

The Laterally Closed Tunnel Technique – A Case Report on Millers Class III Gingival Recession

Dr MidhunKishor S MDS *,Dr Anju S Sreedhar MDS **,Dr Vidya G Nair MDS*

Periodontist and Implantologist ,Privatepractitioner,Trivandrum*

Periodontist and Implantologist,PrivatePractitioner,Calicut**

ABSTRACT

Gingival recession is defined as “the displacement of marginal tissue apical to the cementoenameljunction.It is considered as one of the most common mucogingival problem with multiple etiology.It is characterized by the loss of periodontal connective tissue fibers along the cementum of the root associated with loss of alveolar bone.Different treatment modalities are implicated for the management of gingival recession based on the classification or type of defect. This case report focused on successful management of Miller’s class III gingival recession using laterally closed tunnel technique with Sub epithelial connective tissue graft.

Key words :Gingival recession ,Laterally Closed Tunnel technique,Vestibule deepening

INTRODUCTION

Gingival recession is a frequent clinical feature in the general population . Gingival recession (GR) can be defined as the exposure of the root surface caused by an apical shift in the gingival margin¹.The etiology of gingival recession is multifactorial in nature .Various periodontal disease such as bone resorption, periodontal pockets, accumulation of plaque and calculus, mechanical forces such as improper flossing and tooth brushing, improper occlusal relationships, iatrogenic factors such as orthodontic tooth movements, anatomical factors including alveolar bone dehiscence, tooth malposition, aberrant frenal attachment ,improperly designed partial dentures, smoking and subgingival restorations ,are considered the main conditions leading to the development of these defects.²

Gingival recession can be assessed by an appearance of a long clinical tooth and varied proportion of the teeth when compared with adjacent teeth. Marginal tissue recession not just affects gingival aesthetics but also places the patient at risk for root caries, abrasion/erosion of roots ,gingival bleeding , plaque retention, and hypersensitivity of teeth.³

Several surgical approaches for covering exposed root surfaces, including coronally advanced flap , modification of coronally advanced flap , laterally positioned flap, double pedicle flap, fully or partially epithelialized free gingival grafts ,subepithelial connective tissue graft (SCTG) ,envelop flap , guided tissue regeneration tunnel technique and Combination of one or more techniques have been proposed.⁴

Mandibular incisor teeth, which have a minimal amount of labial attached gingiva, may be predisposed to periodontal destruction.⁵The main indication to treat isolated mandibular gingival recessions is to increase soft tissue thickness and stability to facilitate plaque control and prevent further periodontal inflammation and breakdown or root caries.⁶

This case report presents a clinically successful treatment of Miller's class III gingival recession using laterally closed tunnel technique with SCTG

CLINICAL PRESENTATION

A 28-year-old male patient reported to the clinic with a chief complaint of dentinal hypersensitivity on the labial side of the mandibular right central incisor. The patient described severe sensitivity to hot and cold liquids and a constant uneasiness in that area. No relevant medical history was recorded and there was no history of any type of habits. Further, the periodontal evaluation revealed normal probing depths on the recessed tooth with mild plaque accumulation and minimal bleeding on probing. The patient presented with Miller's Class III GR along with the problems of shallow vestibule , inadequate width of AG, frenum pull and a lack of attachment on the labial surface with respect to 41.(figure 1). There was no mobility in any of the central and lateral incisors. After discussing the clinical findings, treatment options, and risks associated with the patient, oral and written consent was obtained for the same. The treatment plan was divided in three phases: Presurgical phase which consisted of inflammation control through oral hygiene instructions, full-mouth debridement, and occlusal adjustment followed by Surgical phase which involved deepening the vestibule and periodontal regenerative surgery of the area; and finally Maintenance phase, involving a strict supportive periodontal therapy (SPT).

PRE-SURGICAL PHASE

Thorough scaling and root planing was performed as part of phase I therapy and patient was advised to use 0.2% chlorhexidine mouth rinses for 2 weeks. Patient was also demonstrated the correct

brushing technique. After 4 weeks the patient was recalled and A full-mouth debridement along with slight occlusal adjustment were performed. Few necessary oral hygiene instructions were given and after re-evaluation the vestibule deepening procedure and regenerative periodontal surgery was suggested. Written informed consent was obtained from subjects who voluntarily agreed to participate after a detailed explanation of the study was provided to them

SURGICAL PHASE

Vestibule deepening technique:

A horizontal incision was made through the mucogingival junction severing the labial frenum to make detachment of the vestibular tissue from the attached gingiva.(Figure 2) Periodontal pack was dipped into the vestibule to keep the vestibular tissue separated from the attached gingiva. Finally the periodontal dressing (pack) was placed on the labial side of the operated site(Figure 3).patient recalled after 1 month.

Laterally closed tunnel technique

The patient was asked to rinse with 0.2% chlorhexidinedigluconate solution prior to surgery. Local anaesthesia of 2% lidocaine with 1/100,000 epinephrine was administered following which the exposed root surface was debrided with curettes. Subsequently, slightly beveledintrasulcular incisions were made using microsurgical blades and a mucoperiosteal pouch (tunnel) was prepared(figure 4). No special attempt was made to remove the epithelium surrounding the margins of the pouch, since this was removed by means of the beveledintrasulcular incisions. The pouch was then mobilized apically beyond the mucogingival line and extended mesially and distally from the recession defect by undermining the facial surface of the interdental papillae (Figure5,6) Muscles and collagen fibers inserting apically and laterally at the inner surface of the pouch were released using conventional and microsurgical blades and Gracey curettes until tension-free mesial and distal displacement of the pouch margins was obtained. Special attention was paid to avoid disrupting the interdental papillae or perforating the flap.

As a result of this procedure, the margins of the pouch could be approximated without tension mesially and distally to cover completely or cover the greater part of the exposed root surface (Figure7,8). Subsequently, a palatal SCTG 1 to 1.5 mm thick was harvested by means of the modified single incision technique (figure 8).Immediate closure of the donor site was performed using using a 3-0 silk suture.(figure 9)

After root surface conditioning with 24% ethylenediaminetetraacetic acid (EDTA) (PrefGel, Straumann) and copious rinsing with sterile saline solution to remove EDTA residue, using mattress sutures, the SCTG was pulled and fixed mesially and distally at the inner aspect of the pouch (figure 10). The graft was adapted to the CEJ by means of a sling suture. Finally, the margins of the pouch were pulled together over the graft and sutured with interrupted sutures to accomplish tension-free complete or partial coverage of the graft as well as the denuded root surface. (figure 11). periodontal pack placed. (figure 12).

Maintenance phase

The patient was prescribed 500 mg of amoxicillin TID for 7 days to prevent potential infection, 400 mg Ibuprofen BID for pain management and twice daily rinse with 0.12% Chlorohexidine rinse for 2 weeks. Patient was advised to take soft diet and not to brush at the surgical site for at least 2 weeks after the day of surgery. Sutures were removed at 2 weeks after surgery and returned to regular post-operative oral hygiene at 1 month and regular dental recall appointments.

RESULT

In the present case report, follow-up was done at 6 months showed satisfactory root coverage in terms of recession height and width as compared to the baseline. At baseline a gingival recession of 5 mm was recorded in the labial aspect of mandibular incisor. There was a complete reduction in gingival recession height and width. (figure 13) The surgical site was also completely healed. The patient expressed satisfaction as dental hypersensitivity was no longer reported.

DISCUSSION

The indications for surgical treatment of gingival recession include reducing root sensitivity, minimizing cervical root caries, increasing the zone of attached gingiva, and improving esthetics.⁷ To increase the success rate of root coverage, many clinicians have attempted to combine different procedures. This study included vestibule deepening techniques and Laterally Closed Tunnel (LCT) along with the use of subepithelial connective to achieve the goal.

The surgical procedure in the present study was performed with laterally closed tunnel technique described by Sculean A et al.⁸ An important aspect in the laterally closed tunnel technique was the wide mesiodistal and apical mobilisation of the tunnel which would result in tension free movements of the lateral flap margins without disturbing the interdental papilla to cover the root surface completely which is advantageous in treating the deep isolated gingival recessions. This passive

lateral closure of the tunnel margins may be advantageous in the treatment of isolated deep recessions located in areas with inserting frenula or shallow vestibule, which makes a coronal, tension-free advancement of the flap extremely difficult.

The tunnel technique also known as “Supraperiosteal envelope” technique is a modification by Allen(1994) of Raetzke’s 1985 “envelope” technique. The tunnel technique has a minimally invasive nature since the interdental papillae are left intact and vertical incisions are not performed leading to better aesthetic results. This technique entailed the placement of a connective tissue graft in the tunnel.⁹Previous studies have provided evidence for the critical role of tension-free flap mobilization and suturing in root coverage procedures.¹⁰

Besides the tension-free flap preparation, the use of SCTG plays a key role in increasing flap thickness and blood clot stability and in providing the cells needed for soft tissue regeneration and keratinization.¹¹Sub-epithelial connective tissue graft (SCTG) is considered as a gold standard for treatment of recession defects, however it requires a donor site.The present case report use modified single incision to harvest the SCTG. The modification of the single incision technique offers ease of execution to harvest the graft. It also offers the advantage of less bleeding, better visibility, and early determination of the size of the graft to be harvested. It also retains the advantages offered by the original single incision technique of being less traumatic, faster healing with primary closure, and less postoperative complications.¹²

The importance of complete graft coverage to obtain CRC in mandibular anterior teeth is still unclear. While some studies report statistically significantly better CRC when the SCTG is completely covered.¹³

Various studies in the past have suggested different methods to treat root coverage among which Coronally Advanced Flap (CAF) combined with Subepithelial Connective Tissue Graft (SCTG) is the most commonly used and regarded as one of the predictable techniques for Miller class I or II gingival recession defects. However, their effect on wide and deep gingival recession remains inconclusive.¹⁴

Zucchelli G et al., introduced laterally moved coronally-advanced surgical approach for treating isolated gingival recession and resulted in 96% mean root coverage. But the disadvantage with this technique is that limited amount of keratinised tissue lateral to the recession defect can result in gingival recession of donor site.¹⁵

Sculean A and Allenm EP, described the laterally closed tunnel along with SCTG to treat the deep isolated gingival recessions similar to present case report. The author reported 24 case series. An important aspect in the laterally closed tunnel is the wide mesiodistal and apical migration of the flap which enables tension free lateral movement of the flap margins that helps in root coverage. His result showed mean root coverage of 96.11% from the initial recession depth.⁸

A case report by Vrushali et al., (2018)¹³ in the treatment of Mandibular Anterior Lingual Recession Defect with Minimally Invasive Laterally Closed Tunneling Technique and Sub-Epithelial Connective Tissue Graft concluded that it is possible to successfully and predictably treat isolated lingual recession defects with a laterally closed tunneling technique and that the connective tissue graft still dominates effective method to cover exposed roots.¹⁶

This case report shows successful root coverage in the mandibular labial gingival recession after 6 months with almost complete root coverage. However, the present case series has only evaluated the proposed technique in isolated mandibular defects, and therefore no conclusions can be drawn about its potential use for treatment of multiple recessions.

CONCLUSION

The present results indicate that the LCT represents a predictable approach for the treatment of deep isolated mandibular Miller Class III gingival recessions. Laterally closed tunnel technique with the use of SCTG can be an alternative for the conventional techniques for root coverage procedures. The surgical treatment using SCTG has proven to be a gold standard with highly predictable outcome for root coverage and excellent colour match.

REFERENCES

1. Caranza FA, Takey HH. Muco-gingival surgery. In: Caranza FA, Newman MG (ed). *Clinical Periodontology*, 8th WB Saunders Company, Philadelphia 1996; ch.59:p.651-71
2. Pradeep K, Rajababu P, Satyanarayana D, Sagar V. Gingival Recession: Review and strategies in treatment of recession. *Case Rep Dent*. 2012;p. 1–6.
3. Bhoomika Khosya, Devaraj CG. Etiology and severity of different grades of gingival recession in adult population. *Natl J Med Res* 2014; 4(3):189-192.
4. Alghamdi H, Babay N, Sukumaran A. Surgical management of gingival recession: A clinical update. *The Saudi dental journal*. 2009 Jul 1;21(2):83-94.

- 5 Dorfman HS. Mucogingival changes resulting from mandibular incisor tooth movement. *Am J Orthodont* 1978;74:286-97
- 6 Agudio G, Nieri M, Rotundo R, Franceschi D, Cortellini P, Pini Prato GP Periodontal conditions of sites treated with gingival-augmentation surgery compared to untreated contralateral homologous sites: A 10- to 27-year long-term study. *J Periodontol* 2009;80:1399–1405)
- 7 Kassab MM, Badawi H, Dentino AR. Treatment of gingival recession. *Dental Clinics of North America*. 2010.
- 8 Sculean A, Allen EP. The Laterally Closed Tunnel for the Treatment of Deep Isolated Mandibular Recessions: Surgical Technique and a Report of 24 Cases. *International Journal of Periodontics & Restorative Dentistry*. 2018 Jul 1;38(4).
- 9 Allen AL. Use of the supraperiosteal envelope in soft tissue grafting for root coverage. I. Rationale and technique. *Int J Periodontics RestorDent*. 1994;14(3):216–27.
- 10 Pini Prato G, Pagliaro U, Baldi C, et al. Coronally advanced flap procedure for root coverage. Flap with tension versus flap without tension: A randomized controlled clinical study. *J Periodontol* 2000;71:188–201
- 11 Sculean A, Gruber R, Bosshardt DD. Soft tissue wound healing around teeth and dental implants. *Journal of clinical periodontology*. 2014 Apr 1;41:S6-22.
- 12 . Kumar A, Sood V, Masamatti SS, Triveni MG, Mehta DS, Khatri M, Agarwal V. Modified single incision technique to harvest subepithelial connective tissue graft. *Journal of Indian Society of Periodontology*. 2013 Sep;17(5):676.
- 13 Zucchelli G, Marzadori M, Mounssif I, Mazzotti C, Stefanini M. Coronally advanced flap+ connective tissue graft techniques for the treatment of deep gingival recession in the lower incisors. A controlled randomized clinical trial. *Journal of clinical periodontology*. 2014 Aug;41(8):806-13
- 14 Cairo F, Nieri M, Pagliaro U. Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions: A systematic review. *J ClinPeriodontol*. 2014;41(5):44-62.
- 15 Zucchelli G, Cesari C, Amore C, Montebugnoli L, De Sanctis M. Laterally moved, coronally advanced flap: A modified surgical approach for isolated recession-type defects. *J Periodontol*. 2004;75:1734-41.

- 16 Vrushali A, David W, Jules M. Treatment of a mandibular anterior lingual recession defect with minimally invasive laterally closed tunneling technique and sub-epithelial connective tissue graft. *Int Arch Maxillofac Surg.* 2018;2(1):17.



Figure 1:Preoperative view of a deep Miller Class II recession located at the facial aspect of the mandibular right central incisor



Figure 2: Vestibuloplasty done

Figure 3 :Periodontal pack placed



Figure 4:Vertical preparation of tunnel

Figure 5: Tunneled distal and mesial papilla



Figure 6:Tension-free lateral movement/adaptation of the soft tissue margins



Figure 7:SCTG harvested by means of the modified single incision technique

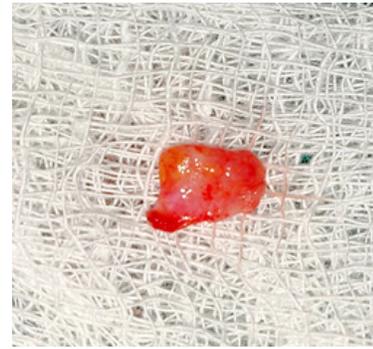
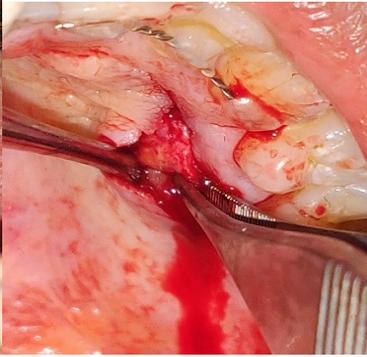


Figure 8:Connective tissue graft (CTG) harvested



Figure 9:Donor site sutured



Figure 10 :Connective tissue graft is placed in the tunnel and on the facial



Figure 11:Closure of the tunnel by means of single sutures



Figure 12 :Periodontal pack is placed

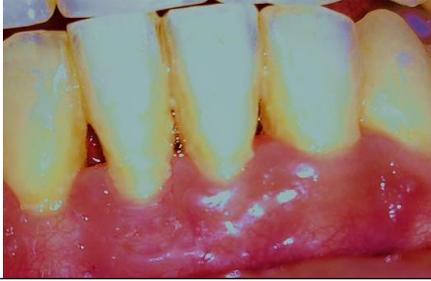


Figure 13 : 6 months postoperative