GUIDED BONE REGENERATION ASSOCIATED WITH L-PRF VERTICAL BONE GAIN: A CASE REPORT

Felipe Vilhena Brilhante¹, Rodolfo José Gomes de Araújo², Ana Catarina Nunes Tavares³, Wagner Almeida de Andrade⁴, Cicero Almeida de Andrade⁴, Bruno Albuquerque Mauad⁵, Fabio Valverde Rodrigues Bastos Neto⁶, Jessica Mendes Damasceno², João Evandro da Silva Miranda⁷

1 Guarulhos University, Guarulhos, SP, Brazil
2 Federal University of Para, Belém, PA, Brazil
3 São Leopoldo Mandic Institute, Campinas, SP, Brazil
4 State University of Campinas, Campinas, SP, Brazil
5 Amazon College, Belém, PA, Brazil
6 Cruzeiro do Sul University, São Paulo, SP, Brazil
7 Sao Paulo University, Sao Paulo, SP, Brazil

CORRESPONDING AUTHOR: fbrilhante@hotmail.com

ABSTRACT

Every day have been increased the number of patients in the dental office looking for oral rehabilitation, many of them being a challenge to the dentist surgeon. Currently, implants are installed on guided bone regeneration, the use of membranes, titanium threads and bone substitutes are key parts for correcting bone defects and to support the implant. Thereunto, the aim of this study was the description of a case addressing the methods and materials used for guided bone regeneration with the use of L-PRF for vertical bone gain. The patient showed the absence of the elements 22, 23 and 24, and a bony defect arc in this region. The installation of the implants, followed by guided bone regeneration support with a titanium mesh was indicated. The use of guided bone regeneration technique involving the mesh titanium implants, bone and lyophilized bovine L-PRF membrane showed a viable technique, the succeeding vertical bone gain until the implant platform.

KEYWORDS: bone regeneration, fibrin, oral rehabilitation, dental implants

http://dx.doi.org/10.19177/jrd.v4e62017162-166

INTRODUCTION

Bone grafts have been used frequently in Dentistry for horizontal bone gain in patients with bone deficiencies which make impossible the appropriate installation of implants. However, the first choice for graft has been the autogenous, which mostly cases has been used in block, due to be considered the Golden standard for grafts. Meanwhile, vertical bone gain is still a challenge.

Despite the results, techniques which use autogenous bone graft need confection of two surgical beds. Oftentimes, the access to extraoral donor areas brings greater post-operative morbidity and consequently uncomforting to the patient. Then, several biomaterials have been studied in order to replace techniques which use autogenous bone graft. However, bone substitutes have only the osteoinduction property, what shows inferior results, when compared to autogenous grafts. Meanwhile, techniques for bone grafts, even with autogenous bone or bone substitute biomaterials have limitation in vertical bone gain.

Guided bone regeneration techniques using mechanical barriers, like titanium meshes or non-absorbable
membrane shave demonstrated good results in vertical bone tissue gain\(^6\text{-}10\). Some techniques have associated mechanical barriers and simultaneous implant installation to create a more stable framework to stimulate the bone formation\(^1\). Some studies have used mechanical barriers with combined use of morphogenetic protein, but the high cost and few prospective studies decrease this technique indication\(^12\text{-}13\). Platelet-rich fibrin has demonstrated good results as support on bone grafting techniques for bone remodeling and soft tissue healing\(^14\text{-}20\).

Therefore, this work has as aim describing, through a case report, the usage of guided bone regeneration using titanium mesh associated to implants installation, and using particulate biomaterial with L-PRF technique.

**CASE REPORT**

Female patient, 47 years old with favorable systemic health has searched implant specialization of Superior School of Amazônia (ESAMAZ) in Belém, Para state, in order to install implants in the region between lateral incisor and first premolar. However, after clinical examination and computed tomography we find that the patient had vertical bone loss characterized by a bone defect in the arch, making impossible anesthetic rehabilitation in the region through implants (Figures 1 and 2). Before the challenge to obtain vertical bone tissue, the guided bone regeneration technique using titanium mesh was proposed. By bone tomography, we observed that the patient had height and thickness bone tissue, what enables the implants installation (Figure 1).

Previously to the surgery, four tubes of blood were collected from the patient and started the centrifugation for L-PRF technique. Then, the surgical technique was initiated with bone crest linear incision, slightly palatinate to preserve greater mucosal volume (Figure 3), following to the total displacement surgical flap (Figure 4) and milling frequency to install the implants by surgical guide (Figure 5). Three External Hexagon Implants were installed (SIN implants) and a turn in supra bone in 3 to 4 mm were left exposed in order to the implants platform would achieve the same height than the cementitious junction of 11 element (Figures 6 and 7). With implants inserted, a titanium mesh was installed and stabilized at vestibular with two graft screws. For turn filling, inorganic bone graft (Gen Mix, Genius, Baumer, Brazil), mixed to L-PRF membrane perforated pieces (Figure 8). Over the particulate material, a L-PRF membrane was inserted (Figure 9). Next, the mesh modelling was confectioned to cover the biomaterial (Figure 10). Another L-PRF membrane was accommodated on the titanium mesh (Figure 11), finishing with horizontal mattress sutures on wound’s surgical lips and stabilized by simple surgery points (Figure 12).

After 6 from the surgery, a new tomography was solicited to follow the osseointegration and verify the vertical bone tissue gain by vestibular. Meanwhile, the same gain was not observed by palatine (Figures 13 and 14). Nevertheless, result found did not harm the implants stability. On the other hand, another surgical opening was planned to remove the titanium mesh and install healers. Then, gingival healing was followed to observe whether the peri-implant tissue keep itself stable or absorbing, exposing the implants (Figure 15). Due to the ongoing orthodontic treatment after only seven months from the surgical opening, mucosal tissue stability was verified in order to try a gingival conditioning. After 3 months from the conditioning, definitive metal ceramics crowns were installed through the provisional ones over the implants (Figures 16 and 17).
Figure 5. Install the implants by surgical guide.

Figure 6. Installed implants im supra bone.

Figure 7. Installed implants.

Figure 8. Inorganic bone graft mixed to L-PRF membrane perforated pieces.

Figure 9. L-PRF membrane.

Figure 10. Mesh modelling confectioned to cover the biomaterial.

Figure 11. Another L-PRF membrane was accommodated on the titanium mesh.

Figure 12. Finishing with horizontal mattress sutures.

Figure 13. A new tomography after 6 months.

Figure 14. Bone gain was not observed by palatine.

Figure 15. Healing abutment.

Figure 16. Provisional crowns.

DISCUSSION

Guided bone regeneration techniques using mechanical barriers have been described in the literature to gain vertical bone volume. However, the technique showed itself sensitive to the operator ability, bringing certain difficulties.

This case report allows observing the titanium mesh usage as mechanical barrier for bone formation is effective. On the other hand, the lack of soft tissue for total recovering of mesh and soft tissue tensioning through sutures promote post-surgical exposition of this mesh. This exposition may result in contamination of bone graft material.

L-PRF membranes usage shows potential to fight infection by leukocyte releasing and facilitates the titanium mesh covering, decreasing the soft tissues tensioning. This study allows observe an improvement on soft tissue
healing in 7 days, suggesting a faster healing by this material usage. L-PRF also has potential to stimulate new blood vessels (angiogenesis), then stimulating new vascularization on the surgical area, facilitating the cellular renovation and of any biomaterial for bone substitution, even a slow absorption.

This study presents a limitation due to the use of an external hexagon implant. Whether the use of cone morse implants probably the results could be better.

CONCLUSIONS

The use of bone guided regeneration technique associated to titanium mesh as mechanical barrier, implants and lyophilized bovine bone as osseoaductors and L-PRF membrane as stimulator of bone tissue cells and soft tissue on healing showed a viable technique obtaining success in vertical bone tissue gain until the implant platform.

Implant spires exposition for healing as bone biomaterial, despite being audacious, it is effective for bone formation on vertical defects. L-PRF membranes usage demonstrated possible fight over infection, even with postsurgical exposition of titanium mesh and provided a more favorable soft tissue healing in 7 days.

REFERENCES


