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Bone formation in sinus augmentation procedures using autologous bone, porcine bone, and a 50 : 50 mixture: a human clinical and histological evaluation at 2 months

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M Cassetta[1]
V Perrotti[1]
S Calasso[2]
A Piattelli[2]
B Sinjari[2]
G Iezzi[2]

1 | Dental School "Sapienza", University of Rome, Rome, Italy
2 | Department of Medical, Oral and Biotechnological Sciences, University of Chieti-Pescara, Chieti, Italy

ABSTRACT

In case of a severe resorption following teeth extraction and the pneumatization of the maxillary sinus, it is necessary to adopt maxillary sinus augmentation procedures with biomaterials in order to obtain a sufficient volume of bone tissue to allow a successful implant placement. With reference to bone substitute, the material used must be biologically safe and must satisfy the three fundamental mechanisms of osteogenesis, osteoinduction and osteoconduction.

The purpose of this human study was to compare from the histological, histomorphometrical and clinical point of view the outcomes of autologous bone, porcine bone, and a 50:50 mixture of the two in maxillary sinus augmentation procedures, after a 2-month healing period. In order to do this, 10 patients were included in this study, undergoing two-stage sinus augmentation procedures using 100% autologous bone (Group A), 100% porcine bone (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy - Group B), and a 50:50 mixture of autologous and porcine bone (Group C) were included in this study.

After a 2-month healing period, in group A it was possible to observe trabecular bone with large marrow spaces. Histomorphometry showed that the percentage of newly formed bone was 23.2±3% (median: 23.4), of marrow spaces 60.4±2.3% (median: 60.45) and of residual grafted material 16.4±3.8% (median: 14.9).

In group B, trabecular bone with marrow spaces and residual biomaterial particles was observed.

Histomorphometry showed that the percentage of newly formed bone was 21.6±3.4% (median: 21.6), of marrow spaces 56.1±3.2% (median: 56) and of residual grafted material 22.3±3.5% (median: 22.2).

In group C, trabecular bone with marrow spaces was observed. Histomorphometry showed that the percentage of newly formed bone was 24.5±3.4% (median: 24.5), of marrow spaces 55.1±3.7% (median: 55.1) and of residual grafted material 20.4±3.2% (median: 20.4).

CONCLUSIONS

Based on the results of the study, the Authors concluded that *"the clinical and histological results of this study indicated that porcine bone alone or in combination with autologous bone are biocompatible and osteoconductive materials and can be successfully used in sinus augmentation procedures"*.

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