P-SU-069

IMPLANT THERAPY OUTCOMES; SURGICAL ASPECTS

Xenogenous bone blocks for maxillary reconstruction- histologic and microtomographic split-mouth clinical trial

Carvalho PHA [1], Trento G[1], Okamoto R[2], Gonçalves M[1], Pereira-Filho VA[1]

[1] São Paulo State University, Dental School at Araraquara, Department of Diagnosis and Surgery

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Abstract

Background: Atrophic ridges are a challenge in the oral rehabilitation with osseointegrated implants. Autogenous bone graft is the gold standard in ridge augmentation. However, the resorption rates and donor site morbidity limit its use. The deproteinized bovine bone (DPBB) are a viable alternative. DPBB can be particulate or compacted in a block, like the autogenous bone block. There are few clinical studies evaluating the DPBB graft incorporation to the receptor site and its remodeling properties. **Aim/hypothesis:** This study hypothesis is deproteinized bovine bone blocks (DPBB) sintered in low temperatures, present similar characteristics of mineralization and bone neoformation than autogenous graft from mandibular ramus. **Material and methods:** Six patients with edentulous atrophic maxillary ridges were randomized selected in a list of patients whose sought for oral rehabilitation with implants. The inclusion criteria were absence of systemic health issues, age between 20 and 70 years old, with hormonal stability, and consent. Irradiated patients, patients with systemic 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 process, xenogenous block (test) or Mandibular ramus block graft (control). After 9 months of healing, at implant placement, a biopsy was performed with a 2mm trephine bur, in horizontal direction, Specimens were first processed in 10% formaldehyde for 48h, washed for 24h and stored in 70% alcohol, after they were processed in a digital microCT scan, and then submitted to paraffin inclusion and histomorphometry analysis. **Results:** The analyzed parameters were tissue volume, bone volume, bone volume percent, tissue surface, bone surface, bone density and porosity, soft tissue and mineralized tissue. The trabecular number, thickness and separation were also evaluated. All the evaluated parameters respect the normal distribution (Shapiro-Wilk; p = 0.060 – 0.975) and homoscedastic (Levene; p= 0.250 – 0.972). There was statistical difference between groups only for the trabecular thickness. Autogenous bone graft presented larger trabeculae (0.45mm) than DPBB (0.29mm) (p<0.05). **Conclusions and Clinical Implications:** Results suggest that the DPBB block tested presented similar micro structural and bone formation characteristics to the autologous bone graft from mandibular ramus, furthermore, Deproteinized Bovine Block grafts could be a suitable clinical alternative to autologous bone when this is contraindicated, for example in compromised health patients or in cases with no sufficient autologous bone donation site.

Results

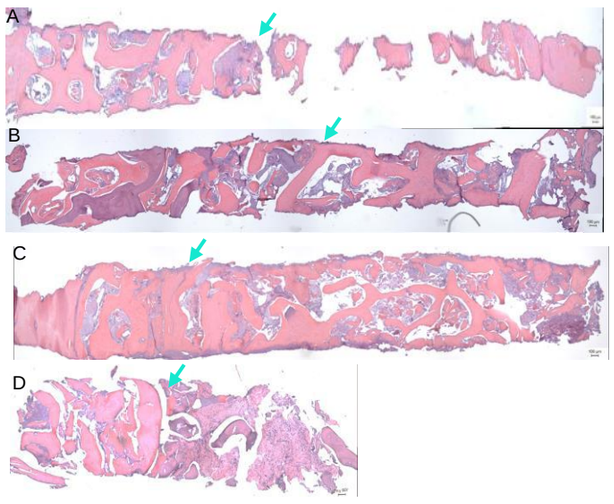


Figure 3. Histomicrographs of entire biopsies removed from (A and C) Autogenous graft from mandibular ramus and (B and D) Bovine deproteinized bone block (green arrows indicate the interface between host bone and graft). Hematoxylin-eosin stain (100µm)

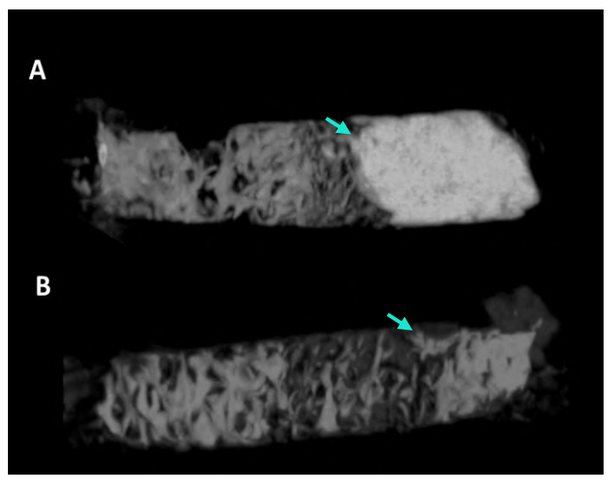


Figure 4. Microtomographs of entire biopsies removed from (A) Autogenous graft from mandibular ramus and (B) Bovine deproteinized bone block (green arrows indicate the interface between host bone and graft).

Table 1. Distribution of evaluated parameters on microtomographic analysis. Mean (SD) for Autogenous bone and Deproteinized bovine bone block grafts (DPBB)

		Autogenous (6)	DPBB (6)
Parameters [Mean (SD)]	***Sample vol.***	23,01 (8,29)	32,94 (6,57)
	Bone vol.	8,66 (4,44)	9,15 (3,36)
	Bone vol. (%)	37,84 (10,93)	28,43 (9,84)
	Bone surface vol.	11,45 (2,06)	13,28 (2,43)
	Bone surface	96,15 (40,74)	116,9 (39,54)
	Tissue surface	51,94 (15,47)	67,17 (10,33)
	Trabecular number	0,87 (0,33)	0,95 (0,29)
	Trabecular separation	0,39 (0,12)	0,49 (0,17)
	Trabecular thickness	0,46 (0,15)*	0,29 (0,04)*
	Bone density	4,20 (1,04)	3,59 (0,98)
	Porosity	62,16 (10,93)	71,56 (9,84)

Background and Aim

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

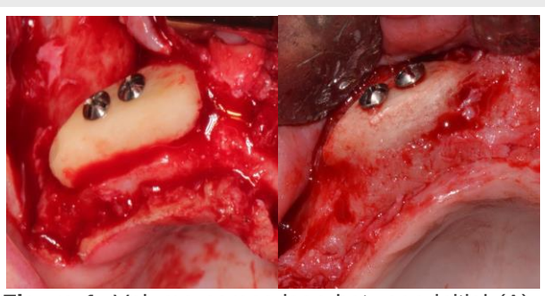
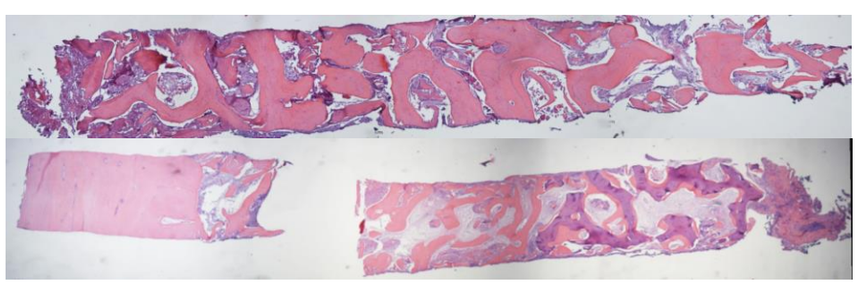


Figure 1. Volume comparison between initial (A) and after 9 months (B) for autogenous bone graft.

AIM

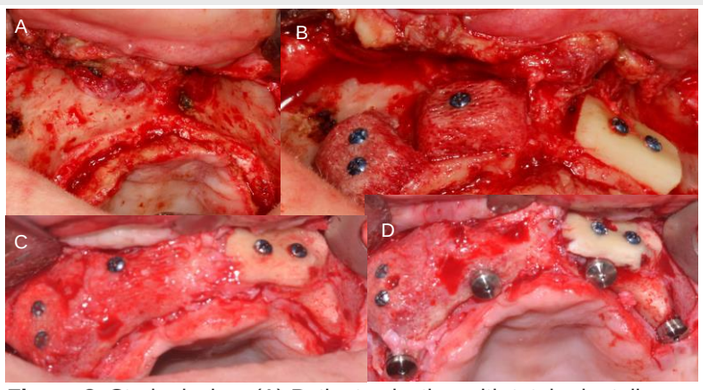
To evaluate the mineralization and new bone formation of a bovine deproteinized bone block in comparison to autogenous graft from mandibular ramus.

Conclusion



DPBB block tested presented similar micro structural and bone formation characteristics to the autologous bone graft from mandibular ramus.

Methods and Materials



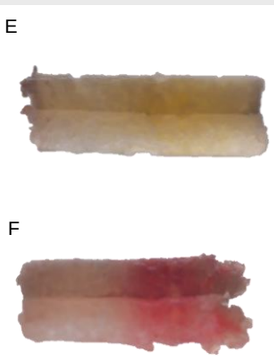


Figure 2. Study design. (A) Patient selection with total edentulism and maxillary resorption with at least 10mm of ridge height and 2mm of thickness. (B) Split mouth graft placement. (C) Reopenig of grafts after 9 months, biopsy and (D) implant placement. (E and F) core biopsies of autogenous and bovine bone blocks for microCT and Histology.

References

Sakkas A, Wilde F, Heufelder M, Winter K, Schramm A. Autogenous bone grafts in oral implantology—is it still a "gold standard"? A consecutive review of 279 patients with 456 clinical procedures. Int J Implant Dent. International Journal of Implant Dentistry; 2017;3(1).

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Presented at

EAO CONGRESS
EUROPEAN ASSOCIATION FOR OSSEOINTEGRATION
Lisbon 2019

P-SU-112

IMPLANT THERAPY OUTCOMES; SURGICAL ASPECTS

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

Pereira-Filho VA[1], Carvalho PHA [1], Gonçalves M[1], Moura LB[2], Okamoto R[3].

[1] São Paulo State University, Dental School at Araraquara, Department of Diagnosis and Surgery
[3]Pelotas Catholic University, School of Dentistry, Department of Oral Surgery
[2] São Paulo State University, Dental School at Araçatuba, Department of Basic Sciences

Abstract

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.

Results

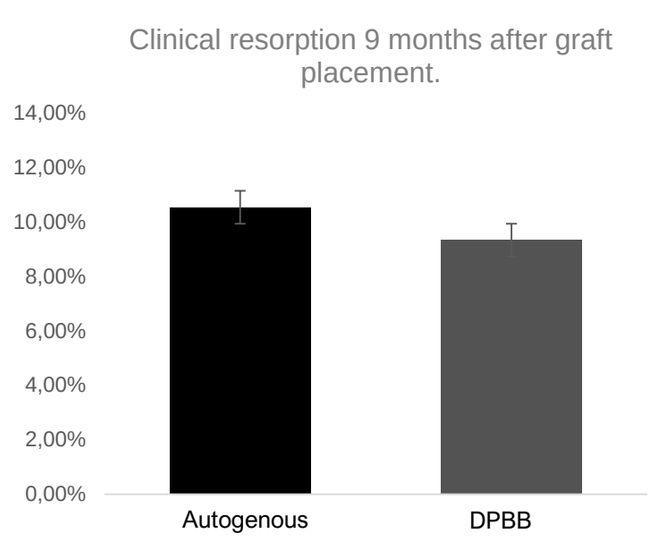


Figure 3. Comparison between percentage of clinical resorption (result from difference between T1 and T2 measures), for autogenous and Deproteinized bovine block graft (DPBB).

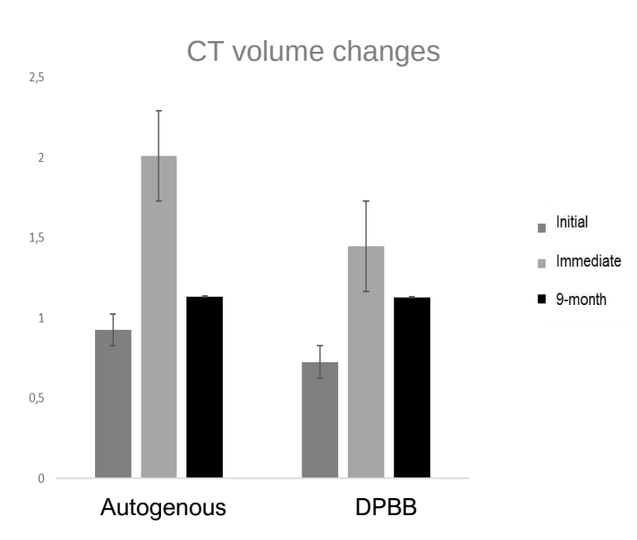


Figure 4. 95% CI for the Bone volume in mm³ prior grafting, immediate after grafting and 9 months earlier. There was no difference for autogenous bone and DPBB in all evaluated periods, and both grafts have achieved feasible volumetric gain in CT.

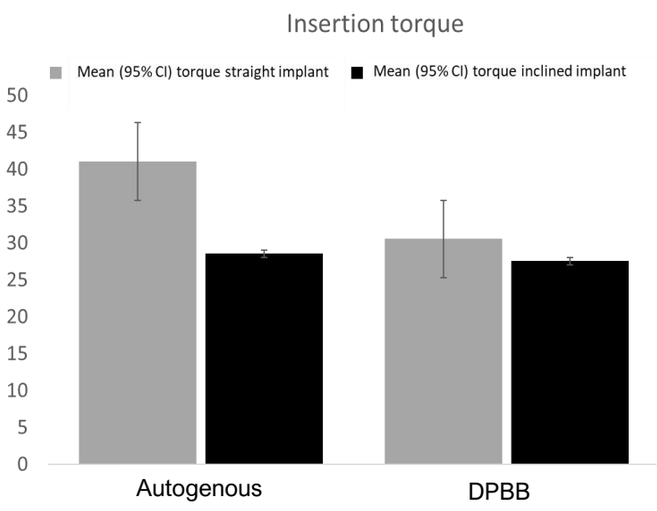


Figure 5. 95% CI for the insertion torque (N), for straight and inclined implants. Inclined implants presented lower insertion torque in both autogenous and DPBB.

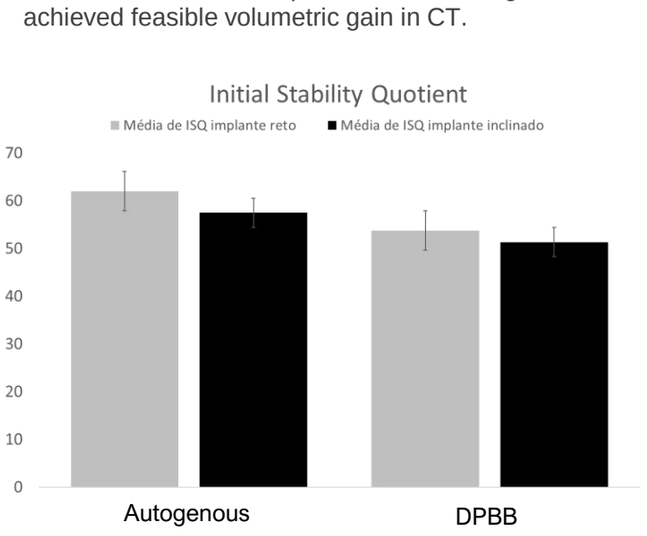


Figure 6. 95% CI for the Initial Stability Quotient (ISQ), for straight and inclined implants. No difference was observed for both autogenous and DPBB.

Background and Aim

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

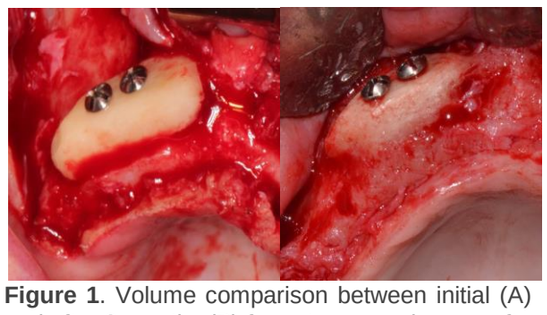


Figure 1. Volume comparison between initial (A) and after 9 months (B) for autogenous bone graft.

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.

Methods and Materials

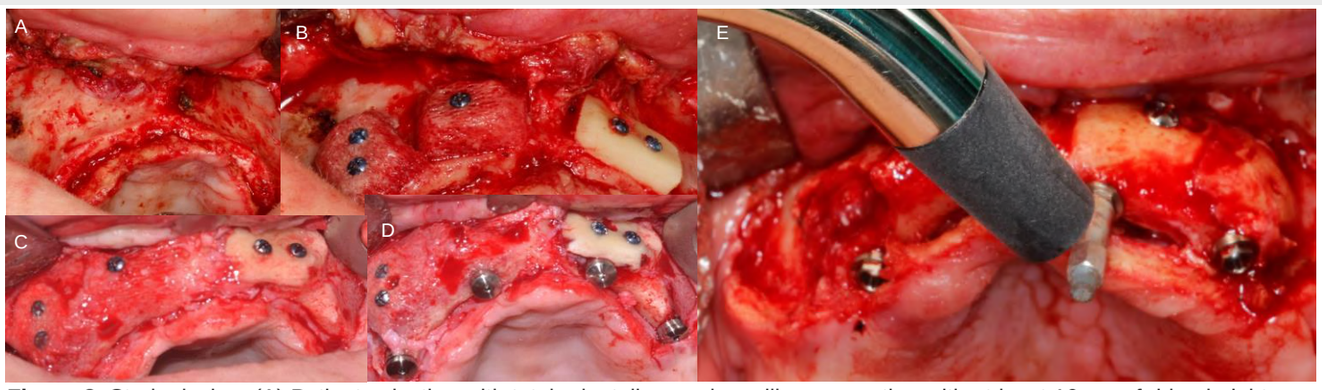
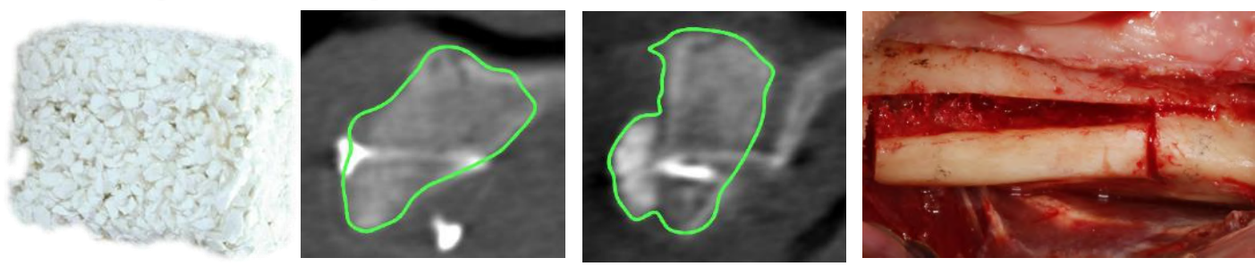


Figure 2. Study design. (A) Patient selection with total edentulism and maxillary resorption with at least 10mm of ridge height and 2mm of thickness. (B) Split mouth graft placement. (C) Reopenig of grafts after 9 months, biopsy and (D) implant placement. (E) Initial stability measurement with Ostell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

Conclusion

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



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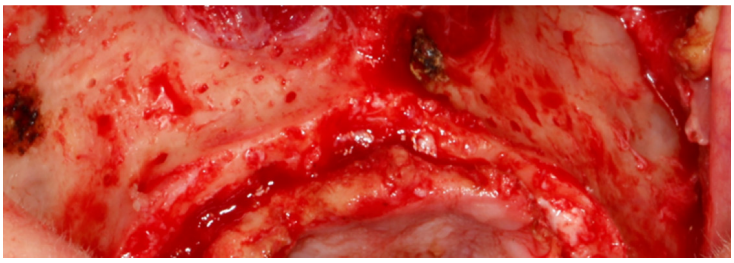
CASE 66

Orientado: Pedro Henrique de **AZAMBUJA CARVALHO**

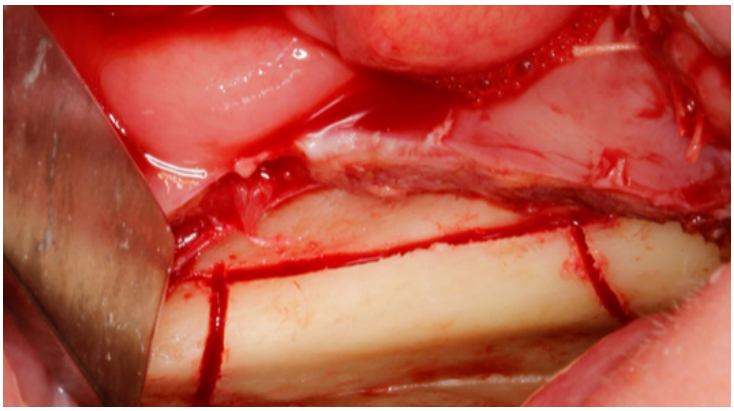
Orientador: Prof Dr Valfrido Antonio **PEREIRA FILHO**

Faculdade de Odontologia de Araraquara
Programa de Pós-Graduação em Ciências Odontológicas
Área Diagnóstico e Cirurgia

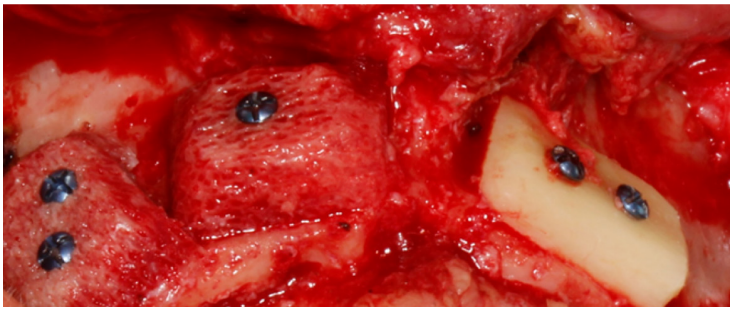
Avaliação clínica, tomográfica e histológica da reconstrução alveolar horizontal por meio de enxerto autógeno e heterógeno em bloco: estudo clínico prospectivo de boca-dividida



Defeito inicial

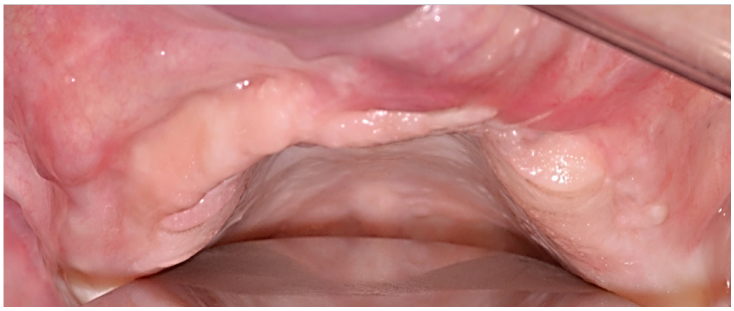


Área doadora no ramo mandibular



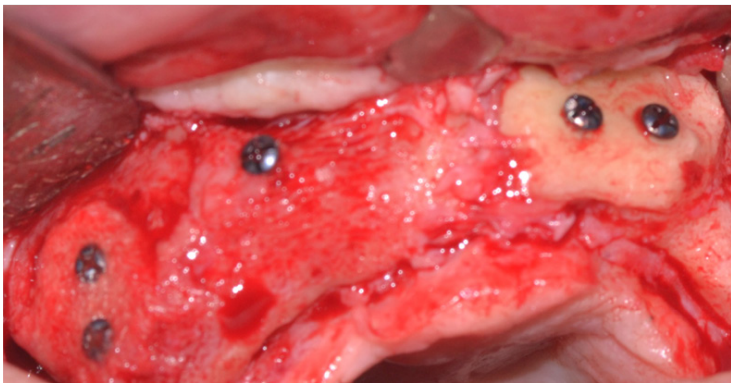
Blocos ósseos [Autógeno e xenógenos**] posicionado**

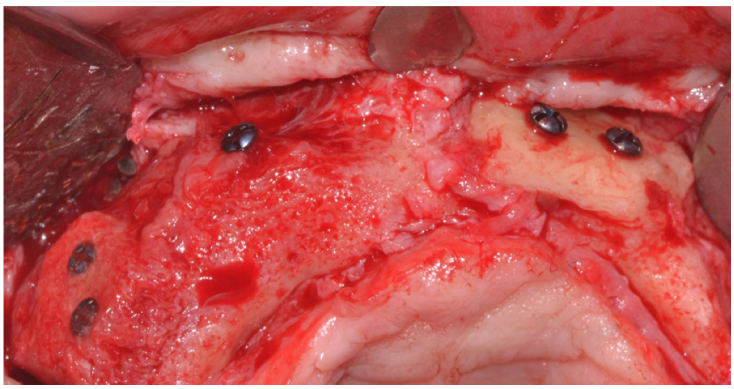
Bonefill Bloco **[**Cod **16498** Lote **]**



Situação clínica

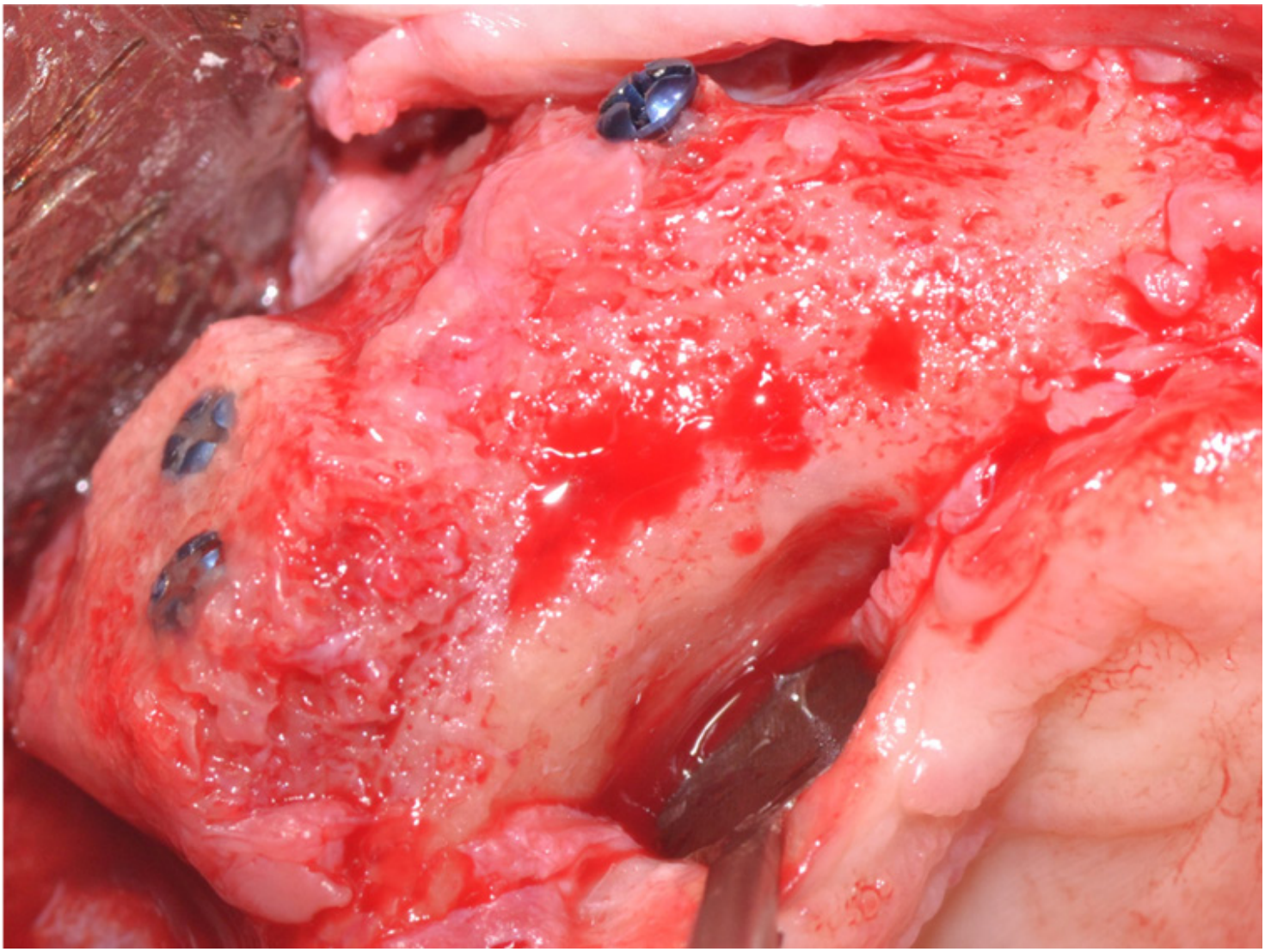
Follow Up ≅ **09 meses**



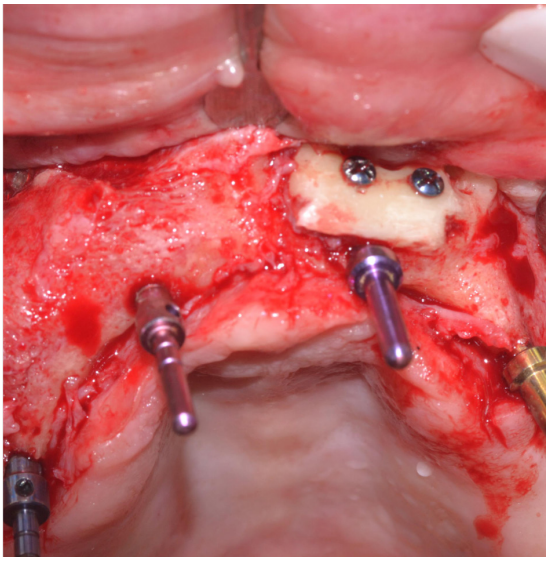


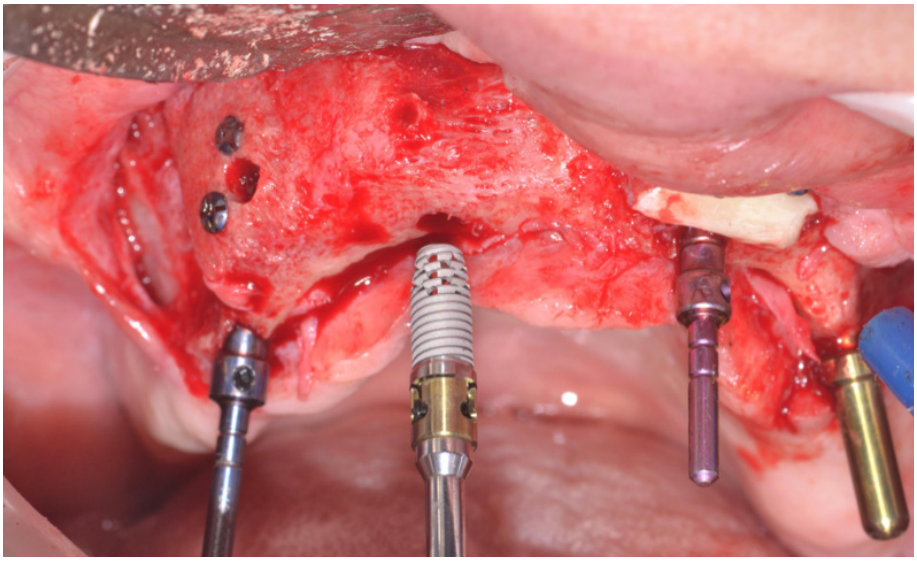
Reentrada após 09 meses, revelando regeneração óssea ideal

Follow Up ≅ **09 meses**

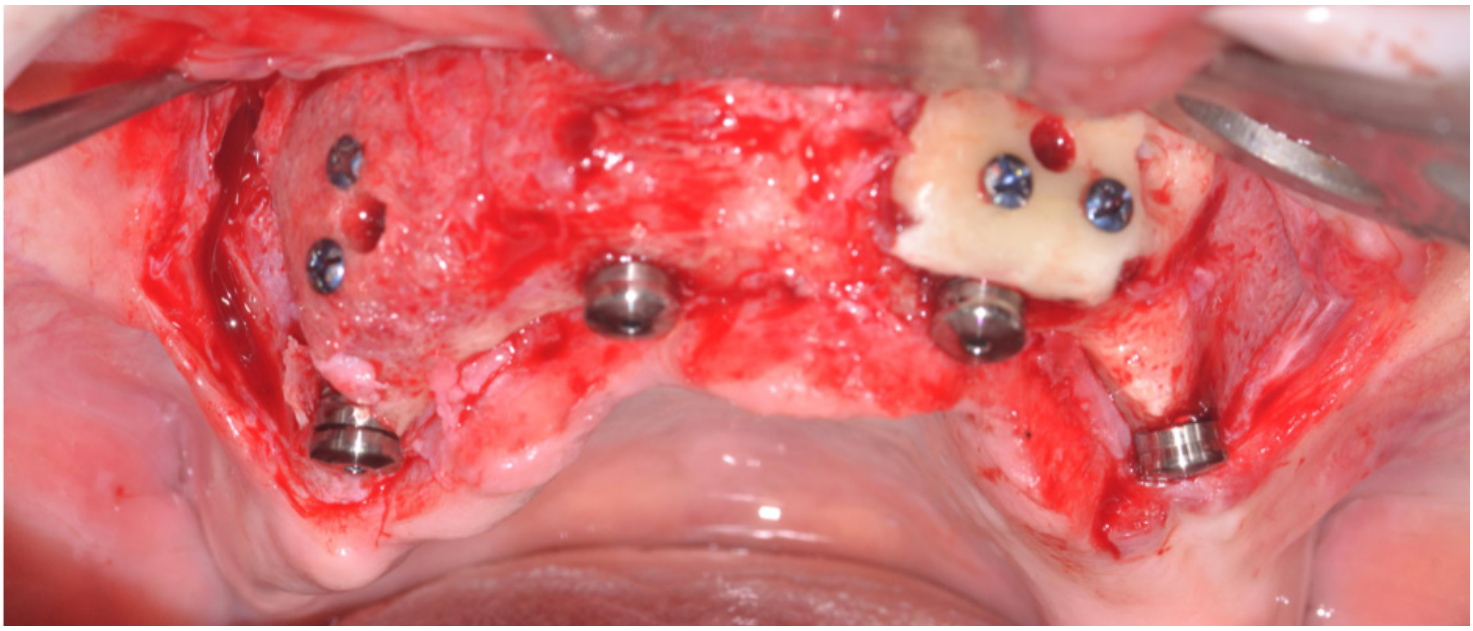


Situação na reabertura revelando osso maduro e contorno reconstruído do rebordo





Implantes BioDIRECT SWE instalados



4 x **BioDIRECT SWE instalados**

Estabilidade primária com Ostell **ISQ > 60** Travamento ≅ **45 Ncm**

Pedro Henrique de Azambuja Carvalho

Graduado em Odontologia com mérito pela Faculdade de Odontologia de Pelotas - FOP/UFPel (2013), bolsista PIBIC CNPq por 2 anos (2009 e 2010) e bolsista PROBITI/FAPERGS por dois anos (2011 e 2012), sob orientação do professor Rafael Guerra Lund, atuou nas áreas de farmacologia e controle de infecções, fitoterapia, micologia, desenvolvimento e teste microbiológico de biomateriais. Realizou trabalhos em saúde coletiva e populações escolares e atuou como estagiário no Departamento de Cirurgia, Traumatologia e Prótese Buco-Maxilo-Facial da FOP/UFPEL. Concluiu Residência em Área Profissional da Saúde Cirurgia e Traumatologia Buco-Maxilo-Faciais do Hospital Escola da Universidade Federal de Pelotas/EBSERH (2017). Atualmente é Bosista CAPES de Doutorado do programa de Pós Graduação em Ciências Odontológicas da faculdade de Odontologia de Araraquara- UNESP, na área de Concentração: Diagnóstico e Cirurgia. Atua nas áreas de traumatologia oral e maxilofacial, patologia oral e maxilofacial, diagnóstico e correção das deformidades dento-ósseas dos maxilares, cirurgia oral, implantodontia e procedimentos de enxertia óssea..

Valfrido Antonio Pereira Filho

Possui graduação em Odontologia pela Universidade Estadual Paulista Júlio de Mesquita Filho (1994), Mestrado em Clínica Odontológica pela Universidade Estadual de Campinas (1998) e Doutorado em Clínica Odontológica pela Universidade Estadual de Campinas (2002). Fellowship of University Hospital Johann Wolfgang Goeth--University Frankfurt am Main, em 2008. Atualmente é Professor Adjunto da Universidade Estadual Paulista Júlio de Mesquita Filho. Professor Permanente do Programa de Pós Graduação em Ciências Odontológicas da FOAr-Unesp (Capes 5). Foi presidente da Comissão Permanente de Pesquisa da FOAr no biênio de 2014-2016. Tem experiência na área de Odontologia, com ênfase em Cirurgia Buco-Maxilo-Facial, atuando principalmente nos seguintes temas: implante dentário, deformidade dentofacial, trauma facial e fixação interna.