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Ridge preservation of compromised extraction sockets applying a soft cortical membrane: A canine proof-of-principle evaluation

EXPERIMENTAL STUDIES

206

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ABSTRACT

After tooth extraction, different ridge preservation techniques can be used, including placement of graft materials and/or usage of occlusive membranes focusing on preservation and regeneration of hard tissue. With reference to the different biiomaterials used for the above mentioned purpose, collagenated porcine bone substitutes have been investigated in pre-clinical and clinical studies, showing promising results with regard to turnover into new bone while maintaining the ridge dimension.
The aim of this proof-of-principle study was to assess the use of a porcine soft cortical membrane in combination with a porcine graft material in order to restore the original ridge contour and to achieve complete bone regeneration in case of a missing buccal wall without raising a flap and attempting primary wound closure.
In a first intervention, a standardized buccal dehiscence defect was artificially created at the distal roots of the 3rd and 4th mandibular premolars of a Beagle dog. Four weeks later, following endodontic treatment of the mesial roots, teeth were hemisected and the distal roots were extracted without raising a flap. A cortical membrane (OsteoBiol® *Lamina*, Tecnoss®, Giaveno, Italy) was placed outside of the bony envelope of the extraction socket to rebuild the buccal bone contour. Afterwards, sockets were filled with a collagen-modified porcine bone graft material (OsteoBiol® *Gen-Os*®, Tecnoss®) to the level of the surrounding bone height. The socket orifice was closed with a porcine dermal matrix (OsteoBiol® *Derma*®, Tecnoss®).
After four months, block specimens containing the socket-sites and remaining roots were retrieved, histologically processed and analyzed. Histologically, bone formation under the membrane was found and the membrane showed clear signs of degradation. Bone substitute was well integrated in newly formed bone and resorption of particles was found.

CONCLUSIONS

Hence, within the limitations of this study, the original hypothesis of regeneration of the missing buccal socket wall was approved. Moreover, it was observed that the regeneration of a compromised socket seems possible when applying the presented approach, the soft cortical membrane was sufficiently stable to allow for the establishment of the contour and to inhibit soft tissue invasion and the applied xenogenic graft material was undergoing remodelling processes while allowing adequate bone regeneration.

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