A Case Report

Soft & Hard Tissue Augmentation in Periodontically & Endodontically Compromised Teeth: A Case Report

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Access this article online

Website: www.healtalk.in

DOI: 10.4880/zenodo.7839777

Quick Response Code:

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Abstract

Periodontal regenerative and aesthetic surgeries often involve a series of complex procedures to attain a desired outcome. Gingival defects are not always confined to soft tissue, but may also be involved with bony defects. This case report emphasizes on the treatment of such cases with a combination of various hard and soft tissue procedures.

INTRODUCTION

Regenerative and plastic surgeries of modern era emphasizing on increasing awareness about esthetics has led to numerous treatment modalities for the gingival deformities of either soft or hard tissue origin. Sometimes these surgeries may require interventions at different stages and no single procedure could be sufficient in treating these defects meticulously and getting the desired outcomes.[1]

Since Platelet Rich Fibrin (PRF) duplicates the microcirculatory system generally and produces growth factors that are crucial for soft tissue healing, it has proven to be a successful treatment method for multiple tooth gingival recession coverage procedures. By applying PRF membrane to gingival recession defects, the labial surface of upper and lower teeth regenerates parts of the gingiva and restores the functionality of keratinized gingiva.[2] To prevent new "periodontal ligament (PDL)," "alveolar bone," and cementum to cover the denuded root surface the use of barriers with the GTR technique was put forward by Tinti and Vincenzi providing stability and efficacy in root coverage procedures.[3]

The next step towards the treatment of gingival recession is the regeneration of hard tissue after appropriate coverage is attained. For the bone augmentation, various surgical techniques have been employed which includes the use of bone grafts, guided bone regeneration with bio-resorbable or non-resorbable membrane, alveolar distraction osteogenesis and ridge splitting.[4] Due to its outstanding osteogenic, osteoconductive and osteoinductive properties, the autograft is considered as the gold standard of bone transplantation and as we know, due to increased patient morbidity and discomfort, intraoral autograft is the choice of treatment for bone augmentation.[5] With the advancement of bone harvesting procedures autogenous bone grafts can be harvested using Bone Trephine bur #5 for obtaining particulate cortical and cancellous bone. Furthermore, resorbable collagen membranes (GTR/GBR) owing to the advantage of one step surgical placement, good host acceptance and reasonably good manipulative consistency increases the overall prognosis.[6]

This case report includes the treatment of Miller's Class I and II multiple tooth recession coverage using L-PRF + resorbable collagen type I GTR membrane and then autogenous bone regeneration using trephine bur + Xenograft + GBR membrane.

CASE REPORT

A 25 year old male patient reported to the Department of Periodontology and Oral Implantology, J.N. Kapoor DAV (c) Dental College and Hospital, Yamunanagar, Haryana in November 2021 with chief complaint of receding gums in the lower front region of the jaw since 1 year. Patient had no previous medical history. On clinical examination, the patient was diagnosed with Miller's Class II recession in 41 and Miller's Class I recessions in 42, 31 and 32. On examination the tooth were grossly carious and discolored. The patient was undergoing orthodontic treatment since 1 year.

How to cite this article: Pandit Nymphea et al.: Soft & Hard Tissue Augmentation in Periodontically & Endodontically Compromised Teeth – A Case Report, HTAJOCD.2022;July-August(6):24-26.

The treatment was planned under 2 steps:

1. Recession coverage procedure using L-PRF + resorbable collagen type I GTR membrane.
2. Bone regeneration procedure using trephine bur + Xenograft + GBR membrane.

Informed consent form was obtained from the patient and then the surgery was planned. Prophylactic antibiotic medication, consisting of 500 mg amoxicillin and 400 mg metronidazole every 8 hours was initiated one day prior to surgery. The aforesaid regimen was supplemented with 600 mg of ibuprofen every 8 hours on the day of operation. For 1 minute, a presurgical rinse containing 0.2 percent chlorhexidine was employed. The antibiotic treatment was continued for another 5 days after surgery. Pre-operative clinical photographs were taken **(Figure1).**

The Local anaesthetic, 2% lignocaine hydrochloride containing adrenaline at a concentration of 1:80,000 was used to anaesthetize the involved area. On the labial aspect, intra-sulcular incision was made from mesial line angle of 32 to 42 using Bard parker number 15 blade. The flap was raised using the periosteal elevator till mucogingival line. After Periosteal Scouring a vestibular releasing incision was made using B.P Blade No. 15 just adjacent to surgical site extending from 32 to 42 **(Figure 2)**. The root surfaces were thoroughly planned and debrided using Gracey curettes **(Figure 3)**. After complete debridement L-PRF was obtained by collecting 12 ml of venous blood in PRF Tube (Lab tech) from patient right arm, centrifuged in Dentist's Centrifuge PRF machine (Lab. Tech, India) at 2700 rpm for 12 minutes. The L-PRF obtained was used to formulate a membrane by a PRF Box **(Figure 4)**. The L-PRF membrane was the placed on the recipient site and held in position **(Figure 5)**. Then the resorbable type I collagen GTR membrane was positioned in place **(Figure 6)**. The flap was then placed coronally and all the three i.e. L-PRF, GTR Membrane and flap were sutured using interrupted sling sutures **(Figure 7)**. After this surgery the soft tissues were allowed to heal and after 5 months, the second surgery was planned **(Figure 8)**.

Figure 1: Pre-operative

Figure 2: Incisions given

Figure 3: Debridement

Figure 4: L-PRF membrane

Figure 5: L-PRF membrane placement

Figure 6: GTR membrane placed

Figure 7: Suturing done

Figure 8: Post-operative after 5 months

Informed consent was obtained and pre-operative regimen was followed like before. Pre-operative radiographic image was taken **(Figure 9)**. A full thickness mucoperiosteal flap was reflected by giving intra-sulcular and vertical releasing incisions from 33 to 43 using Bard Parker blade no. 11 **(Figure 10)**. After complete exposure of bone, autogenous bone was harvested using bone trephine bur #4 mounted on 1000 rpm micro-motor handpiece in a circular block **(Figure 11)**. Bone mill was used to obtain particulate graft. Then the particulate bone graft was mixed with Xenograft and placed into the surgical site **(Figure 12 and 13)**. After proper placement of the graft, GTR/GBR bio-resorbable membrane was placed to cover the bony surface **(Figure 14)** and the flap was sutured with 4-0 mersilk sutures **(Figure 15)**. Post operative radiograph was documented after 2 months **(Figure 16)**.

Figure 9: Pre-operative

Figure 10: Flap reflected

Figure 11: Bone trephine bur harvesting

Figure 12: Xenograft + Particulate bone

Figure 13: Both grafts placed

Figure 14: GTR/GBR placement

Figure 15: Suturing done

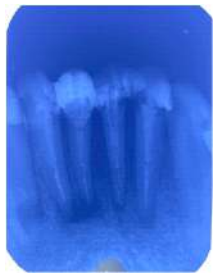

Figure 16: 2 months Post-operative

DISCUSSION

The present case report demonstrated better root coverage with the combination of L-PRF and GTR membrane and further better bone regeneration using trephine bur (for autogenous bone graft harvesting) in combination with Xenograft and GBR membrane. Recession coverage using L-PRF and GTR membrane are well tolerated by the patient with minimal post-operative discomfort, reduced chances of infections and improved healing potential.[1] The presence of growth factors such as Transforming Growth Factor-β (TGF-β), Platelet Derived Growth Factor (PDGF) and Vascular Endothelial Growth Factor (VEGF) provides a new dimension in the regenerative potential of L-PRF.[7]

Using a barrier membrane, either resorbable or non-resorbable, GTR (Guided tissue regeneration) maintains space over the surgical site, causing sectionalization and letting osteoblasts colonize the wound before epithelial and connective tissue cells, thereby repairing bone. The benefit of resorbable membranes is that they don't require a second surgical procedure for removal, thus minimizing patient discomfort and retaining tissue integrity.[8]

Another aspect of this case study was bone regeneration using autogenous particulate bone graft that was obtained from the anterior mandibular region using a trephine bur. The minimum resorption of the harvested bone graft, proximity to the recipient location, no need for hospitalization, ease of surgical access, and lack of cutaneous scar formation are few of the benefits of this area for bone grafting surgeries over other intraoral and extraoral sites.[9] A plentiful source of bone and marrow cells with osteogenic potential and an extensive osteoconductive surface area, but lacking rigidity and support, is made available by the particulate autograft. Corticocancellous blocks are therefore favoured because they have improved cancellous revascularization, mechanical support, and rigidity in the cortical section, all of which allow adequate bone augmentation.[5] The patient is still on the follow up for the serial radiographs to monitor bone regeneration and soft tissue modeling and will require the permanent restoration of the incisors.

CONCLUSION

This case report emphasizes the importance of multidisciplinary approach to achieve the optimal soft and hard tissue alignment in complex cases involving different tissues and regenerative potential of some recently introduced novel techniques. Within the limits of the study, significant amount of soft tissue coverage is achieved by the combination of L-PRF and GTR membrane over a five month follow up period and adequate amount of hard tissue augmentation is attained using autogenous particulate graft in combination with Xenograft and GBR.

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