

Xenogenous bone blocks for maxillary reconstruction: clinic and tomographic split-mouth trial

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Abstract

Results

Background: Autogenous bone graft still the gold standard in ridge augmentation. However, the resorption rates and donor site morbidity limit its use. Many bone substitutes, as the deproteinized bovine bone (DPBB), are an alternative for ridge reconstruction. DPBB can be particulate or compacted in a block, with autogenous block like structure. There are few clinical studies evaluating the block of DPBB graft clinical behavior, resorption, incorporation and implant stability in xenogenous block area. **Aim/hypothesis:** This study hypothesizes deproteinized bovine bone blocks (DPBB) sintered in low temperatures, present similar clinical behavior, similar implant initial stability and less resorption rates than autogenous graft from mandibular ramus. **Material and methods:** Ten patients with edentulous atrophic maxillary ridges were randomized selected in a list of patients for oral rehabilitation with implants. The inclusion criteria were: absence of systemic health issues, age between 20 and 70 years old. Irradiated patients, patients with general diseases and post menopause women were excluded. The patients were submitted to reconstruction surgery under general anesthesia. Each side of anterior maxilla received one type of graft, according to randomization, xenogenous block (test) or Mandibular ramus block graft (control). The alveolar ridges were scanned by CBCT at three times: pre-graft surgery (T0), immediate post-operative (T1) and pre-implants (T2). At the moment of graft surgery the alveolar ridges were measured with surgical caliper in three standardized position. Nine months later an all-on-four protocol was installed, and the clinical measurements were repeated, and it was measured implant torque and implant stability quotient (ISQ). **Results:** All the 20 grafted areas were able to implant placement, at post operative period of grafting, 5 patients presented one or more complications, 2 related with xenogenous bone and 3 in the autogenous group. The main complications were wound dehiscence and graft exposure, with a mean time of 74,2 days after surgery, ranging from 20 to 120 days. Membrane exposures were kept with chlorhexidine 0,12% gel and follow-up, in 3 cases the membrane needs removal due soft tissue impairment. Three patients presented complications of donor site, like seroma, infection, swelling and hemorrhage, treated with local procedures. The volumetric changes had not statistic difference between the test ad the control graft, initial volume was 81.5 (SD 10.27) in autogenous group and 89.75 (SD 8.34) in the bovine block, mean resorption percentages were 10.53 (7.08) and 9.33 (10.41) respectively. Installation torque (control: 41; test: 30.5) and ISQ (control: 62; test: 53.37) presented no statistical difference. **Conclusions and Clinical Implications:** The tested xenogenous block presented similar clinical behavior of mandibular ramus autogenous block, for maxillary horizontal reconstruction. The complication rates, resorption and implant torque and stability presented no statistical difference in this clinical trial.

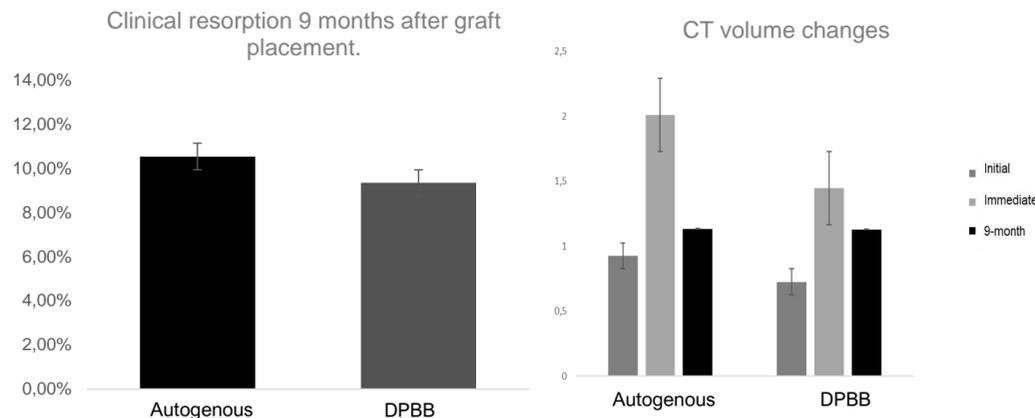


Figure 3. Comparison between percentage of clinical resorption (result from difference between T1 and T2 measures), for autogenous and Deproteinized bovine block graft (DPBB).

Figure 4. 95% CI for the Bone volume in mm³ prior grafting, immediate after grafting and 9 months earlier. There was no difference for autogenous bone and DPBB in all evaluated periods, and both grafts have achieved feasible volumetric gain in CT.

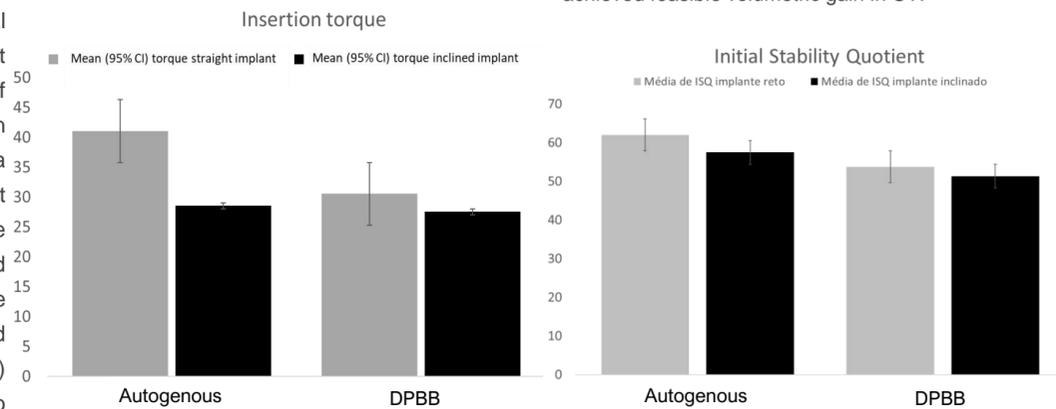


Figure 5. 95% CI for the insertion torque (N), for straight and inclined implants. Inclined implants presented lower insertion torque in both autogenous and DPBB.

Figure 6. 95% CI for the Initial Stability Quotient (ISQ), straight and inclined implants. No difference was observed for both autogenous and DPBB.

Background and Aim

Conclusion

Early teeth loss;
Atrophic ridges;
Implant rehabilitation;
Autogenous bone as gold standard;
Alternatives to autogenous bone grafting

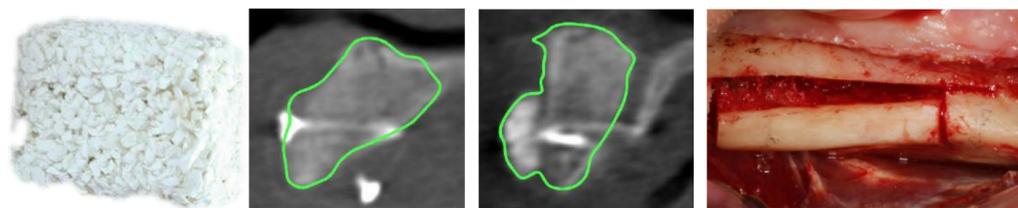


Figure 1. Volume comparison between initial (A) and after 9 months (B) for autogenous bone graft.

AIM

To evaluate the graft incorporation, the volume changes and the implant stability of a bovine deproteinized bone block in comparison to autogenous graft from mandibular ramus.

There were no differences for resorption, complication rates and clinical behavior between DPBB block tested and the autologous bone graft from mandibular ramus.



Methods and Materials

References

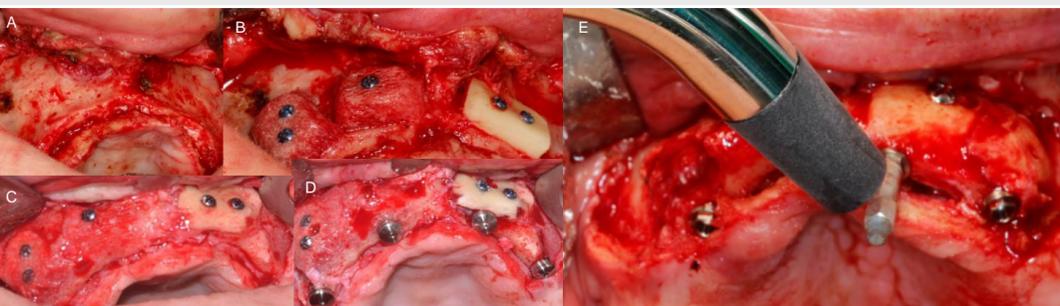


Figure 2. Study design. (A) Patient selection with total edentulism and maxillary resorption with at least 10mm of ridge height and 2mm of thickness. (B) Split mouth graft placement. (C) Reopening of grafts after 9 months, biopsy and (D) implant placement. (E) Initial stability measurement with Ostell G.

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