

Immediately-Loaded, Fixed Prosthesis on Dental Implants, Is This an Option for You and Your Patients?



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ABSTRACT

This article describes a method for fabricating an immediate-load, fixed hybrid implant provisional restoration in the anterior mandible. The method uses relatively inexpensive materials and can be accomplished in one afternoon, allowing the patient to use this fixed provisional during the postoperative healing period. Direct loading of implants is becoming more common and is driven by patients' desire to replace missing teeth as soon as possible. This method allows the clinician to place a provisional mandibular restoration for cases in which extensive healing and/or long-term monitoring of osteointegration is indicated or desired.

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INTRODUCTION

The traditional two-stage method of implant placement followed by a variable waiting period and uncovering is still necessary in some cases. If the clinical situation allows, immediate construction of a final (or more commonly, a temporary) prosthesis saves the patient time and a surgical procedure, and may increase satisfaction.

The concepts of immediate loading and immediate provisionalization are well documented.¹⁻⁷ Success rates for individual implants placed this way are reported to vary from 85 to 100 percent, with uniformly high prosthesis success.¹⁻⁷ Bone quality, implant type, framework



Figure 1: Note the large amount of gingival show and small teeth in old denture.



Figure 2: Preoperative x-ray of patient's dental condition.

rigidity, and passive fit, among other factors, influence success. A minimum of four implants, rigidly connected, is suggested.⁸ Placement of additional non-loaded implants for incorporation into the final prosthesis may increase prosthesis success in case of individual implant failure.

Clinical evaluation showed a poorly fitting maxillary denture.

The maxillary teeth were unattractive and much too small in width and length, leading to a great deal of tissue showing in the gingival area.

CASE REPORT: RESTORATIVE DENTIST'S VIEW

The patient was a 68-year-old healthy male. He was very energetic and outgoing and somewhat embarrassed by the condition of his teeth. His chief complaint was the poor cosmetic appearance of his upper denture (Fig 1) and the very mobile, painful teeth in the lower arch. The patient hoped that he could have fixed dentistry in his lower arch like his previous bridgework. He was deeply concerned about his ability to wear anything on the lower arch that would be removable. He also indicated that he traveled frequently

and had numerous public speaking engagements as the editor of a national magazine. Because his job involved so many public appearances, he hoped that we could develop a treatment plan that would allow him to have some fixed restorations at all times during treatment. He also indicated that finances allowed him to pursue an extensive treatment plan that would meet his goals.

Clinical evaluation showed a poorly fitting maxillary denture. The maxillary teeth were unattractive and much too small in width and length, leading to a great deal of tissue showing in the gingival area. The lower jaw presented with a highly mobile fixed bridge with decay on the abutment teeth. Extensive periodontal disease and multiple abscesses were present. Tooth #32 was partially erupted and decayed (Fig 2).

TREATMENT OPTIONS: SURGEON'S PERSPECTIVE

The patient was referred to my office with a chief complaint of a loose mandibular bridge and recent toothache. He reported that the restoration present was only part of his original prosthesis, which "never fit right." He did not note any problems with his upper denture. He admitted

that dental phobia was responsible for a delay in his seeking care.

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Examination revealed an ill-fitting and worn maxillary denture. The maxillary ridge form was adequate, but evidence of anterior maxillary resorption from occlusion with anterior mandibular teeth only was present. The mandibular bridge was grossly mobile with recurrent caries on all abutments. He had a partially exposed, impacted mandibular right third molar tooth with obvious caries and gingival inflammation. There was moderately severe bone loss in the mandibular edentulous areas. A panoramic radiograph showed his impacted third molar with gross caries but also deflection of the inferior alveolar nerve. He had a retained root from tooth #29 and gross caries on #21, #22, #27, and #28. Periapical radiolucencies were present at #20, #28, and #29. There was adequate bone between the mental foramina for long implants; there was only adequate bone for short implants posterior to the mental foramen.



Figure 3: Rubber dam in place over impression blocks and ready for impression.



Figure 4: Denture to be converted to provisional fixed bridge with lingual window cut out.

I explained to the patient that his remaining mandibular teeth all required extraction. Because he was satisfied with his upper denture, a decision was made to construct a conventional denture as his maxillary prosthesis. He then had some treatment options, which included conventional complete dentures or an implant-supported removable or fixed appliance in the mandible opposing his conventional maxillary denture. The patient insisted on a fixed mandibular prosthesis. He was given the option of interim temporary complete dentures versus a provisional fixed appliance with later construction of a definitive prosthesis. After some discussion, it was decided that from the patient's standpoint, the ideal treatment plan was surgery under intravenous (IV) sedation followed by same-day construction of a fixed temporary.

SURGICAL PROCEDURE

Antibiotic premedication was followed by intraoral preparation with chlorhexidine mouth rinse and antiseptic facial preparation.⁹ IV sedation was commenced per American Association of Oral and Maxillofacial Surgeons anesthesia protocol. Local anesthesia was obtained with

lidocaine and marcaine blocks and local infiltration. A crestal incision was used to split the remaining attached gingiva posteriorly with intracrevicular incision in the dentate areas. The mental foramina were identified. The teeth were extracted via routine or surgical extraction and the sockets were thoroughly curetted and irrigated with sterile saline. Facial dehiscence of bone was present at many of the extraction sites. An alveoplasty was performed to gain vertical dimension for the prosthesis, eliminate dead space around the implants, and minimize axial inclination problems from the existing alveolus/dentition and the planned screw access to the prosthesis. The vertical dimension was not increased. Space was necessary for the metal framework, denture base, and teeth. Redundant gingival soft tissue was not removed, to prevent total loss of attached gingiva. Although difficult to handle during impressions, this tissue will shrink back to physiological levels with time.

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Screw-type root-form implants (in this case, Lifecore® Restore®, (Lifecore Biomedical, Inc.; Chaska, MN), with surface treatment for enhanced integration are used by most practitioners for immediate loading.¹⁰⁻¹² Only implants with good initial stability and lack of bony voids should be used for the provisional prosthesis. Implants that require significant countersinking or guided tissue regeneration to fill bone deficiencies may be left unloaded for later use. In this case, implants of 4.0 mm diameter x 10 mm length were placed with direct visualization of the mental foramina posteriorly. These were left unloaded for later use. Four 4.0 mm x 15 mm implants anterior to the foramina were used for support of the provisional. Healing caps were placed and the gingiva was closed with 4-0 chromic gut suture (Ethicon; Sommerville, NJ) in a horizontal mattress and individual fashion. Recovery was complicated by a brisk arterial bleed from the third molar site. Hemostasis was achieved with Surgicel® (Ethicon) packed into the socket and the patient was discharged in good condition for the restorative portion of his treatment.



Figure 5: Stone model with analogs of the anterior four implants.



Figure 6: Acrylic denture adjusted to fit over four temporary U.C.L.A. abutment sleeves.



Figure 7: Underside of acrylic fixed hybrid provisional bridge.



Figure 8: Occlusal view of fixed hybrid acrylic provisional.

RESTORATIVE PROTOCOL

The patient returned to our office the afternoon of surgery. Hemorrhaging of the third molar area was under control. The healing caps were removed and impression blocks placed on the four anterior implants. A vinyl rubber dam was placed over the impression blocks to prevent impression material from getting under the tissue flaps (Fig 3.) The mandibular denture base was modified ahead of time by the laboratory to include a lingual window (Fig 4). The lower denture was fitted over the impression blocks after some slight modification. The denture was then used as an impression tray to pick up the implant positions using a vinyl polysiloxane impression. Im-

plant analogs were placed onto the impression blocks and Speed Rock (Discus Dental; Culver City, CA), a fast-set plaster, was poured into and around the denture and boxed impression, leaving a model of the implant positions (Fig 5). The four implant analogs were fitted with provisional aluminum U.C.L.A. Lifecore sleeves (Lifecore Biomedical, Inc.) (Fig 6). The height of the sleeves was shortened to place them within the confines of the lower denture. Each sleeve was partially cold-cured into the denture. Each case is unique and attention should be given to minimizing shrinkage stresses and distortion as acrylic cures. The denture was trial-fitted in the mouth for accuracy before sleeves were completely cold-

cured into place. The acrylic was processed in a pressure pot and removed for trimming. The lower denture was trimmed and borders removed. The underside was contoured in a convex manner and polished to facilitate cleaning (Fig 7). The processed fixed acrylic denture (Fig 8) was placed into the mouth, occlusion adjusted, and access holes closed with a cotton pellet, Term endo restorative material (Dentsply Caulk; Milford, DE), and Triad acrylic (Dentsply; York, PA) in that sequence (Fig 9). The patient returned approximately three months after surgery and had a final fixed prosthesis placed. The final restoration had a highly pleasing cosmetic appearance. The access holes were closed with cotton pel-



Figure 9: Acrylic fixed hybrid provisional screwed into place in mouth.



Figure 10 Underside of completed fixed hybrid denture.

lets, Term, and then Triad in the gum tissue areas with Cosmedent (Chicago, IL) microhybrid in tooth-colored areas (Figs 10-14). The patient has kept the provisional restoration as a spare in case of emergencies or further treatment.

DISCUSSION

Implant placement in extraction sites is considerably different from placement in the edentulous jaw. Implant placement for crown and bridge is also quite different from placement for a screw-retained prosthesis. It is much easier to place implants in the ideal position for a screw-retained prosthesis on an edentulous patient. As the alveolus resorbs, the crest of the ridge moves inferiorly and lingually in the mandibular arch, and superiorly and palatally in the maxilla. Implants placed here frequently will emerge lingually/palatally in regard to the tooth position by default. For crown and bridge, the implant should be centered to emerge at the central fossa of posterior teeth, and near the incisal edge on an anterior tooth. For the screw-retained fixed prosthesis, ideal placement has emergence through the lingual flange for anterior teeth and lingual or sometimes occlusal for posterior teeth. This is not always

possible given the axial inclination of the alveolus in an immediate provisionalization case. A decision to delay treatment, graft, compromise placement, or change the treatment plan may be encountered. In the authors' opinion, construction of a provisional appliance is necessary when extraction and immediate placement of implants is performed because of the extensive hard and soft tissue remodeling that will occur. Immediate construction of the permanent prosthesis is possible in many edentulous cases. Implants placed in areas that will undergo extensive remodeling or implants that require grafting should be left unloaded for use in the final prosthesis. The placement of "extra" implants may allow the success of the final appliance even if an individual implant should fail. A thorough understanding of where both the implants and prosthesis should be in all three dimensions is necessary for both the surgeon and restorative dentist.

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CONCLUSION

Dental implants are well-received by the public as a restorative option. Resistance to implant treatment often has centered around the traditional six-month waiting periods involved in implant restorations. The method described in this article for immediate provisional restoration is one way to overcome patient concerns involving the waiting periods. One note of caution: the practitioner attempting to duplicate this procedure must allow plenty of time (at least four–five hours) to complete a provisional fixed hybrid and must be comfortable with all aspects of implant and denture laboratory procedures. The method described, while time-consuming, can be especially gratifying for both the patient and practitioner. *AB*

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Figure 11: Completed fixed hybrid denture screwed into place.



Figure 12: Fixed hybrid in place with screw holes cosmetically sealed with acrylic.



Figure 13: Anterior view of new upper denture and fixed hybrid lower denture.



Figure 14: Postoperative x-ray of completed implant case.

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