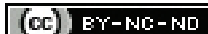


# Minimally Invasive Surgical Approach for the Treatment of Miller's Class I Recession Defects- A Report of Two Cases

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## ABSTRACT

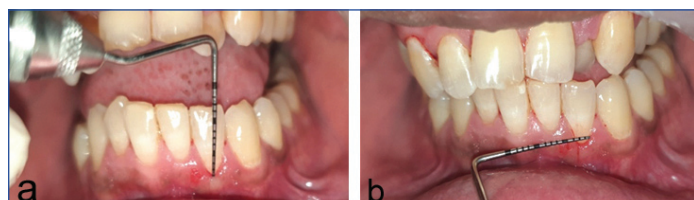
Gingival recession is defined as the apical displacement of the gingival margin leading to exposure of the root surface. Occurrence of the gingival recessions in the anterior teeth is a major concern for the patients as it leads to compromised aesthetics and achieving the aesthetics and functional requirements of the patients remains a major therapeutic challenge for the treating dental surgeon. Incorporating the principles of Minimally Invasive Surgical Technique (MIST), surgical trauma is minimised, thus causing less cell damage, eventually resulting in less inflammation and less discomfort. MIST aims to achieve aesthetically superior outcomes that are made possible due to improved visual acuity. Therefore, the intent of this case report was to emphasise the impact of implementing the minimally invasive surgical procedure in the management of marginal gingival recessions using the conventional Coronally Advanced Flap (CAF) and the Tarnow's technique, with the use of microsurgical instruments and magnifying surgical loupes.

**Keywords:** Coronally advanced flap, Gingival recession, Microsurgery, Periodontal plastic surgery, Root coverage

## CASE REPORT

### Case 1- Conventional Coronally Advanced Flap Technique

A 32-year-old male patient, reported to the Department of Periodontology with the chief complaint of unaesthetic appearance due to receding gums; localised to one tooth in the left lower front region, observed by the patient 4-5 months ago. Patient did not report any relevant past medical or dental history. Radiographic examination revealed no bone loss. All the clinical parameters of probing depth [1], plaque index [1], plaque index score (Loe-Silness) [1], clinical attachment level [2], recession depth [2], recession width [2] and gingival biotype [3] were recorded. Thus the diagnosis of Miller's class 1 gingival recession [4] was made for the left mandibular lateral incisor (tooth number 32) [Table/Fig-1a,b]. The decision was made to perform root coverage procedure by the means of Coronally Advanced Flap (CAF) technique as described by Norberg in 1926 [5], a technique that has been advocated for the treatment of the isolated gingival recession defects [5]. Informed consent was obtained from the patient.



**[Table/Fig-1]:** a,b) Preoperative picture of left mandibular lateral incisor showing gingival recession.  
Clinical examination: Probing depths

**Surgical technique:** The armamentarium for the case report has been depicted in detail in [Table/Fig-2].

The patient was advised for presurgical rinse using 0.2% chlorhexidine gluconate solution {Dr. Reddy's Clohex Anti Discolouration System (ADS) mouthwash}. Disinfection of the extraoral surfaces using 10% povidone iodine was done and local anaesthesia {Lignox (LOX) 2% adrenaline,1:200000} was administered. Implementing the Minimally Invasive Surgical Technique (MIST) principles, horizontal releasing incisions were given in the mesial and distal aspects, at a distance equal to Recession Depth (RD)+1 mm from



**[Table/Fig-2]:** Armamentarium required for Coronally Advanced Flap Technique.

the tip of the interdental papillae [Table/Fig-3a,b]. An intrasulcular incision was made at the labial aspect of the tooth to be treated. This was followed by two non parallel, minimally diverging incisions, starting from the ends of the two horizontal incisions and extending upto the alveolar mucosa. The trapezoidal design of the flap thus obtained was elevated with a split-full-split thickness technique directed in the coronal direction, exposing upto 3-4 mm of bone [Table/Fig-3c].

De-epithelialization of the facial part of the anatomic interdental papillae was done, followed by root biomodification; using 10% tetracycline hydrochloride solution (Humoxy-Coax Bioremedies). Periosteal releasing incision was then given using a sharp dissection to allow adequate flap mobilisation. Passive closure of the flap was done using 5-0 vicryl sutures [Table/Fig-3d].

**Postsurgical instructions:** Postsurgical instructions were given and patients were instructed to leave the surgical site undisturbed. The Non Steroidal Anti-Inflammatory Drugs (NSAIDs) (Ibuprofen 800 mg every 12 hours) were prescribed for three days to allow an uneventful healing phase and 0.2% chlorhexidine gluconate (Dr. Reddy's Clohex ADS mouthwash) to be used twice everyday for two weeks. Patients were recalled after three weeks [Table/Fig-3e] for suture removal and were monitored regularly postoperatively for about 24 weeks [Table/Fig-3f] ensuring for the maintenance of a good oral hygiene in the surgical area.



**[Table/Fig-3]:** Case 1 Conventional Coronally Advanced Flap Technique; a) Line diagram depicting incision design b) Horizontal releasing incision using ophthalmic blade c) Trapezoidal Flap Design d) Suturing done using 5-0 vicryl sutures e) Follow-up at three weeks f) Follow-up at 24 weeks.

In the follow-up visits, the distance from the Cemento-enamel Junction (CEJ) to the free gingival margin i.e the recession depth was calculated, using the millimeter markings of the University of North Carolina-15 (UNC-15) periodontal probe. The root coverage outcome percentage was calculated using the following formula [6]; (Preoperative recession- Postoperative recession depth) \*100=Percentage of root coverage preoperative recession depth.

Intraoral findings for the specific case have been elucidated in [Table/Fig-4].

S. No.	Clinical findings	Preoperative	Postoperative (6 months)
1.	Plaque index score	1	1
2.	Probing depth (mm)	1	1
3.	Recession depth (mm)	1	0
4.	Recession width (mm)	3	0
5.	Clinical attachment level (mm)	2	1
6.	Gingival biotype	Thick	Thick
7.	Recession coverage percentage=100%		

**[Table/Fig-4]:** Case-1: Clinical findings- Conventional Coronally Advanced Flap (CAF).

### Case 2- Semilunar Coronally Advanced Flap-Tarnow's Technique

A 32-year-old male patient reported with the chief complaint of unaesthetic appearance due to receding gums; localised to a tooth in the right upper front region [Table/Fig-5a,b], since 4-5 months. The patient was systemically healthy and no relevant dental history was reported by the patient. Radiographic examination revealed no bone loss. And thus the diagnosis of Miller's Class 1 gingival recession [4] was made in the right maxillary canine (tooth number 13) [Table/Fig-5a,b]. The decision was made to perform root coverage procedure using Semilunar CAF technique as described by Tarnow DP in 1986 [7], for the treatment of the isolated recession defect simultaneously preserving the papillary anatomy [7].

Presurgical preparation was done as described earlier. A semilunar incision was designed and specified following the curvature of the free gingival margin [Table/Fig-5b]. Midfacially, the curved incision was extended far enough so that the apical curve of the incision rested on the bone after it was brought down to cover the uncovered portion of the root. The incision was extended upto the papilla on each end of the tooth, not involving the tip of the papilla so as to leave a minimum of 2 mm on either side of the flap, thus leaving the blood supply reach the flap unhampered. The initial incision line was directed coronally

to connect with the intrasulcular incision made midfacially with a split thickness technique [Table/Fig-5c]. The resultant semilunar shaped flap was then positioned 1-2 mm coronal to the CEJ, upto the height of the adjacent papillae [Table/Fig-5d]. After flap approximation, suturing was done using 5-0 vicryl sutures [Table/Fig-5e].



**[Table/Fig-5]:** Case 2- Semilunar Coronally Advanced Flap Technique; a) Preoperative; b) Line diagram depicting the incision design; c) Semilunar Incision given; d) Semilunar flap; e) Suturing done using 5-0 vicryl sutures; f) Follow-up at three weeks and g) Follow-up at 24 weeks.

**Postsurgical instructions:** Postsurgical instructions were given as suggested earlier. Patient was recalled after three weeks [Table/Fig-5f] for suture removal and was monitored regularly postoperatively for about 24 weeks [Table/Fig-5g] ensuring for the maintenance of a good oral hygiene in the surgical area. The root coverage outcome percentage was calculated as described earlier. Intraoral findings for the specific case have been elucidated in [Table/Fig-6].

S. No.	Clinical findings	Preoperative	Postoperative (6 months)
1.	Plaque index	1	1
2.	Probing depth (in mm)	1	1
3.	Recession depth (in mm)	1	0
4.	Recession width (in mm)	3	0
5.	Clinical attachment level (in mm)	2	1
6.	Gingival biotype	Thick	Thick
7.	Recession coverage percentage=100%		

**[Table/Fig-6]:** Case 2: Clinical findings- Semilunar Coronally Advanced Flap.

In both the cases, recession defects depicted complete coverage (100%) at 24 weeks follow-up [Table/Fig-4,6].

### DISCUSSION

Gingival recession is a condition where the gingival margin shifts apically from its physiologic position; causing pathologic exposure of the root surfaces. The patients start complaining of hypersensitivity, black discolouration due to root caries and improper plaque removal in the exposed root surfaces [8]. Periodontal plastic surgery is the appropriate treatment option suggested for the patients with aesthetic concerns due to the uncovered root surface [9].

In 1993, Hunter and Sackier defined the Minimally Invasive Surgical Technique (MIST) as a practice that permits precise incisions of the periodontal flap, minimal flap reflection thereby preserving the soft tissues, discussed by Harrel SK; study [10]. This further helps in achieving a passive and primary wound closure. Using magnification tools makes it more predictable as it improves the work accuracy by bringing the working field closer to the eyes and enhancing the surgeon's fine motor skills [11]. These elements assure the modern day patients who envisage the most painless and minimally invasive treatment to be delivered to them [12]. Norberg advocated a common and very reliable periodontal plastic surgical procedure-Coronally Advanced Flap (CAF); to achieve root coverage with an inclusive recovery of the original morphology of the marginal soft tissues [5].

It is important to emphasise on the best available evidence and select the most foreseeable surgical approach for root coverage in a given clinical situation due to increased aesthetic concerns of the patient [13]. This case report contemplates the importance of the principles of periodontal microsurgery that provides enhanced visual acuity and better soft tissue management, further improving the outcome of CAF procedure and its modifications, for root coverage in a minimally invasive manner. Minimally invasive approach improves the vascularization by ascertaining the preparation of a well-defined split thickness flap along with maintaining the thickness for the entire flap preparation. It ensures maintaining primary wound closure, thus respecting the biological principles, thereby bringing about the enhancement of clinical parameters and reduced patient morbidity [14].

CAF procedure brings forth optimum results by providing good colour blending of the treated and the surrounding soft tissues and an inclusive recovery of the original morphology of the marginal soft tissues as well [5]. A modification of CAF procedure was described by Tarnow DP in 1986 with the advantage that it results in no tension on the flap, no shortening of the vestibule and no interference to the existing papillae. In this technique, the sutures may not be essentially required, with the flap stabilisation being achieved with the periodontal dressing itself [6]. CAF procedures however can be only utilised for Miller's class I and class II root recession defects. Also, the residual keratinized tissue present should be same as the depth of the recession defect should be present, thus limiting this approach to shallow recession depth i.e., equal to or less than 3 mm [15].

In 2015, Kang J et al., conducted four randomised clinical trials to evaluate if microsurgical methods provide better results in root coverage when compared to conventional surgical methods and concluded that the use of magnification and finer instruments provide greater opportunities of achieving complete root coverage as compared to conventional methods. And therein, the microsurgical approach clearly contributed with a remarkable improvement of about 8% on an average [16]. Rossi R in 2019 conducted a systematic review on the use of CAF procedure for the treatment of gingival recessions in the aesthetic area using the microsurgical approach and he concluded that CAF offers today the most reliable

and effective solution to this problem and the association of this procedure with the use of the microscope, makes it less morbid and more delicate and accurate [17].

Similarly in the present case report, clinically significant coverage of the recession defect was achieved for both the cases which is in coherence with the results seen in the microsurgical groups in the controlled trials mentioned above.

## CONCLUSION(S)

The use of magnification reduces the surgical fatigue and the subsequent musculoskeletal problems for the clinician, simultaneously inflicting minimal tissue trauma and a comfortable healing phase. This also helps increase the patient's acceptance towards the surgical procedure. Multiple beneficial outcomes of the minimally invasive surgical approach makes it essential to be incorporated in our daily practice decisively. Hence, Minimally invasive surgical approach inevitably leads to superior healing outcomes with more promising results.

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