USE OF FRESH FROZEN BONE GRAFT IN REHABILITATION OF MAXILLAR ATROPHY

Andrea Panigalli

Department of Oral Surgery, Dental Clinic, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan, Italy

Abstract

Clinical results showed in both cases a successful bone regeneration which allowed to rebuild the original bone volume and shape without using extra-oral surgical sites.

After 5 month form graft placement, during second surgery, bone showed a good blood support that shows a process of bone turnover with new bone osteogenesis. Measurement taken during first and second surgery showed no relevant bone resorption. During implant placement (12 fixture: Blue Sky ®, Bredent, Senden Germany) was noticed a good quality bone and implants were placed with an insertion torque of 35 n.

Histological analysis of bone biopsy performed 6 months after bone regeneration showed a good bone quality in which was evident a new bone placement process with calcificated bone areas with a well organized structure and osteonic matrix areas where new bone formation process was in act.

Soft tissue healing was fast and without any complication.

Conclusions

An implant and prosthetic treatment must be chosen in order to be the best treatment for the patient at the most affordable price or, at least, proportionated to the kind of treatment. Moreover treatment choice must be supported by scientific evidence and documentation.

When, after a severe bone resorption, a large bone regeneration is planned, surgeon must chose best regeneration-material for each case.

Fresh frozen bone has to be compared, when analyzing its performance, with autogenous bone. This two materials are in fact the only that owns all three processes of bone formation: osteoinduction, osteoconduction and osseointegration proprieties.

In conclusion, in light of his excellent osteoconductive and osteoinductive qualities, the possibility to use it without an extra-oral donation site in any quantity and the possibility to reduce operating time preparing the graft on stereolithographic models it’s possible to consider fresh frozen bone is a good alternative, in oro-maxillo surgery practice, to autologous bone.

Background and Aim

Fresh allogenic bone, also known as Fresh Frozen Bone (hereinafter called FFB), has been recently adopted for use in dental and maxillofacial reconstructions. This type of bone, has been used for years in complex orthopaedic surgical procedures based on a sound clinical experience.¹ On the other hand, the number of studies present in the literature on its use in major preprosthetic surgery is only limited.²

Allogenic bone from tissue banks presents a number of advantages, including the ready availability of grafts in suitable quantity and quality, limited costs, and the possibility of avoiding the morbidity related to autogenous-graft harvesting. This tissue is of human origin and may be obtained from living donors or cadavers.³

FFB has osteoconductive properties and can act as a scaffold by providing structural support during the bone replacement phase. When performed correctly, freezing does not affect the BMP’s contained in the bone, so its osteoconductive properties are left unchanged. However, similarly to autogenous grafts, such osteoconduction should be regarded as merely potential in non-decalcified tissue (it is through the osteoclast activity that BMP’s will be exposed at a later stage).⁴

The purpose of this work is to show the use of fresh frozen homologous bone for bony augmentation of the maxilla and mandible in preparation for dental reconstruction with endoosseous implants, as an effective alternative to harvesting and grafting autogenous bone from intra or extraneous donor sites.

Methods and Materials

Case 1The patient, Mr B.G., is a 43-year-old male who came to our observation complaining of edentulism and severe maxillary alveolar atrophy in the first quadrant. The teeth 15, 16 and 17 were missing. The bone deficit was corrected by means of a major sinus lift and an onlay graft using a pre-contoured allogenic cancellous bone (FFB) block harvested from a femoral epiphysis. The graft was then fixated with osteosynthesis screws.

The antrum cavity and the gaps between the graft and the alveolar bone were then filled with allogenic bone (FFB) chips. The whole thing, including the screws, were then covered with the same morcellized bone, which was maintained in site by means of resorbable collagen membranes. The wound was closed by sutures after releasing and passing the flaps. At five months the surgery site was reopened, showing limited graft resorption (< 1 mm, as measured in relation to the transcutaneous screw heads at two different points). The fixation screws were removed and 3 endoosseous implants were placed at the level of 1.5, 1.6 and 1.7 (blueSKY, bredent medical, Senden Germany). The final prosthetic rehabilitation was performed 11 months after the grafting procedure. Case 2The patient C.A., a 57 years old male came to our observation complaining partial edentulism and maxillary alveolar atrophy of first quadrant with 1.6 and 1.7 missing teeth. The patient was recently submitted to a right sinus lift surgery with an onlay allograft and 2 implants in 1.6 and 1.7 position. The final prosthetic rehabilitation was performed 12 month after.

Case 2

References