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Morphological behavior of human periodontal ligament fibroblasts towards the exposition to dentinal derivates biomaterial.

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The histological composition of the dentinal tissue lead researchers to explore its use as autologous grafting materials for regeneration interventions in oral and maxillofacial surgeries. Due to the novelty of the use of this material, few reported cases and few in vitro stud- ies are available in literature. The aim of the study was to evaluate the morphological behaviour of human periodontal ligament fibro- blasts (HPLF) towards different types of dentine derivates grafting material. The study design included the evaluation of mineralized dentine (SG), of deproteinized and demineralized dentine (DDP) and demineralized dentine (TT) as test materials, and the evaluation of deproteinized bovine bone (BIOS) as positive control material in con- tact with the HPLF cell line after 24 h, 72 h and 7 days of in vitro cul- ture. The evaluated outcomes were the morphological characterist- ics such as cellular shape and surface by light microscopy (LM) and scanning electron microscopy (SEM), and the adhesion using confocal microscopy (CLSM). The LM observations showed the pres- ence of densely packed cells, whilst the SEM observations showed how fibroblasts exposed to DDP and TT presented cytoplasmatic ex- tensions, while SG and BIOS presented, in addition to digitations and cytoplasmatic extensions, the thickening of the cellular mem- brane. The CLMS observations showed the expression of cyto- skeletal elements (vinculin, actin and integrin) involved in the adhesion process.

Overall, the experimental materials induced a positive response of the HPLFs in terms of proliferations and adhesion. The knowledge of the effects of the degree of mineralization of the dentine on the cellu- lar behavior will help clinician in the choice of the type of dentine derivates material according to the required clinical situation.

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Key words

Human periodontal fibroblasts, dentinal derivates, regenerative dentistry, dentin.