
A Revised Technique for Stage-Two Surgery in the Severely Resorbed Mandible: A Technical Note

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A revised stage-two technique, suitable for the severely resorbed mandible, is described. The objective is to eliminate mucosal mobility around the peri-implant area. This is achieved by means of a technique that limits the detachment of the lingual flap, augments the band of attached masticatory mucosa with a free gingival graft, deepens the vestibule, and prevents the reattachment of the muscles by means of a postsurgical stent. (INT J ORAL MAXILLOFAC IMPLANTS 1998;13:565-568)

Key words: attached masticatory mucosa, free gingival graft, implants, muscle pull, postsurgical stent, severely resorbed mandible, stage-two surgery, vestibule

Long-term studies have verified that the satisfactory soft tissue reactions surrounding dental implants were unrelated to the presence or absence of keratinized masticatory mucosa.¹⁻³ A number of papers cite soft tissue complications such as mucosal irritation, hyperplasia,⁴⁻⁸ and mucosal mobility resulting from muscle pull as reasons for soft tissue complications.^{1,3,6,9}

Various treatment modalities have been used to correct these soft tissue complications. The most widely used procedure in the edentulous mandible is the placement of a free gingival graft around the implants.¹⁰⁻¹⁷ This approach seems to be identical to the classic technique used to augment the zone of attached masticatory mucosa around natural teeth. These two situations may not necessarily be comparable. These techniques focus primarily on the vestibular side and do not address the problems encoun-

tered on the lingual side, where the mobility of the floor of the mouth is a factor in terms of tissue stability, cleansibility, and long-term maintenance.

The purpose of this paper is to present a revised stage-two implant technique suitable for the severely resorbed mandible that, along with abutment connection, will increase the band of attached masticatory mucosa, deepen the vestibule, and eliminate the surrounding muscle pulls along with the associated mobility on the facial and lingual aspect.

Method

Description of the Problem. When dealing with the severely resorbed mandible (Fig 1), some unique anatomic features present a more complex situation when compared to the conventional. It is our clinical impression that there is a correlation between the amount of bone resorption and the width of the band of keratinized masticatory mucosa. In the severely resorbed mandible, there is usually a narrow (1 to 2 mm) band of keratinized masticatory mucosa along with an extremely shallow vestibule. As a result, there are prominent muscle attachments on the vestibular side (especially the mentalis muscle), the lingual attachment is very close to the future implant sites, and the floor of the mouth is very mobile.

If the classic approach is applied to the severely resorbed mandibular situation, a postsurgical gain of the width of keratinized masticatory mucosa on the

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facial side can be expected. Because the operation takes place in proximity to the muscle attachments, excessive postoperative mobility of the floor of the mouth as a result of lingual flap elevation and rapid loss of the surgically gained vestibular depth because of muscle reattachment during the early stages of healing often occur.¹⁸⁻²¹ After experiencing the com-



Fig 1 Severely resorbed mandible.



Fig 2 Incision at the mucogingival junction with the entire band of the keratinized masticatory mucosa included in the lingual flap.

lications described above, it has become obvious that some modifications of generally accepted approaches were needed.

Description of the Technique. The incision is made at the mucogingival junction, so that the entire band of keratinized masticatory mucosa is included in the lingual flap (Fig 2). Subsequently, the implants are uncovered. It is very important that the lingual flap not be elevated in its entire length, but only around each implant so as to maintain maximum attachment to the body of the mandible. Should attachment to the mandible be lost, then not only the lingual flap but the entire floor of the mouth becomes extremely mobile with every movement of the tongue (a situation that is very difficult to control). The healing is delayed and it can take several weeks for the floor of the mouth to become reattached (Fig 3).

A partial-thickness dissection through the muscles of the chin area is performed on the labial vestibular aspect to obtain a free graft. At the base of the bed, a periosteal incision is made as described by Corn.¹⁸ At

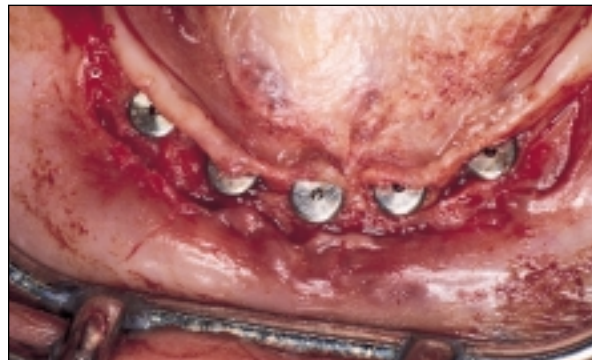


Fig 3 The lingual flap is not detached in its entire length, but only around each individual implant to maintain maximum attachment to the body of the mandible.

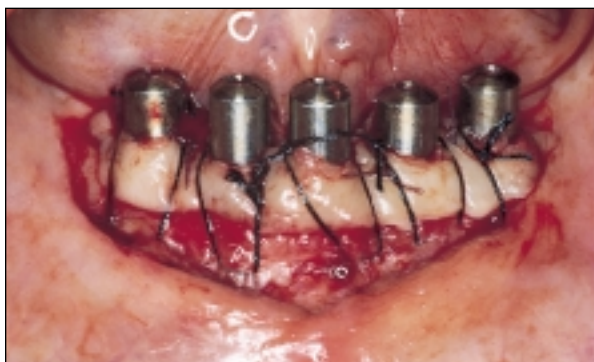
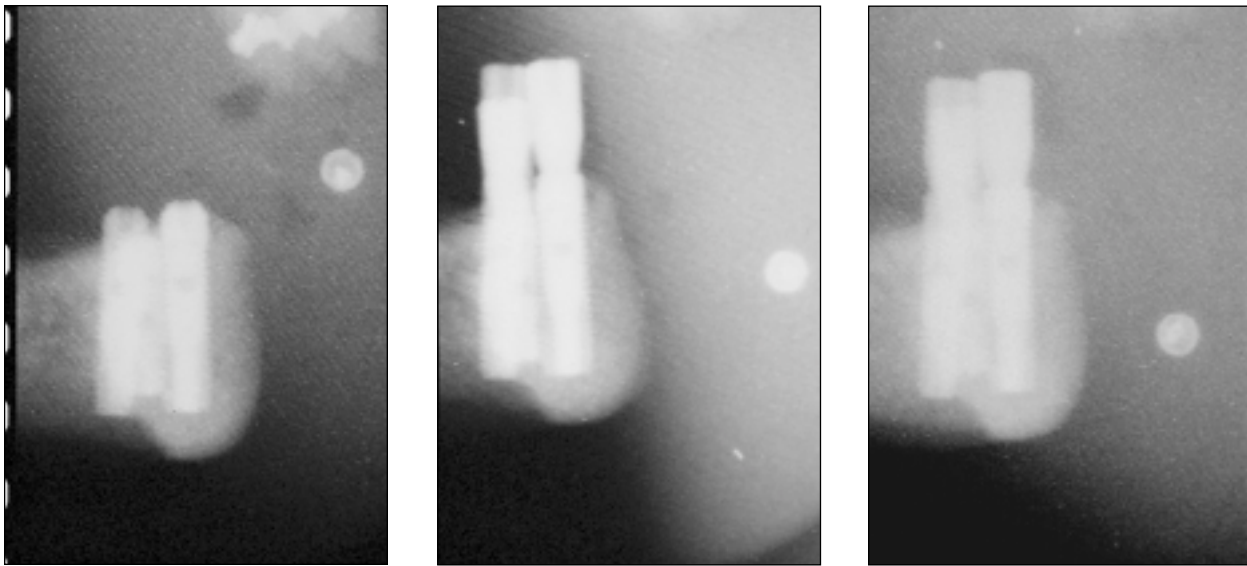


Fig 4 The graft is stabilized by means of interrupted and horizontal mattress sutures.



Fig 5 The buccal flange of the denture is extended to the apical end of the grafted area.



Figs 6a to 6c Lateral radiographs of a metal ball placed in the most apical part of the vestibule to document stability over time. (*Left*) Before the procedure. (*Center*) Immediately after the procedure. (*Right*) Six months after the procedure.

the apical border of the recipient site, the periosteum is elevated and a band of exposed bone is denuded to further minimize the reattachment of the muscles to the future peri-implant area. To obtain precise adaptation of the graft around the implant, a template is used for harvesting a free graft from the palate. This template can be easily made intraorally by adapting tin foil over what will be the recipient site. The shape of the foil represents the shape and size of the donor tissue. It is then placed on the lateral border of the palate and an incision is made following the borders of the template. For tighter adaptation around the healing abutments, the margin of the graft can be trimmed with a tissue punch. Healing abutments are then connected. Placement of healing abutments that are 5 to 6 mm above the gingival level for stabilization of the graft is recommended. The graft is stabilized by means of interrupted and horizontal mattress sutures (Fig 4). A preexisting denture is converted to a postsurgical stent. The base of the denture is relined over the extra long healing abutments, and the buccal flange is extended to the apical end of the grafted area (Fig 5). This stent has many advantages as compared to other techniques^{22,23}: stability provided by the long healing abutments, retrievability, cleansibility of the surgical field, and normal function. Studies on postoperative healing and dimensional changes after different vestibuloplasty procedures have demonstrated a rapid loss of the directly gained operative result in the first postoperative weeks.¹⁸⁻²¹ To prevent reattachment of the muscles,



Fig 7 Clinical result 6 months after the procedure.

the use of a postsurgical stent as advocated by Corn¹⁸ is recommended for at least 4 weeks.

To document stability over time, the technique described by Bohannan¹⁹ was used, which involves placing a metal ball in the most apical part of the vestibule and taking standardized lateral radiographs before, immediately after, and 6 months after the procedure (Figs 6a to 6c). The standardized radiographs demonstrate that this technique successfully prevents the reattachment of the muscles and maintains the stability of the vestibular depth over a period of 6 months (Fig 7).

Discussion

Controversies exist as to whether a zone of keratinized attached gingiva around an implant abutment is necessary to achieve a healthy tissue response.^{1,3,5,10,12} In patients with minimal or no attached keratinized gingiva, favorable soft tissue reactions can be observed, provided the patient can perform good oral hygiene. Problems arise when the patient does not or cannot perform the same level of oral hygiene.

The result can be mucosal irritation, hyperplasia, and possible peri-implantitis, as have been described in different reports.⁶⁻¹⁰ One critical factor that should be considered in decision-making for peri-implant soft tissue manipulation is the presence of mucosal mobility caused by muscle and frenum pull, which has been clearly identified as one of the main reasons for soft tissue complications.^{1,3,5,10} The objective of the vestibular extension with a free gingival graft described in this paper is to avoid soft tissue complications. The objective is not to gain more retention for a removable prosthesis by extending the prosthesis basal seat when overdentures are involved. Retention of an overdenture comes from the mechanical system that is employed involving the prosthesis and implants (eg, clips, bar, and so forth).

Conclusion

This combination technique is indicated only for the severely resorbed mandible where the anatomic environment renders certain surgical procedures necessary beyond the classic free gingival graft. These include preservation of the lingual flap attachment, periosteal incision at the bottom of the lingual flap, and the use of a surgical stent. Stability of the postoperative result renders this technique a useful and predictable tool in the management of the severely resorbed mandible when endosseous implants are involved.

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