

Transitioning Patients: Teeth to Implants

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ABSTRACT The transition of patients from a dentate state to an implant-supported restoration requires significant planning. Traditionally, protocols have included the extraction of teeth and interim use of a removable prosthesis. Newer protocols include approaches to decrease the period of time a patient is required to use a traditional denture. The authors' purpose is to outline options and provide clinical examples when transitioning patients from natural dentition to an implant-supported prosthesis.

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In treatment planning the restoration of an edentulous space, the use of dental implants should be considered. Implant-supported prostheses have a high rate of success, as reported by Adell et al., Zarb, and Symington.¹⁻³ In a multicenter study by Albrektsson in edentulous patients, the 10-year survival rates of such implants were 82 percent for the maxilla and 94 percent for the mandible.⁴ Attard and Zarb reported 96 percent implant cumulative survival/success rates (CSR) for overdentures and 87 percent CSR for fixed bridges.^{5,6} Ekelund et al. reported 99 percent CSR for implants supporting a fixed bridge in the edentulous mandible over a 20-year period.⁷

Implant-supported prostheses provide a number of advantages. In the edentulous patient, implants provide increased support, retention, and stability for prosthesis. The use of implants to restore dentitions has enabled the dentist to rehabilitate

patients to a more normal masticatory function and an improved lifestyle.

Edentulous patients who present with concerns about function and comfort with their complete dentures are typically treated with a traditional protocol. Implants are placed and restored using a two-stage surgical protocol that requires the patients to continue using their existing dentures during the healing phase. Patients who present with an intact dentition with advanced periodontal disease or a dentition that has a poor restorative prognosis are usually treated with extractions and immediate dentures. Following a healing period, implants are placed using the two-stage surgical protocol similar to patients who presented in an edentulous state. In transitioning these patients to implant-supported restorations, it is often necessary to have patients use a removable prosthesis for up to nine months.

With current immediate-loading protocols, edentulous patients can avoid

the phase of using complete dentures after implant placement.⁸⁻¹¹ However; these immediate-loading protocols cannot be used for all patients who present with an intact dentition. The purpose of this paper is to present patients who were transitioned from an intact dentition to an implant-supported restoration and to discuss the rationale for the selected treatment sequence.

Patient No. 1

A 49-year-old-female presented to the authors' offices in January 2005, seeking comprehensive dental treatment. Her medical history was significant for a history of hepatitis B (noncarrier) and noninsulin-dependent diabetes mellitus, NIDDM. Her diabetes was under fair control, taking 500 mg metformin and 10 mg glyburide both b.i.d., and her most recent glycosylated hemoglobin was 7.4.

Her periodontium suffered from advanced attachment loss with each tooth having lost at least 6 mm (FIGURE 1A). Mobilities ranged from 1-3 and with all molars having Class III furcations with the exception of the maxillary second molars, which had fused roots. The radiographs clearly show the advanced horizontal, vertical, and circumferential defects. Calculus deposits were generalized, and tooth No. 14 had a hopeless prognosis from a periodontal, restorative, and endodontics perspective.

Given the advanced nature of the periodontal disease, and only fair metabolic control of the NIDDM, there was a limited possibility of maintaining the existing dentition. She desired predictability but also wanted to retain her teeth. Several detailed discussions were required before she understood that tooth retention and a predictable restoration were, in her case, mutually exclusive. Ultimately, she decided that predictability was her highest



FIGURE 1A. Pretreatment panoramic radiograph.



FIGURE 1B. Postextraction panoramic radiograph.



FIGURE 1C. Frontal view of provisional fixed partial dentures



FIGURE 1D. Panoramic radiograph with provisional restoration.

priority, so she accepted the plan of extraction of her dentition, insertion of immediate dentures, placement of implants, and restoration with fixed prostheses.

The transition from fully dentate to edentulous arches was done in a traditional fashion. Removal of the posterior teeth, with the exception of the first premolars, was performed in June 2005. The ridges were allowed to heal for six months, impressions were made, and immediate dentures were fabricated. After a healing period (FIGURE 1B), in October 2006, six implant fixtures were placed in the maxilla. These were all 13 mm in length, and the most posterior on either side required osteotome sinus elevation for the apical 2 to 3 mm of the fixture. The mandible received three 15 mm fixtures between the mental foramen, and two 11.5 mm fixtures were placed posterior to the mental foramen on either side. None of the fixtures required bone augmentation in the coronal portions of the fixtures. Amoxicillin 500 mg t.i.d. was prescribed postoperatively for eight days. The postoperative period was uneventful, and healing abutments were placed in April

2007. In June, fixed provisional restorations (FIGURES 1C-D) were delivered in both arches.

As is the authors' standard protocol, definitive porcelain fused to metal restorations are not fabricated for at least six months. During the six months with the provisional restorations, both the patient and the provider have the opportunity to evaluate speech, esthetics, and the ability to maintain satisfactory oral hygiene.

Patient No. 2

A 49-year-old male patient presented with many defective restorations and extensive caries (FIGURE 2A). He was interested in implants and wanted to avoid a removable prosthesis if possible. After an extensive evaluation that included radiographs, diagnostic casts, and a full examination, a treatment plan was formulated. In the maxillary arch after caries removal, the treatment plan included conventional crowns and bridges. In the mandibular arch, the treatment plan the patient accepted involved extraction of all remaining teeth and an immediate complete denture. After a short heal-

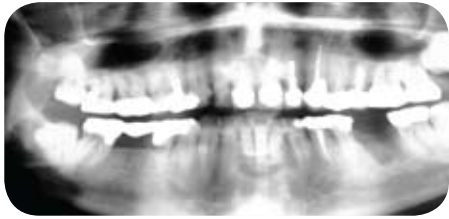


FIGURE 2A. Pretreatment panoramic radiograph.



FIGURE 2B. Implant placement, standard and temporary.



FIGURE 2C. Provisionals.



FIGURE 2D. Mandibular provisional on implants.



FIGURE 2E. Completed treatment panoramic radiograph.



FIGURE 2F. Definitive restorations (prosthodontic treatment by Tony Chammas, DDS).

ing phase, six implants (**FIGURE 2B**) were placed following a two-stage surgical protocol. At the time of implant placement, six transitional implants (Dentatus Modular Transitional Implants, Dentatus USA Ltd., New York, N.Y.) were also placed to support an immediate-fixed provisional restoration (**FIGURE 2C**).

After second-stage surgery, a provisional restoration was delivered on the definitive implants and the transitional implants were removed (**FIGURE 2D**). Definitive prosthodontic treatment (**FIGURES 2E-F**) was then completed following the standard protocol at post-graduate prosthodontic program at the University of California, San Francisco.

The treatment selected for this patient allowed a transition from a fully dentate mandibular arch to an implant-supported fixed restoration in a period of nine months. Utilization of the transitional implants limited the use of a removable complete denture to two months. The treatment for this patient was completed before currently available immediate-loading protocols were routine therapy.

Patient No. 3

The patient was originally referred to a periodontal office in 1974 when she was 19 years old. Her medical and social history did not contribute to her periodontal condition. The pocket depths ranged from 4 mm to 6 mm in all areas, except the maxillary anterior segment, which had only 2 mm to 3 mm probing depths. There was 10 percent to 30 percent horizontal bone loss with superimposed shallow vertical and circumferential defects in multiple areas. The periodontal diagnosis in 1974 may have been juvenile periodontitis or rapidly progressive periodontitis, but the current terminology would assign the diagnosis of aggressive periodontitis.¹²

Pocket reduction was performed in 1975 and 1979 in the posterior sextants. A three-month recall/maintenance schedule was followed closely from 1975-1997 when one author accepted the responsibility for the patient. Between 1991-2003, operative procedures, fixed prosthodontics, endodontics, surgical endodontics, extracoronary splinting, and root amputations were performed. In 2004, the patient began

having problems, mostly in the mandibular arch, with root caries, pain with normal functioning, and increasing mobility (**FIGURES 3A-B**). Because periodontal therapy began at such an early time in her life, she was aware that tooth loss was a distinct possibility for her. The discussion of implant therapy was thus initiated, but she wanted to avoid a removable interim prosthesis. Additionally, while she was aware that the maxillary arch would likely follow a similar fate, she was only able to restore the mandibular arch at that time.

Transitioning this patient to an implant-supported restoration involved two challenges: first transitioning a dentate mandibular arch to an edentulous, implant-supported dentition without a removable interim prosthesis; and second, transitioning each arch at different times, perhaps several years apart.

To transition the mandibular arch, it is critical to have adequate abutment teeth for a provisional fixed partial denture. The requirements for abutment teeth to support a provisional fixed partial denture are obviously different

from those for a definitive fixed partial denture because the provisional abutment teeth need to support the restoration for only months rather than years.

Nonetheless, provisional abutment teeth need to be distributed in a pattern that will accept normal masticatory forces for six to 12 months. In this case, the cuspids and second molars were prepared, the remaining teeth were extracted, and a 12-unit fixed provisional was fabricated and cemented (FIGURES 3C-D). The implants were placed in the areas of Nos. 19, 21, 23, 26, 28, and 30. Following second-stage surgery to uncover the implants, a fixture level impression was made and a provisional implant supported restoration was fabricated (FIGURE 3E). The provisional was delivered when the provisional abutment teeth were extracted (FIGURE 3F). The definitive porcelain fused to metal restoration was delivered approximately nine months later following complete healing of the extraction sites (FIGURES 3G-H).

Because the maxillary arch will be restored in the future, the mandibular arch was restored to an ideal occlusal plane. The maxillary teeth were adjusted to accommodate the mandibular restoration.

Patient No. 4

A 60-year-old female patient presented with the desire to have her maxillary arch restored with a fixed implant restoration. She had used a tooth-supported removable partial denture for many years, but now many of the abutment teeth were failing. There was inadequate bone height and width for placement of a sufficient number of implants to support a fixed restoration. Three-dimensional radiographs demonstrated the need for ridge augmentation in both height and width. After many joint discussions on the treatment options, the following was the selected



FIGURE 3A. Pretreatment frontal view.



FIGURE 3B. Pretreatment panoramic radiograph.



FIGURE 3C. Prepared teeth for provisional.



FIGURE 3D. Provisional fixed partial denture on four abutment teeth.



FIGURE 3E. Fixture level impression copings.



FIGURE 3F. Provisional fixed partial denture on implants after extraction of four teeth.



FIGURE 3G. Definitive mandibular fixed partial denture.



FIGURE 3H. Panoramic radiograph of completed treatment.

treatment sequence: (1) extraction of teeth Nos. 3, 6, and 14, with addition of these teeth to the existing removable partial denture; (2) after healing from the extractions (FIGURE 4A) preparing

teeth Nos. 2, 8, 9, and 15 for a provisional fixed partial denture (FIGURE 4B).

In order to increase ridge width, onlay grafts were planned for the areas of teeth Nos. 4, 5, 6, 11, 12, and 13. To avoid



FIGURE 4A. Pretreatment.



FIGURE 4B. Maxillary provisional on teeth Nos. 2, 8, 9, and 15.



FIGURE 4C. Panoramic radiograph of metal reinforced provisional during implant integration phase.



FIGURE 4D. Maxillary provisional on implants.



FIGURE 4E. Definitive maxillary fixed partial denture.

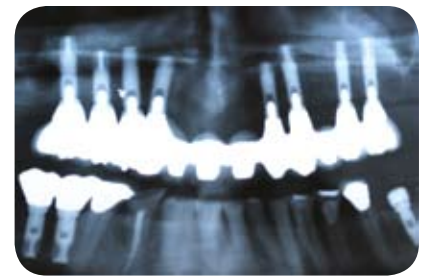


FIGURE 4F. Panoramic radiograph of completed treatment

a tissue-borne removable prosthesis in the area of the bone graft, the area was restored with a provisional fixed partial denture; (3), bone graft (Dr. Pham) to both maxillary sinuses and right and left residual alveolar ridges; (4) placement of eight implants (Dr. Pham) (**FIGURE 4C**); (5) second-stage surgery to uncover implants and fixture level impression to fabricate provisional implant supported prosthesis; (6) extraction of teeth Nos. 2, 8, 9, and 15, and insertion of provisional implant-supported fixed partial denture (**FIGURE 4D**); and (7), fabrication of a definitive porcelain fused to metal-fixed partial denture (**FIGURES 4E-F**).

Conclusion

There are many options available today that will allow a practitioner to transition patients from the dentate state to implant-supported restorations. Some of these options will eliminate the use of a removable prosthesis. In this paper using clinical examples of four patients, the authors have presented the treatment sequence and the rationale for the selection. Immediate loading is an additional

method that is available today, but not all patients who present with an existing dentition are appropriate candidates for the immediate-loading protocol. ■■■■

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