

The Pediculated Connective Tissue Graft: A Novel Approach for the “Blown-Out” Site in the Esthetic Zone

Abstract: Management of the soft tissue framework around an implant is key to achieving ideal esthetics in the maxillary anterior esthetic zone. When a patient has a tooth with advanced bone loss and recession in the esthetic zone, removing that tooth and replacing it with an implant often requires multiple surgical procedures to restore the lost hard and soft tissue. This article will discuss a novel approach to this dilemma. A case treated with a 1-stage surgical procedure using the pediculated connective tissue graft will be presented. The extraction of an anterior tooth with advanced bone loss, placement of an immediate implant, and reconstruction of the hard and soft tissue with 1 surgery will be demonstrated. The 2-year follow-up of the final prosthetic restoration that shows the stability of the soft tissue also will be presented.

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Clinicians often are faced with the dilemma of how to handle a tooth with advanced bone loss and recession when it is planned for extraction and implant replacement. Reconstruction of the hard and soft tissue is imperative if an esthetic result is to be achieved. This is especially challenging if the tooth is in the maxillary esthetic zone and the patient has a high smile line.

There are many ways to treat a site that presents with advanced bone loss and recession. One way is to extract the tooth, consider a ridge preservation procedure, and let the site heal for a few months. When there is a vertical deficiency, further bone grafting with autogenous blocks or membranes often is required.¹⁻³ After approximately 6 months the implant can be placed. Further soft tissue augmentation of the

site can be done at placement or any time during the healing or provisionalization stage if needed. Another method of treatment is to extract the tooth and place the fixture immediately with concomitant bone grafting.⁴⁻⁹ The deficient soft tissue can be reconstructed with connective tissue at a later time.¹⁰⁻¹⁴ Many other permutations of techniques can achieve similar results. However, the case with advanced hard and soft tissue loss often requires multiple surgeries to achieve an esthetic result.

This case will demonstrate a novel approach to this dilemma. The pediculated connective tissue graft¹⁵⁻²⁰ will be used in a 1-stage surgical procedure to treat the “blown-out” site during immediate implant placement, concomitant bone grafting, and soft tissue augmentation.

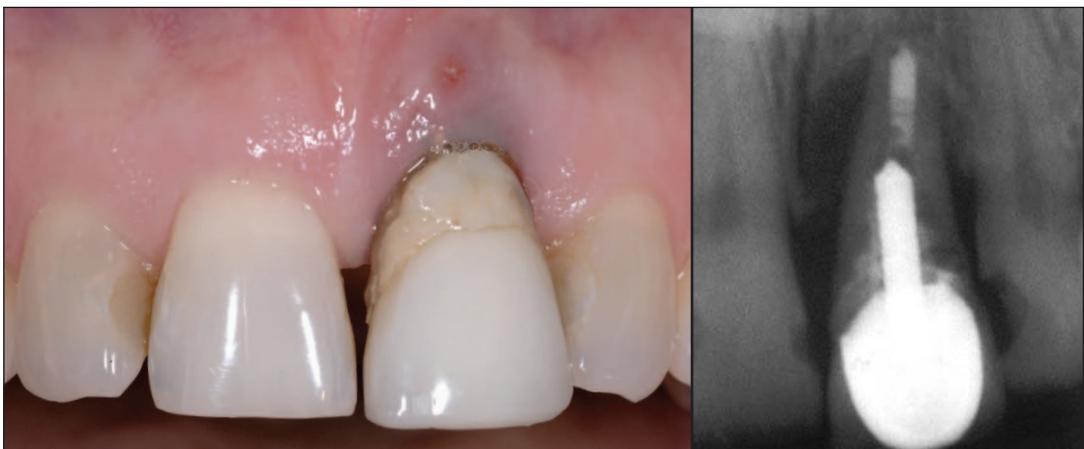


Figure 1—The left central incisor has 8-mm pockets and class 3 mobility. The radiograph reveals the advanced bone loss.

The case with advanced hard and soft tissue loss often requires multiple surgeries to achieve an esthetic result.



Figure 2—After the extraction of tooth No. 9 and site preparation, the palatal osteotomy and labial bone loss can be seen.



Figure 3—The implant is placed and a 2-mm healing abutment is seated. The “gap” is filled with autogenous and allogenic bone.



Figure 4A—The pediculated connective tissue graft is “flipped” over the healing abutment.



Figure 4B—The pediculated connective tissue graft is tucked into the prepared labial site with purse-string sutures.

Case Report

A 45-year-old woman presented with advanced bone loss and gingival recession in and around tooth No. 9 (Figure 1). The tooth exhibited class 3 mobility and probed to 8 mm on the labial and mesial aspects with suppuration. The patient had a very high smile line that showed considerable gingival tissue above the already receded gingival margin. She also had a triangular tooth form that would further complicate the esthetic restoration of the affected tooth.²¹

Surgical Technique

The tooth was extracted using the periosteal elevator (Ace Surgical, Brockton, MA) and gentle removal with forceps to preserve the already deficient hard and soft tissue. The site was debrided with curettes and rinsed with a saturated solution of tetracycline. The labial plate was present at the apical one fifth only. A surgical stent was used to direct the implant angle slightly lingual to the incisal edge. The osteotomy site was initiated at the palatal wall with the use of special lateral cutting burs (Ace Surgical). The inner labial aspect of the osteotomy site was dehisced approximately 5 mm (Figure 2). This area was basted with a mixture of autogenous bone from the osteotomy site, Bio-Oss (Osteohealth Co, Shirley, NY), freeze-dried cortical bone (Lifenet, Virginia Beach, VA), calcium sulfate, and tetracycline. A firm putty-like mix was made and basted into the deficient site before the implant was placed.

A 3.75-mm x 15-mm Osseotite external hex implant (Implant Innovations Inc, West Palm Beach, FL) was placed (Figure 3). Despite the deficient gingival margin, utmost care must be used in placing the platform at the proper location, 3 mm to 4 mm apical to the ideal gingival margin of the final restoration.²²⁻²⁵ A split-thickness dissection was made on the labial of the site to

make a pouch for the soft tissue graft. A 2-mm healing abutment was placed on the implant to serve as a “tent pole” for the pediculated graft²⁶ (Figure 3). To augment the soft tissue deficiency, a large, pediculated connective tissue graft was harvested from the left palate.¹⁹ An outer split-thickness dissection was made on the palate starting at the mesial of the first molar and extending to the palatal sulcus of the extraction site. The pedicle was scribed to bone with a sharp blade on the distal, coronal, and apical areas. The mesial was left intact at the base of the extraction site. The graft should be at least 8 mm wide to cover the mesial-distal width of the extraction site. The pediculated graft was elevated from the bone with a Pritchard elevator (Hu-Friedy, Chicago, IL) with care taken to keep the base of the graft intact. The graft must be released adequately so that the end of the pedicle can be positioned, tension free, 3 mm to 4 mm apical to the platform of the fixture. The pedicle was then “flipped” over the implant site and tucked into the labial pouch (Figure 4). Two 5-0 gut (Surgical Specialties Corp, Reading, PA) purse-string sutures were used to position the end of the graft 3 mm to 4 mm apical to the platform of the implant. The site can be closed with the same suture. Occasionally, it is possible to release the labial tissue enough so that complete closure is possible with a horizontal mattress suture.

It is paramount that the temporary tooth does not put pressure on the site or the palate. For that reason, an Essex appliance or a bonded tooth is necessary to relieve the temporary so that it does not encroach on the graft and also leaves room for subsequent swelling.¹⁹ Further adjustment is often needed at the 1-week postoperative appointment. The area is evaluated at 6 months to see if there is adequate soft tissue bulk in all



Figures 5A and 5B—After 6 months of healing, the “overbuilt” site is ready for uncovering.



Figure 6—The fixture is uncovered and a 4-mm healing abutment is placed.



Figure 7—The tissue is molded for 2 months with a provisional restoration.



Figure 8—Final restoration at 1 year.



Figures 9A and 9B—The final restoration at 2 years postrestoration.

dimensions (Figure 5). Further soft tissue augmentation is rarely needed. The fixture can be uncovered 4 to 6 months after surgery using a punch technique or a pedicle flap initiated from the palate (Figure 6).²²⁻²⁵ It is imperative that the site be overbuilt before uncovering and preserved at the uncovering.

A provisional restoration can be placed approximately 3 weeks after uncovering (Figure 7). The contours are critical in molding the soft tissue that has been overbuilt. The site can be molded to an ideal gingival framework in a few months.^{22, 27} The final restoration should mimic the contour of the provisional to maintain this ideal molded framework (Figures 7 through 10).

Discussion

The pediculated connective tissue graft can augment a large volume of soft

tissue. It also may serve as a barrier membrane. There has been considerable discussion about the advisability of “rotating” the pedicle vs “flipping” the pedicle over the site to be augmented. When the pedicle is rotated, the periosteal side is against the bone and may have a greater barrier/osteoconductive effect, but there has been no research as of yet to validate this. When the pedicle is flipped over the site, it allows for greater vertical soft tissue augmentation. There are a few drawbacks to flipping the pedicle over the site. Primary closure is more difficult to achieve (Figure 4), and the maturity of the graft may take more time. Secondly, the palatal aspect can be lumpy and may require thinning if it is bothersome to the patient (Figure 5B).

From a restorative standpoint, this patient had a triangular tooth form and restoration of the adjacent central incisor would enhance the esthetic result. If the

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Figure 10—The 2-year radiograph of the fixture reveals normal bone levels and integration.

adjacent tooth was not restored it would have been impossible to mimic its shape with the implant restoration without leaving a black space. In this case, the patient opted for some bonding of the mesial aspect (Figure 9B). A veneer or a full ceramic restoration would have resulted in a more esthetic result.

Conclusion

The pediculated connective tissue graft offers an alternative to multiple surgeries to correct sites with advanced hard and soft tissue loss. It can be used at the time of immediate implant placement with concomitant bone grafting to achieve adequate soft tissue volume with 1 surgical intervention. The graft can be used in any area in the maxilla where soft tissue augmentation is required, and it can be used in conjunction with other grafts, membranes, and conventional connective tissue grafts.

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