

The Subepithelial Connective Tissue Graft with a Vestibular Releasing Incision

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Initially, the rationale for mucogingival surgery was for function and health. In the past few years, esthetic results from augmentation procedures have become a goal. The subepithelial connective graft is a technique to achieve root coverage. Anatomically it is a procedure that cannot be utilized in every case. A difficult situation is the shallow vestibule with no keratinized gingiva and a strong frenulum attachment. The subepithelial connective tissue graft with a vestibular release as described here can achieve esthetic root coverage despite a shallow vestibule. J Periodontol 2003;74:893-898.

KEY WORDS

Grafts, connective tissue; grafts, subepithelial; tooth root.

Mucogingival surgery has evolved during the past 3 decades. Initially, the rationale for mucogingival surgery was function and health.¹ We still look to improve gingival health, but now also plan for root coverage, which can reduce dentinal sensitivity, root decay, and plaque retentive areas. Eliminating recession had always been addressed, but improving cosmetic appearance was not considered crucial.²

In the past few years, esthetic results for augmentation procedures have become a goal for many patients and clinicians,³ as procedures have become more predictable in achieving root coverage in most sites.⁴ The quality of the color of the augmented area is also now a focus. The appearance of a free gingival type graft that has been coronally positioned is not acceptable to many of our esthetically minded patients.⁵ The color match of free gingival grafts is not always predictable and can appear “white” and thick. Acellular dermal grafts have been proposed and used to obtain a more predictable color match. The limitation with this procedure is, again, the lack of predictability. The amount of keratinized gingiva available is not always adequate.

The subepithelial connective graft is a consistent technique to esthetically achieve root coverage.⁶⁻⁹ There are 2 common problems with subepithelial connective tissue grafts: inconsistent palatal donor anatomy and a shallow vestibule. The quality of the palatal donor tissue can differ significantly with the amount of dense connective tissue versus fatty loose connective tissue.¹⁰ This can influence success as well as the available thickness of the palatal connective tissue. The other difficult situation is the shallow vestibule with no attached keratinized gingiva and a strong frenulum attachment. This situation is frustrating to the clinician trying to achieve increased root coverage and an esthetic match to the augmented gingiva. This article reports a technique, a modification of the traditional subepithelial connective tissue graft originally reported by Langer and Langer,^{7,8} which can achieve esthetic root coverage despite a shallow vestibule.

DESCRIPTION AND RESULTS

Several cases are shown here to demonstrate the surgical procedure. The preoperative views are shown

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first (Figs. 2A, 3A, and 4A). The subepithelial connective tissue graft is harvested as a single incision technique that has previously been described.¹¹ The connective tissue should be approximately 1.5 mm thick and 5 to 6 mm high to ensure adequate surface area (Fig. 1). The recipient site is root planed and root conditioning accomplished with citric acid. Agents for root detoxification can be left to the individual clinician. An envelope technique is utilized and, most importantly, no vertical incisions are used.¹² A sulcular incision is made (Fig. 2B) and extended laterally at least one tooth adjacent to the teeth being treated. A full-thickness flap is elevated until the apical area of the root is reached. This is demonstrated here in 2 different patient examples (Figs. 2C and 3B). At this point, a periosteal release is made to allow for coronal placement of the flap. Care is taken to keep the periosteal release deep, allowing a superficial external vestibular releasing incision to be made later. The mucosal tension is released with a superficial vestibular releasing incision. This procedure is shown here in 2 separate patient cases (Figs. 2D and 3C). A sharp blade is used, undermining and extending laterally until the flap can easily be coronally positioned. The incision is not extended deep, preserving partial apical blood supply to the flap. Collateral blood supply is also preserved laterally by avoiding vertical incisions. The connective tissue graft is placed with interrupted sling sutures. The papillary areas are deepithelialized at the coronal aspects. The flap is then coronally positioned

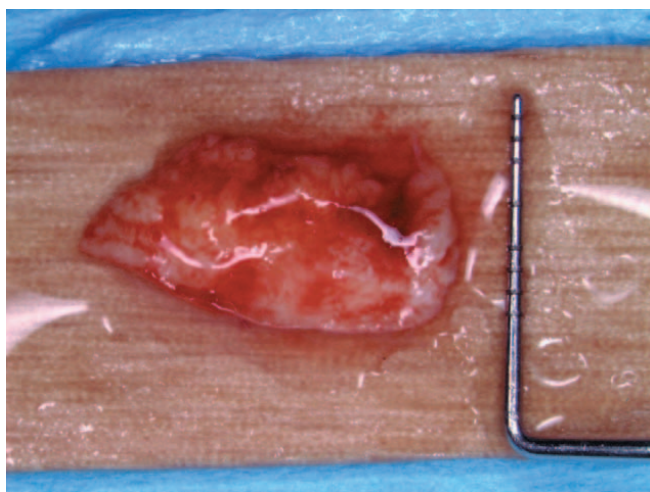


Figure 1.

Typical subepithelial connective donor tissue harvested and trimmed on a sterile tongue blade.



Figure 2A.

Preoperative photo of patient with no attached gingiva and significant frenulum attachment associated with both mandibular incisors.



Figure 2B.

Sulcular incision made beveling in the papillae areas.

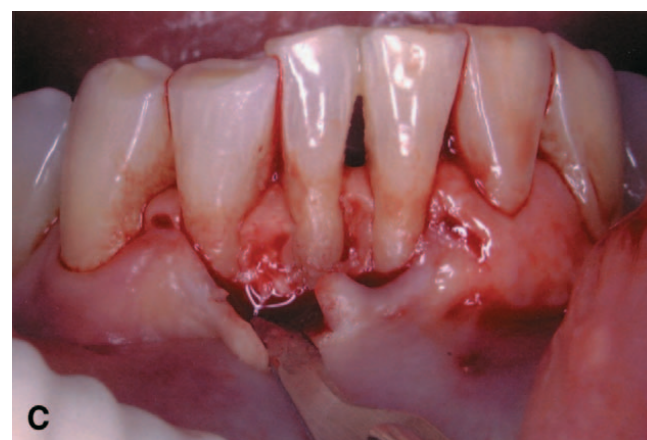


Figure 2C.

Initial reflection is full thickness.

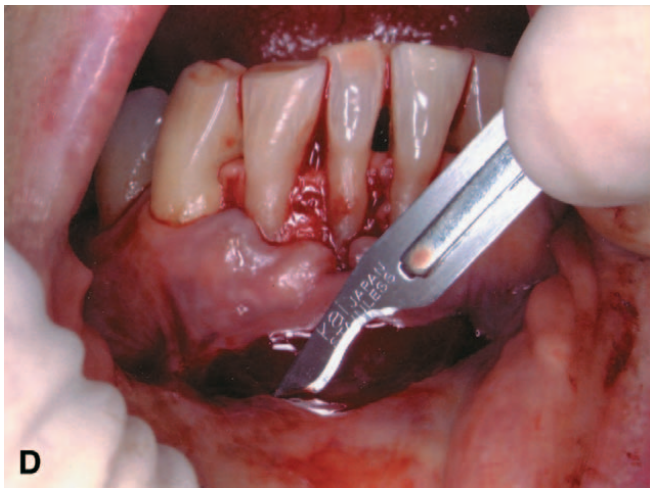


Figure 2D.
A vestibular release incision is made to decrease tension on the flap.



Figure 2E.
The flap is then sutured ensuring minimal tension on the flap. An external mattress suture is also used to immobilize the graft and flap.

to close with primary coverage. Final suturing is shown in 3 cases (Figs. 2E, 3D, and 4B). Approximately 30% of the graft is left exposed facially. Suturing is completed with a 7.0 absorbable suture. It is important that the needle selection be small to prevent compromising the strength and vascular supply of the flap.¹³ Independent sling sutures are used. The flap is further immobilized with a cyanoacrylate dressing (Fig. 5). The lip or cheek is then moved, checking to ensure the graft is well stabilized.

Postoperative care consists of strict instructions for the patient on eating and moving the lip/cheek area. They are instructed not to pull the lip back, use



Figure 2F.
The 8-month post-treatment photo shows increased root coverage, keratinized gingiva, and porcelain veneers in place.



Figure 3A.
Preoperatively #25 presented with no attached gingiva and 3 mm recession.

a toothbrush in the surgical site, or chew firm foods in the area for 2 weeks. Patients are started immediately on chlorhexidine rinses (b.i.d.) for 10 days, and use external icepacks for 48 hours. Antibiotics are rarely prescribed. The patient is seen at 1-, 2-, and 4-week intervals. Some loose sutures are removed at 1 week (Fig. 4C), and the others are removed at 2 weeks.

DISCUSSION

In patients with a shallow vestibule, this technique has allowed us to achieve a high degree of success both esthetically and functionally (Figs. 2F, 3E, and 4D).

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Figure 3B.
Initial full-thickness incision with additional mini vertical release distal to #24.



Figure 3D.
Suturing is completed with individual 7.0 sutures, and the frenulum pull has also been released.

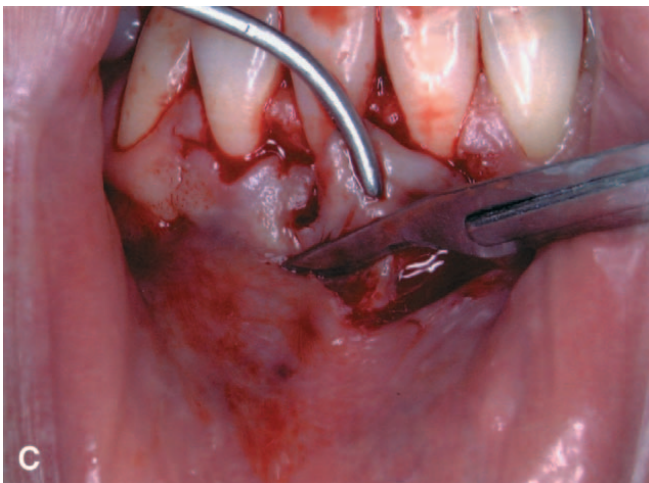


Figure 3C.
The vestibular release removes the tension on the flap.



Figure 3E.
The 3-month photo shows full coverage with an esthetic color match to the augmented gingiva.

It is technique sensitive and requires a high degree of surgical skill. Complications can occur but can be minimized if care is taken. The most common complication is incomplete union or cleft formation in the papillae areas. Another complication is a lack of attachment of the graft to the root surface. This is caused from excessive tension on the flap. Adequate vestibular/periosteal releasing can prevent this problem. Another cause is from using excessively large needles during suturing. Small 7.0 sutures^{†‡} have good tensile strength and come with microsurgical needles, which will not lacerate the flap. The use of extra sutures can also decrease the tendency of small sutures pulling through the flap. Detailed instructions given

to patients cautioning against “looking,” “pulling,” or “traumatizing” the site can also minimize this type of complication.

Significant ecchymosis and edema have been experienced with this procedure. Having the patient use external ice compresses can decrease this. A minimum of 4 times daily for the first 2 days is recommended. The use of cyanoacrylate may also contribute to this complication. In some cases, it may “seal” the wound, preventing normal surgical drainage.

[†] Ethicon, Johnson and Johnson, Somerville, NJ.
[‡] Sherwood, Davis and Geck, Norwalk, CT.



Figure 4A.
Preoperatively #24 presented with no attached gingiva and 2.5 mm recession.



Figure 4C.
One week after surgery, there is a good vascular supply and good coverage.



Figure 4B.
The graft is sutured after the vestibular releasing incision is completed.



Figure 4D.
Ten weeks after the procedure, there is full coverage, and 3 mm of keratinized gingiva is present.

The strong advantage of using it is for immobilization, which does help with successful healing.¹⁴ It gives excellent fixation to the flap and prevents any coronal migration of the graft.

Compromising the blood supply has not been a problem. The occurrence of flap sloughing has not occurred with this clinician. The collateral blood supply is adequate.^{14,15} Perhaps this is due to the use of microsurgical instrumentation.¹³ The use of a surgical microscope or $\geq 4.5\times$ loupes is needed for this procedure. The other aspect is high-intensity lighting. With these aids, the connective tissue layer and vascular supply can be visualized when making the

mucosal releasing incision. Tissue forceps can hold the flap and, as the release is made, one can see the deeper layer of connective tissue remain intact. The open vestibular wound heals rapidly and is closed with a small linear scar by 10 days. Suturing is also aided with magnification, especially with 7.0 or 8.0 sutures.

This procedure has the advantage of increasing keratinized gingival height width and thickness. In comparing this technique to the acellular dermis procedure for root coverage, the advantage of this technique is that it achieves more keratinized gingiva. This is due to the acellular dermis procedure requiring full coverage of the donor tissue.¹⁶ Less coronal

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Figure 5.

The flap is sutured and covered with cyanoacrylate.

positioning than the acellular dermis technique is required and thus there is less chance for the flap to pull free.

In conclusion, this procedure has helped this clinician treat sites with shallow vestibular depths. The previous problems encountered in achieving a cosmetic result while obtaining an increase in the amount of keratinized gingiva have been improved.¹⁷ It allows this to be accomplished with an esthetic color match of the gingiva. The technique also completes this in one procedure and with less traumatic donor sites versus a free gingival connective tissue graft.

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