

# Periodontal Plastic Surgery

## Predictable Root Coverage in the Mandibular Incisor Region

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Root coverage in the mandibular incisor region is a regular challenge in periodontal plastic surgery for several reasons. First, there is often a high frenal attachment, shallow vestibule and thin or non-existent quantities of keratinized and attached gingiva<sup>1</sup>. This poses problems during root coverage procedures due to compromised blood supply as well as excess flap tension which hinders graft stabilization. Furthermore, close root proximity and thin interproximal bone may lead to little to no papillary gingiva available for adequate flap design and suturing. Finally, anterior crowding often results in labially positioned incisors which may have large facial dehiscences. Due to these anatomical considerations, clinicians are often limited as far as choosing the proper technique for predictable root coverage. This article presents a detailed case report as well as other supporting cases demonstrating predictable root coverage utilizing a subepithelial connective tissue graft.

### Patient Presentation

A 26-year-old male presented to the office complaining of “long front teeth that are sensitive to cold.” He was concerned about the esthetic appearance of the teeth, and in addition to root coverage, he was planning to pursue orthodontic treatment. Upon clinical examination, it was discovered that teeth #s 22-26 exhibited two to four millimeters of recession, especially on #24 (Fig. 2). In addition, there was both thin and narrow keratinized and attached gingiva present as well as a high frenal attachment. The presence of mild anterior crowding resulted in long, narrow interdental papillae, and #24 being labially positioned.

### Treatment Options

- 1) A free gingival graft.
- 2) Coronally advanced flap.
- 3) A two-step procedure consisting of a free gingival graft followed by a coronally advanced flap two months later.
- 4) Guided tissue regeneration utilizing a barrier membrane in combination with a coronally advanced flap.
- 5) Acellular dermal matrix graft.
- 6) Subepithelial connective tissue graft.

A free gingival graft has been described for increasing the width of keratinized and attached gingiva,<sup>2,3</sup> but complete root coverage is often a limitation of this procedure. Furthermore, it often heals with a “tire-patch” appearance that may be unacceptable esthetically (Figs. 1A and 1B).



*Figure 1-A*  
Pre-operative photo of teeth #s 24-25 showing 3 mm of recession along with a high frenum attachment.



*Figure 1-B*  
6 month post-operative view demonstrating root coverage following a free gingival graft procedure.



*Figure 2-A*  
Pre-operative view showing recession defects on teeth #s 22-26 along with a high frenum attachment. Note the mild crowding present.

The coronally advanced flap is often considered for obtaining root coverage<sup>4</sup>. It may be limited by the quantity of keratinized and attached gingiva present. Furthermore, complete root coverage may not be obtained with this technique in the absence of adequate keratinized gingiva. Because of the anatomical considerations in this case, this technique was eliminated as a treatment option.

The coronal advancement of a previously placed free gingival graft has been reported in the literature,<sup>5,6,7</sup> but was not considered in this case because of the longer healing time and morbidity associated with two surgical procedures.

Guided tissue regeneration using both resorbable and non-resorbable barrier membrane has also been shown to be an effective technique for treating recession.<sup>8,9,10</sup> This technique is most successful when the membrane is fully covered with a coronally advanced flap with no membrane exposure. Once again, this option was eliminated in this case due to anatomical considerations. Excess flap tension would have to be placed in order to fully cover the membrane, and the risk of membrane exposure could risk an unsuccessful result that could possibly be worse than the initial presentation.

The fifth option, an acellular dermal matrix (ADM) graft has also been shown to be effective for the treatment of recession defects.<sup>11,12,13</sup> It is a freeze-dried allograft composed of human skin that has had its cellular contents removed, maintaining essential elements of the tissue structure such as collagen, elastin, and proteoglycans. Use of ADM is somewhat technique sensitive and requires a longer healing time. As a result, it was not used in this case.

Therefore, a subepithelial connective tissue graft was decided as the best and most predictable treatment option for this case. The connective tissue graft has the advantage of achieving predictable and complete root coverage, while simultaneously gaining keratinized and attached gingiva.<sup>14,15,16,17</sup> Esthetically, the connective tissue graft often heals with an excellent color match to the surrounding tissues, often leaving no evidence surgery was ever performed.

### Surgical Procedure

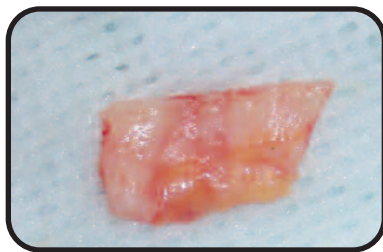
There are a variety of techniques and suturing methods for performing the subepithelial connective tissue graft. Only the technique employed for this case will be described.

Local anesthesia was obtained with 2% lidocaine with 1:100,000 epinephrine. A 21 mm long by 8 mm wide connective tissue graft (Fig. 2B) was harvested from the right palate in the area of the bicuspids and first molar. No epithelium was present on the graft, and the fatty tissue was trimmed from the graft. The graft was further thinned to 1.5 mm in thickness. The palate was then sutured with 5-0 Vicryl suture. An acrylic stent was then placed over the donor site to aid in hemostasis as well as to provide protection during the healing phase of treatment.

The recipient site extended from cuspid to cuspid, and was prepared in the following manner: Intrasulcular incisions were made with a #15 blade on the facial surfaces of #s 22-27. A full thickness mucoperiosteal flap was elevated on the facial surfaces of the teeth to the mucogingival junction. From the mucogingival junction, the flap was sharply dissected with a #15 blade, creating a split-thickness flap. Care was taken not to excessively thin the flap and compromise the blood supply. It was also important in this technique that the papillae were left intact and not incised. After checking the flap for mobility and passivity, the roots were then scaled with a sonic scaler and hand instruments. No effort was made to remove the convexity of the roots. No root conditioning was performed.

Following the preparation of the recipient site, the connective tissue graft was then placed over the roots and checked for appropriate length and width. It was imperative the graft cover not only the roots but also extend an additional 3 mm beyond the dehiscences onto the surrounding alveolar bone. After being assured of the proper dimensions, the connective tissue graft was sutured to the incisors at the cemento-enamel junctions with interrupted sling sutures using 7-0 Vicryl suture (Fig. 2C). The mucoperiosteal flap

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*Figure 2-B*  
A 21 mm by 8 mm connective tissue graft was harvested from the patient's right palate.



*Figure 2-C*  
The connective tissue graft was sutured to the teeth with 7-0 Vicryl suture material.

was then thinned with Ledge scissors in the papillary areas to allow for proper thickness of the interdental papillae. The flap was then coronally advanced and sutured to the teeth also utilizing interrupted sling sutures using 7-0 Vicryl sutures (Fig. 2D). No attempt was made to completely cover the connective tissue graft with the flap. The lower lip was then manipulated laterally and vertically to ensure no excess tension was placed on the flap or graft. This was important because any movement of the graft during this manipulation would lower the opportunity for complete root coverage to be achieved. Since the graft remained stationary during this lateral and vertical lip movement, the surgery was complete. Positive pressure was placed on the recipient site for 5 minutes prior to dismissing the patient.

Post-operative instructions included placing the patient on a soft diet and instructing him to avoid contact or trauma to the area as well as avoiding pulling the lower lip in any direction. The patient was placed on analgesics for post-operative pain management and 0.12% chlorhexidine rinses twice a day for two weeks. No other oral hygiene practices were allowed in the recipient site. No other medications were prescribed.

The patient was seen at one week for suture removal. Healing was unremarkable, and the patient complained only of mild pain and discomfort. The patient was further seen at three, six, nine, and twelve weeks post-operatively to check for proper plaque removal and healing. The area was not probed until six months post-operatively which revealed one and two millimeter sulcus depths, suggest-

ing the presence of new attachment (Fig. 2E). At six months, 100% root coverage was achieved. Minimal inflammation was present despite less than optimal oral hygiene. Furthermore, an adequate width and thickness of keratinized and attached gingiva was present (Fig. 2D).

### Discussion

The predictability and amount of root coverage that can be obtained for teeth with any amount of recession depends on the classification of recession. The classification system utilized was described by Miller and will be reviewed briefly.<sup>18</sup> Class I recession includes marginal tissue recession that does not extend to the mucogingival junction. There is no loss of bone or soft tissue in the interdental area. This type of recession can be narrow or wide. Class II consists of marginal tissue recession that extends to or beyond the mucogingival junction. There is no loss of bone or soft tissue in the interdental area. Class III consists of recession that extends to or beyond the mucogingival junction, but there is bone and/or soft tissue loss interdentally or malpositioning of the tooth. Class IV is marginal tissue recession that extends to or beyond the mucogingival junction in the presence of severe bone loss and soft tissue loss interdentally and/or severe tooth malposition. For Class I and Class II recession, up to 100% root coverage can be anticipated with the subepithelial connective tissue graft (Figs. 2A-2E, 3A-3B, and 4A-4B). In the above figures, complete root coverage was expected and achieved due to the adequate interdental papillae height and lack of interdental bone loss.

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*Figure 2-D*  
The flap was coronally positioned over the majority of the connective tissue graft and sutured with 7-0 Vicryl suture.



*Figure 2-E*  
Results at 8 months demonstrating complete root coverage of #s 22-26.



*Figure 3-A*  
Pre-operative view of recession on teeth #s 23-25 with a high frenum attachment.



*Figure 3-B*  
Results at 6 months showing complete root coverage.



*Figure 4-A*  
Pre-operative view of recession on teeth #s 23-26.



*Figure 4-B*  
Results at 6 months showing complete root coverage.

## Conclusions

Obtaining predictable root coverage in the lower incisor region offers many challenges for the clinician. The presence of crowding, a midline frenum, thin keratinized and attached gingiva, a shallow vestibule, and narrow interdental papillae makes sound surgical planning and technique critical. Compromises in blood supply, excess flap tension, among other considerations must be addressed because failure in the lower incisor region can result in a situation that is often worse than the initial presentation. A subepithelial connective tissue graft has been employed in such situations for predictable and esthetically acceptable root coverage. Success in these cases has been attributed to atraumatic surgical technique, a conservative flap design that includes the narrow interdental papillae, proper graft size, precise suturing with 7-0 sutures, as well as the absence of flap tension from the midline frenum.



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## Bibliography

1. Woofter C. The prevalence and etiology of gingival recession. *Periodont Abstr* 1969; 17: 45.
2. Miller PD Jr. Root coverage using a free soft tissue autograft following citric acid application. Part I. Technique. *Int J Periodont Restor Dent* 1982; 2: 65.
3. Miller PD Jr. Root coverage using a free soft tissue autograft following citric acid application. Part III. A successful and predictable procedure in areas of deep wide recession. *Int J Periodont Restor Dent* 1985; 5: 15.
4. Bernimoulin JP, Loscher B, Muhlemann HR. Coronally repositioned periodontal flap. *J Clin Periodontol* 1975; 2: 1.
5. Caffesse RG, Guinard E. Treatment of localized gingival recessions. Part II. Coronally repositioned flap with a free gingival graft. *J Periodontol* 1978; 49: 358.
6. Matter J. Free gingival graft and coronally repositioned flap. A 2-year follow-up report. *J Clin Periodontol* 1979; 6: 437.
7. Maynard, JB. Coronal positioning of a previously placed autogenous gingival graft. *J Periodontol* 1977; 48: 151.
8. Cortellini P, Clauser C, Pini-Prato GP. Histologic assessment of new attachment following the treatment of a human buccal recession by means of a guided tissue regeneration procedure. *J Periodontol* 1993; 64: 387.
9. Harris RJ. A comparison of 2 root coverage techniques: Guided tissue regeneration with a bioabsorbable matrix style membrane versus a connective tissue graft combined with a coronally positioned pedicle graft without vertical incisions. Results of a series of consecutive cases. *J Periodontol* 1998; 69: 1426-1434.
10. Pini-Prato G, Tinti C, Vincenzi G, et al. Guided tissue regeneration versus mucogingival surgery in the treatment of human buccal gingival recession. *J Periodontol* 1992; 63: 919.
11. Aichelmann-Reidy ME, Yukna RA, Evan GH, Nasr HF, Mayer ET. Clinical evaluation of acellular allograft dermis for the treatment of human gingival recession.
12. Harris RJ. A comparative study of root coverage obtained with an acellular dermal matrix versus a connective tissue graft: Results of 107 recession defects in 50 consecutively treated patients. *Int J Periodontics Restorative Dent* 2000; 20: 51-60.
13. Henderson, RD, Drisko CH, Greenwell H. Root coverage using Alloderm acellular dermal graft material. *J Contemp Dent Pract* 1999 Oct; (1)1: 024-030.
14. Allen AL. Use of the supraperiosteal envelope in soft tissue grafting for root coverage. II. Clinical results. *Int J Periodontics Restorative Dent* 1994; 14: 303-315
15. Bouchard P, Etienne D, Ouhayoun JP, Nilveus R. Subepithelial connective tissue grafts in the treatment of gingival recessions. A comparative study of 2 procedures. *J Periodontol* 1994; 65: 929-936.
16. Langer B, Langer L. Subepithelial connective tissue graft technique for root coverage. *J Periodontol* 1985; 56: 715.
17. Wennstrom JL. Mucogingival therapy. *Ann Periodontol* 1996; 1: 671-701.
18. Miller PD Jr. A classification of marginal tissue recession. *Int J Periodont Restor Dent* 1982; 2: 65.