EFFECT OF ERYTHRITOL-ENRICHED POWDER IN ORAL BIOFILM ON DENTAL IMPLANTS: AN IN VITRO STUDY

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Introduction
Due to the increase of dental implant treatments, peri-implant infectious complications (mucositis and peri-implantitis) are increasing (1). Biofilm removal plays a central role in its prevention (2,3,4). Plaque debridement may be accomplished by air polishing using abrasive powders. In this in vitro study, a new formulation consisting of erythritol and chlorhexidine (3%) is compared with the standard mechanical removal by saline and gauze. The in vitro antimicrobial and antibiofilm effects on P. gingivalis, A. actinomycetemcomitans, F. nucleatum, A. naeslundii, V. parvula and S. oralis are investigated.

Material and Methods
In vitro multispecies biofilm was grown for 14 days on 52 titanium dental implants (Avinent ® Santpedor, Spain) in an artificial mouth (Fig.1) and were randomly divided into three groups: negative control (CON), erythritol-chlorhexidine (ERY) and saline-gauze (GAU). Twelve dental implants from groups ERY and GAU, and 8 implants from CON group were re-incubated after treatment for 7 additional days. DNA extraction, q-PCR (quantitative polymerase chain reaction) and qPCR-PMA (propidium monoazide) was performed (Fig 2). Furthermore the implants were analyzed with confocal microscopy after treatment. A descriptive and bivariate analysis of the data was performed with SPSS v22.0 (SPSS; IBM corp, Armonk, USA).

Results
After 14 days of biofilm formation, bacterial count of the different groups showed a decrease in A. actinomycetemcomitans and P. gingivalis in group ERY when compared with CON. A decrease was also detected in A. naeslundii and P. gingivalis in the GAU group when compared to CON. There were no significant differences between the groups ERY and GAU. After re-incubation (7 additional days), there was a decrease in the bacterial count for all the species from group ERY (Table 1).

Table 1: Main results of the 3 treatment groups (ERY, GAU, and CON) in the second phase of the 14 days of incubation. The data are presented as bacterial species. SD: standard deviation.

Conclusions
The use of erythritol and chlorhexidine applied by air polish system displays a similar antibiofilm activity when compared with the standard mechanical treatment (gauze with saline). However, the combination of erythritol/chlorhexidine seems to reduce the formation of a new biofilm during the first 7 days after therapy.

References