Development of Stable Peri-implant Soft Tissue and Mentolabial Sulcus Depth with an Implant-Retained Soft Tissue Conformer After Osteocutaneous Flap Reconstruction

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Excessive soft tissue bulk, movement, chronic inflammation, and hypertrophy in peri-implant areas pose challenges for long-term management of peri-implant soft tissues surrounding osteocutaneous flap reconstructions. A case history report is presented on the predictable establishment of stable peri-implant soft tissue and improved mentolabial sulcus depth in a patient treated for high-grade osteosarcoma of the mandible. Following surgical resection, reconstruction with osteocutaneous fibula free flap, and endosseous implant placement, a combined surgical and prosthetic approach was used through a lip switch vestibuloplasty and an implant-retained soft tissue conformer. *Int J Prosthodont 2013;26:265–267.* doi: 10.11607/ijp.3410

Oral function and quality of life after mandibular resections are significantly improved by reconstruction with vascularized osteocutaneous flaps and endosseous implant-supported prostheses.[1] Excessive graft tissue thickness, mobility, vestibule ablation, perioral musculature, and tongue movement pose challenges in rehabilitating such defects.[2] Mobile soft tissue surrounding endosseous implants often promotes soft tissue inflammation, hypertrophy, pain, bleeding, and compromised esthetics.[3] Suggestions to eliminate compromised peri-implant soft tissues have included tissue thinning during grafting, debulking at time of endosseous implant placement or uncovering, split thickness skin graft, palatal mucosal grafts, vestibuloplasty, topical silver nitrate, laser resurfacing of the epithelium or reactive tissues, and implant-retained fixed partial dentures.[4] Because of the inevitable constant mobility from the tongue and peri-oral musculature, transplanted skin grafts cannot always be immobilized resulting in unfavorable peri-implant healing.[5] A case history report is presented where stable peri-implant soft tissue and improved mentolabial sulcus depth were achieved by a combined surgical and prosthetic approach through a lip switch vestibuloplasty and an implant-retained soft tissue conformer.

Patient History

A 26-year-old woman presented in 2010 to the Mayo Clinic Division of Prosthetic and Esthetic Dentistry for discussion of prosthetic oral rehabilitation. Patient was diagnosed with high-grade (grade 3 of 4) osteosarcoma of the mandible. The pre-prosthetic multidisciplinary care included neoadjuvant chemotherapy due to inability to rule out distant micrometastasis, subtotal anterior segmental mandibulectomy with removal of a portion of the floor of the mouth and inner surface of the lip, immediate microvascular osteocutaneous fibula free flap reconstruction, and endosseous implant placement.

Prosthetic treatment options discussed included no further rehabilitation, a removable partial denture (RPD), an implant-supported RPD, and an implant-retained fixed partial denture (IRFPD). Because of significant flap soft tissue bulk and mobility upon tongue movement, lack of an anterior vestibule, accentuated mentolabial deficiency, significant vertical discrepancy of the fibula segment with the opposing arch and remaining mandibular teeth, the patient was advised to consider an IRFPD.

At the time of implant placement, following two-stage protocol, soft tissue debulking was accomplished. At time of uncovering, a crestal incision with a

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Figs 1a to 1c Supraperiosteal dissection with reflected facial and lingual flaps displaced. Access to peri-implant areas is ready for modification of the implant-retained soft tissue conformer with MMAA.

Fig 2 Cicatricial tissue formation surrounding transdermal implant components at *(a)* 3 weeks and *(b)* 8 weeks of healing.

supraperiosteal dissection at the level of the implants was performed. The facial aspect of the pedicle was sutured down and anteriorly to the level of the fibula while the lingual aspect was sutured down to the subcutaneous tissue (Fig 1). Multiunit, 7-mm abutments (Nobel Biocare) were torqued to 35 Ncm. The provisional RPD was modified to accommodate implant impression components. Methyl methacrylate acrylic resin (MMAA) (Jet acrylic resin, Lang Dental) at a doughy stage was added multiple times creating intimate contact with the newly displaced soft tissue flaps. Anterior facial bulk was added to improve vestibule depth. The intaglio surface of the prosthesis was gradually relieved and finished to a high polish every 10 days (Fig 2). After 8 weeks, the tissue had matured to its desired position and stability. As a result of lack of access for cleaning during the healing process, a 0.12% chlorhexidine rinse was prescribed. At each follow-up, the area was debrided with copious 0.12% chlorhexidine irrigation. The functional and esthetic needs of the patient were definitively restored with an implant-retained abutment level mandibular resection prosthesis (Figs 3 and 4).

Discussion

Concerns with surgical revisions of reconstruction sites are related to the potential for vascular supply interruption to the graft. In the presented case history report, the lip switch vestibuloplasty was minimally invasive and ensured maintenance of the existing skin paddle vascularity through a supraperiosteal dissection.

Figs 3a and 3b Mandibular reconstruction prosthesis at the abutment level allows visualization of soft tissues and access for cleaning.

The rigid fixation of the implant retained soft tissue conformer immobilized the flaps during healing, assisted with cicatricial formation of tissues immediately surrounding the transdermal implant components, reduced the risk for compromised healing from tongue and peri-oral musculature movement, and maintained esthetics while healing.

The disadvantages are patient's inability to clean, malodor, and multiple follow-up appointments for prosthesis modification while healing. Malodor was managed well with a 0.12% chlorhexidine rinse. MMAA was easy to use chairside, contour, and polish. The definitive prosthesis provided access for cleaning, ease of retrievability and clinical surveillance for evidence of disease recurrence.

Conclusion

An implant-retained soft tissue conformer in combination with a lip switch vestibuloplasty can be predictably used to establish stable peri-implant soft tissue approximation and improved mentolabial sulcus depth in microvascular osteocutaneous flap reconstructions.

Fig 4 *(a)* Facial profile before procedure with provisional RPD in place revealing a deficient mentolabial sulcus and compromised esthetics. *(b)* Facial profile after procedure with definitive prosthesis in place showing improved esthetics.

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