extraction alone (control group) or ridge preservation (test group). After tooth extraction horizontal and vertical measurements were taken using a caliper and an acrylic stent. The test sites were grafted with a corticocancellous porcine bone and a collagen membrane. Seven months after surgery a bone biopsy were obtained with a trephine from all sites before implant placement.

Results: The mean ridge width decreased of 0.75 mm in the test group, while the mean ridge width decreased of 2.5 mm in the control group.The vertical ridge dimension changed of 0.2 mm in test group, versus a change of 1.5 mm in the test group. The sites which received porcine bone showed presence of vital bone and residual biomaterial. The particle were surrouded by newly formed bone. No inflammatory infiltrate and no tissue reactions were observed.

Conclusion: The ridge preservation procedures using a mixture of collagen and corticocancellous porcine bone were efficacy in reducing alveolar ridge changes after tooth extraction when compared to extraction alone. This technique contributed to maintain stable the alveolar bone dimension, after 7 months. The histologic analysis showed that the biomaterial is biocompatible and can be used for ridge preservation without interfering with the physiological reparative bone processes.

205 | Topic Tissue Augmentation

Histological outcome of extraction sockets augmented with Straumann BoneCeramic®

De Coster P[1], Browaeys H[2], De Bruyn H[3]

[1]Dept. Paediatric Dentistry & Special Care, University Hospital, Ghent, Belgium, [2]Dept. Oral and Maxillofacial Surgery, University Hospital, Ghent, Belgium, [3]Dept. Periodontology & Oral Implantology, University Hospital, Ghent, Belgium

Objectives: BoneCeramic® (Straumann, Basel Switzerland) is a fully synthetic bone-graft substitute (hydroxyapatite + tricalcium phosphate) designed for augmenting bone to support dental implant procedures (launched May 2006). Bone regeneration in healing sockets was analyzed both clinically and histologically in a first-wave patient sample.

Material and methods: Eight patients (mean age 63, range 55–81), presenting for multiple extractions due to periodontal disease and selected for later implant placement, were included in the study. Extraction sockets with intact buccal and palatal bone plate were filled with BoneCeramic® mixed with own blood. One socket was randomly selected for normal healing. Bone cores from 12 substituted and 8 naturally healed sockets were sampled for histological analysis at the time of implant surgery. In 2 patients bone substitution of the graft (after 8 & 21 weeks of healing) was totally ineffective and sampling was impossible due to complete lack of mineralisation. Average healing time of the 6 remaining patients was 11 weeks (range 10–16). Samples were randomly assigned to 2 experimental groups to be processed either as decalcified or ground sections. Demineralized sections were stained with haematoxylin and eosin by Masson's trichrome method and immunostained for Cbfa1, a marker of early osteoblast differentiation. Ground sections were immunostained for osteocalcin, a marker of late osteoblast differentiation. The sections were blinded and examined by transmitted light microscope.

Results: Bone in substituted sockets was significantly softer than in controls and often initial stability was difficult to obtain in the experimental graft material, leading to the use of wider implants. Preliminary histological findings included the presence of large amounts of non-resorbed biomaterial in 60%, poor formation of new bone as compared to controls in 80% and chronic inflammation in 70%. Cbfa1 en osteocalcin reactivity were significantly weaker in the experimental samples, indicating poor osteoblast differentiation.

Conclusions: The present preliminary findings are indicative of a poor resorption/substitution of BoneCeramic® in human alveolar bone augmenting procedures after tooth extraction. Further research is needed to analyze both the biological mechanisms and the long-term clinical benefits of this procedure.

Clin Oral Implants Res 18(5) xcii 2007

206 | Topic Tissue Augmentation

Evaluation of different clinical variables in the determination of resonance frequency values at implant insertion

Strocchi R[1], Degidi M[2], Daprile G[2], Piattelli A[1], Petrone G[1], Carinci F[3]

[1]Dental School, University, Chieti, Italy, [2]Private Practice, Bologna, Italy, [3]Dental School, University, Ferrara, Italy

The immediate implant loading technique requires a high primary stability. Resonance Frequency Analysis has been proposed to assess this stability with a quantitative method.

The aim of the present study was to evaluate the importance of different clinical variables in the determination of Resonance Frequency values at implant insertion. In 14 patients, 80 XiVE and 12 Frialit Synchro (DENTSPLY-Friadent, Mannheim, Germany) 2 screw implants were inserted. Sixty-five implants were inserted in a site previously treated with a sinus augmentation procedure, 11 implants were inserted in a healed site and 16 in a post-extraction site. For each implant, diameter, length, bone density, insertion torque, RFA value and percentage of implant fixed to non-grafted bone were recorded. A statistically significant positive correlation was found between Resonance Frequency values (RFA) and implant diameter ($P=0.008$), implant length ($P=0.02$), XiVE implants ($P=0.008$), diameter of the last bur used ($P=0.01$). No statistically significant correlation between RFA values and all the other variables considered was found. Very few variables seem to influence RFA values. In particular the length and the diameter of the implants, together with the geometry of the implant used are important to obtain a good primary stability.