

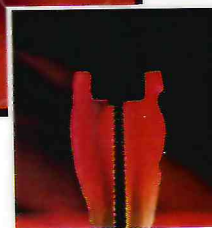
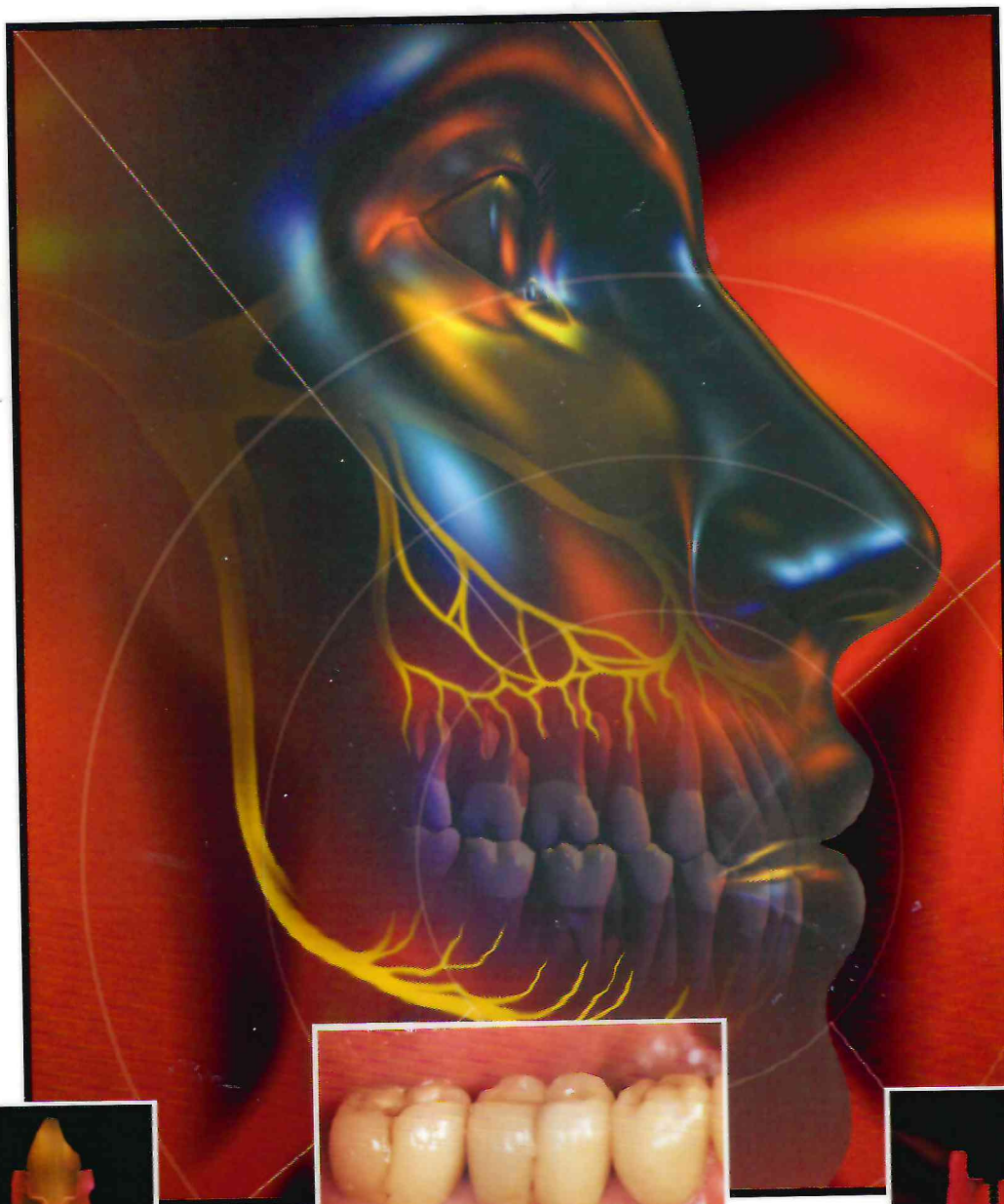
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# IMPLANT PLACEMENT WITHOUT FLAPS— PART 2: UTILIZING A TWO-STAGE SURGICAL PROTOCOL

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*The single-stage punch technique can provide an effective means of seating an implant fixture without necessitating flap elevation. As described in Part 1 of the article, when the implant must be submerged during the healing phase of osseointegration, the single-stage punch technique may be modified to permit the requisite isolation to be achieved. In this procedure, the mucosal tissue is removed with the soft tissue punch and resealed at the ridge site following the placement of the implant. The second part of the article utilizes two case presentations to demonstrate the proper use of the modified single-stage punch technique.*

Human studies have demonstrated that the treatment of edentulous patients with implants of various systems can provide successful long-term oral rehabilitation.<sup>1,3</sup> Traditional surgical protocols of numerous contemporary implant systems advocate the submergence of the implant fixtures during the initial healing phase.<sup>1,3</sup> Apical proliferation of mucosal epithelia along the implant surface is thus prevented, infection is minimized, and the risk of undue early loading is eliminated. The concept of a two-stage surgical procedure originated from the Brånemark protocol, and had been challenged by Schroeder et al, who successfully demonstrated proper anchorage of ITI titanium

implants to bone utilizing a single-stage surgical protocol.<sup>4</sup> Successful short-term results using the single-stage procedure have been reported with alternate implant systems, and numerous studies have documented successful and predictable results with immediately loaded implants.<sup>5-9</sup> According to the surgical protocol of contemporary implant systems, both treatment modalities require flap elevation, and exposure of the implant site must precede preparation of the osteotomy and subsequent implant placement.

Linkow and Chercheve, however, did not exclude the possibility of obtaining access to the bone by "perforation of the (intact) fiber mucosal tissue" lining of the ridge.<sup>10</sup> Buchs had recently suggested a minor modification to this approach, the "one-step punch technique," in which a tissue punch is used to remove a plug of gingival tissue prior to preparation of the osteotomy.<sup>11</sup> The avoidance of flap elevation has previously been suggested in staged implant placement utilizing socket seal surgery,<sup>12</sup> and in immediate implant placement with<sup>13</sup> and without the use of socket seal surgery.<sup>14,15</sup>



Figure 1. Placement of the implant fixture into the prepared site. Note that the cover screw protrudes minimally above crest level.

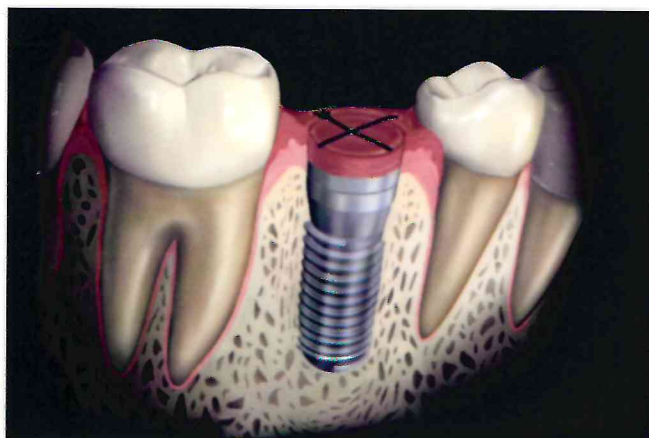
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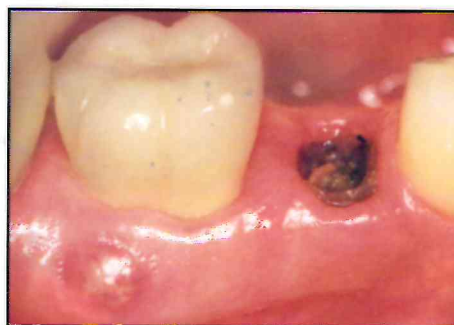


**Figure 2.** The mucosal plug is resected over the cover screw and secured beneath mattress sutures.

In Part 1 of this article, the implementation of the punch technique has been demonstrated and discussed as a modified single-stage surgical procedure.<sup>17</sup> As previously described, the implant site is prepared by punching a soft tissue "plug" out of the mucosal tissue and drilling the bone without the elevation of "traditional" mucosal flaps. This procedure is primarily advantageous in areas where access to the implant site is limited and elevation and manipulation of mucosal flaps may be complex or may interfere with the integrity of the adjacent tissues. Additional clinical and histological research is required, however, prior to the clinical implementation of this single-stage punch technique on a routine and predictable basis. When the traditional approach is preferred (ie, submergence of the implant during the healing period), the punch technique may still be utilized provided that a soft tissue seal isolates the implant from the oral environment following placement. In this article, a clinical modification is suggested whereby soft tissue sealing of the implant site following the punch technique is achieved with a mucosal tissue graft.

### Examination and Assessment of the Implant Site

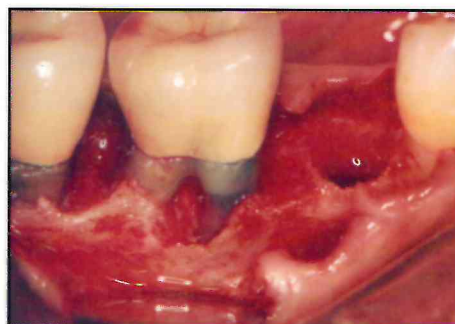
Anatomical obstructions in the region of the implant site (eg, high muscle attachments, bony ledges, limited size of the oral cavity, or high floor of the mouth), may impose difficulty in flap management and may indicate the use of the proposed technique. The width and shape of the ridge is subsequently examined using clinical and



**Figure 3.** Case 1. Buccal view indicates the severe decay present on the residual root of the premolar. The first molar is associated with a periodontal abscess.



**Figure 4.** The walls of the premolar root are extremely thin. Note the radiolucency associated with the furcation and the mesial root of the molar.



**Figure 5.** The premolar has been extracted, while leaving the remaining alveolus intact. Note the bone loss associated with the molar tooth.

radiographic means. In order to minimize the potential perforation of the cortical plates, a bone width no less than 7 mm may be considered adequate.

### Preparation of the Implant Site

The implant surgical site is anesthetized by infiltration of a vasoconstrictor-free anesthetic solution in order to avoid compromising the revascularization of the grafted mucosal

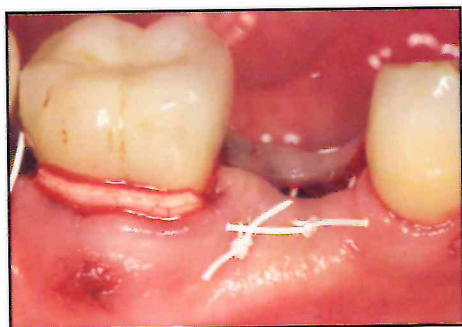


Figure 6. In order to efficiently contain the blood clot, the flaps are approximated. A resorbable barrier membrane is placed in the furcation area.



Figure 7. Two months following the completion of surgery, a soft tissue "plug" is removed with a biopsy punch.

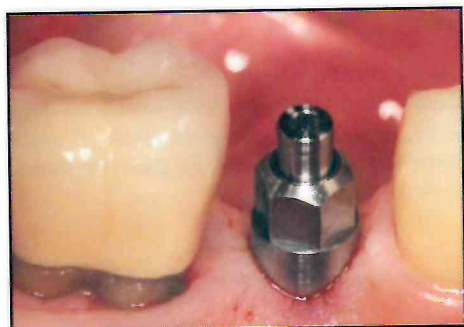


Figure 8. The implant mount is exhibited at the time of complete implant placement. Note that the neighboring gingival tissue remains intact.

tissue. The mucosal surface of the implant site is carefully wiped with gauze saturated by a 0.2% chlorhexidine solution to minimize the potential of infection. At the initiation of implant surgery, a circular plug of the mucosal lining is removed with a biopsy punch and maintained in a sterile saline solution. The remainder of the placement procedure must be performed in less than 15 to 20 minutes to prevent the compromise of the graft. Once the

osteotomy has been adequately prepared, the implant is placed in a manner such that the cover screw protrudes minimally above the crest level (Figure 1).

### Soft Tissue Grafting

The soft tissue plug is subsequently placed over the cover screw and secured to the mucosal walls with mattress sutures; care is exercised to prevent piercing the graft itself (Figure 2). If the graft protrudes minimally above the surrounding mucosa surface, its epithelial surface may be trimmed.

### Postoperative Instructions

While an antibiotic regimen is not usually required, the patient is generally prescribed analgesics (500 mg diflunisal tablets 2 to 3 times daily) as necessary. The use of a 0.12% chlorhexidine solution twice daily for 1 minute is recommended for a period of 2 weeks. Tissue-borne provisionalization should be avoided for a 1-week period.

### Case Presentations

#### Case 1

A 40-year-old male patient presented with a painful abscess in the furcation of the right mandibular first molar and a severely decayed root of the second premolar (Figures 3 and 4). Tooth #30 had a periodontal abscess associated with grade II furcation involvement, moderate bone loss, and no fracture, indicating a questionable prognosis. A decision was made to treat the tooth with a periodontal regenerative procedure that utilized a

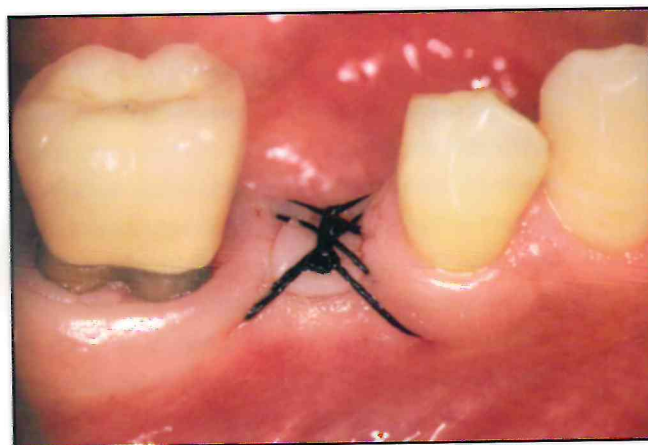


Figure 9. The implant site is sealed with the soft tissue plug. Mattress sutures are utilized to adapt the graft to the surrounding tissues.



resorbable membrane barrier. The premolar, which had a poor prognosis, was removed at the same session (Figures 5 and 6). Two months postsurgery, the ridge exhibited adequate width, and a 14 mm threaded implant ( $\varnothing 3.8$  mm, Steri-Oss, Yorba Linda, CA) was placed in the premolar site using the punch technique (Figure 7). This procedure did not require flap elevation and prevented the possibility of premature irritation of the membrane placed in the adjacent molar site (Figure 8). The implant was then submerged beneath the previously removed keratinized soft tissue plug as described (Figure 9). This afforded optimal protection of the implant site that was prepared relatively soon (2 months) following root extraction. The use of the keratinized soft tissue plug also permitted the quantity and quality of the soft tissue component of the ridge to be restored.

Six months following the membrane placement and 4 months after implant placement (Figure 10), flaps were used to expose the implant and connect a healing abutment. In order to enhance the keratinized tissue on the buccal aspect of the implant (Figures 11 through 13), the mucosal flap was buccally displaced. Two months postoperatively, the first molar tooth was restored with a definitive crown restoration, whereas a porcelain-fused-to-gold crown restoration was provisionally cemented to a custom-made gold transmucosal abutment screwed to the implant. The patient has been periodically recalled to monitor the function of the definitive restorations and the favorable tissue response (Figures 14 and 15).

## Case 2

A 44-year-old female patient presented with an abscess associated with the maxillary right second molar. The tooth exhibited severe periodontal compromise and was indicated for removal. Immediately following tooth extraction, a resorbable membrane was placed to isolate the defective socket from the overlying flaps. Following a 6-month healing period, the ridge was determined to be clinically and radiographically adequate for implant placement. Due to difficulty in achieving access and visibility, and since the ridge demonstrated sufficient width, the punch technique was selected over "traditional" flap elevation (Figure 16). In order to increase the retention and stability of the implant in the ridge and to allow lifelike emergence from

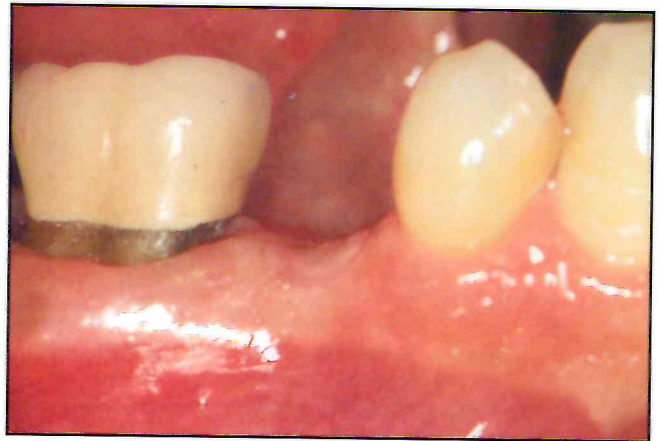


Figure 10. Buccal view of the site 4 months following the completion of implant surgery. Note that the soft tissue graft has been completely incorporated.

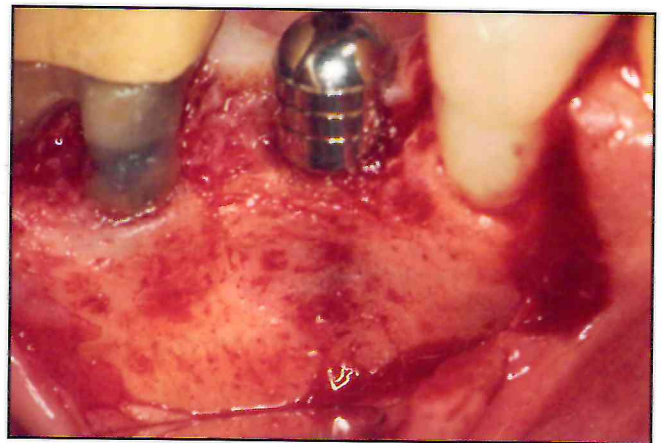


Figure 11. At second-stage implant surgery 4 months following placement of the fixture, the buccal plate is exposed and determined to be intact.



Figure 12. A gingival flap is displaced buccally to enhance the keratinized soft tissue component of the ridge.



Figure 13. Buccal view of the posterior site 1 month following exposure of the implant. Note the increased width of keratinized tissue.



Figure 14. Radiographic view 3 years following the uncovering of the implant. Note the solid crestal profile around the implant fixture and the molar teeth.



Figure 15. Three-year postoperative view of the fixed porcelain-fused-to-gold restorations.

the surrounding mucosa of the anticipated crown restoration, a 10 mm implant ( $\varnothing 5$  mm, Steri-Oss, Yorba Linda, CA) was selected for placement (Figure 17). Since the regenerated bone in the maxillary posterior region was of type II to III, the authors elected to protect the implant by submerging it beneath the previously removed soft tissue plug for the entire duration of the healing period (Figures 18). Healing was uneventful and at 6 months postsurgery, the implant was exposed using the biopsy punch (Figure 19).

A custom-made gold transmucosal abutment was fabricated according to the cervical contouring concept,<sup>18,19</sup> and a provisional acrylic resin crown and the gold cap plug of the definitive crown restoration were fabricated directly onto it. The clinician received three prosthetic components from the laboratory: 1) the transmucosal abutment to be connected intraorally to the implant head; 2) the gold coping to be seated and utilized in the fabrication of the veneering material; and 3) the provisional acrylic crown restoration to be cemented temporarily. The provisional restoration was placed in order to protect the abutment, establish a dynamic occlusal pattern for the region, and to guide the peri-abutment soft tissue around a wider natural diameter. At this time, the abutment was connected intraorally. The gold coping was placed to allow the verification of its fit and the registration of the intra-arch relationship with a silicon pick-up impression. Gradual pressure was then exerted upon the seated provisional restoration to permit adjustment of the gingiva to its optimal configuration. As the cervical portion of the restoration was optimally contoured, a transient blanching of the peri-implant soft tissue occurred upon the intraoral seating. A composite resin-fused-to-gold (Artglass, Jelenko, Armonk, NY) definitive crown restoration was temporarily cemented to the abutment. Three years postoperatively, reexamination of the restorations exhibited acceptable functional and aesthetic results (Figures 20 and 21).

### Discussion

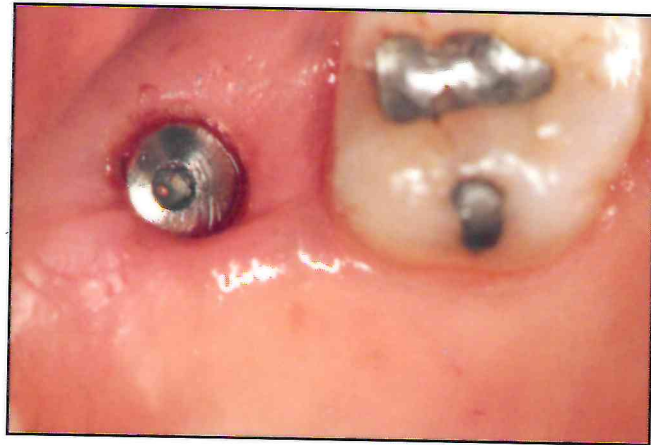
The punch technique as described in this article is essentially a modified first-stage approach in the traditional two-stage implant surgical protocol. It is performed without the use of flaps, and to allow the implant to be submerged



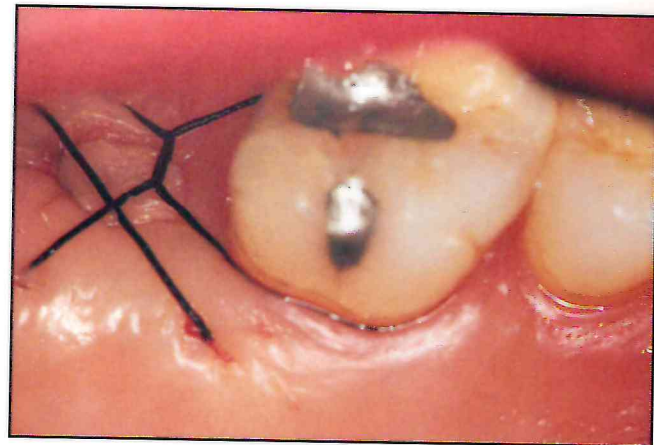
during the healing period, the soft tissue plug that is removed at the beginning of surgery is subsequently regrafted to its original location. The use of a soft tissue graft as a socket sealant following flapless tooth extraction was first suggested by the authors.<sup>12</sup> It was further modified to be used simultaneously with immediate implant placement.<sup>13</sup> Although not histologically proven, it was speculated that nutrition followed by complete revascularization of the graft originated from both the soft tissue walls of the socket and the underlying organizing clot.<sup>12,13</sup> Since the mucosal graft fits exactly on the underlying cover screw in the two-stage punch technique, the source for plasmatic circulation and vascular anastomoses to the graft is expected to originate solely from the mucosal walls of the osteotomy. Consequently, various measures should be taken to ensure the survival and incorporation of the soft tissue graft. The solution utilized to anesthetize the surgical area should not contain vasoconstrictors, which could potentially compromise the revascularization of the graft. To reduce the exposure of the graft in the saline solution, the process of implant site preparation and implant placement should be performed in less than 15 to 20 minutes. If more time elapses or if physical disruption of the graft occurs, an alternate donor site should be considered. To allow sufficient space for the graft, the implant cover screw should protrude minimally from the ridge; a thin, flat, or cut-headed cover screw is therefore preferred. Since the graft tends to shrink minimally, its adaptation to the



**Figure 16.** Case 2. The ridge demonstrated sufficient width to allow a flapless osteotomy to be prepared. Note the width of the internal soft tissue wall.



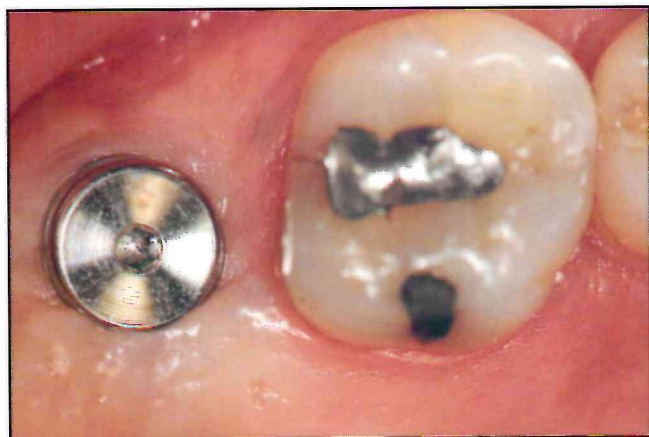
**Figure 17.** A wide (Ø5 mm) cylindrical implant (Steri-Oss, Yorba Linda, CA) was placed in position. Note the reduced height of the soft tissue wall due to the space occupied by the implant head.



**Figure 18.** The mucosal graft was placed to seal the implant site. Mattress sutures were used to approximate the soft tissue walls of the implant site to the graft without piercing it.

mucosal walls of the osteotomy should be achieved by using mattress sutures as described. In order to prevent undue pressure, tissue-borne provisionalization should be avoided for a 1-week period.

In comparison to the single-stage punch procedure, the two-stage punch technique is advantageous in several aspects: 1) the implant is efficiently protected from bacterial and biochemical contamination; 2) undue loading of the implant fixture is prevented; 3) the patient requires little monitoring or maintenance in the period between first- and second-stage implant surgery; and 4) keratinized mucosa may be displaced buccally at the second stage to enhance the zone of peri-implant keratinized mucosa for improved function, aesthetics, and maintenance.<sup>19,24</sup>



**Figure 19.** A biopsy punch was utilized to expose the implant and facilitate the connection of a wide-diameter healing abutment.



**Figure 20.** Postoperative radiographic view of the restored right maxillary second molar.

Based on their clinical experiences, the authors prefer the use of the two-stage protocol over the one-stage protocol of the punch technique in the following situations:

- When the aesthetic outcome of the implant restoration is of significant importance.
- When bone quality is compromised (type III or IV), or the implant is inserted relatively early during the postextraction healing period.
- When the mucosal lining of the ridge at the implant site is thicker than 2 mm.
- When the mucosal tissue lining at the implant site is adequately keratinized.
- When final control of periodontal inflammation in all parts of the mouth has not yet been achieved at the time of implant surgery.

- When the patient exhibits excessive occlusal parafunction.

As with any procedure, it is necessary to evaluate each clinical condition on its own merits to determine which technique should be utilized to restore the patient to optimal oral health.

### Conclusion

Implant placement without flap elevation may be performed in selected clinical situations. Performed as either a single- or a two-stage procedure, the punch technique causes relatively minimal trauma to the intraoral environment. When the aesthetic appearance of the soft tissue surrounding the implant-supported restoration is of primary concern, however, the two-stage implant surgery is often advantageous, since soft tissue augmentation may be predictably achieved by flap manipulation around the healing abutment during implant exposure. As previously discussed, the flapless approach today is still essentially a blind surgical procedure that should be carefully performed by only a skilled and experienced clinician. This technique will ultimately be performed at a lower level of risk when necessary data are improved and applied by advanced imaging and CAD-CAM technologies. While thorough planning and execution of the surgery enhances its safety and maximizes the predictability of success, this approach should not be implemented on a routine basis prior to the completion of further clinical and histological investigation.



**Figure 21.** Occlusal view of the definitive implant-supported crown restoration 3 years postoperatively. The adjacent molar was re-restored with direct composite resin.



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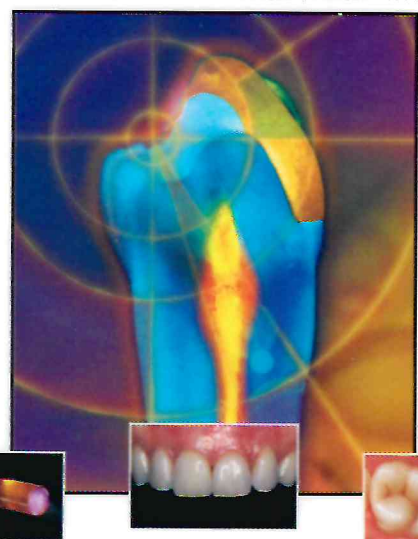
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