

## USE OF ELECTRICAL FIELD IN BIOFILM IMPLANT REMOVAL

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**Aim:** to evaluate the use of an electric field for biofilm removal from implants using a novel implant surface decontamination device.

**Methods:** three implants suffering from peri-implantitis, an open defect with more than 80% bone loss, purulent exudate, and positive bleeding on probing, with a pocket depth > 6 mm, were selected, although without presenting mobility.

The XIMPLANT machine (LED S.P.A., Aprilia, Italy), acted through the "PERIMPLANTITIS" protocol, in which Alternating Current (AC) flows through the unipolar electrode with a sine wave at 625 kHz, 260 Vpp peak-to-peak voltage and 15 W power, with an amperage of 180 mA, at a temperature of 37°C. Then, the surfaces, appropriately fixed and placed on the supports for SEM observation, using the BSD4 probe, are

observed with scanning electron microscopy (SEM - GEMINISEM 500, Carl Zeiss Microscopy GmbH, Oberkochen, Germany), with increasing magnification (500×, 1.000× e 2.000×).

**Results:** all three samples showed the absence of microbial biofilm in the application area, while the rest of the observed surface was covered with microbial biofilm, with an intensely thickened bacterial population.

**Conclusions:** the promising results, together with the data available in the literature, open a new window on therapeutic options for the prevention and treatment of peri-implantitis, with new electrolyte devices acting on both the microbial population and the adhesion of biofilm to the implant surface, with promising results for a new and viable therapeutic option.

## SEM-EDX ANALYSIS OF METAL PARTICLES FROM SURGICAL BURS AFTER GIS PROCEDURES

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**Aim:** the preparation of the implant site in guided surgery procedure takes place without irrigation. This could lead to the formation and release of metal particles, that could represent a trigger for macrophage activity, and consequent implant loss. According to the guided surgical protocol, the study aimed to evaluate the presence of metal particles deposited during implant site preparation.

**Methods:** the study involved the use of 50 sections of ribs obtained from a 15-month-old pig, surgical guides in plexiglass and a guided surgery drill kit TKD-GUIDED T8C (AB Dental, Ashdod, Israel). This same kit was used 50 times to prepare 50 different implant sites and evaluated at different edges and number of preparation (T<sub>0</sub>-neutral edge, T<sub>1</sub>-1 full preparation,

T<sub>2</sub>-10, T<sub>3</sub>-20, T<sub>4</sub>-30, T<sub>5</sub>-40, T<sub>6</sub>-50) by SEM-EDX to assess the presence of any metal deposition.

**Results:** the presence of metal residues in the implant site increased according to the cycles of use of the drills. We have observed that in the first three groups there is no presence of metals, but it is evident in groups T<sub>3</sub> and T<sub>4</sub>. Moreover, the geometry of the preparation of the last 2 groups tends to be more irregular due to the reduced cutting efficiency of the cutters.

**Conclusions:** the study highlighted how the lack of irrigation in the work site leads the deposition of metal particle and the reduction of the drill's efficiency. These factors alter the shape of the prepared site and reduce the primary stability of the implants.