

Immediate Implant-Supported Restoration of the Edentulous Arch

Stephen G. Alfano and Robert M. Laughlin

Department of Oral and Maxillofacial Surgery, Naval Medical Center San Diego, San Diego, California, USA

A method of transitioning a patient with complete edentulism or a nonrestorable dentition to an implant-supported fixed restoration without the use of an interim removable prosthesis.

Indications

1. Adequate bone volume for the placement of dental implants
2. Adequate interarch distance for a fixed prosthesis
3. Properly motivated patient to maintain a fixed prosthesis

Contraindications

1. Uncontrolled systemic disease
2. Retrognathic jaw relationship

Technique (Surgical)

1. The procedure may be undertaken using local, intravenous, or general anesthesia.
2. Extraction of the remaining dentition is carefully completed, making sure to preserve alveolar bone.
3. The alveolar bone is curetted to debride granulation tissue, periapical pathology, and fistulous tracts.
4. The residual edentulous maxillary arch is leveled and reduced to ensure the interface between the abutment, and the final restoration is superior to the lip line during animation (see Figure 7.2 [all figures are in Case Report 7.1]).
5. The residual edentulous mandibular arch is leveled to achieve a uniform flat surface topography to provide the proper width for the placement of dental implants and sufficient vertical space to allow for restorative materials (Figures 7.5 and 7.6).
6. Posterior implants are placed to ensure proper distal angulation to avoid violating vital structures (mental nerve, and maxillary sinuses) (Figures 7.3 and 7.5). Anterior implants are placed along the long axis of the anterior alveolus (Figure 7.6).
7. Alveolar bone interfering with the seating of the abutments is removed.
8. Abutments are seated and torqued to manufacturer recommendations.

9. Healing caps are placed on the abutments, and the incisions are closed in a tension-free manner with resorbable sutures (Figures 7.4 and 7.7).
10. Postsurgical films are taken to ensure appropriate implant position and complete seating of abutments.

Note: These procedures are typically performed in conjunction with the restoring prosthodontist, and the interim prosthesis is placed and adjusted immediately after implant placement.

Technique (Restorative)

1. If intravenous or general anesthesia is utilized, the patient is allowed to recover prior to the restorative phase of the procedure.
2. The restorative phase is initiated with the removal of the healing caps and the placement of the impression copings (Figure 7.8).
3. Floss is threaded around the impression copings to provide a scaffold for the impression.
4. A low-flow bis-acryl bite registration material is used to connect the impression copings.
5. A medium-viscosity impression material is flowed under the bis-acryl registration material and onto the tissue (Figure 7.9).
6. A rigid-bite registration material is placed over the bis-acryl and medium-viscosity impression material to complete the impression (Figure 7.10). Care is made to avoid covering the screws with impression material.
7. The impression is removed and poured.
8. The impression is completed for the opposing arch and poured.
9. The interim dentures are relieved to allow complete, passive seating over the abutments.
10. Impression material is placed on the intaglio surface of the denture, and the denture is placed in the mouth to identify the exact location of the abutments (Figure 7.11).
11. Access holes are placed at two locations within each denture, allowing the full seating of the denture. Temporary cylinders and copings are placed on two of the abutments (Figure 7.12).
12. A rubber dam is placed over the sutures and extraction sites to prevent the extravagation of the

impression material into the surrounding tissues or extraction sites (Figure 7.12).

13. Self-cure acrylic resin is used to connect the temporary cylinders to the denture (Figure 7.13).
14. The process is repeated for the opposing arch, if applicable.
15. The remaining temporary cylinders are connected to the abutments, which creates a fixed restoration.
16. The dentures are placed (Figures 7.15 and 7.16), and retaining screws are torqued to 15 NCm.
17. The access holes are filled with a silicone material.
18. Final occlusal adjustments are made with the dentures seated.
19. A final film is obtained (Figure 7.19).

Postoperative Management

1. Analgesics and antibiotics are prescribed based on the invasiveness of the procedure.
2. Continued follow-up with both the surgeon and the restoring prosthodontist is key to patient comfort and prosthesis success.

Complications

1. **Lack of primary stability of the implants:** Care is taken in the site preparation to prepare the site according to the bone density. Softer bone requires minimal site preparation and/or the use of dental implants with a more aggressive thread pitch.
2. **Inability to fully seat the abutment:** The use of a bone mill or bone profile is required to ensure the bone does not interfere with seating the abutment. Full seating must be visually confirmed during surgery.
3. **Sinus location prevents adequate anterior-posterior spread of implants:** Preoperative evaluation is critical in case selection. The use of zygomatic implants can be used to extend the anterior-posterior spread of the maxilla.
4. **Inadequate inter-arch distance to properly fabricate restorations:** Adequate bone removal is necessary prior to implant placement to ensure the appropriate amount of inter-arch distance.
5. **Transition of prosthesis to tissue is evident during animation:** Evaluation of the smile line is a key component in the preoperative evaluation. The bone level must be superior to the smile line for this type of restoration. If this is not possible, alternative restorations should be considered.
6. **Fracture of the provisional prosthesis:** Adequate thickness of the provisional restoration and/or additional substructure support may be necessary.

Key Points

1. The smile line must be evaluated and bone level determined prior to surgery.

2. The required inter-arch distance and amount of reduction required must be determined prior to surgery.
3. An adequate anterior-posterior spread is required.
4. An implant insertion torque of 35 NCm must be obtained.
5. Verification that the abutments are fully seated must be visually and radiographically confirmed prior to beginning the restorative phase.
6. Restoration must be cleansable.
7. A substructure support may be necessary if a large span is present.
8. A sufficient number of implants should be placed to avoid a pontic span greater than 15 mm.

Case Report

Case Report 7.1. A 62-year-old male presents with a chief complaint of failing dentition and the inability to tolerated removable partial dentures. The decision was made to extract the remaining dentition, place immediate dental implants and fabricate immediate maxillary and mandibular implant-supported restorations.



Figure 7.1. Pretreatment panoramic radiograph; note existing anterior maxillary dental implants.

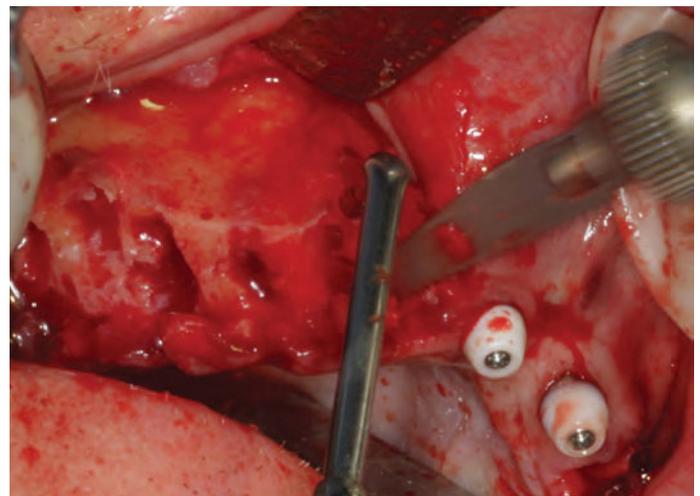


Figure 7.2. After extraction, the maxillary alveolus is leveled with a reciprocating saw.

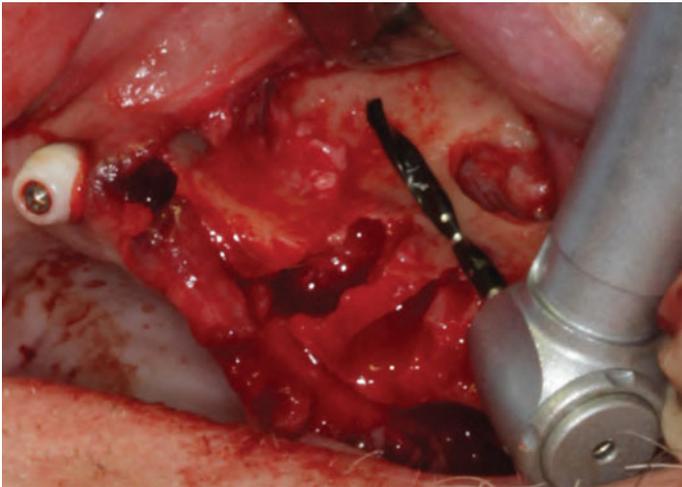


Figure 7.3. The sinus is located. The drill demonstrates the proposed angle of the distal implant to engage the medial sinus wall.



Figure 7.4. Maxilla immediately post-surgery and prior to the restorative process.

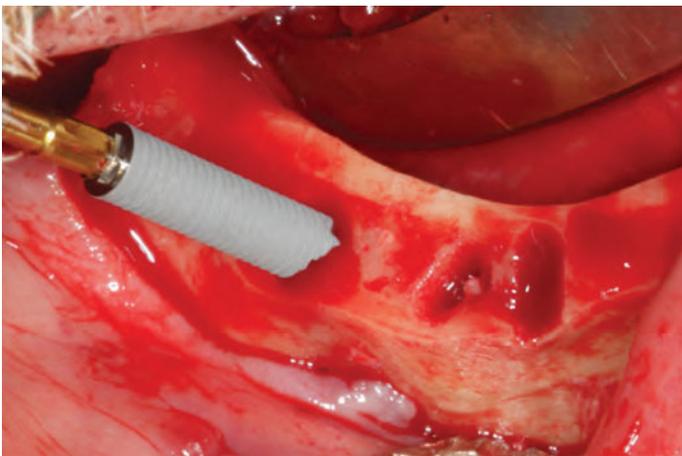


Figure 7.5. Mandibular arch after extraction of teeth and the creation of a flat broad table for implant placement. The mental nerve is identified, and the posterior implant is angled distally to avoid contact with the mental nerve and to maximize the anterior-posterior (A-P) spread of implants.

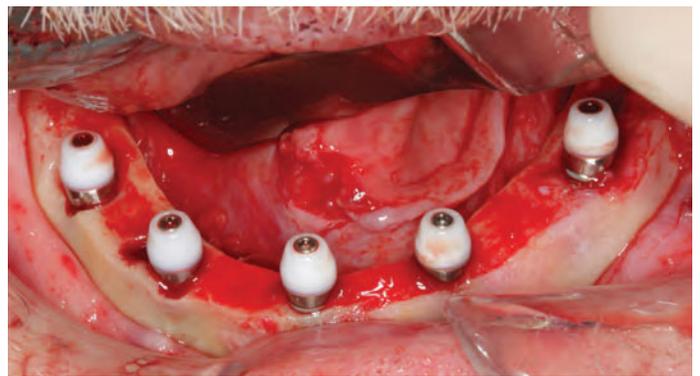


Figure 7.6. Mandibular arch post implant placement demonstrating the abutment locations and the anterior-posterior (A-P) spread. Both distal implants are angulated to increase the A-P spread.



Figure 7.7. Mandible immediately post-surgery and prior to the restorative procedure.



Figure 7.8. Impression copings placed within the mandibular arch.

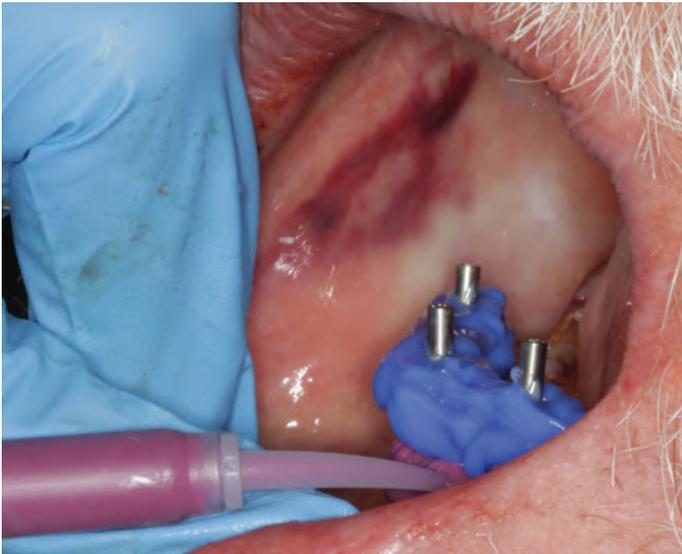


Figure 7.9. Injection of a medium-body impression material under the bis-acryl resin to impress the tissue surface.



Figure 7.10. A rigid-bite registration material completes the impression.



Figure 7.11. A heavy-body impression material is used to locate the abutments, and the denture is relieved to allow for complete seating.



Figure 7.12. Temporary cylinders are in place, and a rubber dam is placed over the tissue to protect suture ties and extraction sockets from the acrylic resin.



Figure 7.13. The mandibular denture is completely seated and held in place as the resin cures and connects the temporary cylinders to the denture.



Figure 7.14. Intaglio surface of the mandibular denture after the pickup of the temporary cylinders.



Figure 7.15 Occlusal view of the completed mandibular provisional restoration.



Figure 7.16. Retracted frontal view of completed restorations.



Figure 7.17. Completed restorations upon animation.



Figure 7.18. A 3 mm soft mouth guard provides cushioning during occlusal force while the patient sleeps.

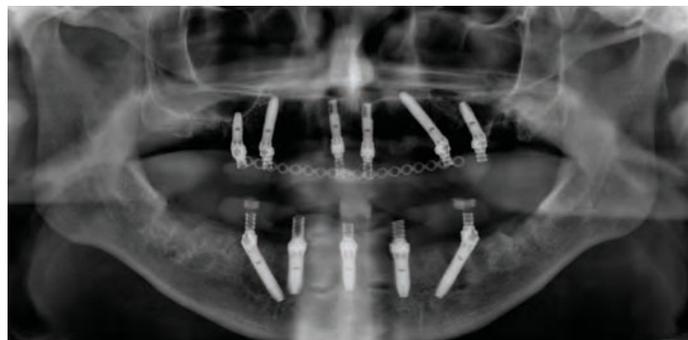


Figure 7.19. Postoperative panoramic radiograph demonstrates ideal implant placement. The interim fixed restorations are in place, and a titanium mesh substructure is used to support areas of excessive pontic span.

References

Balshi, T.J. and Wolfinger, G.J., 1997. Immediate loading of Brånemark implants in edentulous mandibles. A preliminary report. *Implant Dentistry*, 6, 83–8.

Maló, P., Rangert, B. and Nobre, M., 2003. “All-on-4” immediate-function concept with Brånemark system implants for completely edentulous mandibles: a retrospective clinical study. *Clinical Implant Dentistry and Related Research*, 5(Suppl. 1), 2–9.

Parel, S. and Phillips, W., 2011. A risk assessment treatment planning protocol for the four implant immediate loaded maxilla: preliminary findings. *Journal of Prosthetic Dentistry*, 106, 359–66.

Schnitman, P.A., Wöhrle, P.S., Rubenstein, J.E., DaSilva, J.D. and Wang, N.H. 1997. Ten-year results for Brånemark implants immediately loaded with fixed prostheses at implant placement. *International Journal of Oral and Maxillofacial Implants*, 2, 495–503.