Comparative evaluation of the efficacy of Collagen membrane and PRF membrane in a non invasive approach to root coverage using Pinhole Surgical Technique- A case report

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Abstract- Gingival recession (GR) is the most common periodontal condition that causes negative impact on plaque control, esthetics and hypersensitivity. The exposed root surfaces are prone to root caries and noncarious cervical lesion development .With the advancement of techniques various approaches for the management of recession are done. Pinhole surgical technique is one such approach which shows effective result in the treatment of root coverage.Various regenerative material are used along with the treatment to have a good clinical outcome. The purpose of the study was to investigate the efficacy of the Pinhole Surgical Technique (PST) along with PRF and collagen membrane for the management of miller's class I recession.

Index Terms- Marginal tissue recession, Gingival recession , Pinhole Surgical Technique

I. INTRODUCTION

M'ucogingival surgery', was first introduced by Friedman in 1957 and this surgical procedure forms the basis various root coverage techniques. The term Mucogingival therapy denotes the periodontal treatment for the correction of defects in the morphology and the position of soft tissue and underlying bone support around implants and teeth[1]. Then in 1993, Miller introduced the term 'periodontal plastic surgery', and was accepted by the international scientific community in 1996.

Over the past few decades , conventional flap surgeries were the treatment modalities for advanced periodontitis cases. In the 1980s, various researchers conducted studies to find a minimally invasive procedure for the treatment of root coverage. Wickham and Fitzpatric introduced the Minimally Invasive Surgery (MIS). They defined MIS as "These are smaller and more precise surgical procedures, utilizing small incisions, utilizing operating microscopes and microsurgical instruments and materials, to achieve same surgical end point as that of conventional surgical techniques. In 1995, Harrel and Rees first introduced, minimally invasive surgery (MIS) in periodontology.

Gingival recession is defined as the displacement of the margin tissue apical to the cemento-enamel junction (CEJ) [2].With the introduction of minimally invasive surgery (MIS), a new technique called Pinhole Surgical Technique (PST) was introduced for the management of marginal tissue recession. This technique was introduced by Dr. John C Chao in 2012[3].

The introduction of platelet-rich preparations has revolutionized the concept of healing and regenerative dentistry [4,5]. The latest innovations in the regenerative process is the use of platelet concentrates: 1) platelet-rich plasma (PRP) and 2) platelet-rich fibrin (PRF). Platelets secrete a significant amount of growth factors such as platelet-derived growth factors, vascular endothelial growth factors and cytokines, as well as many other adhesion factors. One of the major components in platelet concentrates are f PRF for the coverage of Miller's class I and II gingival recession defects when combined with various root coverage procedures. The following is a case report which was aimed to compare the efficacy of collagen membrane and PRF membrane for the treatment of MTR by pinhole surgical technique.

II. CASE REPORT :

A healthy female patient of 35 years reported to the Department of Periodontics with the chief complaint of unesthetic root exposure and hypersensitivity.The patient has undergone orthodontic treatment in the maxillary teeth also.The gingival recession in the patients was of Miller's Class I type MTR with thin gingival biotype in the mandibular region (33,34,43,44). Full mouth oral prophylaxis was done 1 week before the surgery.

III. SURGICAL PROCEDURE:

After examining the patient's oral hygiene local anesthesia was administered. Root planning of the tooth was also done before the treatment. A small pinhole is created at the height of the mucobuccal fold and orban's knife was used to elevate the mucosal tissues in apicocoronal direction (FIGURE 3& 9). All the attachment are freed and the entire mucogingival complex was advanced in the coronal direction. To stabilize the advanced tissues, collagen membrane was used on one side and PRF membrane on the other side (FIGURE 4 &11). A blood sample is taken without anticoagulant in 10-mL tubes which are then immediately centrifuged at 3000 rpm for 10 min. After centrifugation a fibrin clot is obtained in middle of the tube, acellular plasma at the top, and the red corpuscles at the bottom(FIGURE 10).Healiguide was used as collagen membrane in our study.Collagen membrane was cut into small strips and PRF was also made into two pieces.The cut membranes were introduced through the pinhole until there is sufficient fullness in the papillary tissues for self-holding the mucogingival tissue complex in the desired position(FIGURE 4&11). The advantages of this technique is that no incisions and no sutures are used. The entire mucogingival complex is moved in the coronal direction and the root coverage can be appreciated immediately (FIGURE 5 & 12) . No periodontal dressing was placed and patients were advised analgesics for 5 days and were informed to discontinue the medications when the pain subsides. The patients were reevaluated after 1 week and after 1 month:

Figure 1: Measurement of recession width at baseline

Figure 2: Measurement of recession height at baseline

Figure 3: Pinhole incision in alveolar mucosa

Figure 4 : Insertion of collagen membrane

Figure 5: Immediately after treatment

Figure 6: Postoperative healing after 1 month

Figure 7: Measurement of recession height at baseline

Figure 8: Measurement of recession width at baseline

Figure 9: Pinhole incision in alveolar mucosa

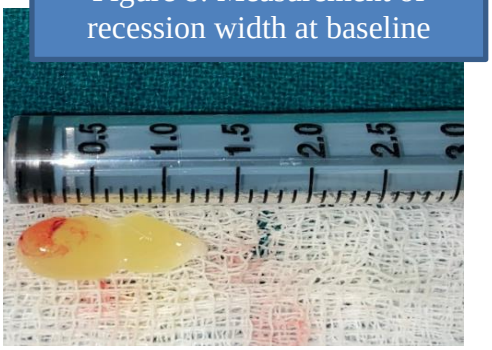

Figure 10: PRF membrane

Figure 11: Insertion of PRF membrane

Figure 12: : Immediately after treatment

Figure 13: Postoperative healing after 1 month

IV. RESULT :

This technique shows promising result with both collagen membrane and PRF.There has been prominent increase in recession height(RH), recession width (RW) and width of keratinised gingiva (WKT) both with collagen membrane and PRF. Partial root coverage is observed in both the canines and the remaining sites shows complete root coverage as well as increase in the thickness of keratinized gingiva(FIGURE 6 & 13).Slight post operative swelling for 2 days is reported by the patient.Apart from that healing was uneventful and the results were satisfactory. Indepth studies with more cases are required for better understanding of the technique and to confirm the efficacy of this technique.

V. DISCUSSION:

Chao's PST for the treatment of Miller's Class I recession has showed satisfactory and highly esthetic root coverage.Platelet rich fibrin was first prepared by Choukron et al 2001 in France[6]. It is a second generation platelet concentrate[7]. Autologous leukocyte PRF matrix is the main constituents of prf and it is a tetra molecular structure consisting of platelets, stem cells and cytokines. Tofler et al.[8] used PRF membrane in a maxillary sinus lift procedure to seal a sinus membrane perforation during a lateral window osteotomy. Simonpieri et al.[9]achieved good clinical results using a mixture of PRF with a bone graft and placing in bone defects, or, in cases of immediate implants.According to Dohan et al.[10] PRF has antibacterial and immunological properties, which may lead to leukocyte degranulation, and cytokines that may lead to pro/anti-inflammatory reactions and angiogenesis.

The ultimate goal of any root coverage procedure is to gain clinical attachment level.Studies in humans and animals proved that collagen membrane helps in the establishment of a new connective tissue attachment[11].According to Chambrone et al. sub epithelial connective tissue graft (SECTG) is the gold standard in the management of root coverage[12].According to Pippi et al.(2017) free gingival graft had a higher postoperative pain in comparision CTG and no difference in wound healing after 3 weeks[13.] However, the difficulty arises as it involves a second surgical site which causes pain.[14]

Both collagen membrane and PRF in this technique gives us satisfactory results. In PST,flaps are not elevated and tissue thickness available at the host bed is completely utilized for the regenerative process[15] . No actual separation of the underling tissues is done in PST. Some transient changes is observed in vascularity and this helps in the early wound healing process.

VI. CONCLUSION:

Several factors are responsible for the of choice technique, and every technique have specific indications, contraindications, advantages and disadvantages. The clinician should aim for surgical protocol which is least traumatic for the patient and also yield good clinical outcome. The use of Platelet Rich Fibrin for the regenerative process present new possibilities in this area of research. Chao's PST was found to be very much effective for the treatment of multiple marginal tissue recession with minimal patient discomfort and maximal esthetic outcomes.From our case report it can be concluded that PST is a definitive treatment technique for the management of multiple MTR and as an alternative to various techniques.

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