

Tongue Flap for Keratinized Soft Tissue Coverage Around Dental Implants: A Case Report and Discussion

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The tongue flap is a hardy flap that is routinely utilized by oral and maxillofacial surgeons to cover intraoral defects. It has not been previously described as a method for keratinized soft tissue coverage in conjunction with dental implant placement. In this article, we describe use of a tongue flap in the closure of a chronic anterior maxillary dehiscence and to provide keratinized soft tissue coverage for anterior dental implants.

Key Words: tongue flap, keratinized gingival, dental implants, soft-tissue management, surgical procedure

INTRODUCTION

The tongue flap is a pedicled soft-tissue flap that surgeons use for intraoral defects. The literature has not demonstrated use of this flap for keratinized tissue coverage for implants. This technique was used as a salvage procedure for an anterior maxillary soft tissue defect after multiple local soft tissue procedures were attempted and failed. It has a high success rate due to the robust blood supply to the tongue. However, it is not without morbidity, as patients have limited range of motion of the tongue before the flap is divided, and intermaxillary fixation (IMF) is frequently used. Following is a case study wherein this technique was applied.

CASE SUMMARY

A 44-year-old male, with no significant past medical history, presented to our clinic with a history of chronic dehiscence in the anterior maxilla (Figure 1). Prior to presenting to our clinic he reported that teeth 8 and 9 had been extracted secondary to localized bone loss and dental implants were placed immediately. These implants subsequently failed, and he ended up with severe atrophy of the maxillary anterior alveolar ridge.

The patient had a significant horizontal and vertical bone deficiency. The decision was made to perform bone augmentation with autogenous and allogeneic bone with mesh. After the graft and adequate height and width were obtained, dental implants were subsequently placed.

During the healing process the patient was noted to have a soft tissue dehiscence involving both implants. Multiple attempts at soft-tissue closure were made utilizing: buccal advancement flaps, a palatal rotational flap, and acellular

dermis coverage. All of these techniques failed to provide adequate soft-tissue coverage.

Due to these multiple failures, a tongue flap was proposed to the patient. The risks, benefits, and alternatives of the procedure were discussed with the patient, and he consented to the procedure. The patient was brought to the operating room for an anterior based tongue flap to the anterior maxilla and placement of IMF screws.

The soft-tissue margins of the maxillary recipient bed were sharply de-epithelized. Electrocautery was then used to outline an anterior-based tongue flap of approximately 5 mm in thickness (Figure 2). The flap was raised and noted to be of adequate size to reach and cover the maxillary defect. Hemostasis of the tongue donor site was achieved with electrocautery. The lateral margins of the tongue defect were reapproximated with vicryl sutures (Figure 3). The flap was then rotated over the defect and sutured to the defect margins using vicryl sutures. Next, IMF screws were placed in the maxilla and mandible (Figure 4).

The IMF was released 3.5 weeks later, and the pedicle was sectioned at the base (Figure 5). The base of the flap was then de-epithelialized and sutured to the palatal mucosa.

The flap was debulked and recontoured at a subsequent visit approximately 3 months later (Figure 6), and implants were restored (Figures 7 through 9). A tissue punch was used to remove soft tissue overlying the implants, cover screws were removed, and healing abutments were placed. The implants were restored using screw-retained restorations torqued to 35 Ncm. The patient was pleased with the appearance of the restoration. Maintenance was scheduled for the patient; however, the patient has failed to follow up with our clinic since the implant placement.

DISCUSSION

The importance of keratinized soft tissue around implants has been studied, and it has been demonstrated that peri-implant

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FIGURES 1–4. **FIGURE 1.** Soft tissue defect with implants in place. Bone appears healthy. **FIGURE 2.** Anteriorly based tongue flap. **FIGURE 3.** Harvest-site closure, leaving the base tension free. **FIGURE 4.** Double-layer closure of flap to anterior maxilla with use of intermaxillary fixation screws.

keratinized soft tissue decreases the amount of bone loss, recession, peri-implant disease, and accumulation of plaque.^{1,2}

Several techniques are available to provide keratinized soft-tissue coverage around dental implants. Epithelialized free gingival grafts are reliable for coverage directly over bone or periosteum. The grafts can have an unesthetic patchy appearance, which is why they might not be favored in the anterior maxilla.³ Subepithelial connective tissue grafts are a highly predictable technique better suited for anterior esthetics.⁴ The limiting factor with this approach is the thickness of the graft tissue that can be obtained. Vascularized pedicled grafts, such as the vascularized interpositional periosteal connective tissue flap of the palate, allow for transfer of larger volumes of tissue suitable for the esthetic zone.⁵ Allograft, such as AlloDerm (Allergan plc, Madison, NJ), can also be used to obtain soft-tissue coverage and bulk without associated donor-site morbidity.⁶

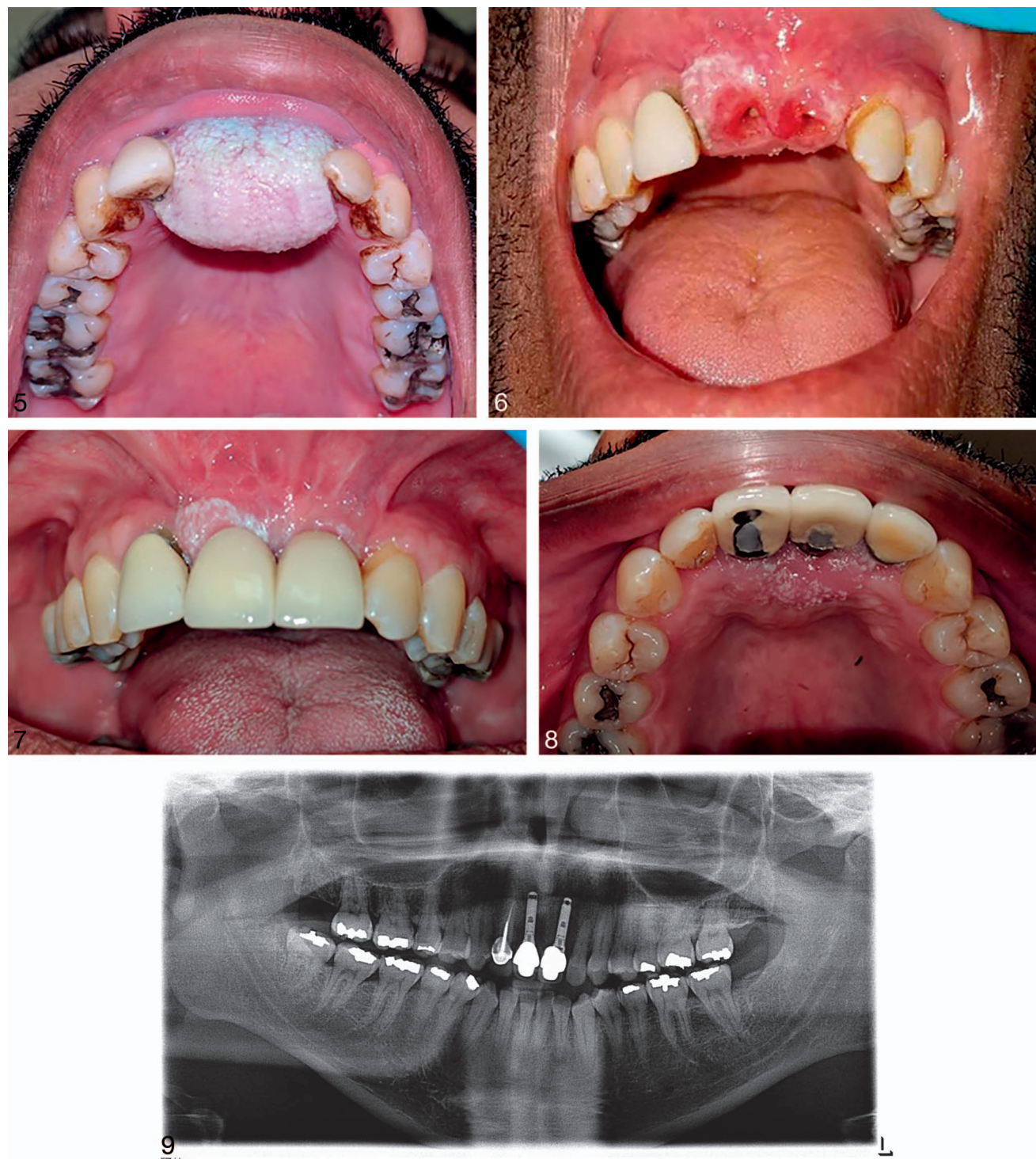
The tongue flap is a well-known source for closure of intraoral defects. It has a very stable and robust blood supply

and can be utilized as a random or an axial flap. Blood supply is from the branches of the lingual (suprahyoid, dorsal lingual, deep lingual, and sublingual) and facial arteries. Approximately 25 branches of the deep lingual artery feed into the body of the tongue.⁷

The flap can be anteriorly or posteriorly based. Anteriorly based flaps are good for defects of the hard palate, upper and lower lips, and anterior buccal mucosa. Posteriorly based flaps are good for soft palate, retromolar area, and posterior buccal mucosa.⁸

The thickness of the flap should be 3 mm at the tip, increasing in thickness to 5 mm at the base. The maximum anterior-posterior dimensions should be 1 cm from the tip of the tongue to 1 cm anterior to the circumvallate papilla.

This procedure can be performed under local anesthesia or in the operating room under general anesthesia. Patients frequently need IMF to aid with comfort and to keep the flap as immobilized as possible. The secondary procedure, where the



FIGURES 5–9. **FIGURE 5.** One month after division of flap. **FIGURE 6.** After soft-tissue recontouring and removal of the provisional restorations. **FIGURE 7.** Final prosthesis in place, buccal view. **FIGURE 8.** Final prosthesis in place, palatal view. **FIGURE 9.** Final prosthesis in place, panoramic radiograph.

flap is divided at the base, can be performed as soon as 3 weeks after the procedure.⁹

A large flap can often be harvested, with up to 6 cm soft-tissue coverage reported. Usually, there are no permanent functional or neurosensory deficits of the tongue following this

procedure. Approximately half of the tongue can be rotated without compromising normal function.¹⁰

Due to the robust blood supply, the tongue flap is a hardy flap that has a high success rate. The literature describes a success rate of approximately 90%.¹¹ However, most of these

studies are based on palatal fistula closures.¹² It is conceivable that this success rate would be higher when there is no fistula further studies should be done.

There are relatively few contraindications to tongue flaps, such as previous tongue procedures, tobacco use, intolerance to IMF, medical comorbidities (eg, malnutrition, anxiety, diabetes, and seizures).

One of the difficulties in performing this type of procedure is patient comfort. Because the flap is pedicled, the tongue often needs to be immobilized as much as possible, which is why IMF is often used. There is also a need to debulk and recontour the soft tissue in most cases.

CONCLUSION

The tongue flap may be considered as a salvage procedure for keratinized soft tissue for intraoral defects involving implants. It should be included as part of the armamentarium available to surgeons for soft-tissue defects lacking keratinized tissue.

ABBREVIATION

IMF: intermaxillary fixation

NOTE

The authors declare no conflicts of interest.

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