 5 years. Clinical and radiographic findings (CRF): arrest of root formation and microdontia.

2nd case: 8 years old male treated with RT when 2 years old for optic glioma. FUT: 3 years. CRF: teeth aplasia, arrest of root formation, short and conical roots.

3rd case: 12 years old male with Langerhans cell Histiocytosis treated with CT when 5, 8 and 10 years old, for head and neck lesions. FUT: 3 years, CRF: vertical bone loss in mandibular molar and premolar area.

4th case: 15 years old girl treated with CT and total body irradiation when 3 years old for neuroblastoma. FUT: 2 years, CRF: aplasia of premolars, abnormal root formation and microdontia.

5th case: 5 years old male treated with R/CT for neuroblastoma when 3 years old. CRF: Severe early childhood carries, abnormal crown formation of mandibular first premolars.

Comments: Childhood cancer survivors may present tooth developmental anomalies that may negatively influence their oral health.

PR10.34

Clinical and pathohistological profiles of chronic odontogenic infections with microvascular proliferation in children with permanent dentition

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Background: The apical periodontitis as an infection is the result of endodontic infections and is manifested when the immunological system of the host is activated from microorganisms which penetrate in to the dental pulp through the root canals.

Aim: The aim of this study is to compare the clinical diagnosis and the pathohistological identification in chronic odontogenic infections with microvascular proliferation in children with permanent dentition.

Design: In our study we included 36 children with permanent dentition and with chronic apical changes and granulomas, in which children the indication for extraction of the teeth that caused the odontogenic infections was set and from the extracted teeth we verified the diagnosis using pathohistological methods (vascular proliferation).

Results: From 36 children with chronic apical changes and granulomas, 9(25.00%) of them had chronic apical periodontitis, from which 6(16.67%) of the children did not have microvascular proliferation, 1(2.78%) child had a medium level and 2(5.56%) children had significant microvascular changes (proliferation).

A total of 6 (16.67%) children had chronic apical periodontitis with a fistula. 5 (13.89%) children did not have microvascular proliferation and 1 (2.78%) child had a medium level of microvascular proliferation. A total of 5(13.89%) children had chronic apical periodontitis with parulis, from which 3 (8.33%) children didn't have microvascular proliferation, 1 (2.78%) child had a low level of microvascular proliferation and 1 (2.78%) child had severe microvascular proliferation.

Conclusions: The findings from this study show the importance of histopathological examination for the correct determination of periapical lesions in children's permanent teeth.

PR10.35

Case series of paediatric odontomas: are we communicating the link with Gardner's syndrome?

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Introduction: Odontomas are benign odontogenic tumours (hamartomas) subdivided into compound and complex types. Odontomas consist of dental tissues, arranged as 'toothlets' (compound) or unrecognizable (complex) structures. Most are diagnosed as incidental radiographic findings in adolescents. Their aetiology is unknown, but there is an association with hereditary conditions including Gardner's syndrome (GS).

GS is a rare but serious condition resulting in premalignant colonic polyps. Other findings include jaw osteomas (including odontomas); in approximately 80% of cases. As jaw lesions are known to precede the detection of bowel polyps, appropriate monitoring of patients diagnosed with odontomas and early diagnosis of GS will likely lead to long term optimum treatment outcomes.

Case reports: Six cases of odontomas in patients (aged 6 - 13) are presented from the Sunderland OMFS Department; four complex and two compound. All were successfully enucleated, including two large odontomas. Histological reports confirmed the diagnosis. None of these patients presented with other signs of GS and all were discharged. None of the discharge letters allude to the significance of this diagnosis and in two cases the GP's were not copied into communications.

Comments: Although awareness exists among dentists, there is little emphasis on future monitoring for potential GS. It is likely that GP's are less aware of the significance of this diagnosis. Perhaps a care pathway with appropriate review intervals should be initiated for patients with odontomas to help with early detection of this rare, but serious condition. GP's should be included in communications and the link with GS highlighted.

PR10.36

Case report of Williams syndrome in Saudi Arabia

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Introduction: Williams syndrome is a rare genetic disorder that affects a child's growth, physical appearance, and cognitive development. People who have Williams syndrome are missing genetic material from chromosome 7, including the gene elastin. This gene's protein product gives blood vessels the stretchiness and strength required to withstand a lifetime of use. The elastin protein is made only during embryonic development and childhood, when blood vessels are formed. Because they lack the elastin protein, people with Williams Syndrome have disorders of the circulatory system and heart.

Case report: An 10-year-old Saudi boy diagnosed with Williams Syndrome presented for dental care at Pediatric Dentistry Clinics at Riyadh collage, Riyadh, Saudi Arabia. The boy was born through full term pregnancy and the delivery was uneventful. The family history did not reveal any further occurrence of WS. The child was diagnosed with aortic insufficiency didn't require any surgical treatment only follow up every year and prophylactic antibiotic cover with extensive treatment. have pulmonary artery stenosis at birth which improved by the age of 6 years. The child had mild mental retardation and was very friendly. The patient was 115 cm tall and weighing 34 kg at initial visit. The patient displayed the characteristic "elfin face" appearance including full prominent cheek, periorbital fullness, mild hyperopia (vertical

strabismus), wide mouth with thick lips, long philtrum, small nose and depressed nasal bridge.

Conclusion: There is no cure for Williams syndrome. Patients must be continually monitored and treated for symptoms throughout their lives.

PR10.37

Investigation and countermeasures of 43 pre-eruptive intracoronal absorption

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Aim: To investigate the characteristics and treatment methods of pre-eruptive intracoronal absorption.

Design: By retrieving the Pubmed database about case reports and epidemiological literatures of pre-eruptive intracoronal absorption, the characteristics of the disease and the treatment methods should be found out and noted in the clinical work and make it get timely treatment.

Results: 34 case reports (1978~2013), a total of 43 teeth influenced, and 6 articles of epidemiology investigation were obtained. The disease occurs between 6 and 20 years old, mostly in the stage of mixed dentition, with the incidence of 1.55% to 1.55% in people, and 0.5% 2.1% in teeth, no racial and gender differences. This disorders of unerupted permanent teeth were usually found during routine radiographic examinations of children with otherwise good oral health by the orthodontist. Few toothache had been reported. Pre-eruptive intracoronal absorption used to appear mostly in the second permanent molar (47.5%), next in the permanent canine(17.5%) and first permanent molar(15.0%), single or multiple, mostly because of the neighbor tooth translocation, or the chronic perioapical disease of the preceding primary teeth. Treatment is clinical observation, or filling after eruption of the tooth, removal and making the adjacent teeth moving forward to replace it was also be choosed.

Conclusion: In mixed dentition stage, panoramic radiograph should be taken to screening pre-eruptive intracoronal absorption. Early detection and early treatment is important to this defect.

PR10.38

Painless and bloodless surgery in pedodontics

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Introduction: The goal of paediatric dentistry is to provide preventive education to parents and patients as well as interception and therapy of dental diseases in a minimally invasive way using a stress-free approach. New technologies enable simpler treatments to be carried out than with conventional techniques. Lasers have been used in the dental field since few decades.

Case reports: This poster will highlight some of the clinical applications of diode lasers especially in young children. Procedures like frenal revisions, fibroma excision, operculectomy, tongue tie corrections will be highlighted. Laser is very effective in paediatric dentistry and enables optimal preventive, interceptive, and minimally invasive interventions for soft tissue procedures.

Comments: The laser is a good tool for soft tissue management in children. Due to almost totally bloodless field and faster healing, Lasers find more acceptance among the pediatric patients and their parents. Laser treatment involves a reduction in the use of medication (anaesthetics, analgesics and antibiotics) and in intra-operative and post-operative bleeding. It eliminates the need sutures and produces faster wound healing and less scarring. It is important for the professional to understand the physical characteristics of the different laser wavelengths and their interaction with the biological tissues to ensure that they are used in a safe way, in order to provide the benefits of this technology to young patients.

Education, Service Evaluation and Audit Poster Session – PR11

PR11.01

Final year dental undergraduates' self-assessed confidence in paediatric dentistry

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Background: Self-assessment based on benchmarked professional standards is an excellent tool to assist in improving the dental curriculum. Areas of strength and weaknesses can be identified. It can also act as a baseline standard when significant changes are introduced to the dental curriculum.

Aim: The aims of this prospective cross-sectional study were two-folds:

- (i) to investigate self-assessed confidence of final year dental undergraduates in paediatric dentistry at University of Malaya,
- (ii) to gather baseline level of self-confidence for the old dental curriculum.

Design: 65 undergraduates completed anonymised questionnaires which was formulated based on expected professional competencies in three domains namely clinical skills, patient management, and professional development and clinical governance. Visual analogue score (VAS) represented by a 10 cm line with score '0' no confidence at all and '10' complete confidence was used to measure the level of confidence.

Results: The overall analysis of self-assessed confidence was very positive with median VAS ≥ 5 cm in; clinical skills, 7.66 ± 1.31 cm (range = 2.41–9.97 cm: $n = 62$; 95.4%), patient management 7.73 ± 1.27 cm (range = 5.09–9.95 cm: $n = 64$; 100.0%) and professional development and clinical governance, 8.13 ± 1.21 cm (range = 5.22–10.00 cm: $n = 64$; 100.0%). High confidence was reported for routine dental care (fillings and preventive care) while lower confidence reported for basic life support (median VAS = 5.65 cm) and pulp therapy for immature permanent teeth (median VAS = 5.95 cm).

Conclusions: The final year dental undergraduate students of University of Malaya appear to have good overall self-assessed confidence in core areas in paediatric dentistry and similar areas of low confidence was reported by undergraduates at other dental schools.

PR11.02

A qualitative study of new graduates' views of barriers to dental training in Libya

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Background: In Libya, studying dentistry involves five undergraduate academic years followed by an internship year wherein the

student has to practice the different specialties of dentistry for not <12 months. Recent reports from Libya showed that dentists were blaming the dental education system for not adequately prepare them to fulfill their roles as dental practitioners and that dental graduates are not proficient in performing most of dental procedures.

Aim: To explore graduated dentists' views and opinions concerning dental education related factors which hamper their competency in practicing dentistry after graduation.

Design: This qualitative study involved semi-structured interviews of newly graduated dentists from different dental schools in Libya. Participants were identified through their social groups on Facebook by two interviewers; those who accepted to take part in the study were asked questions about their personal experiences of studying dentistry in Libyan universities. The interviews were recorded and transcribed and then analyzed using thematic analysis of latent contents.

Results: A total of thirty five dental graduates were interviewed for this study. The most common themes to emerge were: insufficient training, shortage of resources, poor admission and education policies, failure of management, lack of infra-structures, the need of postgraduate training, shortage of qualified staff, unpreparedness to practice independently.

Conclusions: This study showed that the barriers to dental training in Libya are numerous, interact and overlapping. There is a need for immediate and long term plans to improve the quality of dental education and to support the emerging dental workforce.

PR11.03

Placement of preformed metal crowns (PMCs) by dental hygienist / therapist (DHT) Vocational Trainees in Scotland: a service evaluation

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Background: Studies have identified the utility of PMCs for management of carious primary molars, acknowledging the importance of patient and parental acceptance. The evolving role of DHTs has been identified, requiring further investigation.

Aim: This study focuses on diagnosis and management of carious primary molars. Patient and parent satisfaction and cost effectiveness of placement of PMCs by DHTs were evaluated. Attitudes to increased professional autonomy for DHTs were investigated.

Design: Data was collected in 2 audit rounds following placement of PMCs using a "faces" scale for children and a Likert scale for parents. DHTs were questioned on their attitudes to the use of PMCs and increased professional autonomy.

Results: 133 PMCs were placed (110 children) by 10 DHTs over an 8-month period. 10.5% of PMCs placed had radiographs available. Mean time taken to place PMCs was 13.4 min. The proportion of PMCs taking >20 min to place fell from 13.5% (round 1) to 1.7% following structured training 4 months into the module. 92% of patients chose the "very happy" (60%), "happy" (21%) or "neutral" (11%) MCDASf face following

PMC placement. 81% of parents said the PMC was “easier” or “much easier” than a filling. 81% of parents were “very happy” or “happy” with appearance of the PMC. 98% of parents ($n = 42$) found a visual communication resource useful.

Conclusions: Low availability of radiographs represents a missed diagnostic opportunity. PMC placement by DHTs results in high patient and parent satisfaction, comparable to other studies. DHTs showed engagement with developments in increased professional autonomy.

PR11.04

An audit of sedation record keeping in the public dental service

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Background: The Scottish Dental Clinical Effectiveness Programme (SDCEP) has published guidelines for “Conscious Sedation in Dentistry”. They stipulate “treatment procedure” details that should be recorded in clinical records during episodes of sedation. Complete and accurate record keeping is a GDC requirement as set out in “Standards for the Dental Team”.

Aim: (1) To audit current record keeping practice for patients undergoing intravenous/inhalation sedation and to compare this with SDCEP guidelines.

(2) To compare and contrast compliance with SDCEP guidelines for intravenous vs inhalation sedation.

Design: A retrospective audit of 50 clinical records of sedation patients attending Motherwell Health Centre between 1/1/14 and 15/5/14 was completed. 20 patients received inhalation sedation and the remaining 30 received intravenous. Data gathered was compared to SDCEP guidelines.

Results: Dose, route of administration and dental treatment provided was recorded in 100% of cases.

Details of monitoring and time of delivery was recorded in 60% of cases. There was 100% compliance for intravenous records but 0% compliance for inhalation records.

Patient reaction/success of sedation was recorded in 58% of cases. There was 90% compliance for intravenous records and 5% compliance for inhalation records.

Personnel present in the surgery were never recorded.

Conclusion: Results show important information is being omitted from clinical records. A copy of the SDCEP guidelines (Appendix 2) has been circulated to relevant staff. It was recommended that particular attention be paid to inhalation sedation record keeping. A re-audit is planned for 6 months time where it is hoped 100% compliance will be achieved.

PR11.05

Development of a joint paediatric dentistry/oral medicine clinic within a hospital setting

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Background: Children with oral soft tissue conditions often require a multi-disciplinary approach. At the University Dental Hospital Cardiff, a joint Paediatric Dentistry/Oral Medicine service was recently set up to improve the management of paediatric patients, both those with soft tissue conditions referred to the Paediatric Dentistry department and those referred to a predominantly adult Oral Medicine Department.

Aim: The aim of this service is to improve patient care by using a multi-disciplinary approach and to ensure children receive care in an appropriate Paediatric setting.

Design: Clinics operate within the Paediatric Dentistry Unit every 2–3 months, with an average of 12 patients per session. Clinics are attended by consultants in Paediatric Dentistry and in Oral Medicine. Referrals are accepted from general dental practitioners, community dentists, general medical practitioners, internal referrals and from other medical specialities. Patients referred include those with e.g. recurrent oral ulceration, orofacial granulomatosis, recurrent herpes infections, etc.

Results: This service has improved the management of paediatric dental patients with oral soft tissue conditions, by improving service efficiency, promoted inter-specialty medical/dental patient management and has also offered educational opportunities for professionals.

Conclusions: The provision of a joint Oral Medicine/Paediatric Dentistry service ensures that patients receive multidisciplinary care, thereby improving their management. Communication has been improved between the Paediatric Dentistry Unit and other medical specialities e.g. Paediatric Gastroenterologists, as a result of this new service.

PR11.06

Comprehensive dental care under general anaesthesia: carer feedback and satisfaction

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Background: The Care Quality Commission (Outcome 16) requires assessment and monitoring of the quality of service provision, with the NHS ‘Friends and Family Test’ being an important tool to allow patient/carer feedback on their experience.

Aim: To gain carer feedback and determine carer satisfaction regarding their child’s comprehensive dental care under general anaesthetic (CCGA).

Design: At the CCGA pre-assessment appointment, a carer questionnaire information leaflet was provided to carers of patients scheduled for CCGA. Approximately two weeks post-CCGA, a Patient Support Officer telephoned carers and invited them to participate in the telephone questionnaire. Data was collected using a standardised pro-forma until responses from 30 carers were gained.

Results: In total, 36 carers were successfully contacted between June-October 2014; six declined involvement. All carers felt they had been given sufficient, clear and easy to understand pre-operative information about their child’s procedure. Regarding those children who felt pain (87%)/ felt sick (43%)/ were sick (23%), the majority of carers felt this was the same as expected (42%, 62% and 74%, respectively). Eating improved for most patients post-operatively (63%); sleeping was largely no different (67%). Overall, 93% of carers were satisfied with the treatment provided and 97% would recommend the service to friends and family. Constructive comments were received regarding improvements required on the ward.

Conclusions: Carers reported high levels of satisfaction with the service provided. Feedback suggests carers were given appropriate pre-operative information and side-effects were generally as expected. Collaborative teamwork with ward staff is required to further improve the carer/patient experience.

PR11.07

Parent reported reasons for non-attendance to appointment at hospital paediatric dental department

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Background: Little is known about the reasons for child non-attendance at specialist dental services, however, improving

understanding of the reasons why children 'did not attend' (DNA) is essential if service improvements are to be made.

Aim: To establish the reasons given by parents for non-attendance and elicit their opinions regarding strategies to reduce DNAs.

Design: After project registration with the clinical effectiveness unit, all children ($n = 145$) who DNA their dental appointment at Liverpool University Dental Hospital in October 2013 were identified (DNA rate: 22.7%). Parents with available telephone numbers ($n = 113$) were contacted, on two occasions, and permission requested to participate in a structured interview. Questions elicited reasons for non-attendance, preferred method(s) of appointment communication and strategies to reduce DNAs.

Results: Forty parents agreed to take part, giving an overall response rate of 35%. The profile of participants was representative of the non-attending cohort ($P < 0.05$) in relation to; reason for referral, age and clinic non-attended. Reasons for non-attendance included forgetfulness (20%), unaware of appointment (18%) and illness (10%). Text messages were the preferred method of appointment reminder (50%). Seventy-six percent of parents suggested strategies to reduce DNAs, from which two major categories emerged; communication and appointment times.

A new hospital booking system is being implemented and the DNA rate will be monitored.

Conclusion: The low response rate appears to be similar to other surveys of hospital non-attendance. Findings indicate a need to develop innovative strategies designed to reduce non-attendance at paediatric dental appointments.

PR11.08

An audit of complete documentation of allergy status in the Paediatric Dentistry Department, King's College Hospital

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Background: Assess whether allergies are accurately documented in dental records for children attending the department.

Aim: All children with allergies will have appropriate documentation completed in dental records.

Design: Retrospective sample: Children with an allergy attending a new patient consultation February 2013 (first cycle) and July 2014 (second cycle). A proforma was completed using patient records to determine documentation of allergies.

Results: First cycle: 161 records were assessed, 11 children (7%) had known allergies. Second cycle: 251 records were reviewed, 35 children (14%) had known allergies. To facilitate improvement results and recommendations from the first cycle were disseminated via staff meetings, hand-outs and e-mail. Whether the allergic substance was written in clinical records on the alerts table showed a significant improvement from 15% (first cycle) to 56% (second cycle). The orange alert sticker was placed on the front cover of the clinical records in 31% cases (first cycle) and improved to 63% (second cycle).

Conclusions: The second cycle of this audit highlighted there had been a marked improvement in the departments' allergy documentation particularly placing alert stickers on records and recording allergies in the folder cover. Further improvement is necessary to reduce the risk of allergic reactions occurring and improved patient safety due to poor record keeping. A third cycle is planned following dissemination of recent findings.

PR11.09

Patient and parents/carers satisfaction on the joint orthodontic-paediatric clinic (JOP)

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Aims: The aim was to determine if patients and parents were satisfied following their appointment on the JOP clinic. The standard set was 90% satisfaction from parents & patients following the JOP appointment.

Design: All patients and parents attending the monthly JOP clinic were asked to complete the questionnaires after their appointment. The questionnaires were given out by the nursing staff.

Results: The data collected from Aug 2014-Jan 2015 was analysed as interim results. There were 6 clinics during this time period with 42 complete and 3 incomplete questionnaires.

In terms of the patients, majority seemed to know why they had been referred (86%). Most of the patients had not been worried about their appointment (62%) and felt that their concerns had been listened to by the JOP team (83%) and knew what was happening at the next visit (83%).

In terms of the parents, they too understood why their child had been referred (86%) and the length of time for the appointment was acceptable (90%). All parents felt that the JOP team was polite and informative.

Conclusion: The feedback from the initial analysis seemed to suggest both patients and parents were happy with the care given on the JOP clinic. The plan for this review is to continue with the data collection to gain further feedback.

PR11.10

Reasons for and sources of referral to paediatric dentistry

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Background: The University of Otago Paediatric Dentistry service provides contracted care for children referred from throughout Otago and Southland in the South Island of New Zealand. Therefore it is important to have an accurate understanding of the numbers of referrals and care being requested.

Aim: To determine the reasons for and source of referrals to the discipline of Paediatric Dentistry at the University of Otago School of Dentistry.

Design: Consecutive referral letters for children and adolescents were reviewed over a six-month period. The reasons for referral, source of referral, age and gender of the child and medical status were recorded. The children were placed in three different clinics - undergraduate, postgraduate and staff.

Results: Over the six-month period 163 children and adolescents attending the Dental School for the first time were reviewed before placement in the different clinics. The majority of children were referred by Dental Therapists (55%), dentists (19%), emergency (18%). The main reason for referral was for management of caries including early childhood caries early (50%), challenging behaviour (12%), dental anomaly (15%) or medical reasons (13%). 81% recorded the medical status. 67% were referred to the undergraduate clinic and 33% to staff and postgraduates.

Conclusion: This clinical audit highlighted the significant reasons for children and adolescents attending the clinics. It also identified the sources of referral and is allowing us to communicate more efficiently with the referrers.

PR11.11**Service evaluation of the 'piggy back' service provided by Newcastle Dental Hospital**

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Background: Clinicians provide an exodontia service for medically compromised children having other medical procedures under general anaesthesia. This takes clinicians away from other duties and is expensive of their time.

Aims: To prospectively evaluate the 'piggy back' service provided by paediatric dentists to other medical specialities at Newcastle upon Tyne NHS Foundation Trust hospitals.

Design: Data was gathered using a standard pro forma for all 'piggy back' procedures seen over a seven month period, June–December 2014 inclusive of timings, pathways of referral, the specialities involved and the treatment completed. There was a need to better understand the service with an aim to make it more efficient.

Results: Seventeen patients were seen with a mean procedure time of 15 min. However, one patient took all day to be seen (10 h) and the mean waiting time for the other 16 patients was 67 min (range 0–4.3 h) mainly due to delays in theatre running. Ten patients were seen by consultants, 7 by paediatric trainees on lists from a wide number of specialities.

The cost of this service in terms of staff salary was £101 per patient with 27.88 h, £1373 (£82,318 consultant salary) wasted in waiting in theatres.

Conclusions: Information to be shared with medical specialities to encourage closer liaison and to increase the amount of notice given for procedures. Aim to limit the wasted time in theatre. Need for a paediatric dentist available at children's hospital on set sessions on a regular basis.

PR11.12**An audit of Auto transplantation cases carried out at Birmingham Dental Hospital from 2006 to 2014**

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Background: Auto transplanted teeth provides an extra treatment modality in the armamentarium of replacing teeth. Auto transplants can provide an aesthetic outcome with high success rates. These can form an alternative to a removable prosthesis in the growing child and implants in later life.

Aim: To establish the number of viable and aesthetic teeth present following their auto transplantation. Our further objectives were to identify factors that would contribute to a successful outcome and establish a recommended protocol for this procedure.

Design: This was a retrospective audit of 21 clinical cases out of a possible 24. Various parameters were investigated including: reason for transplant, stage of development of the donor tooth, pre-operative assessments, surgical technique, splinting method and duration, postoperative care, subsequent dental treatment and any complications.

Results: 87% of our auto transplanted teeth were viable, aesthetic teeth post auto transplantation with 67% of cases being carried out due to dental trauma. In 61% of cases the donor tooth had an open apex, all cases had pre-operative radiographs and were splinted post-surgery. 24% required occlusion altering devices post operatively in the healing period and 57% received antibiotics. Post-surgery 83% of teeth were built up with composite and all cases went onto orthodontic treatment.

Conclusions: Due to a lack of high quality studies, there are no gold standards for treatment methods for auto transplantation of teeth. Appropriate case selection is key in determining success. Tooth transplants are a viable option for tooth replacement in the growing child.

PR11.13**Paediatric dental anaesthesia safety: where are we now post-WHO surgical safety checklist?**

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Background: The use of paediatric dental general anaesthesia (PDGA) is an appropriate way of facilitating care for uncooperative children where intervention is justified. In 2009, the implementation of the National Patient Safety Agency (NPSA) 'Reducing the risk of retained throat packs (TP) after surgery' protocol and the 'World Health Organisation (WHO) Surgical Safety Checklist (SSC)' ultimately aimed to reduce comorbidity and post-surgical complications. Although developed for general surgery, their relevance to PDGA is obvious.

Aim: To investigate the PDGA team for compliance with the WHO SSC and NPSA TP usage recommendations.

Design: A standardised data collection form was designed which incorporated the WHO SSC and NPSA TP recommendations. An undisclosed member of the dental team utilised this form to collect prospective data. The verbal and documented compliance were recorded by observing the PDGA team, and assessment of anaesthetic chart, operative notes, and peri-operative care plans respectively.

Results: The first cycle ($n = 100$), showed higher verbal compliance to WHO SSC (up to 99.5%) than documented compliance (82%). TP checks/documentation were also assessed with compliance falling as low as 68% in areas. After training and updating the PDGA team the second cycle, nearing completion, has shown significant improvements in adherence to set gold standards.

Conclusion: SSC and TP usage checks play important roles in the PDGA setting. Effective team working accompanied with regular training and audit will ensure that we are always improving our standards of care delivery and that patient safety is kept at the forefront.

PR11.14**An audit for preformed stainless steel crown documentation: indications for placement and post operative instructions**

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Background: Stainless steel crowns (SSCs) are prefabricated crown forms adapted to individual primary molars and cemented to provide a definitive restoration. Indications for placement of SSCs are documented in the literature. Accurate delivery and documentation of Post operative instructions as well as documentation of indications for SSCs placement are essential components in providing the highest quality care.

Aim: The aim of this audit was to assess the documentation of the indications for placement of SSCs in primary molars as well as the post operative instructions given to the parents after SSC insertion in the paediatric department.

Design: Data was collected by case note evaluation of all SSCs placed in the paediatric clinic for a six month period. Documentation of the SSCs indications including SSCs' insertion after pulp therapy and documentation of post operative instructions

after insertion of SSCs were measured. The results were analyzed using Simple descriptive statistic.

Results: During 49 dental visits, 135 crowns were inserted. The indications for placement of SSCs were documented in patients' files in 131 out of 135 cases (97.1%). In 70 cases out of 70 (100%), SSCs were inserted on pulpally treated molars. In 29 out of 49 visits (59.2%) post operative instructions were documented in patients' files.

Conclusions: The findings from the audit highlight many areas of good practice that were observed. A second cycle of the audit will be conducted to re-evaluate the compliance with the recommendations given for those aspects that fell short of the standards.

PR11.15

Audit of paediatric dental referrals into a community dental service requiring treatment plan modifications

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Background: To assess the documentation of treatment plans for referred paediatric patients from general dental practitioners (GDPs) to Northumbria community dental services (NCDS), to improve understanding of the patient journey and communication between services.

Aim: To evaluate the proportion of referrals from GDPs to NCDS resulting in changes to the GDPs requested treatment plan by community dentists. At a local level, the clinical team agreed the standard for the audit: 90% of GDPs requested treatment plans should be followed.

Design: A retrospective random sample of 69 referrals, from 1st January to 31st March 2014, was collected from the referral log-books at four main NCDS clinics. The patient records were reviewed and the information gathered into an electronic data collection form.

Results: Of the 69 referrals audited, 58 referral letters (84.0%) from GDPs had specified treatment plans, however 38 children required NCDS to formulate a different treatment plan (65.5%). Following assessment at NCDS, 68 patients (98.5%) had an itemised treatment plan recorded and this was followed for 51 (75.0%) patients. 16 patients required the treatment plan to be modified, and for 13 the updated treatment plan was documented prior to continuing active treatment.

Conclusions: The audit highlights the need to actively manage the referral process into NCDS to support staff and provide a high quality, safe and caring service. Therefore, one audit recommendation is to explore an electronic dental referral portal to enable management of the referral process, and improve communication between GDPs and NCDS.

PR11.16

Role of a 'video assisted lecture' on changing Albanian undergraduate students' opinions regarding pain free dental injections in children

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Aim: To assess the effectiveness of a video assisted lecture in changing the opinions of dental students toward pain free dental injections (PFDI) in children.

Design: The Fifth grade students (n:62) of University of Medicine of Tirana, Faculty of Dental Medicine participated in the study. Informed consents were obtained. The study was conducted in

two stages: Theoretical lecture, "PFDI in Children", was provided first, and followed by a lecture supported by video recordings of real clinical case demonstrations. Students' opinions were evaluated by means of a questionnaire administered before, during and after the lectures.

Results: Before the study, only 47.9% of students believed in the possibility of PFDI in children, whereas after the study the percentage had risen to 67.7% ($P = 0.0001$). Theoretical lecture was found to be statistically more effective in changing opinions of students than than video assisted lecture ($P = 0.0001$).

Conclusions: Theoretical lecture was found to be effective in changing opinions of PFDI. Effectiveness of a video assisted lecture in changing the opinions of dental students toward PFDI was found to be inconclusive.

PR11.17

What is the burden of care for adolescent dental patients? A service evaluation

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Background: Adolescent patients can have many oral health problems. Social issues, diet and other factors can increase oral disease incidence.

Aim: To determine the burden of care for adolescent dental patients with caries presenting to a specialist paediatric dentistry unit and identify potential barriers to care.

Design: The project was registered with the clinical effectiveness unit. All new patients aged 12–16 years presenting to the unit between September 2013 and February 2014 were invited to complete a questionnaire at initial consultation. A proforma was completed to gauge anticipated dental need.

Results: Thirty one patients participated. The main diagnosis was of dental caries, the average DMFT was 6. Ninety percent ($N = 28$) reported suffering at least one episode of toothache, just over half (52%, $N = 16$) stated the pain had kept them awake at night. Only sixty seven percent ($N = 22$) reported attending for regular recall appointments.

A Visual Analogue Scale (VAS) was used to assess the participants' attitudes to oral health and treatment. Relating to motivation towards oral health, the mean score was 7.2. With regards to how worried participants were before attending the dentist, the mean score was 5.6.

Free text responses showed many children were most concerned about the use of needles. When asked if there was anything that would make it easier for them to attend some stated 'pain free' and treatment without using needles.

Conclusions: The main barrier to these patients accessing dental care was anxiety and phobia of needles. There is a demand for tailored adolescent dental care.

PR11.18

Teaching of overlapping subjects in paediatric dentistry

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Background: Undergraduate UK teaching to satisfy the General Dental Council should demonstrate interdisciplinary and inter-professional education and learning. Paediatric Dentistry is "dentistry in miniature" as aspects of all dental specialties are relevant in child dental care.

Aim: Investigate the level of integration of paediatric dentistry with other dental subjects in UK and Ireland dental schools. Identify areas where collaborative teaching would be most beneficial.

Design: Internet delivered questionnaire to teaching leads in Paediatric Dentistry in the UK and Ireland.

Results: 14 dental schools responded. All had collaboration in course planning or delivery in the subjects investigated, but not all subjects in all schools. Most frequent were Orthodontics (85%) and Oral Medicine (62%) with Human Disease (38%) and Periodontology (23%) lowest. Half of respondents had no collaborative teaching in Radiology or Oral Surgery. This level of cooperation was felt appropriate for 70% respondents considering Radiology and Orthodontics falling to 50% for Oral Medicine and 45% for Human Disease. Most respondents felt the time allocated in other disciplines for teaching Paediatric topics was correct (mean 73%). Respondents outlined the key areas of other dental disciplines that are important for collaborative teaching with Paediatric Dentistry.

Conclusion: There is variation in collaborative paediatric dental teaching in UK and Ireland dental schools. Orthodontics has most interaction but some core areas, (Radiology and Oral Surgery) have no integration in course planning or delivery in 50% of responding schools. This could impact the student's view of dental care of the child and may not meet regulatory standards.

PR11.19

The use of dental dam during pulp therapy in paediatric patients

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Background: Microbes play a major role in the pathogenesis of pulpal pathology and can reduce the overall success rate of the root canal treatment. Dental dam (DD) is effective in eliminating microbial contamination from the operating field during endodontic therapy. The UK National Clinical Guidelines on pulp therapy for primary molars recommend the use of DD for all pulp therapy procedures.

Aim: To assess whether the paediatric dentists are using DD during pulp therapy for both primary and permanent teeth in Dubai College of Dental Medicine paediatric clinic.

Design: Data were collected retrospectively from the electronic patient files during a 6 months period. A data sheet was used to record the pulp therapy type, whether the procedure was performed under local or general anaesthesia, the use of DD, reasons for not placing DD and the child's Frankl rating.

Results: A total of 86 pulp therapy procedures were performed. The overall percentage of using DD during pulp therapy was 65% (56 out of 86). Out of the 30 cases performed without the use of DD, only 4 cases had documentation of the different reasons.

Conclusions: More than half of the pulpal procedures were performed under the isolation of DD and the majority were documenting it; however there were deficient areas in the documentation; especially the reasons for not placing it. A staff meeting was held to present the findings and encourage the practitioners to utilize the DD while performing pulpal therapeutic procedures. Re-audit cycle is planned after 6 months.

PR11.20

Prescribing audit based in a paediatric dentistry hospital department

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Background: Antimicrobial resistance is recognised by the World Health Organisation as a serious threat to public health and restricting antibiotic prescribing to cases clinically appropriate is necessary. In addition, all medicines prescribed should be justified and documented clearly.

Aim: Based on a pre-approved audit which was developed by NHS Education for Scotland's Translation Research in a Dental Setting. The aims included:

- To review antibiotic prescribing to ensure best practice guidance is being followed.
- Consider alternatives to antibiotic prescribing.
- Review prescribing of all medicines for quality of prescriptions and the necessary paper work.
- Implement changes to meet guidance recommendations, if required.

Design: The standards were based on:

- The Scottish Dental Clinical Effectiveness Programme's Drug Prescribing for Dentistry guidance.
- The General Dental Council standards.

26 prescriptions and patient notes were retrospectively examined. The medicine prescribed, the reason why and whether an up-to-date medical history was recorded was noted. For antibiotics, the notes were checked for a record of the clinical symptom and factors influencing the decision to prescribe an antibiotic and, if so, what type.

Results:

- Eight antibiotic prescriptions were included, 50% with no clinical symptom recorded in the notes.
- 18 other medicines including toothpaste and chlorhexidine were prescribed, with 44% having no recorded justification.
- 46% of the patients had no up-to-date medical history.

Conclusions: Full compliance with the standards was not met. Recommendations have been communicated with the department and the audit will be repeated in 3 months time.

PR11.21

Fluoride varnish application in paediatric patients and the role of incentivisation in improving clinician behaviours

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Background: A Cochrane review found young people treated with fluoride varnish (FV) experienced on average a 43% reduction in decayed, missing and filled tooth surfaces (DMFT).¹ A Scottish Government Heat Target focused on topical fluoride preventive strategies "at least 60% of 3 and 4 year olds in each SIMD quintile are to have fluoride varnishing twice a year by March 2014."² Monitoring FV application rates (FVA) and implementing clinician behaviour change designed interventions are required to meet these targets.³

Aims:

1. To evaluate the impact of a quality improvement project (QIP) at Glasgow Dental Hospital to improve FVA rates.
2. To identify whether personal feedback and incentivisation improve FVA rates.

A target of 80% compliance for FVA was set by the Department of Paediatric Dentistry (GDH).

Design: Treatment sessions were randomly selected each week, including all grades of staff. Notes were analysed to determine FVA rates. The results were then communicated to the staff, with 'Fluoride Leader boards' to highlight performance, with the leader receiving a small reward.

Results: A positive shift has already been identified in the departments QI results for FVA rates, although this is not consistently met.⁴

There is further evidence of improvement since using behavioural change methods. The competitive nature of the leaderboard and the incentivisation programme may be the main drivers.

Conclusions: Tailoring implementation interventions to barriers based on behaviour change strategies has led to improvements. Further work on this is required to investigate if these improvements can be maintained.

PR11.22

The utilisation of theatre time for paediatric dental care using propofol intravenous sedation

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Background: The use of intravenous sedation (IVS) to provide dental treatment in the anxious paediatric patient is safe and well tolerated. The Department of Health uses key performance indicators to set targets for improvements in efficiency and standards of service in theatre utilisation.

Aim: The aims of this prospective study was to assess the efficiency and utilisation of theatre time within the paediatric IVS service.

Design: A total of 50 consecutive episodes of dental treatment using IVS for suitable paediatric patients meeting the AIVS selection criteria (for UDHM) were audited over a period of 7 months. A data capture sheet was used to record data on operating times and possible influencing factors; patient demographics, clerking, anaesthetic view, cannulation and treatment, recovery and discharge. The utilisation of theatre time was calculated to evaluate the proficiency and productivity of the service.

Results: In total 50 patient contacts were recorded for the audit, of these 40 patients were treated. Only a third of sessions saw the optimum number of patients treated, theatre utilisation (55%) and compliance to NHS best practice indicators was recorded as below the national standard (77%). Suggestions for improvement and an action plan was implemented to be used in the second audit cycle.

Conclusions: The findings from the present study highlight the importance of auditing theatre timings and compliance with best practice indicators in order to improve efficiency, reducing costings, waiting lists and patient experience as a consequence.

PR11.23

A service evaluation of diagnostic yield of pre-operative phlebotomy for healthy paediatric dental patients receiving treatment under general anaesthetic

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Background: Current NICE guidelines do not recommend routine pre-operative phlebotomy for healthy children undergoing general anaesthetic (GA) for dental procedures. Phlebotomy investigations are often performed at the discretion of the surgeon, but

the diagnostic yield of these investigations is unclear. Therefore the benefit of performing these investigations routinely has not been established.

Aim: To investigate the diagnostic yield of pre-operative phlebotomy (excluding haemoglobin electrophoresis) in healthy paediatric patients and any resultant alteration to patient management.

Design: This retrospective service evaluation examined the case notes of all patients under 16 years of age who had a GA for dental treatment between 01/03/2013 and 30/09/2013. All healthy patients with pre-operative phlebotomy were identified, and their cases were followed to completion. Indication for all tests was recorded, along with diagnostic yield, change to clinical management and intra-operative complications associated with this result.

Results: Interim results show that of 11 patients who had pre-operative investigations, two had abnormal results. No patient required altered pre-operative or intra-operative management as a consequence of these blood results.

Conclusions: The findings of this service evaluation highlight the importance of ensuring that pre-GA phlebotomy is only ordered when clinically relevant. A number of factors must be considered, including the psychological ramification of phlebotomy for children who may be anxious and the financial implications of these interventions. This will help ensure the appropriate allocation of NHS resources. The results of this service evaluation will inform departmental policy regarding appropriate pre-GA phlebotomy.

PR11.24

Antibiotic prescribing practices of East Surrey Hospital Dental and Maxillofacial department

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Background: There is considerable use of antimicrobial therapy within the dental profession. With the rise in antibiotic resistance the judicious use of antibiotics must be regulated, appropriate, and evidence based.

Aim: This retrospective audit is designed to examine antibiotic prescribing practice within the dental department at East Surrey Hospital and to compare this process with national guidelines (SDCEP, FGDP, NICE).

Design: 100 patients' clinical records were to be analysed, 50 patients from the Emergency Dental Service (EDS) and 50 patients seen within dental outpatients, per audit cycle. Assessment included age, gender, and GDP registration status as well as clinical diagnosis, temperature, appropriateness of prescription, and the complete detail of the antibiotics prescribed.

Results: First cycle showed 100 prescriptions were recorded in clinical notes, 94 recorded with all essential information. Seventy two had no documented diagnosis and 62 gave no indication for antibiotics; 22 patients had local measures alongside antibiotics. Overall, 884 patients were seen, 614 (69%) were issued a prescription. Changes were implemented including further training, a logbook, and proformas.

Second cycle near completion; early results indicate decreased use of antimicrobial therapy, near complete compliance with record keeping, and an increased percentage of notes recording temperatures, diagnosis and clinical justification.

Conclusions: There is significant use of antimicrobial therapy predominantly within the EDS, and areas where 100% compliance is not being attained. The measures implemented after the first cycle have made a significant improvement to reaching national guidelines regarding prescribing practices, however further methods need to be developed for continual improvement.

PR11.25

Audit of 'Did Not Attend' (DNA) appointments for 0–16 year old children across Leeds Community Dental Service (CDS)

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Background: There are many reasons for a child not to be brought to a dental appointment. In some cases, failure to attend raises concerns about safeguarding. Repeated non-attendance for health appointments should be seen as an alert for possible child neglect. Leeds CDS treats a very vulnerable patient group, including children with medical comorbidities, learning disabilities and children with pre-existing safeguarding concerns.

In 2013, Leeds Community Healthcare Trust (LCHT) produced a DNA protocol, which described clinicians' responsibilities following individual patient risk assessment.

Aim: Identify children who were not brought to dental appointments and ensure LCHT protocol is followed.

Design: 1st cycle: Computer records of all children who had failed to attend in May 2014 were reviewed and evidence of the following was recorded:

- Risk assessment and action plan by the dentist
- Documented discussions with parents/carers/other professionals
- Administrative staff action

Actions:

- Meeting with the LCHT safeguarding team regarding DNA letters
- Training to the dental team regarding the protocol

2nd cycle (March 2015): Re-audit, using the same inclusion criteria, and comparison with previous results.

Results: 1st cycle: 108 children failed to attend their dental appointments across Leeds CDS during May 2014. 54% did not have a risk assessment recorded and 41% did not have a documented action plan. 50% of "high-risk" DNAs were not adequately followed-up.

2nd cycle: results will be presented and further action plan determined.

Conclusions: Successful implementation of LCHT protocol will enable dealing with DNAs consistently, promote attendance and safeguard vulnerable children.

PR11.26

An audit of documentation of conscious sedation in primary dental care

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Background: In June 2012, the Dental Clinical Effectiveness Programme (SDCEP) published the second edition of the dental clinical guidance on *Conscious Sedation in Dentistry* (www.sdcep.org.uk/?o=2331). It recommends the documentation for each patient includes details of pre-sedation assessment, the visit for dental treatment under conscious sedation, the treatment procedure and the recovery.

Aim: To audit the documentation of conscious sedation in primary dental care.

Design: All dentists in Lanarkshire Health Board who conducted conscious sedation were invited to participate in this audit. Based on the recommendations of the SDCEP guidance on conscious sedation in dentistry, a data collection form was developed to

audit the documentation in patient records. There were 24 and 30 items to be recorded for inhalation sedation (IS) and intravenous sedation (IV) respectively. The data for Round 1 was collected retrospectively, for about 20 cases per dentist. A meeting was held to discuss the findings of Round 1 and to identify areas of improvement in record keeping. Second round data were then collected prospectively. A target of 80% compliance was set for both rounds.

Results: A total of 12 dentists took part in Round 1; while one dentist withdrew in Round 2. *Round 1:* 99 IS and 140 IV records were audited. Percentage of items which achieved 80% compliance was 37%. *Round 2:* 55 IS and 118 IV records were audited. Percentage of items which achieved 80% compliance increased to 100%.

Conclusions: The audit was successful in improving the documentation of conscious sedation in primary dental care.

PR11.27

An audit comparing record keeping in electronic and paper formats on a paediatric dentistry student teaching clinic

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Background: At completion of undergraduate training, dental students are expected to fulfil criteria laid out by the General Dental Council (GDC) in the "Standards for Dental Professionals" document. This includes guidance regarding record keeping. As increasing numbers of dental practices move to electronic patient records (EPR), it is essential that an equal standard of record keeping is maintained when compared to paper-based records (PBR).

Aim: To compare the quality of record keeping in the Department of Paediatric Dentistry at the University of Aberdeen Dental School and Hospital prior to and following the introduction of EPR on the undergraduate student clinic.

Design: In Round 1, 150 patient records were examined retrospectively (50PBR and 100EPR) from patients who had attended the department for an examination with a fourth year dental student. Data were collected for various demographic and clinical criteria and added to a Microsoft Excel spreadsheet. Six months elapsed, and data collection for Round 2 (100 EPR) was completed as in the first round.

Results: Recording of patient demographics was maintained at >95% throughout round 1 and 2. Medical history recording decreased in EPR in Round 1 and 2 when compared to PBR. Improvements were noted in recording of dental charting in EPR round 1, while recording of treatment plan and diagnosis decreased in EPR round 1 and 2.

Conclusions: The quality of record keeping obtained with the EPR appeared to be inferior in some areas compared to the PBR. Feedback on the EPR has been provided to staff- and student groups and re-audit is recommended.

PR11.28

Current referral trends for paediatric dental extractions under general anaesthesia at the University Dental Hospital, Cardiff

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Background: Despite efforts to improve levels of oral health in Wales, there is still a high demand for paediatric dental extractions under general anaesthetic (GA) at the University Dental Hospital (UDH), Cardiff.

Aim: To evaluate the nature of the GA referrals, the average patient profile, effectiveness of the pre-operative assessment process (compared to 2011 National Clinical Guidelines) and the subsequent management of these patients.

Design: Data collection form completed for each patient on all GA assessment clinics at the Paediatric Dental Unit, UDH, Cardiff, for eight months (July 2012–March 2013).

Results: Of the 288 referrals for paediatric dental GA in this period, 92% of patients proceeded to extraction of teeth under GA. The majority (84%) of patients required extraction of deciduous teeth, with an average number of 6.6 teeth being extracted per patient. 41% of the population studied were aged five years or younger, with a mean age of 6.6. Only 1.4% of cases were deemed suitable for treatment under a different behavioural management modality. The 2011 National Clinical Guidelines for the use of GA in Paediatric Dentistry were closely followed.

Conclusion: Of those patients who were assessed on the GA assessment clinic very few were deemed suitable for treatment under different behavioural management modalities. This may have been partly due to the stringent vetting of referrals before patients are allocated to this clinic. Caries in the deciduous dentition was the most common cause for referral, with a large percentage of referred patients being under the age of five.

PR11.29

Non-attendance of paediatric dental patients: an audit to assess practitioner action

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Background: Dentists have a statutory duty of care to protect patients. Repeatedly failing to attend essential follow up appointments that are necessary for a child's health and wellbeing may alert practitioners to safeguarding issues, including those of dental neglect (NICE 2009). Sharing relevant information with other professionals is vital to ensure safeguarding of paediatric patients.

Aim: The aim of this audit was to assess how practitioners are managing non-attendance at the unit of Paediatric dentistry, UDH, Cardiff; to identify deficiencies and to produce a protocol to promote safeguarding.

Design: Data was retrieved of 100 patients who missed appointments and information obtained about demographics, medical, dental and social histories, number and type of missed appointments. Information regarding practitioner action in response to non-attendance was collected within a 6 month time frame, including access to ongoing care and communication with other professionals.

Results: Dental caries (56%) was the most common dental problem among patients who missed appointments. In most cases (41%) patients were discharged following their missed appointment(s). The families were communicated in 74% of cases and other professionals in 70% of cases. At 6 months following their

initial missed appointment, 48% of patients had incomplete treatment and were at risk of ongoing pain.

Conclusion: The findings from the present study highlight deficiencies in practitioner management of non-attendance. A departmental protocol has been developed to aid practitioners in identifying patients at risk of dental neglect to ensure continuity of care, communication with relevant professionals and to promote safeguarding of paediatric dental patients.

PR11.30

A survey of paediatric dentistry undergraduate teaching in the UK

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Background: The General Dental Council (GDC) sets educational standards for dental schools in the United Kingdom (UK) to guide undergraduate education. There are many challenges faced by the Universities to provide the perfect educational experience and this is recognised by the GDC.

Aim: To assess the current teaching of paediatric dentistry, at an undergraduate level, across UK dental schools.

Design: Online questionnaires were emailed to the course leaders in each of the UK dental schools. Results were analysed.

Results: There was a wide variation in the teaching and experiences of paediatric dentistry across the 11 dental schools, which responded. The variation occurred in the number of students per year (50–160). The didactic teaching methods varied: number of lectures ranged (6–35), seminars (10–35), clinical skill laboratories (2–36) and joint lectures (0–15). Clinical teaching occurred in dental hospitals and outreach clinics. Clinical procedures are taught in all dental schools but the students clinical experiences varied. Non-specialist teachers teach the majority of students and there is a wide variation in the format of examinations and in course assessment.

Conclusion: A comprehensive insight into the range of undergraduate paediatric dentistry experience gained by students has been achieved and lack of harmonisation can be seen. Standardisation in course assessment and didactic could be achieved with integration and communication with the Universities. Standardisation of clinical teaching may be difficult due to the variation of disease and populations in the UK. However, a “gold standard” blueprint in undergraduate paediatric dentistry is needed to harmonise academic teaching.

PR11.31

An audit of parent satisfaction in a paediatric dental department, Eastman Dental Hospital, UCLH

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Background: Patient and parent feedback / satisfaction is a fundamental component of good clinical governance. Questionnaires are often used to seek information from parents in paediatric areas completed with the child's input.

Aim: To determine the current levels of satisfaction amongst parents of paediatric patients and compare these with the two previous audit cycles carried out in 2009 and 2012.

Design: Parents were asked to complete a questionnaire with 38 questions relating to all topics including environment, staff and waiting times over a 3 week period. The gold standard was 100% satisfaction in all areas. This had not been previously achieved and therefore improvement in previous weak areas was examined.

Results: Following a pilot of 10 questionnaires, a total of 75 questionnaires were completed. Parent satisfaction was positive in most aspects of care but areas for improvement are in raising awareness of the hospital play specialist and future appointment arrangements. The best feedback was in relation to interactions with the reception staff, nurses and dentist.

Conclusions: As the standard was not fully met, organisational changes have been implemented and hospital play services promoted as they are not fully utilised. A fourth cycle will be carried out in 12 months time.

PR11.32

Acceptability and efficacy of nitrous oxide inhalation sedation from a parent/patient perspective

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Background: Nitrous oxide inhalation sedation (IS) has been reported to be an ideal technique for managing paediatric dental patients with dental anxiety.

Aim: To determine child patient and parent acceptability and efficacy of IS for dental treatment in a specialist paediatric dentistry community setting.

Design: Twenty prospective, questionnaire-based surveys were undertaken between 1st September 2014 and 1st December 2014 in Soho Centre for Health and Care. Following verbal explanation, informed consent was obtained to participate. Survey questionnaires were completed separately by the patient and the parent following the first dental treatment using IS.

Results: Patients were five males and five females; mean age 8.2 years (range: 5.1–11.5 years). Five patients had extractions only, four patients had restorative treatment and one patient had a combination of both. Nine patients had local anaesthetic (LA). All parents and 70% of patients felt that IS was required for treatment. Fewer patients (80%) than parents (100%) felt that the patient coped with IS. All parents and 88% of patients thought that IS helped with LA. Ninety percent of parents and 80% of patients thought that IS helped with dental treatment. None of the parents and only 20% of patients thought the patient will cope in the future without IS. All parents and patients felt that the treatment has met their expectation. All parents would recommend us to their friends and only one patient would not.

Conclusion: Both patients and parents were satisfied with the service and the efficacy of IS for dental treatment.

PR11.33

An evaluation of the use of biodentine as an apical barrier

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Background: Apexification for non-vital immature incisors can be induced chemically with calcium hydroxide or by placement of a barrier with materials such as Mineral Trioxide Aggregate and Biodentine. There are no studies evaluating the use of Biodentine in this application.

Aim: Evaluate the clinical and radiographic outcomes of root-end closure for non-vital immature incisors using Biodentine.

Design: Clinical and radiographic records of patients who received treatment with Biodentine were retrospectively reviewed. Age at initial trauma, root development, treatment provided and patient satisfaction; were recorded pre-treatment, post-treatment

and at follow-up. Radiographs were independently reviewed by two calibrated examiners.

Results: Data of 25 non-vital immature incisor teeth ($n = 25$) from 24 patients were analysed. Mean age at initial trauma was 7.7 years (range 6–11) and mean duration of treatment was 10.4 months (range 1–23).

Pre-operative discolouration was noted by both clinician and patient in 24% of cases ($n = 6/25$). Immediate clinical outcomes revealed 92% ($n = 22/25$) were asymptomatic and 8% ($n = 3/25$) had an associated sinus. Immediate radiographic outcomes confirmed 72% ($n = 18/25$) had a satisfactory Biodentine plug, 20% ($n = 5/25$) were under-extended and 8% ($n = 2/25$) poorly condensed. Periapical pathology was evident in 88% ($n = 22/25$) of cases.

At follow-up (range 4–7 months), 16 teeth ($n = 16/25$) were reviewed. All were asymptomatic, one patient ($n = 1/16$) reported discolouration. There were radiographic signs of periapical healing in 81% ($n = 13/16$) of cases.

Conclusions: This service evaluation highlights that Biodentine is an effective and inexpensive material for root-end closure yielding good patient satisfaction and clinical outcomes. Further studies are required to fully evaluate success.

PR11.34

Assessment of the reason for referral to secondary care and the assessment therein of children with Molar Incisor Hypomineralisation

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Background: Molar Incisor Hypomineralisation (MIH) is a common dental anomaly in the paediatric population with a reported prevalence of between 5.6 and 37.3%. The majority of patients are managed in primary care with only a subset attending secondary dental care. Greater understanding of the reasons for referral to secondary care and evaluation of the initial secondary care appointment may assist in service development for these patients.

Aim: To assess the reason for referral to secondary care and the assessment therein of patients with MIH.

Design: A retrospective audit of fifty sets of patients' notes was undertaken. Information that was deemed to be essential for a referral letter and secondary care assessment was prospectively agreed and a proforma was developed. The gold standard was inclusion of all essential information.

Results: Seventy percent of patients were referred for a second opinion. Other reasons for referral included pain and sensitivity (20%) and aesthetic concern (10%). In only 7/50 cases however was the referring diagnosis MIH, with misdiagnoses including hypoplasia, fluorosis and amelogenesis imperfecta. At the secondary care appointment, relevant medical history was recorded for only 42% of patients. 10 patients required a further referral to an orthodontist.

Conclusion: Although well described in the literature this retrospective audit suggests that diagnosis of MIH may need to be improved in primary care settings. It also highlights the need to improve the investigation of MIH in secondary care. These deficits may be improved by the development of national guidelines for the management of these patients.

PR11.35

Pediatric dentistry undergraduate program: comparing students performance before and after curriculum reorientation

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Background: The undergraduate course at the Faculty of Dentistry, University of Sao Paulo (FOUSP) underwent recently a curricular restructuring in order to meet the National Curriculum Guidelines. It has been supported by the Ministry of Health, as many other courses all over the country, through the National Program of Reorientation of Vocational Training in Health and the Education Program for Work in Health. The new curriculum was organized as from 3 main cycles: diagnosis and treatment planning, promotion and prevention, and rehabilitation. In this regard, the Discipline of Pediatric Dentistry has also been restructured to fit the new model.

Aim: The aim of this study was to compare the performance of the former and the new curriculum dental students, in different kind of evaluations and also in their global evaluation.

Design: The evaluation included theoretical, practical and clinical performance.

Results: The test grades (from 1 to 10) of two students' classes were compared by means of *T* test. Fifty-five students belonged to the new curriculum class while 53 to the old one. The theoretical evaluation showed no difference of performance between the two groups. The practical test grades' mean were 7.08 and 6.61 respectively. The global performance mean were 6.40 and 5.93 respectively and a statistical significant difference was found between the two groups ($P = 0.02$ CI = 0.08–0.05 at the practical evaluation and $P = 0.0017$ CI = 0.18299 at the global evaluation).

Conclusions: The students belonging to the restructured curriculum presented better practical and global performance as compared to the former curriculum ones.

PR11.36

Use of theatre time for paediatric dental operating lists at the Eastman Dental Hospital, University College London Hospitals

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Background: The department of Paediatric Dentistry at the Eastman Dental Hospital provides comprehensive dental care under general anaesthesia. This is predominantly for patients unable to undergo treatment with either local anaesthesia alone, or with inhalation/IV sedation. This may be due to: age of the child, extent of dental decay, anxiety, complexity of treatment, and/or medical conditions. Improved utilisation of theatres reduces waiting lists, improves efficiency, reduces cost, and contributes to improved patient care and experience. Theatre utilisation is identified as one of six key performance indicators by the Department of Health.

Aim: Service evaluation to determine utilisation of theatre time for paediatric comprehensive care lists at the Eastman Dental Hospital.

Design: Data was collected prospectively using a proforma. This was conducted over a 3 month period from October 2014 to January 2015. Anaesthetic and operating times were recorded, along

with operator status, procedures undertaken, and any complications encountered.

Results: 224 patients in total were seen over 34 lists. Overall, the theatre was in use for 78.02% of time available, combining anaesthetic and operating times. Lists started an average of 9 min late and finished an average of 39 min early.

Conclusions: Slightly above average theatre utilisation time compared with a national gold standard of 77%. Suggested main improvements to be made to further increase efficiency: decrease delays to the start of the list, decrease delays between patients; improved planning to reduce any significant over- or under-running, and introduction of a stand-by list to reduce impact of patients failing to attend.

PR11.37

Developing an oral health clinical practice guideline for a children's hospital

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Background: Oral care is often neglected when children receive medical care in hospital. Physicians, nurses and allied health professionals in ambulatory clinics and in-patient units are in a unique position to detect disease and facilitate oral care for these children. Few organisations have developed evidence-based guidelines to support medical staff with oral care.

Aim: To develop an evidence-based oral health clinical practice guideline for a children's hospital.

Design: Two members of a multidisciplinary guideline development group identified and independently assessed relevant published guidelines using the AGREE II tool. Guidelines with evidence-based recommendations relevant to the clinical questions were considered for inclusion. Recommendations were collated and adapted using the ADAPTE methodology. In addition, systematic literature search was undertaken by two group members to evaluate the existing evidence base. Searches were limited to English language, children <18 years and published since 2004. Scientific papers in the medical and dental literature were assessed using the GRADE process.

Results: Search strategies identified 11 existing guidelines from which 18 relevant recommendations were adapted to the proposed guideline. Fifty-seven of 308 identified papers were deemed to be relevant to the scope of the proposed guideline. After evaluation, ten recommendations were developed based on the quality and strength of available evidence. The combination of existing guidelines and systematic literature review enabled the creation of an evidence-based clinical practice guideline.

Conclusion: Evidence-based guidelines for paediatric oral health care at a children's hospital have been created.

PR11.38

Impact of educational program for institutionalized special-care patient's guardians

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Background: Patients with special healthcare needs may have trouble complying with appropriate oral hygiene techniques, requiring additional support. Institutionalized patients need specially-trained staff assistance to maintain optimal oral hygiene.

Aim: The aim is to assess an educational program's effectiveness on preventative and oral hygiene measures for special-care patient's guardians.

Design: This Educational Program was implemented on guardians/parents as well as care-givers of twenty institutionalized patients. Patients' diagnoses included Down syndrome, severe cognitive impairment, and Autism.

The educational program consisted of three practical sessions (once a week for three weeks) including topics on tooth brushing, dietary advice, and special adaptation of tooth brushing implementations.

The Oral Hygiene Index was assessed before and after implementing the educational program. Additionally, a questionnaire was completed by parents on dental care habits.

Results: Oral hygiene Index improved from 95% to 50%. Oral hygiene habits: before intervention five patients brushed twice a day, eleven patients once a day and seven only a few times a week. At the end of the study ten patients brushed twice a day and the other ten once a day. Parents also found it easier to brush their children's teeth. Dental treatment: before the intervention only one patient attended his dental appointments regularly. At the end of the intervention the average attendance of the cohort improved to 90%.

Conclusions: The educational program focused on patient's guardians dramatically improved patient's oral hygiene and dental care habits and also increased families' commitment to dental care.

PR11.39

Evaluation of the clinical documentation during the use of nitrous oxide inhalation sedation for dental treatment

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Background: Nitrous Oxide conscious sedation is a useful behaviour management technique for anxious children undergoing dental treatment. Contemporaneous and accurate documentation are essential components of high quality patient care and informed consent for the procedure.

Aim: The aim of this audit was to evaluate the documentation of the use of nitrous oxide sedation in a postgraduate paediatric dentistry setting pre, intra and post-operatively.

Design: A total of 30 dental records were audited retrospectively during the period between November and May 2014 in the paediatric dentistry clinic. Documentation of pre-operative instructions, informed consent, flow rate, N₂O percentage level, treatment duration, duration of post nitrous 100% of O₂ and post-operative instructions were evaluated. Descriptive statistics were used to analyse the data.

Results: The percentage of the accurate documentation of preoperative instructions was 96.7%, informed consent was 96.7%, flow rate was 46.7%, N₂O percentage level was 74%, treatment duration was 66.7%, post nitrous 100% of O₂ was 46.7% and post-operative instructions was 0%.

Conclusions: The findings highlight the deficiency in documentation of sedation reports. It is of critical importance to have proper documentation to achieve best standards. The results of the audit were discussed in a meeting with all the practitioners in the department where recommendations were made and implemented. A re-audit cycle will be conducted after 6 months to assess the improvement in documentation.

PR11.40

Preventing ECC: the “play-way”

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Background: Early Childhood Caries (ECC) is a serious public health problem in both developing & industrialised countries. It begins early in life, progresses rapidly in those who are at high risk and often left untreated. The relationship between breast-feeding and ECC is considered to be complex and confounded by a number of social variables including child & parental education and socioeconomic status.

Although a challenge, the disease can be effectively prevented by a number of measures like early examination, identification of individual risk factors, initiation of preventive care procedures and above all through child & parental education.

Various aids are available today to educate the masses about a particular disease but educating children and parents about initiation, prevention, interception and management of ECC has always been a complex and challenging task.

Aim: This paper discusses an innovative, interesting and simple way of educating children and parents about early childhood caries with Dos and Don'ts through “Snakes & Ladders” game which can be displayed in chart form and/ or touch screen.

PR11.41

Acceptability of fissure sealants on undergraduate clinics

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Background: The placement of fissure sealants, particularly in the occlusal surfaces of permanent molars, reduces caries in high risk children. It is perceived as a simple technique, utilised in acclimatisation and a component of the dental curriculum. However, it has been shown to be underutilised in practice.

Aim: The aim of this pilot study was to see opinions regarding fissure sealant placement by the child, parent and student.

Design: A prospective questionnaire was completed on 4th and 5th year dental student clinics. The questionnaire was completed by each patient, parent and operator. Questions included age, gender, undergraduate year and previous experience. Likert scale was used to assess dental visit satisfaction and treatment experience. Open-ended questions explored the indications of sealant placement, acceptability of the procedure and likelihood of having or doing the procedure again.

Results: 16 questionnaires collected. Majority of children were males above 7 years old; happy to attend for treatment and to return. Common complaint was the taste. Undergraduates were mainly female, confident in sealant placement before treatment but less confident in the outcome of the procedure. This was dependent upon previous experience. Comments included finding “moisture control and positioning more difficult than anticipated”. Overall the parent was happy.

Conclusions: Fissure sealant placement shown to be an acceptable technique by children. Further research required in the perceived acceptability by the clinician.

PR11.42

Three dimensional virtual reality system for pediatric dental training

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Background: Effective diagnostic capabilities and good drilling technique are both vital skills for Pediatric dentists. Typical training approaches include the use of synthetic replica teeth or real teeth extracted from patients.

Aim: We are currently developing a computer-based virtual reality dental training simulation that accurately reproduces the drilling experience in a computer-generated environment allowing for easy repetition, performance evaluation, and representation of a wide range of anatomical and pathological variations.

Design: Train early-stage students in basic psychomotor skills required for tooth preparation, including mirror and drill control. Use a modular system design that allows for easy implementation of new simulations. Make the interface intuitive for students and instructors. Make it easy to create new pathological cases for testing and training.

Results: The average duration of each training session for the two training groups. As can be seen, practice time decreased sharply for participants in the real-world training group, while it increased for those in the simulation group.

Conclusion: Based on conversations with participants and observations during training, we theorize that this difference is due in part to participants in the simulation group finding their task more engaging and less intimidating than those in the real-world group. The results of the experiment are encouraging, in that the simulation group experienced no recognizable negative training effects and performed on par or better than the real-world training group. We will begin a modified and expanded version of the same study based on the experience gained from the pilot study.

PR11.43

Improving the appropriateness of paediatric referrals to community dental services: a completed cycle

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Background: Inappropriate paediatric referrals from general dental practitioners (GDPs) to special care community dental services can result in a delay in children receiving adequate dental care in a timely fashion. With reports showing dental problems as the leading cause of paediatric hospital admissions, it is crucial that all children receive best dental care when required, preferably from their GDP where suitable.

Aim: To assess whether all paediatric referrals to the community dental services of Barts Health NHS Trust meet the referral criteria for special care dentistry.

Design: 575 referrals and patient files were examined. Information was collected regarding stated reason for referral and whether this corresponded with clinician's records. Other factors noted include whether special care was required e.g. inhalation sedation or referral for general anaesthetic.

Results: 38% of referrals were deemed inappropriate. 83% of children were referred as phobic however only 46% of these were recorded to have needed adjuncts for phobia. Many referrals were suitable for treatment with GDP and did not require special care. This resulted in children delayed in receiving their required dental care whilst awaiting referral. Changes implemented included stricter referral criteria with consequences of inappropriate referrals emphasised. Also offered was information on treating children in the general dental practice. Second cycle showed a reduction in inappropriate referrals to 19%.

Conclusions: This audit highlighted the fact that often children are inappropriately referred which can place them at risk of further dental problems. There is still room for improvement which is crucial to protect paediatric patients.

PR11.44

Audit of caries risk assessment and caries prevention within the salaried dental service

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Background: Community dental services treat many high-caries-risk children, who require a thorough caries-risk assessment (CRA) and individual caries prevention plan, according to their caries-risk status.

Aim: To assess the identification, documentation and subsequent preventive treatment planning of children of high-caries-risk referred to the salaried dental service in Northallerton.

Standards: 100% of children should receive a:

a) caries-risk assessment b) caries-risk status c) individual caries prevention plan consistent with the Department of Health's (DoH) Prevention toolkit.

Design: Computer notes of 100 children were retrospectively analysed for the documentation of factors involved in CRA and prescription of caries prevention. Patients were included if they were:

a) attending new patient or recall examinations b) aged 16 or younger c) had at least one carious lesion.

Results: Dietary habits were documented in 43% of casenotes and oral hygiene in 85%. A caries-risk status was assigned to 48% of patients. In terms of prevention, 35% of children were prescribed dietary advice, 77% oral hygiene instruction, 75% fissure sealants, and 85% fluoride application. Of the casenotes analysed, 40 patients were seen by junior dentists, 20 by dentists undergoing further training and 40 by senior dentists. The level of detail documented decreased with increasing seniority of staff.

Conclusions: These findings highlight a need for the service to improve the provision and documentation of caries-risk assessments to enable prescription of an appropriate caries prevention plan.

Action Plan: (a) Implementation of a caries-risk assessment and prevention computer template b) Staff training on DoH toolkit and importance of record keeping.

PR11.45

Utilization of dental services among secondary school students in Port Harcourt, Nigeria

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Background: The regular use of dental services has been associated with optimal oral health. Reports in some parts of Nigeria have shown poor utilization of dental services and there is paucity of information in the South-South region of Nigeria.

Aim: To determine the frequency/pattern of dental visits and identify barriers to utilization of dental services among children

Design: This was a cross sectional study done among secondary school children in Port Harcourt, Nigeria. Information was elicited by means of a self administered questionnaire. These included socio-demographic characteristics, reported visits during the previous year, pattern of dental visits and the barriers to utilization..

Results: There were 200 school children; 98(49%) males and 102 (51%) females with a mean age of 13.3(+1.1) years. Dental visits were deemed important by 187(93.5%) children; but 19.5% of

them were afraid of visiting the dentist. Although 60.7% of them reasoned that dental visits should be at least once a year, 32.0% respondents suggested that visits should be when there are symptoms. Only 42 (21%) pupils had been to the dentist in the last 12 months.

The barriers to utilization of dental services majorly included no perceived needs (64.3%), cost of treatment (10.1%) and access to dental clinic (5.4%). Demographic variables had no significant association with reported visits and pattern of visits.

Conclusion: Utilization of dental services among these school children was low. There is a need to increase oral health awareness by having an effective school oral health programme

PR11.46

Repeat attendance by paediatric patients on general anaesthetic lists over 5 years, Oxfordshire Salaried Primary Care Dental Service (OSPCDS)

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Background: OSPCDS provides treatment to a range of patients, general anaesthesia (GA) may form a part of this. National Clinical Guidelines in Paediatric Dentistry state that repeat GAs are undesirable in terms of 'morbidity, potential mortality, associated behavioural and emotional effects as well as cost'. The current mortality rates associated with GA in developed countries is estimated at 1:100,000.

Aim: The aim of this audit was to investigate the number of paediatric patients between 01/04/2009 to 31/03/2014 with more than one GA episode, with the objective of producing recommendations to reduce repeats.

Design: A query was run on the patient database to identify qualifying patients. Individual patient data was analysed and entered into a pre-designed spread sheet.

Results: Of 2793 patients 62 (2.2%) had repeats. There was a total of 56 retreated teeth and 28 patients (45%) with retreated teeth. 76% of patients had evidence of oral hygiene or other preventative advice and 29% had diagnostic imaging.

Conclusions: Overall there was a low repeat GA rate (2.2%) by following the recommendations below the trust may be able to further limit its incidence of repeats.

Recommendations for the trust include; reinforcing hygiene and preventative advice regularly in line with NICE recall guidelines, as well as suggesting recall for referring GDP's. Ensuring imaging is carried out for all where possible. Greater use of Hall technique stainless steel crowns and topical fluoride under GA and considering whether primary teeth should be extracted or Hall crowned only, rather than filled under GA.

PR11.47

Effect of b-learning in Objective Structured Clinical Examination (OSEC) in practice assessment pterygomandibular technique

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Background: The use of e-learning combined with traditional teaching is a trend and became a challenge of higher education.

The FOU SP Pediatric Dentistry discipline has used this teaching-learning methodology since 2008. The graduate students use the Moodle platform with complementary and supplementary activities to the classroom, where they perform asynchronous activities and receive feedback from tutors. Undergraduates are assessed by their participation and performance in activities.

Aim: This paper compares the performance achieved in the question of the statement of anesthetic technique on dummy in Objective Structured Clinical Examination (OSEC), among students who accessed or not the virtual object of learning on the platform.

Design: The sample consisted of 120 undergraduate students. After assessment of the student performance in Objective Structured Clinical Examination (OSEC) and the compiled data from participation in e-learning, linear regression analysis was performed to determine the association between student performance and the use of the instrument or the student's interest by the feedback.

Results: The results showed that the undergraduates who watched the video (Anesthesia complex pterygomandibular in children) available on the Virtual Learning Environment (VLE) and found that the feedback given by the tutor were more likely to get better note on the question of anesthesia were respectively 2.4 (95% CI: 0.02–0.25) and 2.5 (95% CI: 0.01–0.17).

Conclusions: The students who pledged to participate in blended learning performed better in the practical assessment. Therefore, the b-learning and the virtual object developed for anesthesia pterygomandibular complex in children benefited students in the teaching-learning process.

PR11.48

Child abuse and role of the paediatric dentist

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Background: Child abuse is a major public health problem all over the world and in India. We as Paediatric Dentists are able to identify physical evidence of injuries to children especially in the regions of the head and neck, orofacial structures and even arms. When such injuries are of suspicious origin, we have an obligation to document and report. A number of children go missing every year. CRY (2007) estimates suggest: 8945 children go missing in India every year, 500,000 children are forced into sex trade every year, children form 40% of the total population of commercial sex workers.

Aim: To assess the preparedness of the Paediatric Dentist in identifying a potential case of child abuse and ability to report the same and to give an insight about the vital signs of an abused child (esp. the girl child in India).

Design: The study was conducted as a review as to what are the forms of abuse and the role the paediatric dentist ought to play. And the awareness of the same amongst the Paediatric Dentist population in 2 cities in India.

Results: The results indicate Paediatric Dentists are well aware of the role they ought to play as mediators, psychologists, informers. But many deflect the fact that they avoid the embarrassing situation of confronting the parent about the same.

Conclusion: Therefore, Child Abuse is a serious problem with an alarming increase by the day in India which needs quick attention and immediate reporting by the Paediatric Dentist.

Basic Science Research Poster Session – PR12

PR12.01

Parathyroid hormone: increased tooth mobility after orthognathic surgery?

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Introduction: Following orthognathic surgery, increased tooth mobility is observed clinically and is utilized for postsurgical orthodontic tooth movement. It was suggested that the increase may result from a surgery-associated alteration of parathyroid hormone (PTH) and calcium metabolism.

Design: 30 young adult patients were divided into a mandibular osteotomy group (Group A, $n = 20$) and an untreated control group (Group B, $n = 10$). Tooth mobility was evaluated using the Periotest device. Tooth mobility, serum PTH and calcium levels were determined repeatedly for both groups.

Results: The tooth mobility was increased significantly in the Group A patients in the first 10 days post-surgery. All serum PTH and calcium mean levels were within normal ranges. No significant differences were found between the measurements of both groups. The serum calcium levels recorded at the 1st post-surgery day were slightly lower in the operated patients compared to the control group.

Conclusion: It can be concluded that the increased facility of orthodontic tooth movement immediately post-surgery was confirmed by Periotest measurements, while no association was found with surgery-related altered levels of PTH and calcium. Since dietary effects can be ruled out, the increase of clinical tooth mobility may rather result from preoperative orthodontic forces and/or the post-surgical elimination of masticatory muscular influences.

PR12.02

The relationship between children's primary teeth's occlusal and body's gravity center movement

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Design: Forty nursery school children, ages 4–5 years (21 boys, 19 girls with Hellman's dental age of IIA whose overjet and overbite were normal and had no skeletal problems) with cooperative behavior were the subjects of this study. Informed consent was acquired from the children's parents or guardians.

All the data were analyzed with SPSS11.0 for Windows statistical package. *t*-test was used to examine the difference between the occlusal balance center of the middle group and the occlusal balance center of the deflection group (Distance and Area of GCM).

Results: For occlusal ability, the average occlusal contact area was found to be 10.47 mm² and average occlusal pressure was 41.6 MPa. The distance and area of gravity center movement were less for eyes-opened than eyes-closed. (A significant difference was found between the occlusal balance of the middle group ($n = 10$) and the occlusal balance of the deflection group ($n = 30$) in the distance and area of gravity center movement with eyes-opened and closed.

Conclusion: The relationship between body's equilibrium function and occlusal balance in children with primary dentition exists.

The distance and area of gravity center movement of the middle group was less than that of the deflection group.

After this study, we want to study the relationship of the body's equilibrium function and occlusal balance in children with mixed dentition and permanent dentition.

PR12.03

Distinct post-transcriptional regulation of monocarboxylate transporter 1 expression between neurons and non-neuronal cells in the mouse brain

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Background: Monocarboxylates, such as the lactate and ketone bodies, have been known to represent substantial energy substrates for the developing brain. Rapid transport of them across the plasma membrane of cells is essential for the carbohydrate, fat, and amino acid metabolisms. The transport is facilitated by proton-linked monocarboxylate transporters (MCTs). Of 14 isoforms of MCTs so far identified, MCT1, MCT2 and MCT4 expressed in the brain.

Aim: The aim of this study was to clarify cellular expression of MCT1 in the mouse brain.

Design: We examined cellular expression of MCT1 in the mouse brain by fluorescent in situ hybridization and immunohistochemistry.

Results: In the hippocampal CA1, high neuronal expression was shown by intense MCT1 mRNA signals in pyramidal cells expressing vesicular glutamate transporter-1 (VGluT1) mRNA. Low expressions were also found for GABAergic interneurons expressing 67 kDa-glutamic acid decarboxylase (GAD67) mRNA, astrocytes expressing plasmalemmal glutamate transporter GLAST mRNA, and capillary endothelial cells expressing vascular endothelial growth factor receptor-1 (VEGFR1) mRNA. By immunofluorescence, however, MCT1 immunoreactivity was intense in astrocytes expressing 3-phosphoglycerate dehydrogenase and capillary endothelial cells expressing glucose transporter-1, but negative in pyramidal cell dendrites and somata expressing microtubule-associated protein-2. Such a dissociated transcription and translational control in neurons was also found in Purkinje cells in the cerebellum and cholinergic neurons in the dorsal motor nucleus of vagus nerve.

Conclusions: Neuronal expression of MCT1 is transcriptionally active, but suppressed at the post-transcription levels. Through this mechanism, predominant MCT1 expression in astrocytes and capillary endothelial cells is constructed in the brain.

PR12.04

Salivary α - Amylase activity, Immunoglobulin A, G and total protein concentration in children with different level of dental caries

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Background: Amylase Activity, Immunoglobulin A, G and total protein concentration in saliva may be related to the susceptibility to dental caries.

Aim: The aim of this study was determination of Amylase Activity and Immunoglobulin A, G and total protein concentration in saliva of children with different level of dental caries.

Design: One hundred six children in the age group of 4–6 years were divided into 3 groups. Group one, 36 Caries-free children with dfs <1, Group two 38 children with 510. Three groups were matched for age and gender.

The unstimulated mixed salivary sample was collected from each child.

Measurements of Alpha-Amylase Activity, total protein concentration were performed by Colorimetric technique.

Also, the level of salivary IgA and IgG was determined by ELISA. Data were analyzed by student *t*-test, non-parametric Mann-Whitney and Anova test.

Results: There were no significant differences between groups regarding the salivary concentrations of total protein and IgA ($P > 0.05$). Mean values of Amylase Activity in group 3 (39.85 IU/L) was significantly higher than group 1 (35.55 IU/L) ($P < 0.05$) and mean values of IgG Concentration in group 3 (0.4 mg/dL) was significantly higher than group 1 (0.28 mg/dL) and 2 (0.27 mg/dL) ($P < 0.05$).

Conclusions: Our results revealed that increase in the salivary Alpha-Amylase activity and IgG concentration was associated with presence of caries.

PR12.05

The role of AEG-1 in dental pulp cells during inflammatory reaction

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Background: AEG-1 (Astrocyte Elevated Gene 1) was originally identified and cloned in astrocytes from HIV-infected embryos. A large number of studies have shown that AEG-1 played a critical role in tumor angiogenesis, drug resistance and the process of invasion and metastasis. Recent studies have also demonstrated that AEG-1 played an important function in other physiological and pathological processes, such as innate immune, development, inflammation, and neural degenerative diseases.

Aim: To investigate the role of AEG-1 in dental pulp cells during inflammatory reaction and possible molecular mechanism.

Design: Human dental pulp cells (DPCs) were treated by different concentrations of LPS and then the mRNA and protein expression levels of AEG-1 and its target NF- κ B were detected by RT-PCR and western blot. After DPCs were treated by NF- κ B inhibitors parthenolide overnight and then treated with LPS for 1 h, the expression level of AEG-1 were detected. Knocking down AEG-1 by shRNA, DPCs were transfected by NF- κ B-Taluc luciferase plasmids and treated by LPS for 6 h, NF- κ B-dependent luciferase activity were detected.

Results: LPS up-regulates AEG-1 in DPCs which is dose-dependent. Parthenolide can inhibit LPS-mediated up-regulation of AEG-1 in DPCs. NF- κ B-dependent luciferase activity decreased when knocking-down AEG-1 in DPCs treated by LPS.

Conclusions: AEG-1 up-regulation is NF- κ B-dependent in DPCs during inflammatory defense. The underlying mechanism involved in crosstalk between AEG-1 and NF- κ B pathway needed further research.

PR12.06

Isolation, identification and biological characteristics of Beagle stem cells from pulp of deciduous teeth

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Background: Nowadays, stem-cell-based tissue engineering was considered as the most promising alternative for pulp regeneration. Beagle is an appropriate model for dental research.

Aim: The aim of the present study is to isolate and characterize the Beagle stem cells from pulp of deciduous teeth.

Design: Using enzyme tissue block method for primary culture of Beagle stem cells from pulp of deciduous teeth, and the cell colonies were picked and expanded for the following measurement of biological characteristics.

Results: Beagle stem cells from deciduous pulp were harvested by enzyme tissue block method and the cell colony formation rate was 32%. Immunohistochemistry staining and flow cytometry analysis confirmed the cells were derived from mesenchymal tissue, rather than from the epithelial tissue. Abilities of adipogenic and osteogenic/odontoblasts differentiation were verified after being induced.

Conclusions: The Beagle stem cells from pulp of deciduous teeth were defined as mesenchymal origin and had multilineage differentiation abilities. It might be a capable candidate cell resource for pulp regeneration.

PR12.07

Anti-growth effects of triple/double antibiotic paste on stem cells from exfoliated deciduous teeth (SHED)

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Background: Typically, triple antibiotic paste (TAP) or double antibiotic paste (DAP) had been used in regenerative endodontic procedures for disinfection. TAP/DAP are also used to treat primary tooth with periapical abscess. However, the effects of triple/double antibiotic paste on stem cells from exfoliated deciduous teeth (SHED) were still unclear.

Aim: The purpose of this study is to evaluate the anti-growth effects of TAP or DAP on stem cells from exfoliated deciduous teeth (SHED).

Design: SHED were isolated and primary cultured from human deciduous teeth. SHED were cultured and subjected to either non treatment or various dosage including TAP or DAP. For evaluation, cell viability and cell cycle was investigated with MTT assay and PI stain by flow cytometry on the 3rd day.

Results: Our results indicated that, after treated with 1 mg/mL TAP or DAP for 3rd days, about 40% of SHED growth was inhibited which was significantly than control group (0 mg/mL).

Conclusion: Our data showed that the SHED cells proliferation were inhibited by TAP or DAP in a dose-dependent manner.

PR12.08

Changes of alveolar bone volume for healthy and ovariectomized rats in ligature induced experimental periodontitis

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Background: Osteoporosis is thought to contribute to pre-existing alveolar degeneration although the association between periodontal disease and osteoporosis is not fully characterized.

Aim: The aim of the present study was to observe the initial changes in the mandibular alveolar bone for healthy and ovariectomized (OVX) rats in ligature induced experimental periodontitis of first molars.

Design: At time points ranging from 0, 3, 7 and 11 days following ligature placement, Micro-CT analysis was performed to calculate vertical bone loss as well as bone volume loss in the root furcation area. Furthermore histological analysis was performed to calculate the loss of alveolar bone crest height from the cemento-enamel junction. TRAP staining was visualized to observe osteoclast activity and number.

Results: OVX animals demonstrated significant vertical bone loss at all time points when compared to normal animals and that significant bone loss was observed over time in both groups confirming the ligature model. In the furcation area, a significant decrease in bone volume/total volume and trabecular thickness was observed in the OVX group as assessed by Micro-CT analysis at 11 days. The histological analysis also revealed that alveolar bone crest height was significantly reduced in OVX animals when compared to normal animals at all time points. TRAP staining further demonstrated that a higher intensity staining was observed in the OVX animals and the intensity of TRAP staining peaked at 3 days post ligature placement.

Conclusions: The results from the present study suggested that an osteoporotic phenotype has the potential to speed periodontal breakdown.

PR12.09

Analysis of the tetR dependent regulation in *Treponema denticola*

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Background: *Treponema denticola* is frequently isolated from chronic periodontitis and apical periodontitis and plays an important role for development and progression of the disease. In the treatment of periodontitis, antimicrobial agent was often used. Resistance to the antimicrobial agents affect the outcome of the therapy.

Aim: TetR is reported to regulate antibiotic resistance in a number of microorganisms, however, the concrete function in *T. denticola* has not clarified yet. The aim of this study is to clarify the role of the tetR in antibiotic resistance of *T. denticola*.

Design: To inactivate the TetR of *T. denticola*, the *ermFermAm* cassette was inserted in the tetR of *T. denticola* ATCC35405 by overlap PCR. Obtained fragment was transformed into *T. denticola* by electroporation. Clones deficient tetR was isolated in TY-GVS agar containing 40 mg/mL erythromycin. To evaluate resistance to antibiotic of the mutant, wild type strain and mutant of tetR was inoculated in TYGVS medium containing azithromycin (AZM) or ofloxacin (OFLX). After 7 days incubation under anaerobic condition, minimum inhibitory concentration (MIC) was determined visually.

Results: Nine clones were grown in TYGVS agar plate containing erythromycin. In all clones, insertion of *ermFermAm* cassette was

into tetR locus confirmed by PCR. The growth rate of the mutant was similar level compared with wild type. The MIC of OFLX and AZM in wild type was lower than that the mutant.

Conclusion: These data suggest that tetR is associated with resistance to OFLX and AZM in *T. denticola*.

PR12.10

Role of Wnt signaling in dental mesenchyme during serial tooth formation

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Background: Wnt signaling plays an important role during tooth morphogenesis. The inhibition of canonical Wnt signaling arrests the tooth morphogenesis at an early stage. On the other hand, forced activation of Wnt signaling in dental epithelium leads to continuous formation of supernumerary teeth. However, the role of Wnt signaling in dental mesenchyme has remained less well elucidated.

Aim: The aim of this study is to examine the role of mesenchymal Wnt signalling during the serial addition of posterior molars. In particular, we investigated the relationship between Wnt, Fgf10 and the stem cell marker Sox2 during the initiation of the mandibular 2nd molar tooth bud.

Design: TCF/Lef:H2B-GFP (Wnt reporter) and wild type mouse embryos were used in this study. Mandibular 1st molar tooth buds were dissected from E14.5 mouse embryos and cultured *ex vivo* in organ cultures for 7 days to observe the formation of the 2nd molar. Radioactive *in situ* hybridization and immunohistochemistry were performed using tooth buds from E14.5 and E15.5 embryos.

Results: The organ culture experiment showed that the expression of Lef1 (Wnt target) localized in dental cusps of 1st and 2nd molar during development. The expression of Fgf10 and Sox2 was detected especially on distal side of the first molar in E14.5 mouse embryos. In addition, strong expression of Axin2 was detected in the dental mesenchyme during the morphogenesis of 2nd molar.

Conclusions: These results indicate that mesenchymal Wnt signaling is involved in the development of mandibular 2nd molar.

PR12.11

Maternal occlusal disharmony suppresses cell proliferation in the hippocampus of pups

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Background: Exposure of pregnant female rodents to stress has profound effects on the behavior of their adult pups. We recently reported that occlusal disharmony leads to deficits in learning and memory, and neuronal degeneration in the hippocampus of aged mice through the induction of chronic stress. Neurogenesis regulation occurs at several different levels, e.g., by cell proliferation.

Aim: The aim of this study was to determine which aspect of neurogenesis regulation is influenced in the hippocampus of pups obtained from dams with occlusal disharmony during pregnancy induced by raising the bite.

Design: Twenty male DDD mouse pups (4-mo-old) from pregnant mice with occlusal disharmony and 20 male pups from control pregnant mice were used. The bite of the pregnant mice was raised to induce occlusal disharmony by placing dental composite

resin on the teeth under anesthesia during the last week of pregnancy. Control mice were anesthetized but the bite was not raised. We measured plasma corticosterone levels by radioimmunoassay, learning ability in the Morris water maze, and cell proliferation in the hippocampus by bromodeoxyuridine injection.

Results: Plasma corticosterone levels of pups obtained from bite-raised dams were significantly greater than those of controls. Pups obtained from dams in the bite-raised condition during pregnancy required significantly more time to reach the platform in the Morris water maze and exhibited significantly decreased proliferation of newborn hippocampal cells.

Conclusions: These findings suggest that learning deficits in pups obtained from dams with occlusal disharmony during pregnancy result from altered neurogenesis in the hippocampus.

PR12.12

CCL17 enhances saliva IgA response and protection of anti-carries DNA vaccine

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Background: We previously identified the specific up-regulation of mRNA expression levels of CCL17 in targeted anti-carries plasmid transfected dendritic cells (DCs) by gene array analysis, suggesting an important role CCL17 played in enhanced immune response.

Aim: We investigated the effect of CCL17 DNA administration on immune responses to an anti-carries DNA vaccine pCIA-P.

Design: The plasmid encoding CCL17 protein, designated as pCCL17/VAX was constructed by inserting murine ccl17 gene into the vector pVAX1. Chemotactic effect of CCL17 expressed by pCCL17/VAX on DCs was assessed *in vitro* and *in vivo*. Experimental rat caries model was established and immunized with pCIA-P or with pCIA-P plus pCCL17/VAX intranasally. Serum PAc-specific IgG and salivary PAc-specific IgA antibody levels were assessed by ELISA. Caries activity was evaluated by the Keyes method. The colonization of *Streptococcus mutans* (*S. mutans*) on rat teeth was assayed by culture samples on solid MSB medium.

Result: CCL17 showed strong chemotactic activity on DCs *in vitro* and *in vivo*. CCL17 promoted the production of specific IgG in serum and secretory IgA in saliva of rats by intranasal immunization with pCIA-P plus pCCL17/VAX. Furthermore, we found that enhanced IgA responses in saliva were associated with the inhibition of *S. mutans* colonization of tooth surfaces and endowed better protection with significant fewer caries lesions.

Conclusions: Our study demonstrates that CCL17 could enhance specific IgA responses in saliva and protective ability of pCIA-P, providing an effective mucosal adjuvant candidate for intranasal immunization of an anti-carries DNA vaccine.

PR12.13

Immunohistochemical observation for multirooted tooth formation in rat

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Background: A molar of most mammals is multirooted tooth (MRT) to bear the heavy bite force. Although many studies on tooth crown development have been reported, there is little information on tooth root development. Especially, the mechanism of MRT formation is still unknown.

Aim: Since subpulpal lobes (SLs) appear during MRT formation in human and rat, the aim of this study is to clarify the MRT formation with SLs histologically and immunohistochemically using rat molar.

Design: Maxillary second molars (M2s) from postnatal (PN) 8–18 days in Wistar rats embedded in paraffin wax by conventional method after decalcification and frontal sections were made for hematoxylin-eosin and immunohistochemical staining with anti-heat shock protein (HSP) 27, anti-pan keratin (CK) and anti-bone morphogenetic protein (BMP) 4 antibodies. Some specimens were observed by stereomicroscope.

Results: Epithelial projection (EP) exhibiting anti-CK immunopositive elongated from cervical portion toward the center of dental papilla at PN8. With the passage of time, dental papilla cells facing the part of EP showed columnar and immunoreacted for anti-HSP 27 antibody after PN11. Immunopositive reaction for BMP4 in the dental papilla cells facing the EP was markedly observed in PN15 as compared to PN8. From PN11, SLs appeared on bifurcation area and grow horizontally. Finally, each SLs and dentin projection fused completely until PN18.

Conclusion: Bifurcation area in rats was formed the growth of the SLs and fusion of the SLs and dentin projection. SLs were formed by odontoblasts differentiated from the cells facing a part of EP.

PR12.14

Cross-talk between PDGF-BB and BMP-2 is important for the stemness of dental pulp stem cells

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Background: The process of tooth development is well-regulated by epithelial-mesenchymal interactions. Dental mesenchymal cells contain PDGFRα positive dental pulp stem cells because they are derived from neural crest cells.

Aim: We focused on the role of PDGFs and their receptors on the odontoblast differentiation and epithelial-mesenchymal interactions.

Design: We used SF2 cells, a rat dental epithelial cell line, and SP cells, a mouse dental pulp stem cell line. To investigate the role of epithelial-mesenchymal interactions for SP cells differentiation into odontoblasts, SF2 and SP cells were co-cultured using 6-well plate and cell culture insert. Further, to examine the interaction between BMP2 and PDGF-BB for SP cells differentiation into odontoblasts, SP cells were cultured with PDGF-BB, BMP2, or both PDGF-BB and BMP2 for 48 h, and then RT-PCR was performed to identify the expression of DSPP.

Results: Co-culture of SF2 with SP cells was most effective for stimulation of DSPP expression in SP cells, and the presence of Noggin inhibited the expression. Epithelial BMPs may regulate odontoblast differentiation. In fact, BMP2 induced DSPP expression in SP cells. Further, PDGF-BB decreased DSPP expression in SP cells cultured with BMP2 and inhibited the smad5 phosphorylation induced by BMP2 indicating that PDGF-BB is one of the negative regulator of BMP2 signaling and odontoblast differentiation.

Conclusions: Interaction between dental epithelial cells and dental pulp stem cells promote odontogenic cell differentiation and PDGF-BB inhibits odontoblast differentiation by BMP2 because of inhibition of smad phosphorylation and may be important to keep stemness.

PR12.15

Time-sequenced expression of Notch in enamel organ cells of mouse incisor after mechanical injury

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Background: Notch signaling is essential in the development of enamel. Involvement of Notch in enamel organ cells of the continuously growing mouse incisor is yet to be investigated.

Aim: To observe the expression pattern of Notch signaling in enamel organ cells of mouse incisor after mechanical injury.

Design: Twenty selected mice, divided into four groups, were used in the study. Mechanical injury was established by grinding off crown 1/2 of mice mandibular incisors using diamond bur. The mice were sacrificed and specimens were processed respectively at 3 d, 5 d, 7 d after injury for each group. Expression of Notch1 and Notch2 in enamel organ cells was observed using immunohistochemical staining.

Results: Notch signaling in enamel organ cells was activated and showed time-sequenced changes after mechanical injury. In control incisors, both Notch1 and Notch2 were absent from ameloblasts and weakly observed in stratum intermedium and stellate reticulum cells. In 3 d group, intense expressions of Notch1 and Notch2 were observed in ameloblasts and stratum intermedium cells, and expression in stellate reticulum cells was sporadic. In 5 d group, Notch1 and Notch2 were still obviously expressed in ameloblasts, stratum intermedium cells, and stellate reticulum cells also showed intensive staining. In 7 d group, the expressions of Notch1 and Notch2 decreased in all cell layers.

Conclusions: Notch signaling in enamel organ cells of mouse incisor can be activated by mechanical injury, suggesting that Notch signaling may be involved in the regulation of repair after tooth injury.

PR12.16

Comprehensive expression analysis of the gene in connection with mouse lack tooth development of symptoms

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Background: Tooth agenesis is the most common developmental anomaly of the human dentition and little is still known about the genetic factors. Congenital tooth agenesis is rarely observed in inbred mouse strains. However, the epilepsy-like disorder (EL) mouse has a 100% incidence of absence of the third molars (M3s) without any generalized craniofacial anomalies. EL mice therefore may be a good model for the genetic study of agenesis of M3s or other types of tooth agenesis in humans.

Aim: The aim of this study was to identify the candidate genes for tooth agenesis in EL mice.

Design: M3 development is arrested in the bud stage on postnatal day 3 (P3) in EL mice. 10 EL and 10 control mice were sacrificed under anesthesia on P3. The heads were immediately embedded and serial sections were prepared using a cryostat. A total of 40 M3s from each strain were dissected out under a dissection microscope, and total RNA was extracted. mRNA expression analysis was carried out using DNA microarray, real-time PCR and in situ hybridization (ISH).

Results: In DNA microarray analysis, a significantly low level of expression of Fgf20, which is one of the essential growth factors for early tooth development, was observed in M3s tooth germs

of EL mice comparing controls. We could support this result using both real-time PCR and ISH.

Conclusions: Our results suggest that the cause of M3 agenesis of EL mice may be a low level of Fgf20 expression in M3 in the bud stage of EL mice.

PR12.17

Investigation of influencing factors for dental caries susceptibility using mice

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Background: Differences in caries susceptibility are caused by many environmental factors and genetic factors. Many studies of environmental factors such as dietary sugar level or oral flora were reported, but little is still known about the genetic factors influencing susceptibility.

Our previous study showed that inbred mice strains such as C57BL/6 (B6) and C3H/Heslc (C3H) revealed high and low caries susceptibility, respectively, and reported that genetic factors play a role in caries susceptibility.

In quantitative trait locus (QTL) analysis, the QTL on chromosome 2 was predicted to be highly associated with dental caries. To verify the effect of the QTL on chromosome 2, we previously constructed consomic mice termed B6-Chr.2^{C3H}, whose chromosome 2 derived from B6 was replaced with that from the low caries susceptibility C3H strain.

B6-Chr.2^{C3H} showed low caries susceptibility suggesting that mice chromosome 2 was related to caries susceptibility.

Aim: The aim of present study was to investigate phenotype influencing caries susceptibility of B6-Chr.2^{C3H}.

Design: We examined the stimulated saliva secretion volume, the histologic characteristic of the submandibular gland and the enamel hardness of B6 and B6-Chr.2^{C3H}.

Results: Total stimulated saliva secretion volume was higher in B6-Chr.2^{C3H} than B6. On the other hand, no clear differences were shown in the other traits.

Conclusions: Our results suggested that the gene influencing volume of salivation exists on chromosome 2 and may play an important role in dental caries susceptibility.

PR12.18

Differentiation potential of dental pulp stem cells derived from hypophosphatasia model mouse

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Background: Hypophosphatasia (HPP) is a hereditary skeletal disease lead to mutations of the gene encoding tissue-nonspecific alkaline phosphatase (TNAP). These mutations result in deficient activity of TNAP leading to rickets often causing death in the short life. Although TNAP is expressed in various tissues, the HPP symptoms appear primarily in bones and teeth. However, these mechanisms of calcification is not revealed to biological and pathological.

Aim: The purpose of this study was to identify the differentiation potential of dental pulp stem cells (DPSCs) derived from HPP in TNAP knockout (Alp2^{-/-}) mice.

Design: Alp2^{-/-} mice develop skeletal disease at day 6–8 and usually die of their disease at postnatal day 20. We used day 4–10

Alp2^{-/-} and Alp2^{+/+} as control mice, sacrificed by decapitation. The heads were immediately dissected out under a dissection microscope, and pulled out M1, M2, and incisor from maxillary and mandibular bone. After picked up of dental pulps from teeth, the dental pulps were incubated under fixed conditions for DPSCs. Then, total RNA was extracted from DPSCs and RT-PCR analysis.

Results: In RT-PCR analysis, the cells collected from dental pulps of Alp2^{-/-} mice expressed Pdgf- α , PKG and Sac1 which are essential DPSCs makers for differentiation potential.

Conclusions: Our results suggest that the Alp2^{-/-} mouse DPSCs have differentiation potential. It is that the DPSCs having differentiation potential with a background of HPP helps a pathologic study of HPP in the future.

PR12.19

Dental pulp stem cells from natal teeth: isolation and morphological study

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Background: Because of their similar characteristics with other mesenchymal stem cells, the study of dental stem cells has become a focus of various types of research. Natal teeth have significant occurrence in newborns, usually where the treatment is surgical removal.

Aim: The aim of this study was to isolate, cultivate and study the stem cell morphology characteristics obtained from natal teeth.

Design: The population of adherent cells were obtained by explant method and separated with STRO-1 marker by magnetic technique. Kinetic assays Colony forming unit-fibroblasts (CFU-F), and growth curve of were performed. For morphological analysis, the cells were analyzed by SEM and HE and the ionic elementios were detected EDS X-ray microanalysis.

Results: It was possible to isolate and expand stem cells natal teeth pulp with STRO-1 marker. These proved clonogenic and proliferative. The most prevalent form fibroblastic morphology was the most significant and ionic characteristics were expressed as Cl, S, and In these cells.

Conclusion: It was possible to isolate and culture stem cells from the pulp of natal teeth. Molecular tests more sensitive and differentiation *in vitro* and *in vivo* is necessary to complement these findings so that in future become viable in cell-based therapy.

PR12.20

Functional analysis of the glutamine metabolism gene in *Streptococcus mutans*

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Background: *Streptococcus mutans*, a biofilm forming bacterium, possesses a large number of transporters that function as import/export molecules. Among them, the PII protein family is composed of proteins that regulate glutamine synthesis activities in various bacterial species.

Aim: In the present study, we identified the glutamine transporter in *S. mutans* analyzed its functions.

Design: The SMU.732 gene corresponding to *glnP* in *S. mutans* and homologous to the glutamine transporter gene in *Bacillus subtilis*, was extracted according to complete genome information available in a database. We then constructed a *glnP*-inactivated mutant strain (*Aglnp*) and evaluated its cariogenic properties,

while growth rate and biofilm quantity formed in the presence and absence of glutamine were also determined. In addition, fluorescence efflux measurements using *N*-phenyl-2-naphthylamine (NPN) were carried out to analyze the transporter function of the *glnP* gene.

Results: The growth rate of *Aglnp* was slightly lower than that of the parental strain. On the other hand, in the presence of glutamine, *Aglnp* growth was similar to that in its absence, while that of MT8148 in the presence of glutamine was significantly lower than that in its absence. Furthermore, the quantity of biofilm formed by *Aglnp* was significantly greater than that by MT8148. Also, addition of 25 or 50 $\mu\text{g/mL}$ of NPN increased the fluorescence intensity of MT8148 and *Aglnp*, though that of the latter was significantly lower.

Conclusions: Our results suggest that *glnP* is associated with glutamine transport, especially in regard to import related molecules.

PR12.21

Intra-accumbal administration of endomorphin-2 decreases accumbal acetylcholine efflux of freely moving rats

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Background: Nucleus accumbens (NAc) is one of the terminal areas of mesolimbic dopaminergic neurons that project from the ventral tegmental area. NAc contains cholinergic neurons and animal experiments have shown that selective depletion of these neurons impairs cognitive function, including memory (Laplane et al., 2012). Opioids are applied to control persistent pain in children and amnesia is a recognised adverse effect. There are three subtypes of opioid receptors: mu, delta and kappa. Accumbal cholinergic neurons express mu receptors that are thought to exert inhibition of cholinergic activity. Endomorphin (EM)-2 is a putative endogenous mu receptor agonist (Zadina et al., 1997) that has been shown to increase accumbal dopamine (DA) without stimulating mu receptors (Okutsu et al., 2006).

Aim: We investigated the role of mu receptors in the effects of EM-2 on extracellular acetylcholine (ACh) in NAc of freely moving rats.

Design: *In vivo* microdialysis was used to collect accumbal samples and to infuse drugs into the NAc.

Results: Intra-accumbal infusion of EM-2 (6 and 30 nmol) reduced ACh levels in a dose-related manner. The EM-2 (30 nmol)-induced decrease of ACh was prevented by co-administration of the selective mu receptor antagonist CTOP (3 nmol), which failed to alter basal ACh. The dose of drug infused into NAc indicates the total amount (mol) over the 30-min infusion time.

Conclusions: This study shows that intra-accumbal infusion of EM-2, which increased accumbal DA efflux without activating mu receptors, decreases accumbal ACh efflux through mu receptor stimulation.

PR12.22

The impact of pulpitis of different degree on cell proliferation and osteoblastic differentiation of DPSC in Beagle immature premolars

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Background: It is found that there are stem cells in inflamed tissue. There are few articles exploring the stem cells in pulpitis and not comparable because the degree of the inflammation is different. So the impact of inflammation on stem cells is debatable.

Aim: To compare the proliferation and osteoblastic differentiation of DPSCs isolated from normal and inflamed pulps of different degree in Beagle immature premolars, and provide evidence for the use of IDPSC.

Design: This study evaluated 14 Beagle's young premolars (21 roots). In the experiment group, irreversible pulpitis was induced by pulp exposure and the inflamed pulps were extracted at 2 and 6 weeks after the pulp chamber opening. For the control group, normal pulps were extracted immediately after the exposure. HE staining and Real-time PCR were performed to confirm of the inflammation. The cells were isolated from the inflamed and normal pulps (IDPSC and DPSC). Cell proliferation and osteoblastic differentiation potential were compared of the two cells.

Result: Inflammation cells infiltration was observed in the inflamed pulps by HE staining. The expression of inflammatory factor was much higher in the 6 week inflamed pulp. IDPSC had higher potential of cell proliferation and osteoblastic differentiation potentials. Furthermore The osteoblastic differentiation potentials of IDPSC from 2 week inflamed pulp were higher than that of 6 weeks.

Conclusion: The potential of cell proliferation and osteoblastic differentiation of DPSC was enhanced at early stage of irreversible pulpitis, and reduced at late stage in Beagle immature premolars.

PR12.23

Activation of AMPK suppresses glia activation and alleviates trigeminal neuralgia

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Background: Trigeminal neuralgia (TN) is the most common type of neuralgia, however, underlying mechanisms have not been completely elucidated, and the outcomes of pharmacological or surgical treatments are often disappointing. Activation of adenosine monophosphate (AMP)-activated kinase (AMPK) has been associated with beneficial effects that include the inhibition of inflammatory nociception and the attenuation of morphine antinociceptive tolerance.

Aim: In this study, we investigated the impact of AMPK activation via resveratrol treatment on trigeminal neuralgia.

Design: Peripheral nerve injury was produced using the model of chronic constriction injury of the trigeminal nerve (CCI). Animals were treated with resveratrol intraperitoneal injection after surgery. We assess mechanical allodynia by measuring withdrawal threshold. The spinal trigeminal nucleus were harvest to quantify changes of the phosphorylated protein levels of NR1, NR2B, ERK, PKC, and TNF- α , IL1- β by western blotting and observe the glia activation by immunohistochemistry and western blotting.

Results: We observed that the AMPK activators resveratrol significantly attenuated trigeminal pain in a dose-dependent man-

ner. Resveratrol has an AMPK-dependent inhibitory effect on chronic constriction injury (CCI)-evoked astrocyte and microglia activation in spinal trigeminal nucleus (STN). The antinociceptive effects of resveratrol were partially mediated by reduced phosphorylation of MAP kinases and decreased production of proinflammatory cytokines in an AMPK-dependent manner.

Conclusions: In summary, our results indicate that AMPK activation in STN glia via resveratrol may have utility in the treatment of CCI-induced neuroinflammation and further implicate AMPK as a novel target for the attenuation of trigeminal neuralgia.

PR12.24

Expression of receptor activator of NF- κ B ligand and osteoprotegerin in chronic periapical granuloma of deciduous teeth

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Background: Receptor activator of NF- κ B ligand (RANKL) and osteoprotegerin (OPG) are the ultimate factors controlling the osteoclast differentiation, activation, maturation and apoptosis process. However, the expression of RANKL and OPG in chronic periapical granuloma progression of deciduous teeth have not yet been fully elucidated.

Aim: Our study aimed to detect the distribution and expression of RANKL and OPG in chronic periapical granulomas of deciduous teeth, and assess its relationship with degree of infiltration of inflammatory cells.

Design: A total of 85 samples of chronic periapical granuloma in deciduous teeth were harvested. Hematoxylin-eosin (HE) staining was used to determine the inflammatory cell infiltration grading (mild, moderate-inflammatory and severe-inflammatory cell infiltration groups), and immunohistochemistry and Enzyme-linked immunosorbent assay (ELISA) to disclose the distribution and expression of RANKL and OPG.

Results: Immunohistochemistry results showed RANKL and OPG were both expressed in periapical granulomas. In addition to inflammatory cells and epithelial cells, they were also expressed on the vascular endothelium. ELISA results showed RANKL and OPG were detected at a higher level in severe-inflammatory cell infiltration group than in mild inflammatory cell-infiltration group and control group ($P < 0.05$), whereas there was no significant difference between severe-inflammatory and moderate-inflammatory cell infiltration groups. However, no significant difference of RANKL and OPG expression was detected between mild-inflammatory cell infiltration groups and control group.

Conclusion: Cytokines RANKL and OPG in periapical granulomas of deciduous teeth increase with the aggravation of inflammatory severity and appear to be a contributing factor for bone remodelling in the progression of periapical granulomas.

PR12.25

Construction of Cadherin11 expression vector and its effect on the growth of rat dental pulp cells

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Background: Cadherin11 (Cdh11) is a cell adhesion molecule, associated with bone formation and differentiation of mesenchymal cells.our previous immunohistochemistry study showed there is positive expression of Cadherin11 in rat dental pulp tissue, but the role of cdh11 in the tooth development process is unclear.

Aim: To investigate the effect of adenovirus expressing cadherin11 (Ad-Cadherin11) on proliferation of rat dental pulp cells.

Methods: The replication adenoviral vector encoding cadherin11 gene was constructed by using homologous recombinant modality. Cultured the rat dental pulp cell *in vitro*, observed the expression of enhanced green fluorescent protein by fluorescent microscopy, and detected the virus transfection efficiency. Transfected the rat dental pulp cells with Ad-cadherin11, detected the target gene expression by immunocytochemistry and PCR, and the exogenous gene modified rat dental pulp cells were comprehensively studied on their biological features, in terms of morphology, and draw the cell growth curve.

Results: Constructed adenovirus carrying the Cadherin11 target gene expression vector, measured the titer is 1×10^{10} TU/ml. Higher transfection efficiency could be obtained at MOI of 50. Cadherin11 gene modified rat dental pulp cells did not show obvious changes in cell viability, but dental pulp cells after gene modification still had some adult cells proliferation.

Conclusion: Cadherin11 gene modified rat dental pulp cells did not show obvious changes in cell viability, but dental pulp cells after gene modification still had some adult cells proliferation.

PR12.26

Researches on expression of glutamate receptors in human odontoclasts and effects on viability of odontoclasts

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Background: Physiological root absorption of deciduous teeth is regulated by various factors, mainly mediated by odontoclasts. But the potential mechanism is not yet clear. Odontoclasts have similar morphology and function to osteoclasts. Many studies have demonstrated that glutamate and NMDA glutamate receptors are involved in regulating formation and activation of osteoclast. Whether the receptors are involved in regulating activation of odontoclasts, has not yet been reported.

Aim: The aim of this study was quantify the expression of glutamate receptors NR1, NR2B and GluR1 in cultured odontoclasts and further to explore the effects of NMDA glutamate pathway on regulating activation of odontoclasts.

Design: Odontoclasts were isolated from human deciduous teeth and cultured *in vitro*. While odontoclasts were identified by morphological and functional studies. Then the expression of glutamate receptors NR1, NR2B and GluR1 in odontoclasts was detected by immunofluorescence. In addition, the variation of Ca^{2+} concentration in odontoclasts in different conditions was studied using laser scanning confocal microscopy. Lastly, influence of MK801 (NMDA receptor antagonist) on F-actin ring in odontoclasts was observed by Phalloidin-FITC labeling.

Results: NR1, NR2B and GluR1 expression was specifically detected in the cytoplasm of cultured odontoclasts. The inflow of Ca^{2+} to intracellular of odontoclasts and the formation of F-actin ring was reduced but not be prevented by MK801 ($P < 0.05$).

Conclusions: NR1, NR2B and GluR1 are expressed by odontoclasts. MK801 has effects on Ca^{2+} concentration in odontoclasts by regulating NMDA pathway, and also influences resorptions of odontoclasts by regulating the formation of F-actin ring.

PR12.27

Photodynamic antimicrobial therapy reduces the production of lactic acid by *Streptococcus mutans* biofilms

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Background: Current technologies as Photodynamic antimicrobial therapy (aPDT) might contribute to improve the results of minimal invasive treatment of dental caries.

Aim: To assess the efficacy of different parameters of aPDT on the production of lactic acid by *Streptococcus mutans* biofilms.

Design: *S. mutans* UA159 biofilms were grown on dentin discs in BHI medium plus 0.2% sucrose 24 h (phase I) and, subsequently, treated by aPDT using 0.25 mg/mL Photogem[®] combined with 0, 75 or 150 J/cm² visible red LEDs (Biotable[®], 630 nm, 50 mW/cm²). After that, biofilms were re-incubated in BHI medium for additional 24 h (phase II). The viability of bacterial cells was determined by CFU counts on BHI agar plates. The concentrations of lactic acid in samples of culture media collected after phases I and II were determined by enzymatic spectrophotometry. Data were evaluated by *t* test and one-way ANOVA and post-hoc Tukey tests ($P < 0.05$).

Results: The concentration of lactic acid significantly decreased after all treatments. Photogem[®] alone was not able to reduce the CFU counts of *S. mutans*, although it considerably decreased the lactic acid concentration of 2.16 (± 0.12) to 1.62 (± 0.05) mmol/L. aPDT reduced significantly the CFU counts. A slight reduction of the viability of *S. mutans* biofilms observed after the increase of light density contrasted with the remarkable reduction of lactic acid concentration of 0.79 (± 0.17) to 0.35 (± 0.24) mmol/L.

Conclusion: aPDT was able to reduce the production of lactic acid by *S. mutans* biofilms.

PR12.28

Deciduous periodontal ligament stem cells regulate the formation and apoptosis of osteoclast during physiologic root resorption

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Background: Deciduous tooth is the only organ which can exfoliate physiologically in human. The research of physiological root resorption of deciduous tooth is of great significance for revealing the potential mechanism of organs exfoliation.

Aim: To explore the potential regulative mechanism of deciduous periodontal ligament stem cells (PDLSCs) in formation and apoptosis of osteoclast during physiologic root resorption.

Design: PDLSCs were isolated and cultured from deciduous tooth with different degrees of root resorption (UN, no resorption; M, moderate resorption; S, severe resorption) and permanent tooth. We examined the expression of RANKL, OPG and FasL, which are key factors to osteoclast status, of PDLSCs from each group through real time-PCR and western blot. In addition, we identified numbers of TRAP (+) osteoclast-like cells by TRAP staining and apoptotic cells by TUNEL staining after PDLSCs co-cultured with RAW264.7.

Results: Real time-PCR and western blot assays indicated that the expressions of RANKL were downregulated while OPG and FasL were upregulated significantly in M group. The TRAP staining results showed that the number of TRAP (+) osteoclast-

like cells were increased significantly in M group co-cultured with RAW264.7, while TUNEL staining showed that the number of apoptotic cells were decreased in M group co-cultured with RAW264.7.

Conclusions: The different expression pattern of RANKL, OPG and FasL may contribute to the formation and apoptosis of osteoclast in the process of physiological root resorption in deciduous tooth.

PR12.29

Withdrawn abstract.

PR12.30

The effects of graded concentrations of xylitol and erythritol on *Streptococcus mutans* and *sobrinus* growth

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Background: Xylitol and erythritol are known inhibitors of *Streptococcus mutans* and *sobrinus*; however, the pharmacodynamics of these polyols has not been adequately characterized.

Aim: The purpose of this study was to investigate *in vitro* the effect of graded concentrations of xylitol and erythritol on *Streptococcus mutans* and *sobrinus* growth and then investigate the pharmacodynamic interaction of xylitol and erythritol.

Design: Graded concentrations of xylitol and erythritol were added to Todd Hewitt Broth (THB) with 1% sucrose or brain-heart infusion (HBI) with 1% sucrose. Strains of *Streptococcus mutans* and *sobrinus* were inoculated into either 2 mL of BHI or THB. These suspensions were inoculated into culture plates. At 48 h, bacterial growth was observed, and optical density was measured using confocal microscopy (620 or 640 nm).

Results: Control groups demonstrated growth of all strains. Xylitol showed inhibited growth of all four strains at 300 mg/mL; erythritol showed inhibition of all four strains at 270 mg/mL, and 2/4 strains were inhibited at 150 mg/mL. Bactericidal effects were not observed even at the highest concentration. For strain 68 and 78, xylitol and erythritol were not synergistic but possibly additive. Synergistic interactions were shown in strain 75, but biomass reduction was inconclusive. For strain 41, the data suggested an antagonistic interaction of xylitol and erythritol in a dose-dependent manner.

Conclusions: Complete growth inhibition of *Streptococcus mutans* and *sobrinus* growth can occur at 300 mg/mL of xylitol and 270 mg/mL of erythritol. Though additive effects were noted, xylitol and erythritol showed a lack of synergistic inhibition.

PR12.31

Salivary biomarkers in early childhood caries

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Background: The literature is conflicting regarding the relationship between dental caries experience and salivary ionic concentrations; and this relationship in 3–5 year old children has not been investigated extensively. A need exists to determine the association between pH, flow rate and ionic content of saliva and caries experience.

Aim: To determine whether the ionic content of saliva is associated with caries experience.

Design: Children who attended randomly selected pre-school centres in inner-Melbourne were invited to participate. Consented children ($n = 119$) gave an unstimulated saliva sample, had their teeth brushed and a dental examination. Dental caries was recorded using the International Caries Detection and Assessment System criteria (ICDAS II). The saliva samples were de-identified and frozen; pH was measured using a microelectrode, the samples were centrifuged, the supernatants diluted, acidified, mixed, filtered and injected into a labelled vial. Levels of detectable inorganic ions were quantified for each sample using an automatic ion chromatography system (Dionex). Statistical analysis utilised descriptive statistics, cross-tabulations and chi-squared tests, binary logistic regression and the Mann-Whitney U test.

Results: Fluoride concentration was statistically significantly higher in children with clinically sound teeth compared to those with cavitated caries lesions (ICDAS >3; $P = 0.005$). Ammonium, sodium, chloride and lactate concentration levels were statistically significantly higher in children with caries including white spot lesions (ICDAS >1) compared to children without (ICDAS <2; $P = 0.007, 0.02, 0.03, 0.03$ respectively).

Conclusion: Specific ionic contents of saliva in 3–5 year old children were associated with caries experience.

PR12.32

The effect of cadherin-11 on the migration and differentiation of rat dental pulp cells

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Background: Cadherin11 (Cdh11) is a cell adhesion molecule, associated with bone formation and differentiation of mesenchymal cells.our previous immunohistochemistry study showed there is positive expression of Cadherin11 in rat dental pulp tissue, but the role of cdh11 in tooth development process is unclear.

Aim: To investigate the effects on the migratory and odontogenic ability of rat dental pulp cells by transfection with adenovirus vector encoding cadherin-11.

Design: The dental pulp cells were primarily cultured, then transfected with pDC316-mCMV-EGFP-Cadherin11. Immunohistochemistry staining were performed to detect the expressions of cad-11 protein. Alizarin red staining and cetylpyridinium chloride assay were performed to investigate the odontogenic ability of rat dental pulp cells. Then the adhesion and migration of rat dental pulp cells were tested.

Results: The immunohistochemistry staining showed that rat dental pulp cells transfected by pDC316-mCMV-EGFP-Cadherin11 could express the cad-11 protein at a high level. ALP activity of experimental group was significantly upregulated, and the formed calcified nodules of experimental group was significantly increased ($P < 0.05$). Cadherin-11 also influenced the adhesion and migration of rat dental pulp cells ($P < 0.05$).

Conclusion: Cadherin-11 may promote the odontoblast differentiation and migration of rat dental pulp cells.

PR12.33

The influence of etching and re-mineralization time on enamel re-mineralization of deciduous teeth

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Aim: To study the effect of etching time and remineralization time on the enamel re-mineralization of deciduous teeth.

Design: Twenty-eight primary incisors were used in this experiment. Four rectangular windows were created in the labial surface of each incisor, randomly assigned to four treatment groups (Group A, B, C, D). The windows in group A, B, C, D were etched 30s, 60s, 90s and 120s respectively with 32% phosphoric acid gel. All the samples were rinsed and re-mineralized in artificial saliva. Confocal laser scanning microscopy (CLSM) was applied to study the de-/re-mineralization. Average Lesion Fluorescence (AF) for each sample was recorded at each time point of 0, 2, 24 h. The data was analyzed with repeated measurement. The significance was 0.05.

Results: The results of MANOVA showed both etching time and re-mineralization time had a significant effect on the value of AF ($P < 0.0001$, $P < 0.0001$ respectively). Bonferroni analysis indicated that the difference of AF between each group was significant except that between 90s and 120s. The difference of AF between each time point within each group was significant.

Conclusions: It was inferred the etching time was no more 60s, and the re-mineralization time may be 24 h when the acid-resistance and remineralization potential of primary teeth were examined.

Keywords: Primary teeth, Enamel, De- and re-mineralization, CLSM.

PR12.34

Comparative investigation of six self-etch adhesives for bonding to dentin of primary teeth

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Background: There are many studies concerning μ -tensile tests of bondings in the permanent dentition. Nevertheless, due to the different structure of dentin the transfer to the 1. Dentition is not allowed.

Aim: The aim of this *in vitro* study was to compare 5 new self-etch adhesives regarding microtensile bond strength (μ -TSB) to dentin of primary teeth in control to a well-established adhesive (Prime and Bond NT).

Design: Thirty freshly extracted primary molars were ground to expose caries-free dentin. Specimen were bonded with 6 self-etch adhesives (Prime and Bond NT (PBNT)/Dentsply De Trey, Gae-nal Bond (GB)/GC- America, Scotchbond Universal (SU)/3MEspe, Clearfil SE Bond (CFSE)/Kuraray, Optibond XTR (OXTR)/Kerr, One Coat 7 Universal (OC7U)/Coltene). Filtek Z250 (3M Espe) was used as resin composite. Light curing was performed with a LED lamp (Bluephase, Ivoclar-Vivadent). After 24-h storage (distilled water, 37°C), resin-dentin beams were cut and 608 resin-dentin sticks were subjected to μ -TSB tests (TC550, Syntac). Fracture analysis was carried out at 40 \times magnification under a fluorescence microscope (AZ 100 M, Nikon) and under SEM (Amray, Liebscher).

Results: The following values of μ -TBS (MPa [SD]); pre-test failures (n , %) were determined (Same letters represent statistical subgroups $P > 0.05$ ANOVA mod. LSD): PBNT 48[14]^B; 0,0%, GB 28[16]^A; 0,0%, SU 51[23]^B; 2,1,9%, CFSE 28[15]^A; 2,2,7%, OXTR 57[16]^B; 0,0% and OC7U 70[17]^C; 0,0%.

Conclusion: Within the limits of this study, the new self-etch adhesives SCU, OXTR, and OC7U seem to be suitable for the use in primary dentition.

PR12.35

Confirmation of a new mutation in the PTH1R-gene over two generations

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Background: Primary failure of eruption (PFE) is defined as the inability of one or more permanent teeth - preferably posterior teeth - to erupt fully into the oral cavity. Heterozygous mutations of the parathyroid hormone receptor 1 (PTH1R, MIM 168468) have been identified to be causal via an autosomal dominant trait of inheritance.

Aim: Only recently, several new mutations in the PTH1R-gene have been discovered, merging the number of known mutations to 27. The newly identified frameshift mutation c.322delT has been identified in two brothers so far. Here, we present the segregation- and DNA-analysis of a family over two generations in which one parent and two siblings are affected with the respective mutation.

Methods: PFE was clinically and radiographically diagnosed in the siblings and their father. Informed consent prior to participation was obtained from three affected and one unaffected family member. Ethylenediaminetetraacetic acid (EDTA) blood samples were obtained, and after extraction of the DNA the coding exons of the PTH1R-gene were investigated via amplicon sequencing.

Results: The frameshift mutation c.322delT was identified in one parent (father) and the two siblings (brothers), while the other parent (mother) did not display any possibly pathological or so far unclassified variant (UV).

Conclusions: This analysis identified the c.322delT mutation in the PTH1R-gene within this family. Frameshift mutations are considered to be deleterious. The confirmation of this mutation within a family with a two generation pedigree endorses the results in two siblings found prior to this analysis.

PR12.36

Using the deciduous tooth as a tool to record early zinc nutrition

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Background: It is long established that early life nutrition can have long - life consequences for health. These events are known as 'programming' events. Zinc is an abundant micronutrient and has essential roles in human growth and development. Thus, zinc nutrition exposure during early life becomes an interesting micronutrient to study. Zinc deposition within deciduous teeth has been reported by previous studies. Deciduous teeth develop from the prenatal/in utero period. Therefore the present study overall aim is to explore the usefulness of deciduous teeth as a tool to record zinc nutrition exposure during early life.

Aims: Zinc is obtained from human diets and the distribution throughout the body and within cells is regulated by a saturable carrier-mediated transport mechanism, known as a zinc transporter protein. Therefore, our preliminary study is focussing on the expression of zinc transporter genes within dental pulp of teeth.

Design: RNA from dental pulp extracted from the deciduous human teeth was prepared using TriZol (Ambion) RNA isolation. RNA from Caco-2 cell line also isolated, to be used as control tissues in the study. Then zinc transporter gene expression was analysed using an RT-PCR based method.

Results: There is a differential pattern of zinc transporters expressed in pulp extracted from deciduous human teeth.

Conclusion: There is a role for zinc transporter in dental pulp of deciduous human teeth.

PR12.37

Characterization of long-term cryopreserved stem cells from human exfoliated deciduous teeth

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Background: Stem cells from human exfoliated deciduous teeth (SHED) have been considered to be a promising source for

regenerative medicine due to their self-renewal capacity and multipotency ability. Several studies have indicated that cryopreserved dental pulp tissues of SHED is a retrievable and practical source for cell-based therapy. However, the studies of long-period storage SHED are limited.

Aim: to investigate the ability of SHED cryopreserved over 5 years in terms of clonogenicity, self-renew and multipotential differentiation.

Design: Human freshly isolated SHED (fSHED) were compared with cryopreserved SHED (cSHED) in terms of cell proliferation rate ($n = 6$), colony-forming efficiency ($n = 3$), multilineage differentiation capacity ($n = 4$).

Result: There was no significant difference between fSHED and cSHED with regard to morphology, proliferation, or osteogenic and adipogenic differentiations.

Conclusion: These data suggest that our long-term cryopreserved SHED could be retrieved and they presented similar characteristics as freshly isolated ones.

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PR13.01

A study on factors associated with the eruption disorder of first permanent molars

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Background: Ectopic eruption of the maxillary first permanent molars could be frequently seen. A first permanent molar with a minor degree of impaction usually will be spontaneously corrected. However, if there is a greater degree of impaction, it will not be self-corrected.

Aim: The purpose of this study was to find out the factors that are associated with the ectopic eruption of first permanent molar and predict the ectopic eruption in sample of growing Korean children.

Design: Retrospective study was done using the panoramic radiographs of patients in the early mixed dentition stage. In the affected patients, two types of ectopic eruption (reversible and irreversible) were distinguished. A method was designed to evaluate the angle between second primary molar, first permanent molar and the tooth germ of second permanent molar using the long axis of each tooth was measured on the radiographs and the angle between the occlusal plane were measured. Occlusal relationship of primary molar was also observed.

Results: As degree of impaction was greater compared with control group, the value of intermolar angulation and occlusal plane angle between second primary molar, first permanent molar and tooth germ of second permanent molar was getting smaller.

Conclusions: The degree of angulation of first permanent molar and tooth germ of second permanent molar has significant relationship with possibility of self-correction. Also correlation between inclination of the occlusal plane and degree of impaction was observed.

PR13.02

Cone beam CT in pediatric patients

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Background: Radiographs are valuable aids in the oral health care of children. They are used to diagnose oral diseases and to monitor dentofacial development and the progress of therapy. New imaging technologies have added three-dimensional capabilities that have many applications in dentistry.

Cone beam computed tomography (CBCT) has improved diagnosis and treatment planning in dentistry. The decision to use CBCT should be based on the diagnostic information required. As with any other radiographical technique, routine use of CBCT is not acceptable. CBCT usage must be justified on a patient case individual basis.

Aim: In this presentation we discuss about CBCT application in pediatric patients.

PR13.03

Double dilacerations in an erupted upper central incisor: a case report

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Introduction: Double dilacerations are not commonly reported, with only one case report found following a literature search.

Cone beam computed tomography (CBCT) is an evolving imaging technique and its main use in paediatric dentistry is for localisation of unerupted teeth and in detecting root resorption.

This case describes diagnosis, through the use of CBCT, of double dilacerations affecting an upper left central incisor (21) which had nevertheless erupted.

Case report: A 12-year-old boy was referred to Glasgow Dental Hospital and School, concerned over the appearance of his “squint teeth.” There was a history of trauma to the deciduous dentition.

Oral examination: mixed dentition; 21 erupted with an unusual morphology and area of hypoplastic enamel; 22 erupted palatal to 21 and in crossbite; moderate crowding in both arches and poor oral hygiene.

Plain imaging: a panoramic radiograph (DPT) and an upper anterior oblique occlusal radiograph showed what appeared to be an unerupted supernumerary superimposed on 21. CBCT was carried out with a limited height field of view to investigate this. This provided a definitive diagnosis of “double dilacerations” affecting 21, and revealed that no supernumerary was present.

Comments: What initially appeared to be a common anomaly turned out to be a much rarer entity. Monitoring of further eruption and oral hygiene instruction is required. Future treatment options will include fixed appliances with composite masking or veneering of 21.

Without CBCT, had only plain films been available, diagnosis would have been incorrect, which may have resulted in inappropriate invasive treatment.

PR13.04

The influence of fissure sealants on values of laser fluorescence

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Background: Laser fluorescence can be used for non-invasive diagnosis of caries in pits and fissures caries.

Aim: The aim of this study was to investigate whether caries under a sealant can be detected by the laser fluorescence device.

Design: In order to study the influence of the distance of the probe from the carious lesion on the fluorescence values, 24 extracted molars with fissure caries were obtained. The laser fluorescence device used was DIAGNOdent (Kavo., Germany). The probe was placed at a distance of 0.0, 0.3, 0.5, 0.8 and 1.0 mm

vertically from the carious lesion and values were measured. Next, the influence of the sealant when placed between the probe and the carious lesion on the DIAGNOdent values was investigated. The sealant was placed in two thicknesses; 0.3 and 1.0 mm, and in four shades; red, yellow, clear (natural) and white (opaque) on the flat side of the experimental tooth, and the DIAGNOdent values were measured.

Results: A decline of measured value was observed when the distance increased between the probe and the carious lesion. Also there was a tendency for the fluorescence values to decline with increasing thickness of the sealant.

Conclusions: Our results showed that distance from the lesion, thickness of the sealant and the shade of the sealant influenced the fluorescence values, and therefore the results obtained with the use of DIAGNOdent when used for diagnosis of fissure caries under a sealant should be interpreted with caution.

PR13.05

Diagnostic bitewing radiographs: an audit of compliance with national guidance

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Background: Scottish Dental Clinical Effectiveness Programme (SDCEP) Guidance on Prevention and Management of Dental Caries in Children report “bitewing radiographs are an important adjunct to visual diagnosis of caries”. SDCEP Guidance recommend practitioners take bitewing radiographs at intervals based on the child’s risk of developing caries: 6–12 month intervals for children at increased risk, for children considered low and medium risk with primary teeth at 12–18 month intervals, and at two-yearly intervals for these children with permanent teeth.

Aim: This audit was planned to assess current compliance with SDCEP Guidance by dentists working in a Public Dental Service Clinic in Lanarkshire.

Design: Data was collected by retrospective review of patient records from a computerised patient management system for 70 patients attending examination appointments over a five-month period with all dentists working at a Public Dental Service Clinic. A Gold Standard was set - “100% of patients meet current SDCEP Guidance”.

Results: 38% of patients met current SDCEP Guidance regarding bitewing intervals. Following an educational meeting with the dentists to present findings and targets for improvements examination appointments were extended to allow necessary radiographs to be taken and reported on. A second round of data collection was completed for 54 patients attending examination appointments over a three-month period. 72% of cases met SDCEP Guidance representing a significant improvement in compliance.

Conclusions: Bitewing radiographs are necessary for diagnosing early interproximal carious lesions which would otherwise remain untreated. Auditing compliance to SDCEP guidance can increase diagnostic information and improve patient oral health outcomes.

PR13.06

Determination of total antioxidant capacity of serum and saliva in sickle cell anaemia patients

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Background: Sickle cell anemia is a congenital haemoglobinopathy characterized by deformed red blood cells, acute episodic

attacks of pain and pulmonary compromise, widespread organ damage that can lead to death. Oxidative stress plays an important role in pathophysiology of sickle cell anaemia as it destroys free radicals and thereby depleting the protective mechanisms such as antioxidants in serum. These antioxidants present in the body are very essential to protect the harmful oxidation-reduction reactions avoiding oxidative damage to the cells.

Aim: To evaluate and compare the Total Antioxidant Capacity (TAC) of serum and saliva in sickle cell anemia patients.

Design: 4–12 year old children ($N = 100$) were selected and divided into two equal groups: Children suffering from sickle cell anemia and healthy controls. Blood and saliva samples were collected aseptically from both groups and were subjected to phosphomolybdenum method. Absorbance was read spectrophotometrically at 695 nm. Concentration of total antioxidants was obtained by plotting the absorbance of test against standard graph.

Results: TAC in serum (10.89 ± 2.26) and saliva (11.17 ± 1.19) of sickle cell anaemia patients was reduced when compared with serum and saliva of the healthy children respectively. Levels of TAC were found to be statistically significant in serum and saliva in sickle cell anaemia patients. Reduction in the total antioxidant capacity was noted as the age advances as antioxidant defense mechanisms are not sufficient to prevent age related increase in oxidative damage.

Conclusion: Saliva, a non invasive biomarker could be an alternative for assessing the antioxidant status in sickle cell anaemia patients.

PR13.07

An audit of the documentation of dental radiographic examination justification

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Background: A routine dental radiographic examination where radiographs are exposed regardless of the presence or absence of clinical signs and symptoms is unacceptable. According to the European guidelines on radiation protection in dental radiology, the selection of radiographs should be based on the individual patient’s history and clinical examination, where the dental radiographic examination will add new information to aid in the patient’s dental treatment planning.

Aim: To evaluate whether the justification for exposing dental radiographs has been documented in the files of patients attending the paediatric dentistry clinic with a targeted standard of 100%.

Design: A retrospective case note evaluation of children aged twelve years and younger who attended the pediatric dentistry clinic. Data was collected over a six months period using a data collection sheet.

Results:

- Dental radiographs taken in 167 visits.
- Justification documented for 11 visits (6.6%).
- Justification not documented for 156 visits (93.4%).
- Thus only 6.6% of dental radiograph justifications have been documented in the patients’ files.
- 3% of the files were missing the documentation for radiographs exposed.
- The clinical notes template used in the clinic includes only the need for documenting type of radiograph taken and findings but not the justification.

Conclusion: This audit has highlighted the deficiencies in our practice of patient file documentation. Recommendations for improvement had been made where the clinical note template was updated by adding a dental radiographic examination justifi-

cation note and a second audit cycle is planned to measure the outcomes.

PR13.08

Influence of exposure settings on the visibility of anatomical landmarks in intraoral radiography

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Background: Intra-oral radiograph examination is widely used with low but frequent absorbed dose, especially with paediatric patients. It is suggested that frequent low dose exposure can provoke risks of stochastic effects.

Aim: To evaluate the bite-wing image quality and the visibility of different anatomical landmarks with respect to different exposure settings using visual grading analysis.

Design: Ethical and radiation safety approvals were obtained. Digital posterior bite-wing radiographs at settings of 70, 66, 63 and 60 kV, range of (2–8) mA were taken to dry skull with wax simulating soft tissue. The focus-soft tissue simulate distance was 20 cm and a rectangular collimator (35 × 45 mm²) was used. Photostimulable phosphor (PSP) digital radiography systems-technology was used, and the exposure times were 1.6 and 1.25 s. Several anatomical landmarks were selected due to their clinical relevance, and the images were evaluated by dentists with clinical experience ranging from 8–25 years based on the visibility of these landmarks. Intra and inter-observer agreement were assessed.

Results: The results from the evaluation of the quality of the bite-wing images indicate that the VGAs are higher for low-kV settings. In turn, the clinical image quality improves when the tube voltage is reduced. Despite that the trend of the VGAs as a function of tube-voltage are obvious, significant differences were not demonstrated. However, exposure time and image quality did not display a notable relation.

Conclusion: An adequate clinical image quality of a bite-wing radiograph is achievable by reducing the tube-voltage, subsequently leading to decreased radiation dose.

PR13.09

Cone beam computed tomography evaluation of the effect of permanent tooth germ on localization of deciduous teeth apical foramen

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Background: Physiological root resorption causes continuous change in the position of the apical foramen (AF) in primary teeth, making determination of working length (WL) difficult.

Aim: This study aimed to evaluate the relationship between primary tooth AF, primary tooth root apex (RA) and permanent tooth germ (PTG) on Cone-beam computed tomography (CBCT) images in order to identify a radiographic reference point for the termination of WL.

Design: A total of 115 root canals were evaluated from CBCT images divided into three groups according to location of the PTG, as follows: Group 1 (*n* = 14): PTG located below the primary tooth RA; Group 2 (*n* = 51): PTG located between the primary tooth RA and the root apical third; Group 3 (*n* = 50): PTG located between the root apical one-third and two-thirds.

For all roots, the location of the AF with respect to the RA was identified on CBCT images.

Results: The AF was located within 2 mm coronal to the RA in 100% of roots in Group 1, within 3 mm coronal to the RA in 90.2% of roots in Group 2 and within 3 mm coronal to the RA in 74% of roots in Group 3.

Conclusions: WL for primary teeth with PTG located below the primary tooth RA should terminate at 2 mm coronal to the RA. For primary teeth with PTG located between the RA and the apical third or between the apical one-third and two-thirds, WL should terminate 3 mm and more than 3 mm coronal to the RA respectively.

PR13.10

Validation of method for evaluating pain caused by temporomandibular disorders in youngsters with an intellectual disability

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Background: The Universal Pain Assessment Tool (UPAT) is created to assess the pain level of patients with limited communication skills. UPAT gives clinicians the ability to consult the pain management team more often in order to lead to a more early intervention.

Aim: The purpose of this study was to determine, whether the UPAT could be used as a valid instrument to collect data and assess pain levels caused by temporomandibular disorders (TMD) in people with ID.

Design: Non-down syndrome ID Athletes aged between 15 and 23 years, participating from different countries, were screened during the Special Olympics European games 2014. The clinical scores of possible functional jaw pain were collected using the UPAT, as the athletes were asked to indicate pain severity on a visual scale during jaw movements.

Results: Overall 204 youngsters were screened. The majority of participants were male (133 male and 71 female patients). The distribution of age ranged from 15 to 23 years with a mean age of 19.25 (SD = 2.53). The results of the UPAT indicated the existence of pain related to the temporomandibular joint (TMJ), probably caused by TMD, in 32% of the athletes.

Conclusions: According to the results of the present study, the UPAT demonstrated to be a useful tool, in order to detect the existence of functional jaw pain caused by TMD. Moreover it possibly could be considered as a valid instrument for collecting data considering pain intensity caused by TMD in people with ID.

PR13.11

Detection of occlusal caries among children in Madinah, KSA, according to WHO basic methods, ICDAS II and laser fluorescence

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Background: Caries is one of the most prevalent diseases affecting young children worldwide. There are only few reports on Madinah children, (Saudi Arabia) using DMFT.

Aims: To compare the WHO criteria (DMF and plaque index), ICDAS II criteria, and laser fluorescence measurements in detecting the prevalence and severity of dental caries amongst children between 8 and 12 years.

Design: Ethical approval was obtained from the Research & Ethics Committee at Taibah University, College of Dentistry. A total of 520 children 8–12 years-old, from Al-Madinah, Saudi Arabia, were recruited in this randomized clinical trial. Four parameters (Silness and Lowe plaque index, DMFS, ICDAS II and laser fluorescence measurements) were measured, mainly on first permanent molars, by four students in anonymous way. Data were analyzed using Chi-square, Regression Correlation and Independent *T* test using SPSS21 statistical package.

Results: Preliminary results showed the prevalence of dental caries was as follow:

About 14.5% of the 8–12 year-old children had caries in the permanent dentition according to DMFS, caries lesions were recorded as ICDAS II was about 75.5% (score 1–6), while Diagnodent measure was 36.7% (reading 12–99).

Silness and Lowe plaque index was 1.79.

Conclusions: This study showed the diagnostic potential of the ICDAS II criteria in comparison to the traditional WHO criteria by means of DMFS also the ICDAS II use seems to bring additional information in comparison to DIAGNodent while it's more reliable when compared to DMFS, study showed that ICDAS II is more reliable than DMFS and DIAGNodent in detecting occlusal dental caries.

PR13.12

Prevalence of angulation of the maxillary canine germ

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Background: This study assessed the angulation of the canine germ at different age as a guide to establish the possible impaction of maxillary canines. Most studies focus on the localization of the maxillary impacted canines, no studies about the angulation of the canine germ were found.

Aim: To determine the prevalence of the angulation of maxillary canine germ with age and gender.

Design: This cross-sectional observational study in 100 panoramic radiographs of patients from the Clinic Orthopedics and Orthodontics of Pediatric Dentistry Postgraduate Program based on the criteria of Erickson and Kurok modified: canine angulation in relation to the middle line defined by grades 1, 2 and 3.

Results: Measurements were taken on radiographs of 200 canines of children between 4 and 11 years old. The higher frequency in the angulation canine germ in relation to the midline was grade 1 with 62%. The 60.5% were females in grade 1 and 65% male in grade 1. The highest frequency in all ages was grade 1 except at the age of 10 it was found in grade 2 with a 56.30%.

Conclusions: The origin of the canine germ is apical, distal and palatal in relationship with its final position. Based on the results obtained in this study concludes that the most frequent angulation of the maxillary canine germ is grade 1 except on the 10 years old it may be in grade 2, regardless of gender.

PR13.13

Temporomandibular joint changes detected by cone beam computed tomography in children with sleep bruxism and painful symptoms

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Background: Although the impact of bruxism on the stomatognathic system is unclear, it is a risk factor for TMD. Early detection of changes in TMJ structures by CBCT, possibly associated with sleep-bruxism, would permit the interception of dysfunctional problems in its initial stages.

Aim: To assess bone changes in the temporomandibular joint (TMJ) structures and condyle-articular fossa relationship in symptomatic children with sleep bruxism by cone beam computed tomography (CBCT) imaging.

Design: Twenty 7–11 year-old children were selected based on parent's report about the presence of audible tooth grinding sounds or tooth clenching during sleep and orofacial pain on awakening or in function. Children were subjected to clinical and CBCT examinations. Data were analyzed using Freeman-Halton extension of Fisher's exact test ($\alpha = 5\%$).

Results: Asymmetries of TMJs were found in 60% of the children and condyle flattening in 100%. Osteophytes in the right-condyle were associated with moderate and severe pain in the ipsilateral TMJ ($P = 0.04$). Anterior position of the right-condyle was associated with left-temporal-muscle pain ($P = 0.03$). When the left-condyle was centered, contralateral pain was reported in the right-temporal-muscle ($P = 0.04$). Anterior and posterior right-condyle-fossa relationship was associated with mild and severe pain, respectively, in the ipsilateral masseter-muscle ($P = 0.01$).

Conclusions: Bone changes in the TMJ and alterations in the condyle-articular fossa relationship detected by CBCT showed association with painful symptoms in the joint region and masticatory muscles in children with sleep bruxism.

PR13.14

External root resorption of several permanent teeth: a diagnostic clue

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Introduction: Apical root resorption can be localized (single tooth) or generalized (multiple teeth) and is usually associated with well-defined local or systemic factors. Idiopathic external root resorption involving several permanent teeth is an unusual pathologic condition.

Case report: In January 2013, a 19-year-old boy was referred to the paediatric dentistry unit of the University Hospitals Leuven for advice on the management of an ectopically positioned upper canine. The patient had no complaints. Radiographic examination (peri-apical and panoramic) revealed generalized resorption of the roots of upper and lower front teeth. Medical anamnesis revealed moderate intellectual disability of unknown origin and no other systemic conditions. The patient had no history of den-

tal trauma, orthodontic treatment or tongue malpositioning. Family history showed a sister, mother and maternal uncle with moderate intellectual disability and epilepsy. The sister also had platelet dysfunction. Array CGH analysis and mutation analysis of the *ARX* and *FMR-1* genes did not reveal the cause.

A literature search directed us to a very rare syndrome called Singleton-Merten. Oral findings include acute root resorption and early tooth loss, delayed tooth eruption, immature roots, high caries activity and aggressive alveolar bone loss. Affected persons present general health problems: extensive aortic calcifi-

cation (sudden death), abnormal ossification of limbs, slow motor development, delayed platelet response to collagen exposure. Patients show typical facial characteristics.

Comments: In these siblings, dental findings led to the diagnosis of a very rare genetic disease, accompanied by possible life-threatening health problems. This case illustrates the role of the dentist in detection.