

Histologic evaluation of an immediately loaded titanium provisional implant retrieved after functioning for 18 months: A clinical report

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Histologic evaluation of a single immediately loaded titanium provisional implant that was in function for 18 months revealed 81.3% bone-to-implant contact of the surface evaluated, whereas 9.6% of the implant surface evaluated was opposed by marrow and 9.1% by connective tissue. The bone appeared to be in active remodeling stage and in close contact with the implant surface. (*J Prosthet Dent* 2003;89:331-4.)

Dental implants have become a valid treatment modality for the completely^{1,2} or partially^{3,4} edentulous patient. Immediate loading of dental implants⁵⁻⁹ is a technique that has been described in the literature to eliminate the 3- to 6-month healing period that has been recommended before implants can be loaded.¹⁰ Maintaining the patient in a provisional prosthesis during this healing period may become a challenge. A technique has been developed and described in which provisional implants are placed in conjunction with definitive implants.¹¹⁻¹³ The provisional implants are immediately loaded to support an interim implant-supported prosthesis and used until the definitive implants become osseointegrated. When the definitive implants can support the definitive prosthesis, the provisional implants are removed. Conventional protocol dictates a healing period of 3 months for the mandible and 6 months for the maxilla.¹⁰

Although immediate loading of dental implants has been shown to be clinically successful under long-term function,^{6,7} limited knowledge exists regarding healing and remodeling of these implants. Animal studies have demonstrated the potential of immediately loaded definitive^{14,15} and provisional¹⁶ implants to become osseointegrated.

Nevertheless, it is difficult to obtain histologic evidence in human beings for definitive implants that are immediately loaded. Typically, nonintegrated dental implants are retrieved. Isolated histologic evaluations from immediately loaded integrated implants have shown a high degree of osseointegration under long-term function.^{17,18} Similar observations for immediately loaded provisional implants have been made when evaluated under the microscope.¹¹⁻¹³ This clinical report provides a histologic and histomorphometric evaluation of an immediately loaded provisional implant after functioning for 18 months.

CLINICAL REPORT

A 52-year-old white woman was seen at the Center for Prosthodontics and Implant Dentistry at Loma Linda University (LLU) for treatment of partial mandibular edentulism. After extracting all remaining hopeless mandibular teeth, 5 threaded hydroxyapatite-coated root form implants (Steri-Oss; Nobel Biocare, Yorba Linda, Calif.) were placed in conjunction with 5 titanium provisional implants (TPI) (MTI; Dentatus, New York, N.Y.) that supported a fixed provisional prosthesis. The provisional prosthesis was fabricated from auto-polymerized acrylic resin (Jet acrylic; Lang Dental, Wheeling, Ill.) by use of a placement guide that represented a duplicate of a full-arch diagnostic wax pattern. All TPIs were immediately loaded on the day of implant surgery (November 1999).

The initial treatment plan programmed removal of the TPIs 3 to 4 months after placement, followed by use of the definitive implants to support and retain an implant-supported fixed prosthesis. The patient was unable to proceed with the definitive restoration according to the initial treatment plan for personal reasons. Therefore the provisional restoration was in function for 18 months when the patient was able to return to continue treatment. All provisional implants were retrieved with the proper instrumentation provided by the manufacturer, except for one randomly selected TPI that was removed with a 3-mm internal diameter trephine bur (ACE Surgical Supply Co, Brockton, MI). The patient signed the informed consent approved by the Institutional Review Board at LLU for this procedure. The TPI selected for histologic evaluation appeared clinically stable, which was verified by bidigital manipulation with the handles of 2 dental instruments and recordings obtained through the Perio-Test device (Siemens, Munich, Germany).¹⁹ There was no radiographic sign of pathosis and no clinical sign of pathosis (redness, bleeding on probing, no probing depth exceeding 3 mm). The specimen was fixed in 10% buffered formalin.²⁰

Histologic processing

The implant was sectioned in half and immediately dehydrated with a graded series of alcohols for 9 days.

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