

Clinical studies regarding advantages and limits of the orthodontic mini-implants

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Abstract

Introduction According to last years' research periodontopathogens may have a negative impact on treatment options in patients with periodontal lesions .However not all infected sites suffer periodontal destructions, which can be explained on the assumption that only a limited number of pathogens present in a sufficient amount, is capable of affecting the periodontal tissue. Thermal cycling polymerase chain reaction (PCR) is a new technique used for identification and quantification of periodontopathogenic bacteria. The aim of the study was to confirm the presence of periodontal pathogens and to evaluate the amount of microbacterial pathogens in the periodontal pockets of patients undergoing orthodontic treatment for a more predictable result.

Material and Methods: A total amount of 15 subgingival samples were collected from periodontal pockets $> \text{ or } = 6$ mm in 8 patients. Clinical examinations, periapical radiographs and periodontal screening was performed. Only patients undergoing orthodontic treatment with fixed appliances were included into the study. Polymerase chain reaction (PCR)- and DNA hybridization based identification were performed by paper-point sampling using a micro-IDent plus, Hain Lifescience Germany kit.

Results and Discussions: Results showed that bacterial load may be connected to disease progression. The prevalence of the periodontopathogenic bacteria *Actinobacillus a.* was established in 42.8 % of cases, *P. Gingivalis* in 71.42 %, *P. Intermedia* 57.14 %, *Bacteroides F.* was found in 85.71 % of cases, *Treponema D.* in 100% of cases. Extremely high bacterial loads were recorded for *Actinobacillus a.* , *Bacteroides F.* and *Prevotella I.*

Amelogenine protein is the major component of the continuously secreted enamel extracellular matrix that controls the mineralization of enamel crystals. EmdogainTM is an extract of porcine fetal tooth material, a product based on the high degree of homology between porcine and human enamel proteins, composed primarily of amelogenine protein. It was created to promote the regeneration of periodontal tissues such as cementum, periodontal ligament and alveolar bone by stimulating normal development of these tissues, it is used to treat deep intraosseus defects.

According to titanium's much higher hardness and strength compared with the bone, if correctly applied, mini-screws will suffer no damage. Reusing orthodontic mini-screws would reduce treatment cost and lead to more use of mini-screws and improvement of orthodontic treatments. In this study, scanning electron microscopy (SEM) was used to assess structural variations of retrieved orthodontic implants and to evaluate the mechanical properties that may adversely affect stability of orthodontic implants. For analysis 10 self- drilling mini-implants retrieved after treatment, made from commercially pure (CP) alpha-titanium from two brands LeoneTM, Italy and ForestaDentTM,Germany were analysed

using SEM according to the degree of morphological deformation of the head, transmucosal neck, threaded body, and tip of the implant at up to 10,000 x light magnification. The mini-implants did not present any defects such as bubbles, imperfections or fissures in their internal microstructure. No significant marks resulting from the manufacturing process were observed. Surface irregularities in the threaded body and tip (fig.5,6,7) were observed and significant tip deformation was evident in the majority (80%) of retrieved mini-implants.