Root coverage of a wide anterior mucogingival defect with epithelial embossed connective tissue graft and its evaluation using root coverage esthetic scores

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Abstract:
New and innovative surgical techniques are necessary to help the clinician ensure the best results and satisfy patient's expectations. One such periodontal problem that has been challenging to the dental practitioners and impacts the oral health quality of life of patients has been gingival recession. When present anteriorly where esthetics is a major concern, patient centric parameters too become paramount. Root coverage esthetic score (RES) evaluation helps to keep the patient outcomes in mind. This case reports the successful treatment of a wide anterior mucogingival defect using epithelial embossed connective tissue graft which was evaluated for the first time using RES.

Key words:
Connective tissue, esthetic, gingival recession

INTRODUCTION
Gingival recession or marginal soft-tissue recession is the displacement of the gingival margin apical to cemento-enamel junction.[1] Although it seldom results in tooth loss, its sequel, such as root sensitivity, caries, abrasion, and esthetics have always been a major concern.[2] Various treatment modalities have been described to obtain root coverage in gingival recession. Among them, the one which yields the most predictable and satisfactory root coverage is the subepithelial, connective tissue graft (SCTG). This technique and its many variations have provided significant root coverage, clinical attachment gain with wider zone of attached gingiva (ZAG) and hence has been the most sought-after gold standard for periodontal plastic procedures.[3]

The outcome of two such variations of subepithelial connective tissue, SCTG with and without epithelial collar was compared, and it was found that a greater zone of attached gingiva (ZAG) and hence has been the most sought-after gold standard for periodontal plastic procedures.[3]

The present report describes one such novel surgical technique to manage wide Class I/II...
gingival recessions with epithelial “embossed” connective graft that exactly fits the defect site without any flap advancement and evaluates the results using RES.

CASE REPORT

A 32-year-old male patient reported to the dental clinic with the chief complaint of unesthetic appearance of the gums and hypersensitivity in relation to his upper right canine. No significant medical history and habits were reported.

On clinical examination, he had relatively fair oral hygiene. Periodontal examination revealed localized gingival inflammation in relation to maxillary right canine, with a probing pocket depth of 2 mm and clinical attachment loss of 5 mm with deep/wide Class I gingival recession [Figure 1]. The keratinized tissue (KT) thickness was around 2 mm which was measured at the center of an imaginary line from mucogingival junction (MGJ) to marginal gingiva, using an endodontic file with stopper after anesthetizing the region. Intraoral radiograph in relation to the tooth concerned showed no bone loss.

Considering the height (3 mm) and width (5 mm) of the defect, the treatment decided on was root coverage using an epithelial embossed graft technique. The treatment plan was explained to the patient, and a duly signed written consent was obtained. Oral prophylaxis was done 2 weeks before surgery.

Under local anesthesia, a sulcular incision was made in the right canine region, also involving mesial aspect of the first premolar and distal aspect of the lateral incisor as described by Saertt. Envelop flap was raised without making vertical incisions [Figure 2]. Thorough root planing was done. The connective tissue graft was procured from the contralateral side of the palate between the left first and second premolar region. A tinfoil template was cut fitting the defect size precisely and transferred to the palate from where the donor tissue was to be obtained. It was placed in relation to the upper left premolar palatal region, and an incision was made around the tinfoil which extended 3 mm close to the gingival margin on either side [Figure 3]. The epithelium was undermined 3 mm from the incision. Releasing incision was given so that only the connective tissue of the surrounding 3 mm was separated and the donor tissue was removed. The graft tissue had connective tissue on all the sides, and its center region was embossed with epithelium which matched the defect exactly [Figure 4]. The graft was tucked into the envelope made at the recipient site, with the “embossed epithelium” exactly covering the recession defect [Figure 5]. A tacking suture technique using 4–0 silk suture was used to secure the tissues, with the papilla and graft being picked up together on each side, without tension for uninterrupted healing [Figure 6]. Similarly, the palatal area at the donor site was sutured with 4–0 silk continuous sling sutures. A periodontal dressing was kept in place for 1 week. Analgesics (paracetamol 500 mg twice daily for 3 days) were prescribed, and the patient was instructed to rinse with 1:1 diluted 0.2% chlorhexidine mouth rinse for 1 min twice daily for 10 days. The periodontal dressing (Coepack) and sutures were removed 1 week later, and oral hygiene instructions were reinforced. The patient was examined on subsequent postsurgical appointments [Figures 7 and 8] at 3 months, 6 months, and 12 months. Clinical parameters with RES scores were recorded on each visit and at 12 months postoperatively [Tables 1 and 2].

DISCUSSION

Obtaining root coverage has become more predictable with advances in the understanding of soft tissue healing. The search for an ideal technique has led to pioneering of various surgical techniques. These procedures have not only just accomplished the functional but also the aesthetic requisites of root coverage. The classic technique of SCTG by Langer and Langer was reported in 1985. Although it has proved to be a pioneering technique in the field of periodontal plastic surgery, it also has displayed a risk many a time for incomplete root coverage in cases of deep/wide Miller Class I and II defects because of healing by secondary intention and exposure of the graft during the suturing process. It has also been seen that flap advancement over SCTG has failed to yield a significant increase in width of ZAG with the flap remaining nonkeratinized. Hence, many modifications of this classic technique have been adopted to achieve better root coverage. One such technique by Sterrett, the epithelial embossed graft has shown to be highly predictable in gingival recession therapy for deep/wide Class I/II defect. The fundamental prerequisite for any surgical outcome is an uneventful healing. In the present case, this can be attributed to the double blood supply at the recipient site from the underlying periosteum and overlying recipient flap. The advantages of this technique are twofold. First, the keratinizing epithelium in the shape of the defect allows the graft to heal by primary intention. Second, even if the epithelium sloughs away the integrity of the underlying connective tissue leads to favorable predictable

Table 1: Periodontal parameters which were measured preoperatively and postoperatively at 6 and 12 months interval at 13 region

| Clinical parameters (mm) | Baseline (preoperative) | 6 months (postoperative) | 12 months (postoperative) |
|--------------------------|-------------------------|--------------------------|--------------------------|
| PPD                      | 2                       | 2                        | 2                        |
| CAL                      | 5                       | 0                        | 0                        |
| RH                       | 3                       | 0                        | 0                        |
| RW                       | 5                       | 0                        | 0                        |
| KT thickness             | 2                       | 8                        | 9                        |

PPD – Probing pocket depth; CAL – Clinical attachment loss; RH – Recession height; Recession width; KT – Keratinized tissue; RW- Recession width

Table 2: Root esthetic score scores (Cairo et al., 2009) which were measured preoperatively and postoperatively at 12 months at 13 region

| RES parameters* | 12 months |
|-----------------|-----------|
| GM              | 6         |
| MTC             | 1         |
| STT             | 1         |
| MGJ             | 1         |
| GC              | 1         |

*GM: 0 – No coverage; 3 – Partial coverage; 6 – Complete root coverage, MTC: 0 – Irregular margin does not follow; CEJ: 1 – Proper contour; STT: 0 – Scar/keratinoid formation; 1 – Absence of scar; MGJ: 0 – MGJ not aligned with MGJ of adjacent teeth; 1 – MGJ aligned; GC: 0 – Color of tissue varies; 1 – Color similar. GM – Gingival margin; MTC – Marginal tissue contour; STT – Soft tissue texture; MGJ – Mucogingival junction; GC – Gingival color; RES – Root esthetic score
Figure 1: Preoperative view of the wide Class I gingival recession at 13 region

Figure 2: Envelope flap prepared at the recipient site

Figure 3: Outline of the graft prepared at the donor site using a tinfoil template

Figure 4: Epithelial embossed graft procured

Figure 5: Graft tucked into the envelope pouch at the recipient site

Figure 6: Sutures placed to secure the graft

Figure 7: Postoperative view of the recipient site at 3 months

Figure 8: Postoperative view of the recipient site at 12 months
healing.[13] Moreover, the clot stability is also significant and attributes to tensionless flap with minimal trauma over the wound bed. The latter must be assured by applying accurate suturing technique and minimal incisions as seen in this case and that reported by Ramakrishnan et al., where in the postoperative success of the technique in terms of complete root coverage, supported the use of this technique for deep and wide gingival recession.[10]

Recently, a case of palatal recession that was reported to be treated using the same technique demonstrated successful root coverage which strengthens the evidence for the versatility of this technique. However, the lack of evidence in terms of a standardized esthetic score in terms of color match, alignment of MGJ, and tissue texture was seen in these previous cases.[11]

In periodontal plastic procedures, complete root coverage has always been the main outcome of interest. More recent approaches have emphasized on patient-reported outcomes and his/her direct perception about the outcome as well. RES has shown a better match with patient-perceived outcomes compared to the percentage of root coverage alone.[11] Therefore, in this report, RES was also incorporated which showed a full score of 1 in all the aspects [Table 2]. This made the postoperative results more objective and also had a positive influence on the reliability of the embossed technique not only just from the clinician’s perspective but also from patient’s viewpoint.[12] A similar effect was evaluated in a study by Kerner et al.[13] Another important aspect of the outcome of this technique was significant gain in ZAG and KT thickness which was about 9 and 8 mm, respectively. A densely collagenated attached gingiva serves as a physical barrier to inflammatory spread in turn intervening the progress of periodontal disease in these susceptible areas.[14]

However, this technique exhibited limitation in terms of difficulty of standardization of the graft thickness which may result in some esthetic alterations that was also observed post operatively in this case.

**CONCLUSION**

This technique did feature results which were satisfying for both patient and the clinician for a type of periodontal defect that has shown unpredictable root coverage at times with conventional methods. In addition, RES system may be very helpful in assessing esthetic outcomes following any root coverage procedures. Moreover, long-term randomized clinical trials are needed to strengthen the evidence in favor of this technique over conventional connective tissue graft techniques.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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