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Dimensional alterations of extraction sites after different alveolar ridge preservation techniques - a volumetric study

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ABSTRACT

A tooth extraction always represents a trauma after which there is a horizontal and vertical volume loss of both hard and soft tissues. In order to reduce these volumetric changes, the placement of biomaterials within the fresh extraction socket has been suggested. As the data reported in literature are not conclusive, the aim of this randomized controlled clinical study was to evaluate to which extent a filler or a soft tissue socket seal contributes to ridge preservation. 30 patients were enrolled in the study and, after tooth extraction, were randomly assigned to the following treatments: Tx1 - xenogenic bone substitute (pre-hydrated collagenated cortico-cancellous porcine bone; OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy) and free gingival graft; Tx2 - free gingival graft alone; Tx3 - xenogenic bone substitute (OsteoBiol® *mp3*®, Tecnoss®) without gingival graft; Tx4 - no further treatment (control). The dimensional changes were evaluated by means of impressions taken at baseline (before tooth extraction) and 4 months after surgery, with subsequent pouring of cast models. These ones were then optically scanned and analysed using digital imaging analysis.

Healing of all treatment groups was uneventful and all groups displayed contour shrinkage at the buccal aspect.

Statistically significant differences were found between Tx1 and Tx4 as well as Tx2 and Tx4. A significant positive influence of the free gingival graft on the maintenance of the ridge width was recorded ($p < 0.001$).

CONCLUSIONS

The results of this clinical study show that the investigated alveolar ridge preservation techniques were not able to prevent soft tissue contour alterations entirely after tooth extraction. Because measurements were based on master models, no statements can be made as to whether the documented horizontal volume resorption was caused by loss of soft tissue or underlying bone. The use of a free gingival graft covering the extraction socket was beneficial for maintaining soft tissue volume, but more studies including a higher number of patients or sites are needed to further investigate these findings.

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