AIMS OF THE PROCEDURE

We intend to present a technique of reconstruction of maxillary horizontal bone defects by applying fresh-frozen cortico-cancellous blocks allografts, from the Bone Bank, Faculty of Medicine, University of Coimbra, in the onlay technique, with the aim of implant supported prosthetic rehabilitation.

CASE REPORT

In a 23-months period (2012-2014), a 46-year-old female, ASA I, appeared in the Department of Dental Medicine, Faculty of Medicine, University of Coimbra. With lack of retention of the upper denture. Clinical records including digital photographs, panoramic and CT scans were recorded. The residual ridge was considered reduced in thickness if the bucco-palatal dimensions measured were ≤ 4,00mm. The average thickness of the alveolar crest across the region to rehabilitate was 3,2mm. The patient signed a written informed consent form approved by the Ethics Committee of University of Coimbra. The fresh-frozen bone (FFB) allograft from the iliac crest was processed according to the international guidelines in an authorized bone tissue bank (Bone and Tissue Bank of the Coimbra Hospital and University Centre, Coimbra, Portugal). During the first surgical stage, FFB was thawed in a solution of sterile saline with vancomycin hydrochloride (Farma APS®, Portugal) 500ml/500mg for at least 40 minutes before the procedure, to gradually get to room temperature. Prior to surgery the patient rinsed with chlorhexidine 0,12% (Pierre Fabre®, Portugal). Under local anesthesia (4% articaine with 1:100.000 epinephrine), a full-thickness crestal incision and two vertical releasing incisions were performed; and the ridge defect was evaluated. After determine the size and shape of the needed blocks, the residual fibers were removed from the FFB, and it was cut and sculpted with rotary instruments. The recipient site was prepared with decortication to enhance bleeding and promote the remodeling of the FFB bone onlay blocks. The blocks were positioned, stabilized and fixed to the recipient site with micro-screws (Sistemas de Prótese, Conexão®, Brasil). The residual ridge was measured before and after placing the blocks, with a dial caliper. The gaps at the periphery of the blocks were filled with FFB chips, and the sharp angles were gently reduced. The flaps were repositioned without tension with nylon 4-0 (Lab. Aragão, S.L.Esp.®). After a 5-months healing period, a second stage approach was performed, with the surgical exposure of the augmented sites. A third measurement of the ridge was taken. The micro-screws were removed and 8 standard-dental implants (Master Active, Conexão®, São Paulo, Brazil) were installed. A bone biopsy was performed with a 3,00mm diameter trephine, provided that procedure would not compromised the implants. The core sample was fixed in formalin solution, decalcified, dehydrated and embedded in Paraplast®. Sections were stained with hematoxylin-eosin. The sections were examined by light microscopy. After six months healing period, the patient was rehabilitated with implant-supported fixed prostheses. After each surgical intervention, the patient received antibiotics (amoxicillin+clavulanic acid 875mg/125mg (Bial®, Portugal), twice a day for 7 days), nonsteroidal anti-inflammatory treatment (Ibuprofen 600mg (Abbott® Laboratórios, Lda, Portugal), twice a day for 5 days), and analgesics (Paracetamol-Codein phosphate 500mg/30mg (Bene®, Portugal)).

RESULTS

During the re-entry procedures, all the blocks were found to be firm in consistency, well-incorporated and vascularized, with minimal resorption, allowing the installation of eight implants. Histologic evaluation revealed rapid incorporation of the FFB blocks at 5-months, as evidenced by newly formed bone surrounding the residual allograft and containing viable osteocytes. There were no post-operative complications. After twelve months, the implant-supported rehabilitation was in perfect function and none of the implants were lost.

DISCUSSION

The reconstruction with onlay bone blocks, provides better outline and resistance to implant placement. The phenomenon of osteoconduction is well illustrated at the histologic sample, which found newly formed bone surrounding FFB cancellous fragments. The application of fresh-frozen bone blocks allografts allowed good adaptation to the recipient site, reduced operative time, less morbidity, greater availability, security implementation and patient comfort compared to the application of autografts.

CONCLUSION

Bone reconstruction by the application of fresh-frozen allogenic bone blocks under local anesthesia by applying the onlay technique has been shown to be a suitable alternative to the use of autografts, in bone reconstructions at a short period of time. Future studies using FFB, especially with long-term follow-up, are needed to learn about the behavior of this allogeneic material after longer periods of function.

REFERENCES

Keywords: Bone blocks, onlay technique, bone allografts, osteoconduction, horizontal bone defects, implant supported prosthetic rehabilitation.

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