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Hard And Soft Tissue Evaluation After Vertical Ridge Augmentation (VRA) With Non-Resorbable Membranes Versus Titanium Meshes. A Randomized Clinical Trial: 1-Year Follow-up.

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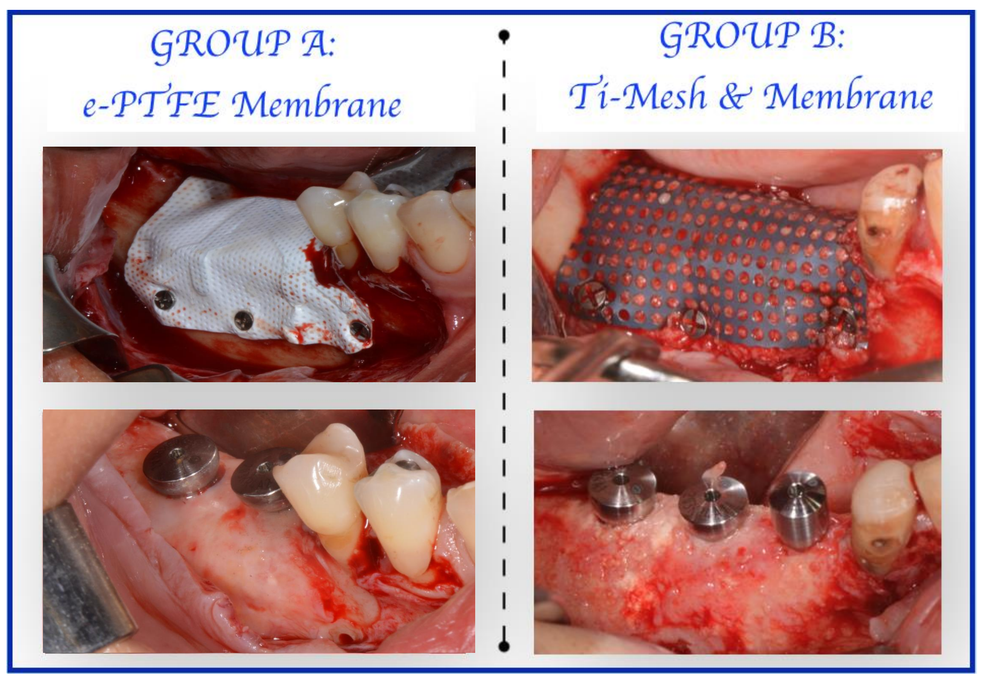
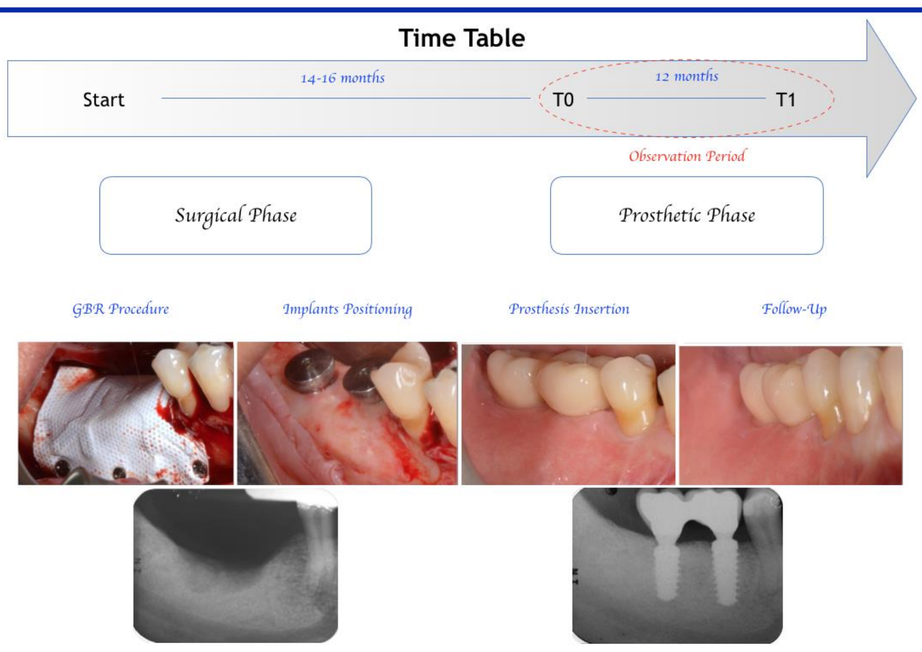
Introduction

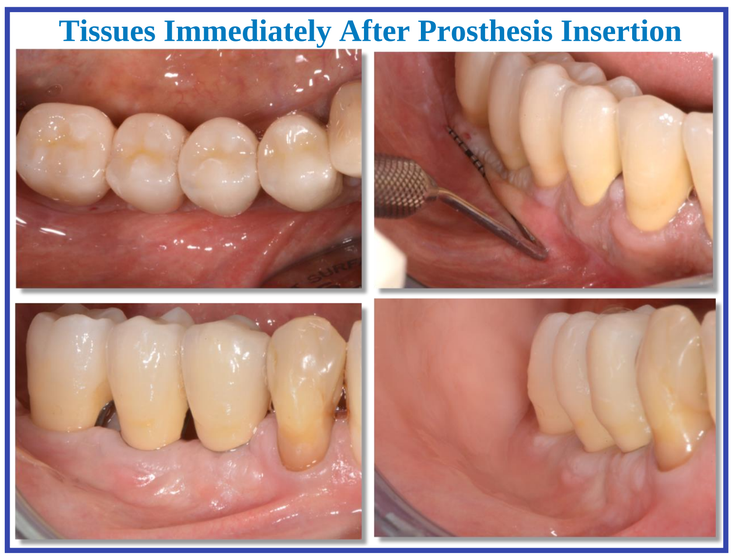
The aim of this study was to evaluate the quality of the hard and soft tissues around the implants placed in posterior jaw 12 months after guided bone regeneration (GBR).
The secondary objectives were to evaluate the correlation between periodontal parameters and clinical signs of inflammation; also to assess the impact of oral hygienic instructions provided during professional teeth scaling in these patients on periodontal tissue parameters.





Free-Gingival Connective Tissue Graft

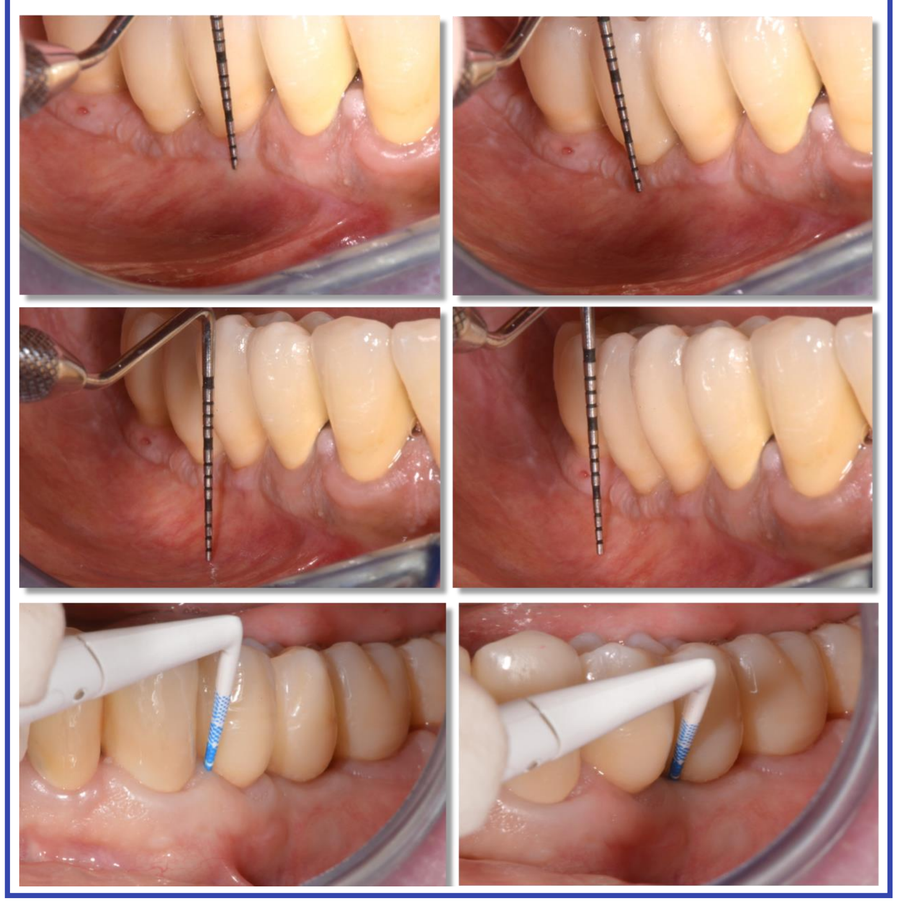
Tissues Immediately After Prosthesis Insertion



Materials & Methods

After the ethical committee approval of University of Bologna (Italy), 30 patients with partial mandibular edentulism with horizontal and/or vertical bone defects were enrolled and treated according to the study protocol. During reconstructive surgery (T0), patients were randomely divided into two study groups: 15 were treated by means of non-resorbable d-PTFE titanium-reinforced (Cytoplast Ti-250 XL, Osteogenics Biomedical, USA; De Ore srl, Verona, Italy) membranes (group-A) while the other 15 were treated by means of titanium meshes (Trinon, De Ore srl, Verona, Italy) covered by cross-linked collagen membranes (Osseoguard, Zimmer Biomet, Florida, USA) (group-B). All patients received simultaneously grafting material for bone regeneration prepared by mixing 50% autogenous bone, harvested from the external oblique ridge of the mandibular ramus using a bone scraper (Safescraper, Meta, De Ore srl, Verona, Italy), and 50% bone allograft (EnCore 50:50, Osteogenics Biomedical, USA; De Ore srl, Verona, Italy); threaded tapered implants (BT SAFE, BTK, Biotec, Vicenza, Italy) and double suture (Cytoplast, Osteogenics Biomedical, USA; De Ore srl, Verona, Italy).
All patients and implants had been evaluated at the baseline (T0) and at 1-year after definitive prosthetic restoration (T1) according to 8 periodontal parameters: pocket probing depth (PPD), plaque index (PI), bleeding on probing (BP), gingival index (GI), thickness and amount of keratinized tissue (TKT, TKA), depth of vestibular fornix and peri-implant level. A statistical analysis of recorded data was performed to investigate any statistically significant differences from T0 to T1 and between the study group ($\propto$=0.05).

Data Collection: Soft Tissue Evaluation and Probing At 1 Year



Results & Statistics

All patients and implants were revaluated at T0 and T1: 15 patients with 40 implants belonging to group A and 15 patients with 43 implants belonging to group B.
The thickness, amount of keratinized tissue, peri-implant level and BP showed statistically significant changes from T0 to T1. The BP showed an improvement from T0 to T1 while the thickness of keratinized tissue was less at T1; In addition, the dimension of keratinized tissue augmented, peri-implant bone level showed a resorption of 0.41 mm from T0 to T1. No correlations were noted between an increase of soft tissue inflammation and the amount of keratinized tissue or between vestibular fornix depth and bone loss. No statistically significant differences were recorded between group A and B.
Regarding the secondary aim of this study, we noticed excellent levels of oral healthcare related with low or absent peri-implant gingival inflammation.

Variable Name	Baseline	Follow-up	Significant Level
PPD	2.21 ± 1,22	2.06 ± 1.01	No significant
PI	**0-1:** 49.38 ± 2.39 **2-3**: 0.62 ± 2.39	**0-1**: 49.38 ± 2.39 **2-3**: 0.62 ± 2.39	No significant
BP	16.76 ± 16.82	9.30 ± 13.12	(p=Significant0.01)
GI	**0-1**: 49.40 ± 2.47 **2-3-4:** 0.60 ± 2.47	**0-1**: 49.40 ± 2.47 **2-3-4:** 0.60 ± 2.47	No significant
TKT	2.61 ± 1.22	2.07 ± 1.12	Significant (p=0.0074)
TKA	2.07 ± 1.21	2.62 ± 1.34	Significant (p=0.0001)
FD	6.67 ± 2.85	6.83 ± 2.31	No significant
BL	0.31 ± 0.67	0.73 ± 1.18	Significant (p=0.0001)

Discussion & Conclusions

The results of this randomized clinical trial confirmed that both bone augmentation techniques are suitable for restoration of horizontal and vertical bone defects in the posterior mandible. In both groups, hard and soft tissues were stable after 1 year of follow-up, with a peri-implant bone loss less than 0.5 mm in the first year.

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