

Management of Plaque-Related Soft-Tissue Trauma



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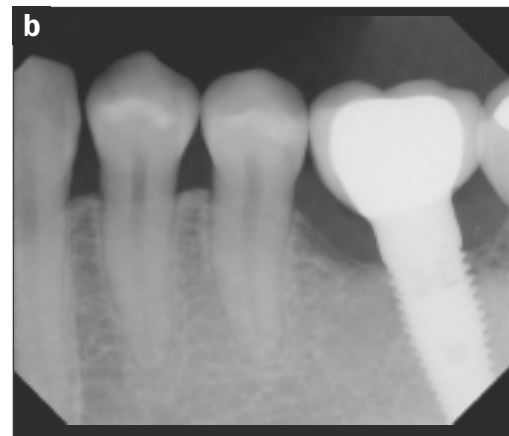
It is well known that an implant cannot be successful without adequate hard-tissue support. However, the importance of adequate soft tissue around an implant restoration is less frequently acknowledged, and problems with soft-tissue recession or breakdown can lead to complications. Peri-implant soft tissue that is compatible with the surrounding gingiva and mucosa is essential from an aesthetic point of view. Also, an implant-supported restoration benefits from thick soft-tissue support, since a thicker biotype is more resistant to mechanical and surgical insults, is less likely to recede, and has more tissue volume for prosthetic manipulation.^{1,2} In addition, thick gingiva can protect the underlying hard tissue and prevent aesthetic problems in highly visible areas.

This article details the treatment of a patient with gingival recession on the midfacial aspect of a dental implant that had been placed 3 years previously. The implant was adequate from the point of view of osseointegration, but the patient was unhappy because of plaque buildup, food impaction, and discomfort around the implant. A mucogingival deformity was diagnosed. This was corrected with a connective-tissue graft that resolved the concave area and gingival recession around the implant. This problem could have been avoided if tissue grafting had been done initially, or if the treating clinician had noted the importance of high-quality keratinized peri-implant soft tissue. The result was successful, and neither the crown nor the implant had to be removed.

The following case report details the correction of the gingival deformity with a connective-tissue graft, which ensured the long-term health of the peri-implant tissue.

CASE REPORT

A 45-year-old woman had received an implant to replace the missing mandibular left first molar tooth 3 years prior. She presented with complaints of food impaction and a “very uncomfortable condition” around her dental implant, especially during normal hygiene procedures. She wished to be treated with a permanent solution to her prob-



Figures 1a and 1b. Preoperative photo and radiographic view of mandibular left first molar implant (No. 19) placed 3 years previously. Gingival deformity in the midfacial and proximal areas was observed. The patient's chief complaint was discomfort during daily oral hygiene procedures. The radiograph shows a well osseointegrated implant with some bone loss.

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lem. Previous attempts by other clinicians to correct this condition included laser treatment, irrigation with a Waterpik (Water Pik), and local antibiotic delivery, but all had been unsuccessful. Replacement of the crown and explantation of the implant had also been proposed, but the patient had rejected these solutions.

Clinical evaluation revealed an acquired gingival deformity, caused by trauma and/or plaque, associated with the facial aspect of the implant-supported crown (Figure 1a). The soft tissue had receded to the first thread facially. A periapical radiograph also showed some bone loss around the implant, which nevertheless remained stable (Figure 1b).

To prevent the attachment loss from continuing and to restore previously damaged areas, autogenous connective-tissue grafting was performed to reconstruct the soft tissue into a normal configuration for optimum health of the periodontium and the associated restoration. No vertical incision was used to prepare the recipient site for grafting. A No. 15c blade (Carbon Steel [Benco Dental]) was used for the initial sul-

cular incision, which reached from the distal of the second molar to the mesial of the first premolar. The facial flap extended apically beyond the mucogingival junction and was relaxed completely to affect coronal advancement. After a full-thickness flap was raised, bone loss was noted up to the third thread on the facial aspect of the implant (Figure 2a).

No attempt was made to perform bone grafting or detoxify the external surface of the implant. It is the authors' view that the mucogingival deformity was an etiology associated with this specific patient, not with an infectious process; therefore, there was no need to decontaminate the implant or apply bone grafts. Due to a severe deficiency of soft-tissue volume, a thick graft was harvested to fill in the large concave area associated with the facial aspect of the implant (Figures 2b and 2c). Because the premolar area has the potential to provide thicker grafts, which will help maintain adequate vascularity and be less likely to recede,^{3,4} a thick (15 x 10 x 4 mm) graft of

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connective tissue was harvested from the maxillary left palate in the canine/premolar region, adapted to the recipient site, and secured with single interrupted 4.0 Vicryl sutures (Polyglactin 910, P3 [Ethicon]) (Figures 2d to 2f). The single-incision palatal harvest technique⁴ was used for patient comfort. The flap was positioned coronally to cover the harvested tissue completely (Figure 2g). This corrected the mucogingival defect and strengthened the peri-implant tissue.

After surgery, the patient was given amoxicillin orally (500 mg, 3 times a day), ibuprofen (800 mg, 3 times a day, when necessary), methylprednisolone to control swelling (Medrol Dosepak), and chlorhexidine rinse (chlorhexidine gluconate, 0.12% oral rinse USP [Aclearn, Henry Schein]) twice daily.

The patient was very happy with the outcome. She stated that the area around her implant felt normal, and the problems with food impaction and discomfort during normal hygiene procedures were resolved permanently (Figure 3). She was advised to replace the



Figure 2a. The site has been exposed for evaluation and treatment. Operative view shows the dehiscence on the facial aspect of the otherwise osseointegrated implant.



Figure 2b. The maxillary left palatal region was chosen to harvest connective tissue.



Figure 2c. Subepithelial connective-tissue graft harvested to correct mucogingival deformity (concave area associated with the facial aspect of mandibular implant).



Figure 2d. A thick subepithelial connective-tissue graft was harvested.



Figure 2e. The harvested tissue has been adapted to the recipient site.



Figure 2f. The graft was stabilized with 4-0 Vicryl sutures.



Figure 2g. Closure of flaps.

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existing bulky implant-supported crown, but since her discomfort had disappeared, she elected to keep the crown.

DISCUSSION

Gingival recession on the midfacial aspect of an implant can be attributed to several causes, including the faciolingual location of the implant within the alveolar bone. Several factors, including implant position, buccal plate thickness, gingival tissue thickness, and width of the keratinized mucosa, have been found to influence the need for soft-tissue grafting.¹ Success in any kind of restorative therapy, whether conventional or implant-supported, must include an intact midfacial soft-tissue profile and interproximal papillae. Soft-tissue deficiency can result in aesthetic and functional complications that are unacceptable to a patient and make the area more susceptible to future tissue recession.⁵

Berglundh et al^{6,7} noted that the attachment apparatus is different for an implant versus a tooth, and the

blood supply to the peri-implant soft tissue is limited. Animal and human clinical studies have shown that the peri-implant gingiva may be more susceptible to infection and display a stronger inflammatory response than the gingiva around a natural tooth.^{8,9} The area of infection around an implant has been reported to be larger and to extend more apically versus the natural dentition.⁸ The absence of adequate peri-implant keratinized mucosa or attached mucosa has also been associated with higher plaque accumulation and gingival inflammation.¹⁰ Other reasons for ensuring adequate connective tissue around an implant include: (1) the lower vascularity of connective tissue (versus mucosa) makes it less susceptible to bacterial infiltration, (2) connective tissue is better at resisting damage from trauma such as tooth brushing or a retraction cord, and (3) attachment loss following implant placement is decreased.^{5,11} The mucosa is easily traumatized and can be difficult to maintain; it is therefore crucial to

ensure that there is an adequate volume of peri-implant soft tissue early in the process of implant treatment.¹¹

A 13-month study investigated the relationship between the width of keratinized mucosa and gingival inflammation, presence of plaque, pocket depths, mucosal recession, and marginal bone resorption.¹² The authors¹² noted that an appropriate amount of keratinized gingiva assisted in long-term maintenance and management. In a 5-year study, Schrott et al¹³ concluded that even patients who exercised good oral hygiene and received regular implant maintenance therapy needed more than 2 mm of peri-implant keratinized mucosa to facilitate home care, prevent plaque accumulation, minimize bleeding on probing, and most importantly, reduce the likelihood of buccal soft-tissue recession.

In addition to the many functional reasons for ensuring adequate soft tissue around an implant, aesthetics is improved. In patients with a thin gingival biotype, the implant body or platform may become visible. Especially in anterior areas, exposure of the titanium, a grayish appearance of the soft tissues (titanium show-through), and inadequate papillae will result in aesthetically inferior results. If there is

minimal keratinized mucosa around the implant at the time of placement, the threads of the implant may become visible within a year or 2 after placement, and the restoration will appear longer, further contributing to poor aesthetics.⁵

Immediate implant placement is becoming a common practice in the dental community to satisfy patients, both aesthetically and functionally, and to reduce treatment time. However, one of the complications associated with immediate implant placement is midfacial gingival recession due to a missing buccal plate, implant positioning, inadequate width of keratinized tissue, or a thin soft-tissue profile of the patient.¹ The authors therefore recommend that soft-tissue grafts should be used to prevent or correct midfacial mucosal recession—precisely what was done in this case to correct gingival deformity. This will result in predictable outcomes, not just from an aesthetic point of view, but also to ensure long-term function and comfort.

Because it is well known that hard tissue inevitably recedes after implant placement (and the soft tissue along with it),¹⁴ it is preferable to manage a site proactively rather than waiting until a problem develops. Connective-



Figure 3. At 3 years post-treatment, resolution of the gingival deformity is apparent. The patient's chief complaint was resolved, and there was no further discomfort experienced during daily oral hygiene. An apparent creeping attachment phenomenon is also evident.

tissue grafting, still seen as the gold standard for correcting mucogingival deformities,¹⁵ should be done when there is minimal peri-implant soft tissue; the additional tissue will support the implant and prevent functional and aesthetic problems from developing. When performed at stage-2

implant crown or the entire implant (explantation). However, the location of the implant in a molar region meant that it bore strong occlusal forces, and this may have contributed to the loss of the facial bone and already thin soft tissue (although it was clearly not the sole cause, since the problem was

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implant surgery, these grafts are stable over the long term (3 years in a study performed by Speroni et al¹⁶).

Fu et al² proposed a “management triad” for peri-implant soft tissue. This involves choosing the appropriate implant position and angulation, implant design, and prosthetic design to promote a thick gingival biotype. Hsu et al¹ presented a decision-making model to prevent midfacial mucosal recession. Capri¹⁷ recently provided an excellent review of different techniques to increase the peri-implant gingiva.

The present case highlights the importance of correct diagnosis and proactive treatment. This patient was treated for a year with no relief of her uncomfortable situation because the diagnosis was incorrect. An infectious cause for her problems was assumed, so she was treated with antibiotics, local delivery of an anti-infective agent (Arrestin), anti-infective rinse, nonsurgical soft-tissue management, laser therapy, and Waterpik. One clinician had even recommended removal of the

resolved without occlusal therapy). The site was therefore inadequate to resist recession, soft-tissue complications, and plaque buildup.

CONCLUSION

To prevent soft-tissue complications associated with dental implants, it is recommended that soft-tissue grafting be done prior to (or at) the time of implant placement to preserve the normal gingival anatomy and to prevent complications with undesirable outcomes. ♦

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