

Fold-Over Flap Technique for Developing the Facial Gingival Contour: A Case Report

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A dental implant surgical technique is described including a 12-mm fold-over of a facial flap and coapting the internal side of the folded flap with a 4-0 suture. The flap is pulled against a provisional crown with a sling-type suture during the implant uncover stage and may decrease the risk for a poor esthetic facial gingival architectural outcome.

Key Words: dental implant, esthetics, gingival contour, mucosal stability, coapt

INTRODUCTION

Patients with facial cortical bone loss who require dental implant treatment are challenging to treat. The facial bone supports the facial gingiva for an esthetic gingival contour. The facial bone may need to be restored by particulate or block grafting for an appropriate architecture to provide the gingival support. The contention herein is that dense submucosa may be more stable than grafted bone; thus, it may be that reconstructed dense submucosa may be used to create or contribute to an esthetic gingival contour when there is a grafted or unstable facial bone at a single implant site. The technique described herein can create a thick gingival biotype, which may be more stable than grafted bone and create a more esthetic outcome.

CASE REPORT

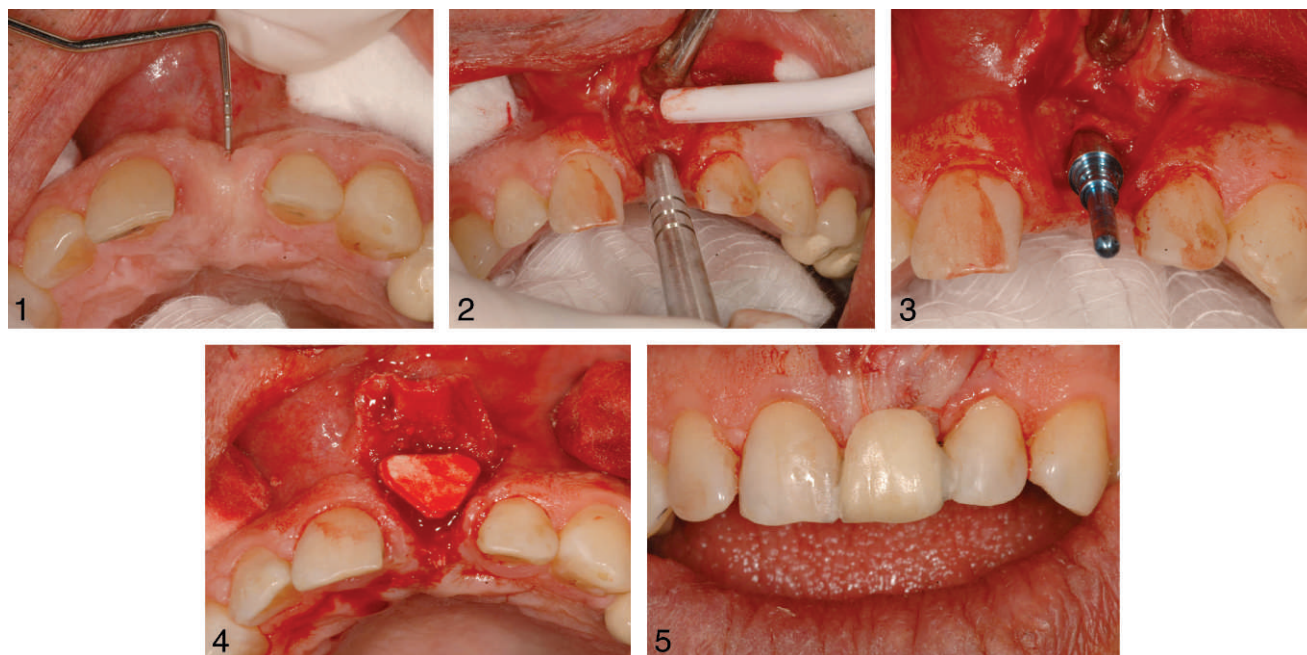
A 61-year-old man had a long-standing missing #9. After decades of wearing a flipper appliance, he desired implant treatment to restore this site. Visual and radiographic examination and bone-sounding ridge mapping was performed, and it was found that the osseous contour was atrophic.¹ A course of treatment was decided upon (Figure 1). The site

was locally anesthetized (articaine [Septocaine]), and the narrow osseous ridge was split with a #15 scalpel, D channel former (Tatum Surgical), and #3 and 4 round osteotomes (Figures 2 and 3). The facial cortical bone flap was then displaced to the facial, thus opening a slot that opened access to the deeper area of bone. The osseous flap was deemed inadequate to provide enough volume for appropriate facial gingival support and would be addressed at the uncover stage. The apical drilling was done between the bone flap and the lingual cortex. A 4-mm × 15-mm implant (3-I, Palm Beach Gardens, Fla) was placed at 35 Ncm (newton centimeters) torque. The facial bone flap was covered with 250- to 1000- μ m particulate cortico-cancellous allograft (AlloOss) and covered with a resorbable barrier membrane (BioMend), and the site was closed with 4-0 polyglycolic acid sutures (Vicryl; Figure 4). An appropriate denture tooth was festooned and bonded to the adjacent teeth and was used as a provisional prosthesis (Figure 5). After 4 months of uneventful healing, the patient was locally infiltrated anesthetized, and a full-thickness papilla-sparing flap was raised. The flap was 12 mm from the base to the palatal cut edge to allow for a fold-over (Figures 6 and 7). The fold-over had 4 mm facial, 4 mm fold-over, and 4 mm lingual aspects that allow for tissue shrinkage, and it placed the cut edge down to the submucosa at the facial of the implant abutment. The folded-over flap was sutured by running a 4-0 polyglycolic acid (Vicryl) suture through the mesial apical corner of the flap

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FIGURES 1–5. **FIGURE 1.** The site was ridge mapped by a bone sounding and impression technique to determine the remaining bone volume. **FIGURE 2.** The atrophic bone ridge was split and expanded to the facial. **FIGURE 3.** An implant analogue was placed and the facial bone segment was deemed inadequate for gingival support. **FIGURE 4.** The implant was placed, and particulate bone allograft and a collagen barrier membrane were placed. **FIGURE 5.** A bonded denture tooth was used as a provisional prosthesis.

base, through the mesial coronal corner of the flap, and then through the mid of the fold-over lingual and then to facial, and then knotting to close the folds together, creating a thick gingival facial margin (Figure 8). The same technique was done at the distal, again compressing the folded-over flap into a thick gingival margin against the provisional crown. During healing, the gingiva shrank and conformed to the contour of the provisional crown. The definitive crown was cemented 3 weeks later after patient approval (Figure 9). The crown has been in function for 4 years without complications or esthetic complaint (Figure 10).

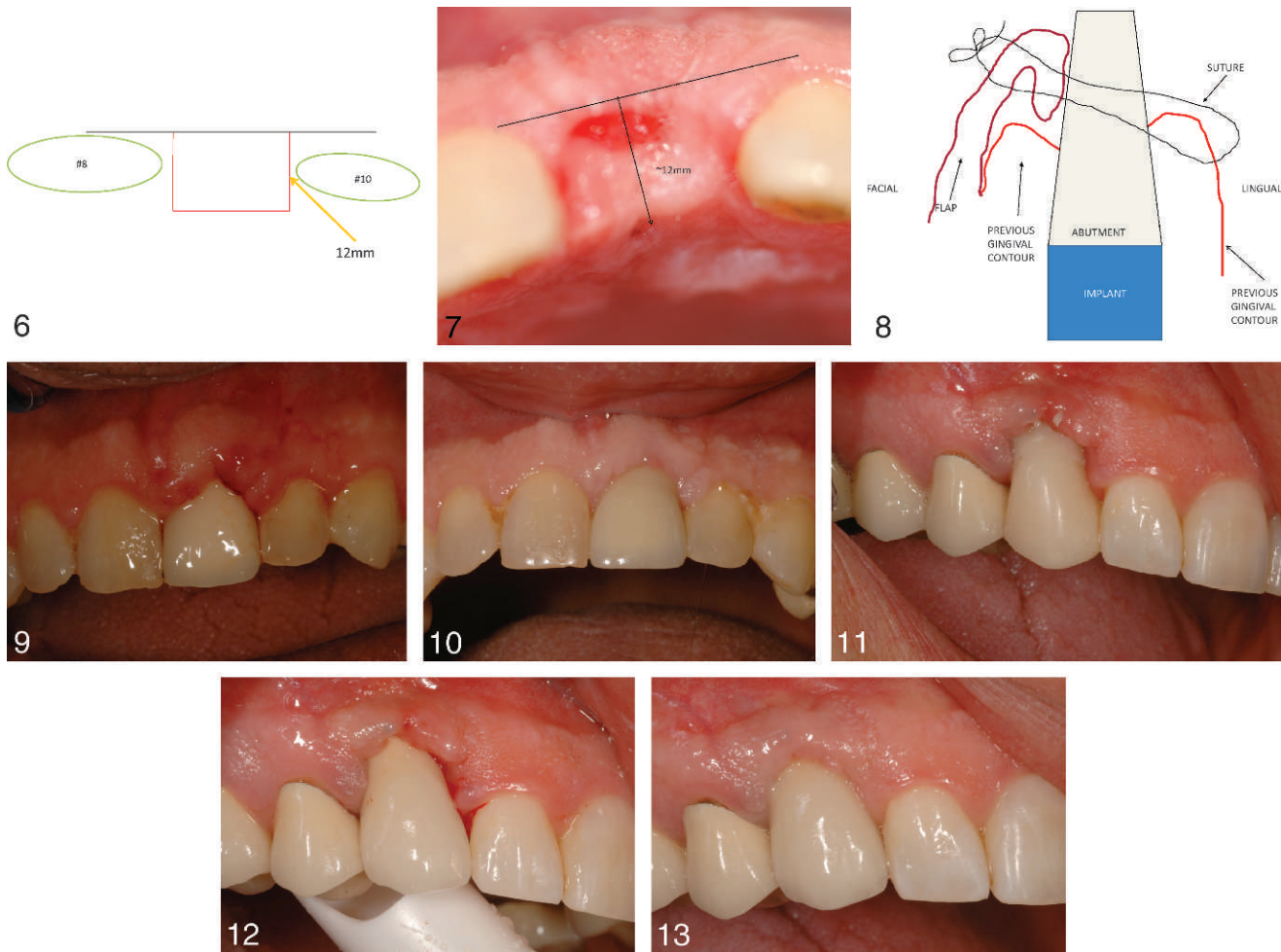
DISCUSSION

When teeth are extracted, the bone undergoes resorption, especially from the facial and coronal aspects. This resorbed bone can be replaced with particulate or block of autogenous, allograft, or alloplast grafts. However, grafted bone may not be stable and may undergo resorption itself and thus be unable to support gingival architecture.² Thickened collagenous submucosal tissue may be more

stable than an osseous graft, in that undisturbed collagenous tissue may not be labile and thus may provide a satisfactory esthetic facial architecture for dental implants. However, there is virtually no evidence of this in the literature.^{3,4} Because the blood supply of dense submucosa is poor, there may be a propensity for stability of dimension, such as is seen in the maxillary tuberosity.

The patient in this case had an atrophic site from an extraction performed decades earlier. The facial cortex was absent. The lingual cortex was present but somewhat coronally resorbed. A split ridge was performed that forced the facial cortical section facially and provided an osseous base for the particulate graft and folded-over gingival flap. This technique may be useful in selected conditions in which the esthetic demands of the patient are not extreme or to supplement a thin gingival biotype.

In another situation, the maxillary canine was treated in the same manner (Figure 11). The maxillary canine can have a thin biotype or a cortical facial plate that is thin or absent. Here, the fold-over flap technique was used to provide an esthetic gingival outcome. The healing of the facial



FIGURES 6–13. **FIGURE 6.** A schematic of the 12-mm gingival flap. **FIGURE 7.** The healed site before the fold-over flap was cut. **FIGURE 8.** A schematic of the sling suture technique. **FIGURE 9.** The healing flap at 2 weeks. **FIGURE 10.** The gingival contour at 3 years. **FIGURE 11.** Healing #6 site at 1 week of a facial fold-over flap. **FIGURE 12.** Healing #6 site at 3 weeks. **FIGURE 13.** Healed #6 site at 1 year.

gingiva of #6 is shown here at 1 week at suture removal, 3 weeks, and 1 year (Figures 12 and 13).

CONCLUSION

A 12-mm fold-over of a facial flap and coapting internal side of the folded flap with 4-0 suture and pulling the flap against a provisional crown with a sling-type suture during the implant uncoverly stage may decrease the risk for a poor esthetic facial gingival architectural outcome.

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