

Mucogingival surgery for root coverage using subepithelial connective tissue graft with tunnel and pouch technique - A case report

Ashvini Mukul Padhye¹, Ninad Milind Padhye²

From ¹Head, ²Department of Periodontics, Mahatma Gandhi Mission's Dental College and Hospital, Navi Mumbai, Maharashtra, India

Correspondence to: Ninad Milind Padhye, B-1-7, Kripa Nagar, Irla, Vile Parle West, Mumbai – 400 056, Maharashtra, India.

E-mail: ninadpadhye91@gmail.com

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ABSTRACT

Marginal tissue recession, also known as gingival recession (GR), is a common condition seen in clinical practice. Along with unesthetic appearance, it also increases the chances of tooth hypersensitivity, root surface caries, abrasion, and pulpal hyperemia. When indicated, the correct mucogingival surgical procedure provides excellent stable results for such deformities. Various modalities such as a coronally repositioned flap, lateral pedicle flap, double papilla flap, and semilunar flap in combination with subepithelial connective tissue graft (SCTG) can be employed to treat GR. This article puts emphasis on a case report in which GR, due to toothbrush trauma, was covered using a tunnel and pouch technique combined with an SCTG harvested from the palate. The dual blood supply for the graft's nutrition, originating from the connective tissue of both, the flap and periosteum along with the minimally invasive nature of the technique resulted in a clinical success. The case was followed up for 2 years subsequent to the procedure, where optimum root coverage for the operated teeth was noted.

Key words: *Connective tissue graft, Esthetics, Gingival recession, Mucogingival surgery, Root coverage, Tunnel and pouch technique*

The loss of epithelial attachment caused by periodontal disease is clinically represented either by the periodontal pocket or gingival recession (GR). GR is the exposure of the root surface by a shift in the gingival margin to a position apical to the cemento-enamel junction (CEJ) [1]. Numerous etiologic, as well as predisposing factors, may act in combination to cause GR. A few of them are thin cortical bone, thin periodontal biotype, fenestration and dehiscence defect, traumatic brushing, orthodontic movements, occlusal trauma, and violation of the biologic width [2].

The exposed root surface due to GR is susceptible to caries, abrasion, or erosion. This can further lead to root hypersensitivity, pulpal hyperemia, and may impair oral hygiene maintenance. It has been noted that 88% of people >65 years of age and 50% of people between 18 and 64 years of age have one or more sites with GR [3].

Numerous techniques have been proposed for root coverage procedures including pedicle flap, coronally advanced flap, guided tissue regeneration, free soft tissue autografts, and subepithelial connective tissue graft (SCTG). The use of SCTG for root coverage is a predictable and versatile technique [4]. It creates a bilaminar vascular environment to nourish the graft. It was first used by Edel in 1974 to increase the width of keratinized gingiva [5] and also used by Langer and Langer in 1985 to treat both, single and multiple GR [6]. Due to its characteristic of quick keratinization and adherence, the use of SCTG along with the

coronal advancement of the flap has been regarded as the gold standard in mucogingival surgery for root coverage [7]. This case report brings forward a case of multiple GR in the maxillary arch treated by tunnel and pouch technique in combination with SCTG with a 2-year follow-up.

CASE REPORT

A 42-year-old female patient reported to the department with a chief complaint of an unesthetic appearance of her upper front gums. She had a negative history for any systemic illness, and on questioning, she revealed the use of a hard bristle toothbrush in a horizontal scrub manner for 10–12 years. Clinical examination showed a Miller's Class I GR with tooth #11 and 21 and Class III GR with tooth #23 (Fig. 1a). The distance from CEJ to gingival margin was 1 mm for tooth #11, 3 mm for tooth #21, and 4 mm for tooth #23 (Figs. 1b and c). Clinically, she presented a thick gingival biotype, and the interdental papillae showed a complete fill until the contact point. Root coverage procedure using a tunnel and pouch with SCTG was planned for teeth #11, 21, and 23.

Periodontal Phase I therapy was carried out for the patient. During the surgical phase, pre-operative antisepsis was carried out through an aqueous solution of 0.2% chlorhexidine digluconate and the tooth was anesthetized using local anesthesia (2% lignocaine). Using a microsurgical blade (Hu-Friedy, Chicago, IL, USA), sulcular incisions were placed around the teeth

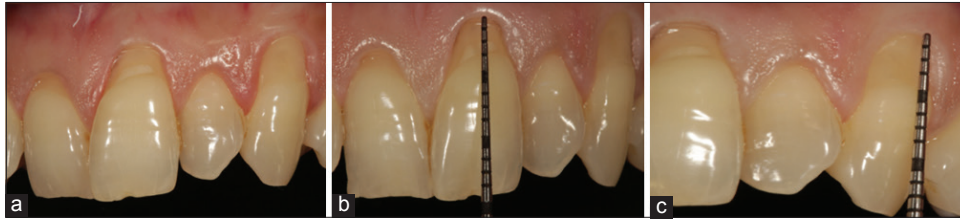


Figure 1: (a) Miller's Class I gingival recession with tooth #11 and 21 and Class III gingival recession with tooth #23, (b) distance from gingival margin to cemento-enamel junction - 3 mm for tooth #21, (c) distance from gingival margin to cemento-enamel junction - 4 mm for tooth #23

adjacent to the GR. A split-thickness pouch was created apical to the gingival margin extending up to 5 mm in depth (Fig. 2a). A tunnel was created beneath the adjacent papillae taking care so as to not reflect the tip (Fig. 2b-d). The exposed root surfaces were planed using area-specific Gracey curettes (Hu-Friedy, Chicago, IL, USA) and subsequently treated with 500 mg tetracycline dissolved in 10 ml of saline solution, for 3 min to remove the smear layer [8].

The size of the defect was measured and a template of the same dimensions was fabricated. This template was then used to harvest an SCTG from the palate using Langer and Langer's technique with a single incision [6]. A perpendicular paracrestal incision at a 3 mm distance from the palatine gingival contour was made (Fig. 3a). The harvested graft was trimmed to the required size, tucked beneath the created pouch, and pulled from the tunnel over the adjacent teeth (Fig. 3b). A resorbable suture material (5-0 Monocryl, Johnson and Johnson, Ethicon, USA) was used to stabilize the graft using the sling technique. The gingival margins were advanced coronally and anchored, by sutures, at the midcoronal point of each tooth by placing composite stops (Fig. 3c). Moderate pressure was applied over the graft and flap with saline soaked gauze for 5 min so as to minimize the clot thickness and prevent dead space formation [9].

During the post-operative period, the patient was instructed to avoid mechanical trauma and tooth brushing for 1 week after the surgery and to apply an ice pack intermittently for the first 4 h. She was advised to restrict her meals to soft and cold food for 48 h. She was prescribed 0.2% chlorhexidine digluconate mouth rinse twice a day for 10 days, and analgesics (Ibuprofen 400 mg) for the pain to be taken every 8 h for 3 days. The patient was also advised to start using a soft bristle toothbrush with Stillman's technique after a week. She was then followed up for 10 days (Fig. 4a), 3 weeks (Fig. 4b), 6 months (Fig. 4c), and 2 years (Fig. 4d) where her root coverage and width of keratinized gingiva were evaluated. At the 2nd year follow-up visit, 1 mm of GR was noticeable with tooth #23.

DISCUSSION

The desired results after mucogingival surgical procedures are root coverage up to the CEJ, firm tissue attachment to the tooth, sulcular probing depth <2 mm, an absence of bleeding on probing, a presence of an adequate keratinized tissue, color, and contour match to the adjacent tissues. Various techniques for root coverage have been described in the literature. Among them,

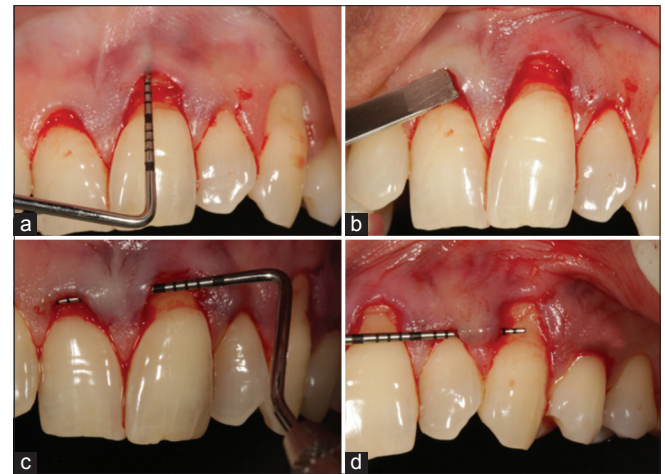


Figure 2: (a) Split-thickness pouch extending 6 mm apical to the gingival margin, (b) microsurgical blade to create a tunnel, (c) tunnel created between tooth #11 and 21, (d) tunnel created between tooth #22 and 23

the tunnel and pouch procedure was used so as to preserve the interdental papillae and facilitate the initial wound healing [10]. Tunneling applies less traction to the margins, thus preserving the gingival height [10]. Furthermore, the scar formation created by the vertical incisions for the coronally advanced flap is eliminated by this technique, making it a preferred technique over coronally repositioned flap [11].

The envelope technique of SCTG was introduced by Raetzke, in 1985 [12]. It was later modified by Allen in 1994 and described as the "Tunnel or suprapariosteal envelope technique" for the treatment of multiple adjacent GRs [13]. The tunneling technique with coronally repositioned flap preserves the integrity of the interdental papilla while being conservative also. It has been used, with high success, to treat multiple adjacent GRs [14].

SCTG can be indicated for the treatment of single or multiple GRs, correction of the papilla's volume, and increasing the amount of the keratinized tissue. The single incision technique for harvesting the SCTG provides grafts without a band of keratinized epithelium. Vertical incisions at the donor site are eliminated, thus preserving the blood supply for the flap [15]. The advantage of using an SCTG is that it provides a good tissue blend at the recipient site while being conservative during its harvest at the donor site [16]. The connective tissue carries the potential to induce keratinization in the newly forming epithelium. It is thus considered as an ideal treatment modality in recession-type defects.

An important parameter in the success of regenerative therapy is the elimination of micromovements of the graft during its



Figure 3: (a) Subepithelial connective tissue graft harvested from the palate using a single incision, (b) strip of harvested graft in position, (c) gingival margins advanced coronally and sutured



Figure 4: (a) 10-day post-operative, (b) 3-week post-operative, (c) 6-month post-operative, (d) 2-year post-operative

healing phase. This was ensured in our case by the stabilization of the gingival margins with the coronally anchored suturing technique [17]. A monofilament resorbable suture material (monocryl) was used in this case so as to prevent scar formation and wicking effect at the surgical site [18].

CONCLUSION

The elimination of the etiologic factor along with a conservative approach and precise indication of the use of SCTG to treat the GR resulted in the long-term clinical success of this case. Stable tissue level 2 years after the surgery indicates the efficacy of this procedure when used judiciously.

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