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Alveoar bone augmentation: histological evaluation of graft remodelling correlated to volumetric ridge alteration

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After tooth extraction the alveolar bone undergoes a remodeling process resulting in an overall bone volume reduction. Several studies showed that socket grafting limits the alveolar ridge remodeling. Furthermore studies showed that the grafting material is involved in a partial remodeling process and that the remodeling time extends for years.

Aim of the present study was to evaluate the correlation between graft remodeling and volumetric ridge alteration.

Materials and Methods Seven extraction sockets were grafted with Bio-Oss collagen and 8 extraction sockets were left untreated. At baseline, 3 and 6 months post extraction alveolar ridge dimensional changes were evaluated on all sites: an acrylic stent was prepared for each patient and measurements from the alveolar bone to the stent were taken using a periodontal probe PCP UNC 15 (Hu-Friedy). Histological analyses on newly formed bone were performed on one specimen from augmented sites after 3 and 6 months post extraction.

Results Untreated alveolar socket showed a stronger volumetric reduction compared to grafted socket. At histological evaluation the slow remodeling process of the graft material was confirmed. At 3 months, bone density was 2.77%, residual Bio-Oss Collagen amounted to 43.75%, and connective tissue was 53.48%. At 6 months, the harvested cylinder was comprised of 44.42% new bone, 12.50% grafted Bio-Oss Collagen and 43.08% connective tissue/ bone marrow.

Conclusions The slow remodeling process of graft material seems to contrast the fast remodeling of the blood clot and the alveolar bone resorption, thus compensating the alveolar ridge contraction.

Key words
Alveolar socket, histomorphometry, bone substitute, resorptive activity