

Bone allografts in implantology-the on lay grafting with block technique: A histomorphometric study in rabbits

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Background: Bone loss has long been a challenge to dental surgeons who seek to reconstruct and rehabilitate patients with resorptions, especially in the atrophic maxillary alveolar ridges. A range of biomaterial is available for use in dentistry, however the homologous graft, or allografts, has been increasingly used. This study explores 4 methods for processing the allografts (Group A, B, C and D) by tissue banks. We initially performed a qualification testing (sterile and cytotoxicity tests) and further an analysis (by optical coherence tomography-OCT, cone beam tomography, Raman spectroscopy, and histomorphometry) of its osseointegration in an experimental trial in rabbits.

Objectives: The aim of this study is to evaluate the osseointegration of grafts performed by onlay grafting block technique. The blocks were processed in 4 different ways: A) cryopreserved allograft block (- 80°C); B) irradiated allograft block (25 kGy); C) freeze-dried allograft block; and D) demineralized allograft block.

Methods: To analyze the osseointegration, the areas of grafts were extracted after 60 days and submitted to the exams of optical coherence tomography -OCT, cone beam tomography, Raman spectroscopy and histomorphometry.

Results & Conclusion: Groups A, B, C, D

Osteoid Surface (OS/BS): [3.50% to 24.09%]

Osteoblasts Surface (Ob.S / BS): [1.69 % to 16.76%]

Osteoid Volume (OV/BV): [0.20 % to 3.10%]

Trabecular Bone Volume (BV/TV): [> 30%]

The Group A (Frozen) presented better results and greater evidence in osseointegration:

Osteoid Volume (OV / BV): 3.10%;

Osteoid Thickness (O.Th): 8.61 mm;

Osteoblasts Surface (Obs / BS): 16.76%;

The Groups C (Freeze-Dried) and D (Demineralized) had the lowest rates of bone resorption and remodeling:

Eroded Surface (ES/BS): [8,41% , 1,27 %]

Osteoid Surface (OS / BS): [13,20 % , 3,50%]

We conclude that the four methods of tissue processing are safe and biocompatible because we did not notice any evidence of contamination or cytotoxicity in the groups studied. The osteoconduction and the connectivity with recipient bed were observed in four methods (Groups A, B, C, D): The bone matrix remained denser [Cone Beam Tomography] with well organized collagen fibers [Optical Coherence Tomography -OCT]. The onlay grafting block technique is predictable and effective and it depends on three important rules: good blood flow in the graft area, good stability to the graft and the absence of gaps between the graft and the receptor bed.

Biography

Luiz Augusto U. Santos is Master in Science, Implantodontist and PHD student at University of Sao Paulo. He works as Manager of Tissue Bank and Researcher of the Institute of Orthopedics and Traumatology, Hospital das Clínicas of the School of Medicine of the University of Sao Paulo. Over the years, he has studied the clinical use of bone allografts in orthopedic and dental surgeries and has published studies nationally and internationally. He is a member of the American Association of Tissue Bank (AATB) and the American Dental Association (ADA). He is also a member of the Group of the Regulatory Health Organizations related to the definition of legislation and standards.

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