

Progress in gingival papilla reconstruction

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One of the most difficult and elusive goals for the periodontist in the reconstructive, regenerative and aesthetic aspect of periodontal therapy is the reconstruction of the interdental papilla that has been lost from either disease or previous pocket eradication periodontal therapy. The poor aesthetic appearance in the maxillary anterior as a result of the lost papilla has been a dilemma for both the patient and the therapist. Countless periodontists have attempted to reconstruct the papilla by numerous surgical methods, but the lack of blood supply for the donor tissue in a small, restricted recipient site has been one of the limiting factors for success. Most of the surgical procedures have emphasized gingival grafting (free grafting, ruga grafting, etc.). Others have attempted the coronal-buccal positioning of the papilla from the palatal side by folding the gingiva from the palatal side or reinforcing the buccally pushed papilla with connective tissue obtained from the palate (1). Periodic curettage of the papilla to stimulate regeneration was reported by Shapiro in 1985 (5).

P. D. Miller emphasized the importance of blood supply to the donor tissue in his classic publications in the mid-1980s (3, 4). If the principle of abundant blood supply for the predictable "take" of the graft is to be followed, the creation of a new papilla must be dictated by the same principle. Therefore, the crafting of a small tissue or the movement of gingival tissue in a pedicle-like manner in a restricted interdental space to create a papilla appears unpredictable or impossible. The recipient site of the interdental space where the papilla is to be created provides a small surface area for either free grafting or pedicle grafting in terms of blood supply for the donor tissue. Therefore, the future of papilla reconstruction cannot use free grafting or the conventional pedicle displacement of gingiva.

Nonsurgical papilla creation

Orthodontic therapy has been used to create a papilla in cases of a diastema or non-contact of two adjacent teeth that can be approximated. The positioning of two teeth closer together creates a pa-

The following clinical case presents the initial attempt in a two- or three-stage surgical procedure to reconstruct a papilla. There is not only the loss of the papilla between teeth 7 and 8, but a concave interdental crater. This first-stage surgery will completely fill the crater and add a few millimeter of the papilla. Subsequent second- and possibly third-stage surgery should reconstruct more of the papilla.

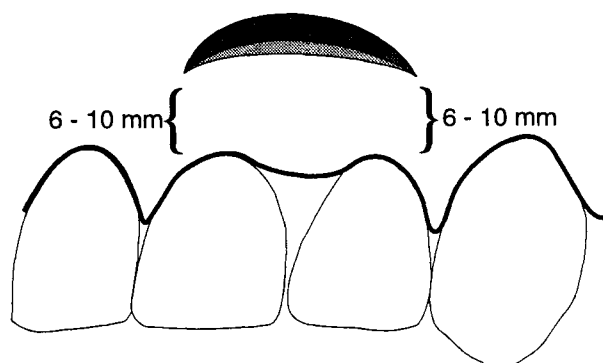


Fig. 1. Above. The semilunar incision made from the distal-buccal line angle of tooth 7 to the mesial-buccal line angle of tooth 8. Approximately 6 to 10 mm apical from the gingival margin and may extend into the alveolar mucosa. Below. The intrasulcular incisions are made around the mesial and distal half of the two adjacent teeth to free the connective tissue from the root surface. A #12-D blade is usually used for this incision.

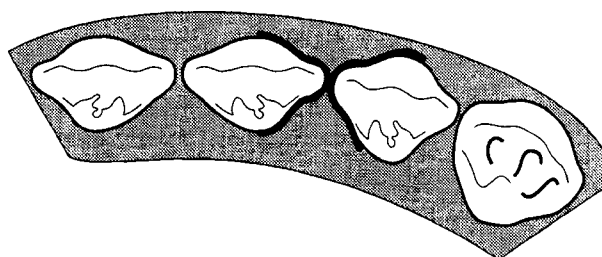




Fig. 2. The interstitial crater between tooth 7 and tooth 8. Note a portion of the palatal gingival wall is seen from the buccal view.

Fig. 3. The semilunar buccal incision is made from the distal-buccal line angle of tooth 7 to the mesial-buccal line angle of tooth 8.

Fig. 4. After sulcular incisions are made around the mesial half of tooth 7 and the distal half of tooth 8 (not shown),

the gingival-papillary unit is pushed incisally to move the gingiva into the cratered area.

Fig. 5. Subepithelial connective tissue is harvested from the palate.

Fig. 6. The palate is sutured after the connective tissue is removed.

Fig. 7. The connective tissue is placed into the pouch-like space after the gingival-papillary unit is pushed incisally.

pilla due to the physical, coronal displacement of the interdental gingiva by “squeezing” the gingiva together. This can be accomplished only if the ideal orthodontic situation is presented. Several clinicians have indicated that one can achieve a

“creeping” papilla formation by closing the interdental space by means of a longer contact in the occlusal-apical direction. The anatomic environment surrounding the papilla can induce this “creeping” papillary formation (6).



Fig. 8. The connective tissue is “stuffed” further incisally to fill the dead space.

Fig. 9. The semilunar incision is sutured.

Fig. 10. A 10-day postoperative view.

Fig. 11. The final healing (4 months) of the surgical site with the interdental crater completely filled with gingiva and additional root coverage of the mesial-buccal line angle of tooth 7 and distal-buccal line angle of tooth 8.

Therefore, the creation of a papilla by surgical means has at best been unpredictable or impossible, and the nonsurgical means of orthodontic procedures or altering teeth positions presents conditions that are governed by the position of teeth.

Papilla reconstruction using the semilunar incision

It is clinically well documented that any form of pedicle grafting is much more predictable than a free graft if the proper donor tissue is found adjacent to the recipient site, since there is good blood supply from the base of the pedicle (2). In 1986, Tarnow (7) reported a technique to cover denuded root surfaces by using a semilunar coronally repositioned flap (pedicle). This technique is very successful since the “pedicle graft, blood supply principle” is used.

The predictable reconstruction of the interdental papilla in the future requires adopting a principle similar to the concept used in the semilunar coronally repositioned flap. Instead of placing the semilunar incision over the root surface, this incision is placed in the interdental region. The incision forms a semilunar arc between the mesial line angles of the teeth adjacent to the papilla to be reconstructed (Fig. 1). Intrasulcular incisions are also made around the mesial and distal half of the two adjacent teeth to free the connective tissue from the root surfaces to allow the coronal displacement of the gingival-papillary unit (Fig. 1). To eliminate the dead space created by the coronal displacement, a section of subepithelial connective tissue is removed from the palate (Fig. 4) and placed beneath the coronally displaced gingiva (Fig. 6). The semilunar incision allows the coronal displacement without creating tension and prevents the gingiva from rebounding back to its original position. To maintain this new coronal

position, the measured amount of the subepithelial connective tissue obtained from the palate is "stuffed" further into the semilunar incision and into the pouch-like space coronal to the incision (Fig. 7). Depending on the extent of the papillary loss, this procedure may be repeated a second or even a third time after 2–3 months of healing. The semilunar coronally repositioned papilla, similar to the procedure reported by Tarnow, appears to be the most predictable procedure at the present time due to the movement of a large segment of gingival-papillary unit with intact blood supply.

Summary

The predictable creation of the lost gingival papilla by surgical means must follow the principle of using the most advantageous pattern of blood supply to the newly created tissue. Due to the small, restricted space interdentally, any form of free grafting cannot be utilized since the surface area for blood supply to the donor tissue is minimal. Therefore, a form of pedicle grafting using the semilunar

incision and the coronal displacement of the entire gingival-papillary unit, held in place with a section of subepithelial connective tissue beneath the coronally displaced tissue, may be one method that is predictable in reconstructing a lost gingival papilla.

References

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