

Soft Tissue Management for an Esthetic Result in Implant Supported Restorations

» By: Dr. Abd El Salam El Askary

BDS.

Former associat clinical Professor at University of Florida

Abstract:

The clinical outcome of the second stage surgery predicts the aesthetic outcome of implant supported restorations to a great extent. Numerous clinical trials have been recorded to increase the predictability of the second stage surgery that includes versatile incision designs. However, Dead space, lack of tissue adaptation usually results in scar tissue formation after the second stage surgery and subsequent poor aesthetic results. This clinical report introduces an incision design that helps more tissue adaptation and reduces dead space formation, the primary clinical results has shown high predictability and acceptable tissue adaptation.

Introduction:

Soft tissues can be influenced during many stages of implant treatment. The second-stage surgery is an example where the labial mucosa exists in a collapsed state ⁽¹⁾. It would require the support of the prosthetic components in order to develop natural-looking peri-implant soft tissue contours. Mucogingival surgical corrections can also be used after implant placement to reconstruct the missing aesthetic biological contours the surrounding already existing implant-supported restorations ^(2,3,4).

The greatest challenge in creating esthetically successful implant-supported anterior restorations is the reconstruction of the interproximal papilla. Many trials have been attempted to reconstruct the papilla by either soft or hard tissue techniques. The soft tissue management techniques consist of free gingival grafts ⁽⁵⁾, coronally positioned flaps ⁽⁶⁾, different types of pedicle grafts ⁽⁷⁾, free connective tissue grafts with pedicle grafts ⁽⁸⁾, guided tissue regeneration procedures ⁽⁹⁾, and guided tissue augmentation ⁽¹⁰⁾.

Misch et al ⁽¹¹⁾ has introduced the split finger technique to bulk the soft tissue around a peri-implant papilla, which showed predictability and clinical efficiency. A sulcular incision is made 2 to 3 mm to the palatal side from each tooth with a loop design (at least 2.0-2.5 mm) adjacent to the implant location. The incisions are then joined facially with a semicircular incision at the preplanned free tissue margin of the implant crown. The facial "fingers" are elevated to the desired inter-implant height for the papillae. The middle "palatal finger" is then split and reflected to the respective mesial and distal sides (each is at least 2.0-2.5 mm wide). The soft tissue maintains its elevated position on the healing abutment. The split-finger papillae approach can also be used for 2 or more adjacent implants. A modified vertical mattress suture is then used to suture each papilla using 4-0 or 5-0 sutures. One interrupted suture at the base of the papilla is suggested when the inter-proximal tissue is thin. The authors have evaluated twenty-one patients with 39 implants consecutively placed in the maxillary anterior region six months to one year after prosthodontic restoration. Results showed the efficacy of the technique in providing an alternate procedure to promote/augment papillae formation around dental implants.

Adriaenssens ⁽¹²⁾ described a similar approach to enhance the papilla formation around dental implants in the second stage surgery either in single or multiple teeth situations. The Palatal Sliding Strip Flap design helps

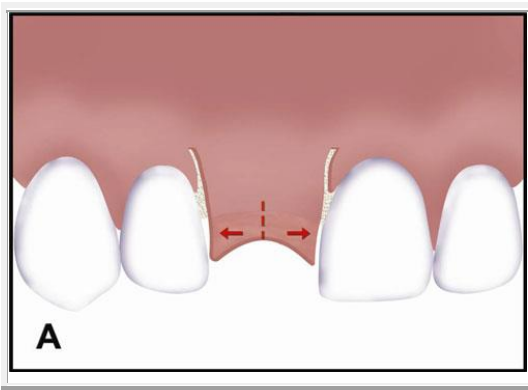
forming the papillae between implants and between natural teeth in the anterior area of the maxilla. The flap is designed and managed so that the palatal attached mucosa slides in a labial direction to create papillae and at the same time augment the labial ridge. The procedure entails an incision that allows the dissection of the masticatory mucosa from the underlying bone in full-thickness using a sulcular approach in a labiopalatal direction perpendicular to the ridge crest, both on the mesial and distal aspects of the implant. A full thickness horizontal incision is extended from the distal to the mesial on the palatal side comprising approximately two-thirds of the distance between the 2 teeth. Two incisions, parallel to each other, are then made in a labiopalatal direction to create a partial thickness flap extending in the palate, leaving the periosteum intact. This extension portion is designed into a strip to be located at the mesial aspect of the implant. A partial-thickness horizontal dissection is made to connect the 2 parallel incisions to form the sliding palatal strip. A final incision dissects the masticatory mucosa from the bone and incorporates the partial-thickness incision into a full-thickness incision in a labial direction. Once the incisions are made, the partial- and full-thickness flaps are prepared for flap elevation. The partial-full-thickness flap with a strip is raised to uncover the implant. The healing abutment is connected and a semilunar incision is made to the distal, away from the side of the strip. Care must be taken that the semilunar incision is coronal to the cemento-enamel junction or the gingival line of the adjacent teeth; otherwise, the healing abutment will displace the flap apically and the final gingival margin will heal apical to the gingival line of the adjacent teeth. The semilunar incision will provide a second strip, which gives 2 pedicles. The distal pedicle created by the semilunar bevel incision will be rotated 90 degrees in the palatal direction around the healing abutment. The mesial pedicle with the partial thickness component from the palate will fill the inter-proximal space. This flap manipulation between the teeth and the healing abutment will allow the reconstruction of two papillae in one time. The buccal soft tissue augmentation is related to the support by the healing abutment and the buccal repositioning of the flap. Simple sutures are used around each newly-formed papilla to maintain the flap in position.

In case of two adjacent implants, the flap design for multiple restorations in the anterior maxilla follows the general principle of a palatal strip of split-thickness tail harvested from the palate, combined with a full-thickness flap displaced in the mid-palate toward the sulcus of adjacent tooth. The difference resides in the location of the palatal strip and the semilunar incisions. The palatal strip of split-thickness connective tissue tail harvested from the palate must be made between the implants. A full-thickness incision in the mid-palatal area dissects the masticatory mucosa toward each adjacent tooth. A final incision dissects the masticatory mucosa from the bone over the ridge crest, creating a full-thickness sulcular incision. Once the incisions are made, the partial- and full-thickness flaps are prepared for elevation. The partial-full-thickness flap with a strip adjacent to the distal tooth is raised to uncover the implants and their cover screws. The healing abutments are connected, allowing the flap to be sustained on the buccal side. Two semilunar incisions are made toward the contra-lateral side of the strip. Care must be taken that the semi-lunar incision is coronal to the cemento-enamel junction; otherwise the healing abutment will displace the flap apically. The 2 semilunar incisions will provide 2 small pedicles. They are rotated in the palatal direction, each one creating a tissue augmentation in the interproximal space between the tooth and the implant. The palatal strip of partial thickness will be foiled to fill the inter-proximal space between the 2 implants. The soft tissues are repositioned and sutured within the pedicles using simple sutures.

Mid-Buccal Tissue Release:

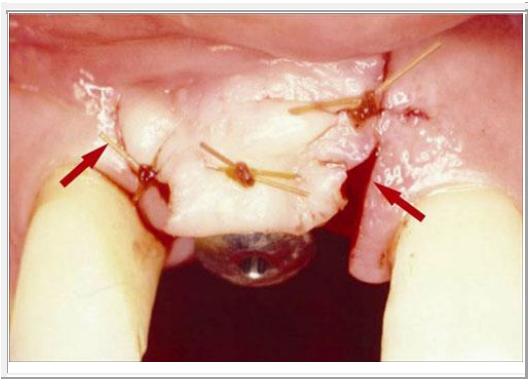
As keratinized mucosa lacks elasticity, the adaptation of the mucoperiosteal flap to the sides of to the wound edges can be a difficult task. When the tissues are moved from the palatal to the buccal side to allow for tissue bulking, it should be adapted to the wound edges and sutured to the adjacent papillae bilaterally, which sometimes becomes a difficult task to achieve. In order to allow for a bilateral tension free suturing to the adjacent inter-proximal papillae, a mid-buccal vertical incision might be

made in the mucoperiosteal flap of the second stage surgery, to facilitate suturing to the adjacent papillae. The incision should be as small as possible, i.e. does not exceed 1 mm, restricted to the keratinized band, and does not involve any vestibular tissues (**Figure 1**). The releasing incision allows flexibility of the flap and eliminates the dead space or tissue ledges between the edges of the flap and the adjacent papillary tissues (**figure 2**). The method has shown highly predictable success rates in stabilizing tissue contours and achieving harmonious margins (**Figure 3**).



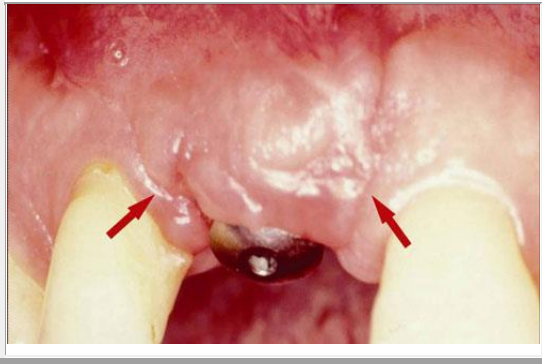
» (Fig. 1)

An illustration showing the incision design of the mid-buccal release of flap.



» (Fig. 2A)

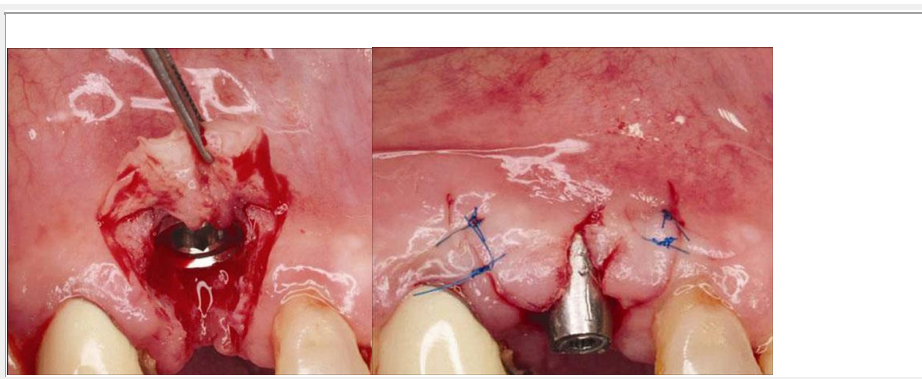
The gap formation between the flap and the wound edges due to the rigidity poor flexibility of the keratinized tissues.



» (Fig. 2B)

The red arrows pointing at the tissue scar and tag formation due to the improper tissue edges adaptation.

The time allowed for soft tissue healing after cosmetic reconstruction is important. Lazara ⁽¹³⁾⁽¹⁴⁾ who recommend a three-month waiting period for the soft tissue to stabilize before selecting the final abutment or making the final impression after the second-stage surgery. recommends that consideration should be given to the healing period after any soft tissue manipulation, as oral soft tissues require an ample time to heal and mend. A stable soft tissue clinical condition must be attained before beginning or continuing with other clinical procedures. This is also reaffirmed by Small and Tarnow





Starting from left: (Fig. 3A): A mucoperiosteal flap is being used to expose the implant. (Fig. 3B): The mid buccal incision is used and the flap sutured bilaterally. (Fig. 3C): the post operative result post restorative showing an excellent tissue scar free condition.

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