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Periodontal microsurgery using Zucchelli's modification of coronally advanced flap with PRF membrane for root coverage

Manish Rathi, Anil Kumar Jha, Sangeeta Singh, Priyanka Prakash

ABSTRACT

Introduction: Marginal tissue recession (MTR) is a most common mucogingival condition found in population. The patient's concerns include poor esthetics leading to root exposure and sensitivity, affecting patient's quality of life. Multiple novel techniques have been introduced for treating isolated as well as multiple MTR. Zucchelli introduced a modification of coronally advanced flap(CAF) for treating multiple MTR in the esthetic region. Results from many randomized clinical trials have shown autologous platelet-rich fibrin (PRF) having remarkable ability of promoting soft-tissue wound healing. This case report highlights the use of Zucchelli's modification of CAF with PRF under the periodontal microscope to treat multiple MTR. Case Report: A 42-year-old male non-smoker, reported to this centre with complaint of receding gums and sensitivity in upper left anterior teeth region. Multiple MTR (Miller's Class I) was observed in maxillary left lateral incisor, cuspid and first premolar. Root coverage procedure was done using Zucchelli's modification of CAF with PRF membrane under periodontal microscope. Six months post-operative results revealed 100% root coverage with reduction in hypersensitivity and higher patient satisfaction. Conclusion: With the introduction of minimally invasive technique in dentistry, periodontal microsurgery has led to excellent postoperative outcomes in terms of patient perception and clinical results. This case report demonstrates the effectiveness of periodontal microsurgery which utilises the microincisions and improved visibility of the operating field. This reduces the post-operative discomfort, better clinical outcome of the procedure. The use of PRF membrane provides an alternative in cases where SCTG is not feasible.

Keywords: Cosmetic periodontal plastic surgery, Gingival recession, Mucogingival surgery, Plastic periodontal surgery

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INTRODUCTION

Marginal tissue recession (MTR) is the apical migration of gingival tissues leading to root exposure. This results in unesthetic appearance, root hypersensitivity

as well as chances of developing root caries. Risk factors most commonly associated with MTR are trauma, malpositioned teeth, inflammation and tobacco consumption [1].

MTR can present as an isolated or multiple adjacent. Several techniques have been proposed for treatment of MTR. The aim of the periodontal plastic surgical procedures is to achieve complete root coverage with tissues that blends with adjacent mucosa. Most predictable of these procedures are based on the coronally advanced flap (CAF) in combination with a connective tissue graft (CTG) (bilaminar technique) and considered as the 'gold standard '[2].

Treatment of multiple adjacent recessions is challenging due to greater avascular tooth surface and difficulty in addressing all adjacent recession defects in a single surgery. Zucchelli and de Sanctis introduced a modified coronally advanced flap (MCAF) which demonstrated high effectiveness in achieving root coverage on multiple adjacent recession in esthetic areas [3].

Many materials have also been proposed aiming at improving the clinical outcomes such as Enamel matrix derivatives(EMD), Acellular dermal matrix(ADM), Platelet-rich plasma(PRP) with varying amount of success [4–6]. In early 2000's, a new concept was developed where modification was done for the centrifugation procedures for PRP, which lead to formation of Platelet-rich fibrin(PRF). Since then, this second-generation blood derivative which is an excellent source of leukocytes and growth factors, has been utilized for numerous surgical procedures.

The aim of this article is to present a case report where multiple adjacent marginal tissue recession was treated using Zucchelli's modification of coronally advanced flap using PRF membrane under periodontal microscope.

CASE REPORT

A 42-year-old male patient presented with a complaint of sensitivity and unesthetic appearance in the maxillary left front tooth region since 6 months. Clinical examination revealed a Miller's Class I recession of 2mm in maxillary left lateral incisor, cuspid and first premolar. Average probing depth of the region was 2-3mm with adequate amount of keratinised tissue present apical to area of recession.

After thorough evaluation, the patient was explained about the procedure and an informed consent signed by patient was taken for the surgical procedure. The patient was counselled and oral hygiene motivation along with oral prophylaxis was carried out.

Surgical procedure

The procedure was done under local anaesthesia (2% lignocaine with 1:80,000 adrenaline), MCAF technique included oblique submarginal incisions which were made in the interdental areas, followed by intrasulcular incisions around the involved teeth. Flap was then elevated in a split-full-split fashion from coronal to apical direction. Initially a split thickness flap was elevated which was followed by full thickness mucoperiosteal flap upto the crest of alveolar bone and continued as split thickness incision in the most apical part to allow for the coronal repositioning of the flap. Interdental papillae were deepithelialized to create a connective tissue bed (Figures 1–3).

Platelet-rich fibrin (PRF) was prepared by collecting intravenous blood in two 10-ml vials without anticoagulant. It was then centrifuged at 3000 rpm for 10 mins. PRF membrane was obtained by compressing the fibrin clot and positioned over the recession defects, just below the CEJ. The flap was then advanced coronally and secured using sling suture with 4-0 polypropylene (Figures 4–5).

Post-operative care

The patient was prescribed antibiotics for 5 days and 0.12% chlorhexidine digluconate mouth rinse for 2 weeks. Patient was advised not to brush in the operated area. Periodontal dressing and sutures were removed 10 days post-surgery oral hygiene instructions reinforced.. Patient was then reviewed after 6 weeks and after 6months where all the clinical parameters were re-observed. A 100% root coverage was observed in all the recession defects which was calculated according to formula (Figure 6).

$$\frac{100 \times \text{Root Coverage (baseline recession depth-6 months follow-up recession depth}}{\text{Baseline recession}}$$

DISCUSSION

Therapeutic intervention for multiple MTR has become an important aspect due to patient's esthetic

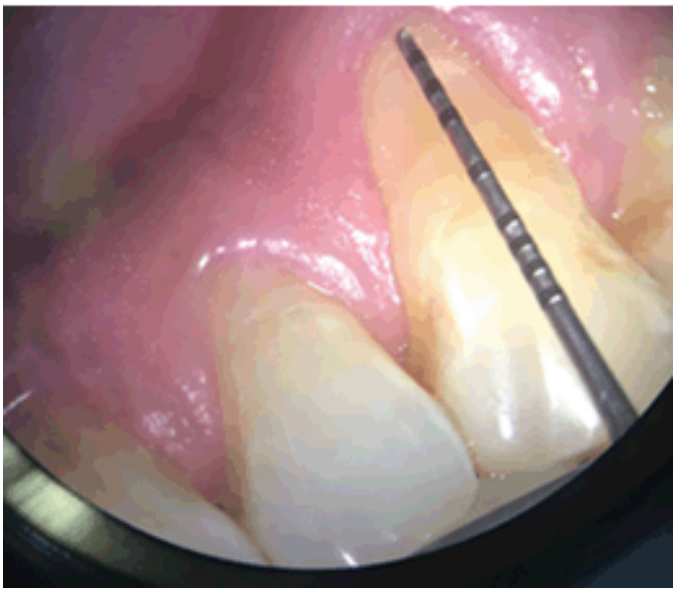

Figure 1: Pre-operative image of marginal tissue recession under 8X magnification.

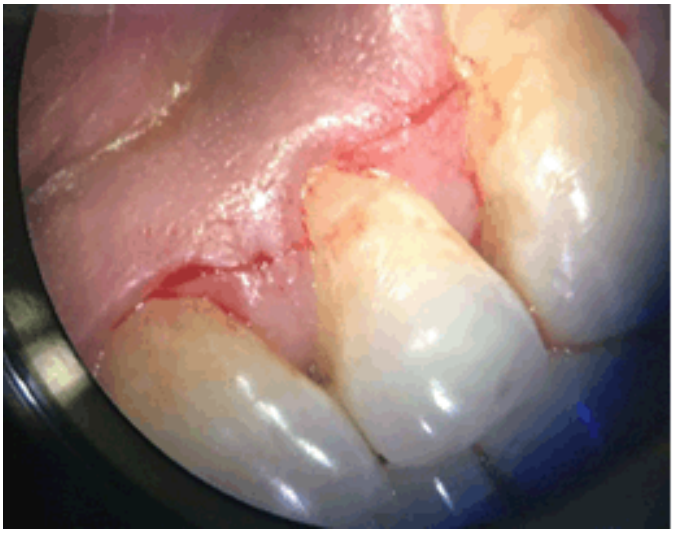

Figure 2: Incision using Zucchelli's modification of coronally advanced flap.

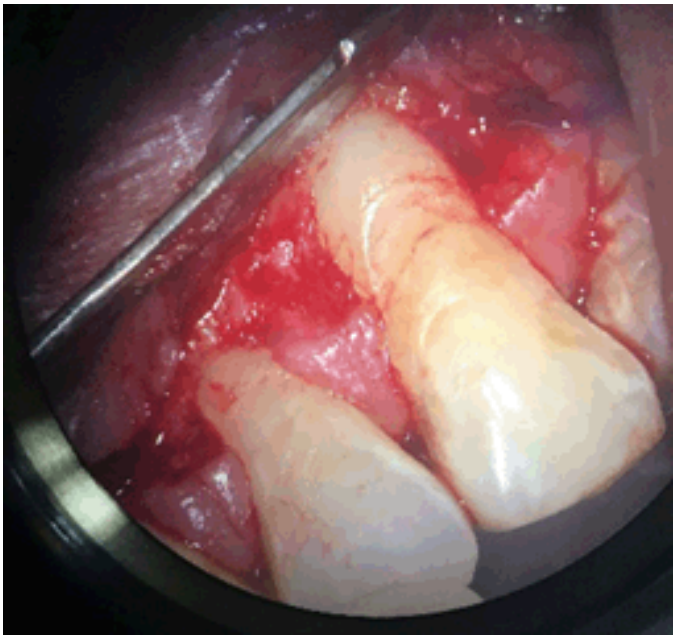

Figure 3: Flap elevation under 8X magnification.

demands, especially in cases with high lip line. Periodontal plastic surgery includes "surgical procedures performed to correct or eliminate anatomic, developmental or traumatic deformities of the gingiva or alveolar mucosa". Complete root coverage is considered as the ultimate outcome of periodontal plastic surgery which leads to resolution of hypersensitivity and esthetic satisfaction [7]. The combination of CAF with SCTG, which is considered as 'gold standard', cannot be utilised in every individual. This could be due to insufficient amount of connective tissue, unwillingness of patient for a second surgical site due to additional morbidity associated with these invasive procedures. Therefore, the use of autologous PRF membrane can be justified in patients which are not indicated for connective tissue grafting techniques.

The focus has now gradually shifted on performing the periodontal surgeries as minimally invasive as possible,

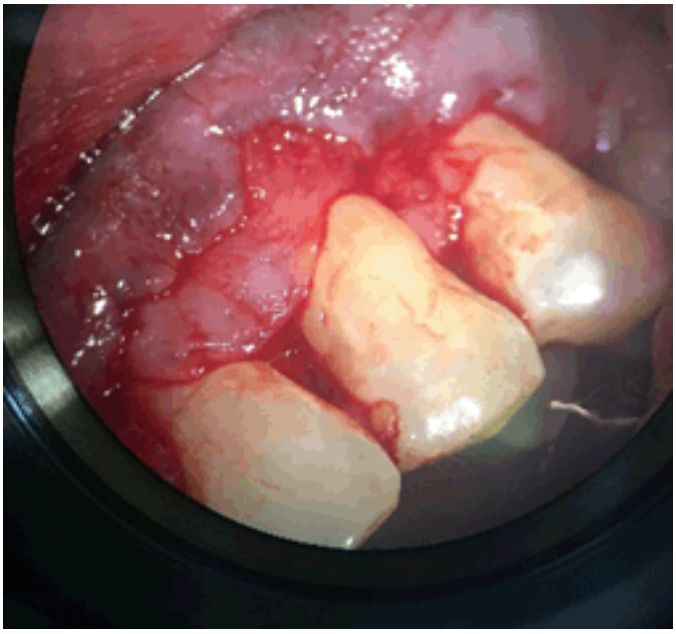

Figure 4: Placement of Platelet Rich Fibrin membrane.

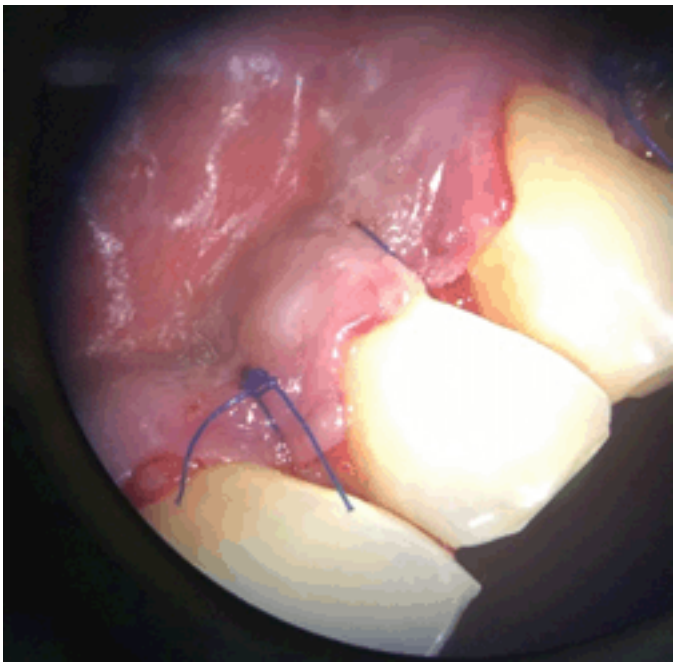

Figure 5: Flap closure using 5-0 non-resorbable polypropylene sutures under 8X magnification.

the incorporation of surgical microscope for periodontal plastic surgeries has led to better visibility of the operating field resulting in minimum trauma to soft tissues and enhanced surgical results. The incorporation of finer microsurgical instruments and delicate techniques results in extremely fine and accurate incisions, and precise repositioning of the wound margins using finer needles and sutures. The results obtained were esthetically better compared to conventional techniques which can be attributed to extremely fine microincisions, gentle tissue handling and precise suturing which resulted in rapid wound healing, low morbidity and less post-operative

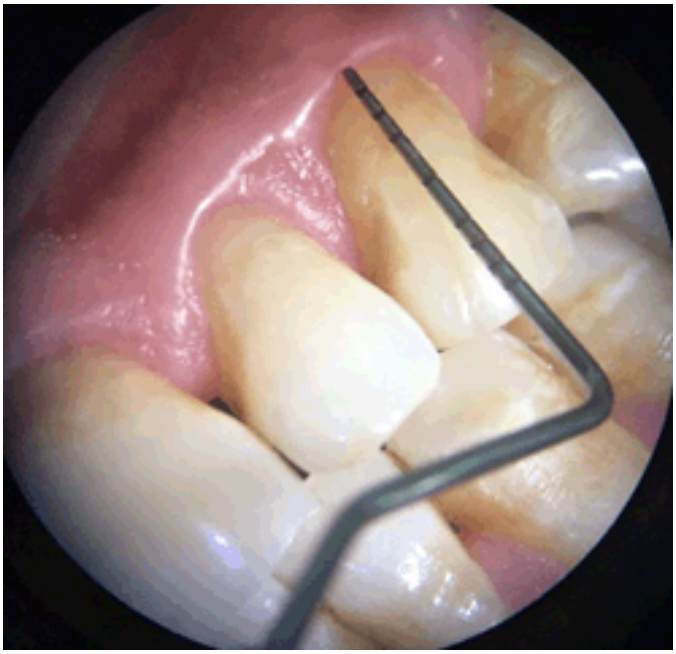

Figure 6: One year post-operative results showing complete root coverage.

discomfort. Periodontal plastic surgical procedures when performed using microsurgical approach, resulted in excellent treatment outcomes which were clinical significant when compared with clinical performance under routine macroscopic conditions [8].

This case report demonstrated the use MCAF technique alongwith autologous PRF membrane that was performed under periodontal microscope. The aim was to follow the principles of minimal invasive surgery to minimizing patient's discomfort and gain desired treatment outcome which are esthetically acceptable.

CONCLUSION

The MCAF technique using PRF membrane under periodontal microscope by utilising the principles of minimally invasive surgery has led to excellent results. However long term studies with larger sample size are required to demonstrate its clinical significance.

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Author Contributions

Manish Rathi – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Final approval of the version to be published
Anil Kumar Jha – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published
Sangeeta Singh – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published
Priyanka Prakash – Conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Consent Statement

Written informed consent was obtained from the patient for publication of this study.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.