

# Immediate Loading of Implants in the Mandible

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## ABSTRACT

The aim was to present a few case reports of immediate loading of implants and to reiterate that immediate loading, when performed in judiciously selected cases wherein high initial stability has been achieved in good bone volume and quality, has comparable results to that of conventionally loaded implants as seen in current literature.

**Keywords:** Dental implants, Immediate loading, Immediate restoration, Edentulous span, Osseointegration, Esthetic.

## INTRODUCTION

Dental implants are now accepted as the method of choice to replace missing teeth. Nowadays, traditional staged or two-stage approach of implant placement and loading implants is being replaced by faster, one step protocols. The placement of a temporary restoration over the implant on the day of surgery may offer esthetic, psychological, and functional benefits which are more advantageous to interim removable prosthesis. Over the years several authors have suggested that implants osseointegrate even though they reside above the bone at the soft tissue level during early remodeling. Single stage protocol can be achieved by using tissue level implants or fixing a healing abutment at the time of implant placement surgery. This approach is called one-stage implant procedure and comes with the benefits of eliminating second stage surgery to uncover the implant. It also eliminates the need of a second stage surgery thereby reducing the overall treatment duration and discomfort to the patient.

Conventional loading is a situation where the prosthesis is attached to the implant after an unloaded healing period of atleast three months in the mandible and six months in the maxilla respectively. Immediate loading is defined as a situation where the superstructure was attached to the implants in occlusion with the opposing dentition within 72 hours.<sup>1</sup>

The terms nonfunctional immediate loading and immediate restorations are used when prosthesis is fixed to an implant within 72 hours without achieving full occlusal contact with the opposing dentition.<sup>2</sup>

Misch suggested a terminology for immediate restoration or occlusal loading.<sup>3</sup> The immediate occlusal loading protocol is an implant supported temporary or definitive restoration in occlusal contact within two weeks of the implant insertion. Nonfunctional immediate restoration describes implant prosthesis with no direct occlusal load within two weeks of implant and is primarily considered in

partially edentulous patients. Nonfunctional early restoration describes a restoration in a partially edentulous patient delivered between two weeks and three months after implant insertion.

The following are two case reports where immediate restoration/functional loading have been presented successfully.

## CASE 1 (FIGS 1 TO 7)



**Fig. 1:** Preoperative view of the failing mandibular long-span bridge in a 60-year-old healthy male



**Fig. 2:** Removal of the bridge followed by immediate implant placement (Biohorizons Internal Implant System, AL, USA)



**Fig. 3:** View of a laboratory fabricated heat-cured acrylic prosthesis supported by 4 implant places in the canine and premolar sites. The provisional prosthesis was fabricated and placed on the day of implant placement. The implants in the molars were not subjected to any load



**Fig. 7:** One-year postoperative radiograph

**CASE 2 (FIGS 8 TO 23)**



**Fig. 4:** Three months postoperative view of the provisional bridge



**Fig. 8:** A well-healed maxillary ridge in a 70-year-old healthy male patient seeking fixed dentures



**Fig. 5:** Postoperative view of PFM bridges fabricated in three sections over six implants



**Fig. 9:** Mandibular ridge



**Fig. 6:** One year postoperative view of the final mandibular prosthesis in occlusion

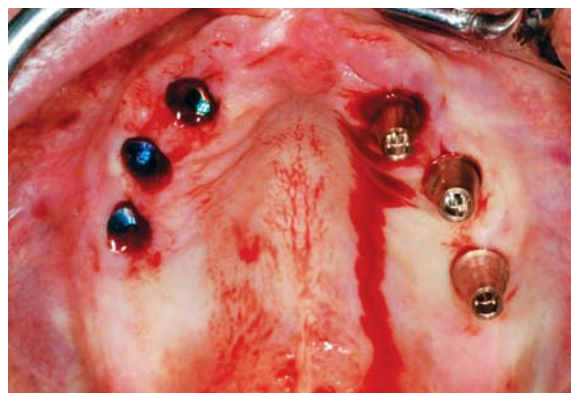


**Fig. 10:** Wax mock-up for making provisionals. A silicone putty index was fabricated using this wax-up

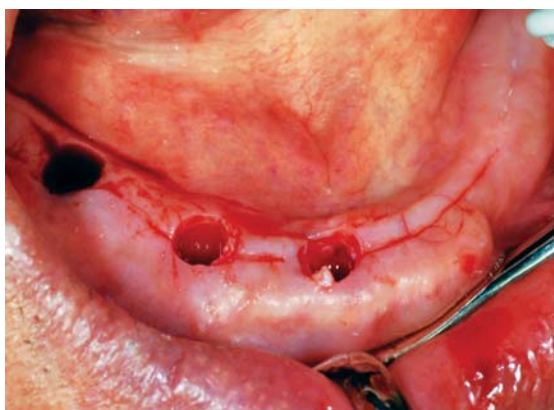




**Fig. 11:** Silicone putty index fabricated out of the wax-up



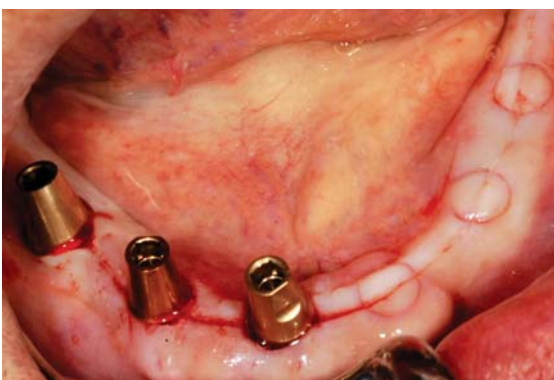
**Fig. 15:** Intraoperative view of maxillary implant insertion



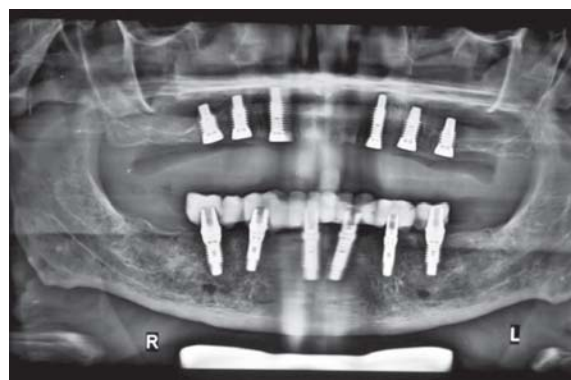
**Fig. 12:** Punch technique for flapless implant placement



**Fig. 16:** Resin-based provisional restorations (Protemp, 3M Inc.) made using the silicone index, fixed immediately over the abutments. Upper relined removable denture



**Fig. 13:** Implant and abutment placement (Biohorizons Internal Implant System, AL, USA)



**Fig. 17:** Radiograph showing implant placement with provisional restorations over mandibular implants



**Fig. 14:** All lower implants with the abutments in place



**Fig. 18:** Impression posts placed four months after implant placement to facilitate fabrication of the final hybrid prosthesis



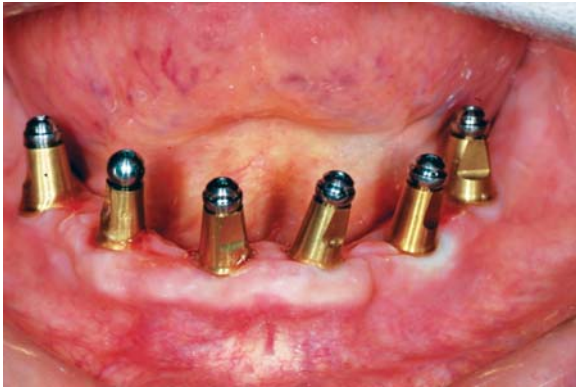


Fig. 19: Impression posts for lower arch



Fig. 23: A satisfied patient

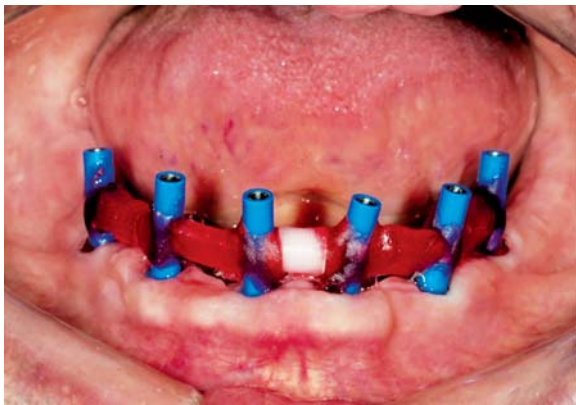


Fig. 20: Wax pattern trial for the lower arch



Fig. 21: Wax pattern trial for the upper arch



Fig. 22: The final prosthesis, a screw retained hybrid denture was fabricated using the BPS system (Ivoclar Inc.)

## DISCUSSION

Several experimental studies have shown that immediate loading of threaded implants does not necessarily lead to fibrous tissue healing. Instead, a bone-to-implant contact develops over time, which is comparable with implants that are loaded conventionally.<sup>4,5</sup>

Immediate loading can be attempted in the edentulous mandible and maxilla, single tooth/multiple teeth situations in extraction sockets.

The experience in immediate occlusal loading of oral implants has led to different consensus papers.<sup>1,3,6</sup> Moreover, some review papers have been published on immediate loading.<sup>7-19</sup> A large number of consensus statements and reviews suggests that immediate loading is a field still developing, and currently leaves room for different interpretations and philosophies.

All reports accept that immediate loading in the edentulous mandible is the most common indication for immediate loading. Randomized-controlled trials have shown that survival and success rates of immediately loaded implants in the edentulous mandible are comparable with conventionally loaded implants.<sup>21</sup> Immediate occlusal loading of prostheses supported on multiple implants in partially edentulous situations has a high level of evidence, and a randomized-controlled study is available.<sup>20</sup> In this configuration, an implant survival rate has been found comparable to conventionally loaded implants. In controlled studies, the survival rate of immediately restored single-tooth implants was comparable or slightly lower than conventionally loaded single-tooth implants.<sup>20,22</sup>

In most studies, good bone quality has been mentioned as an important prognostic factor for the success of the procedure.<sup>21</sup> Rough implant surfaces improve the survival rate of the immediately loaded implant.<sup>23</sup>

Based on different experimental studies, a micromotion threshold not exceeding 50-150 microns has been suggested, otherwise osseointegration would be hindered.<sup>24</sup> Hence, a high initial stability is essential for immediate loading of implants.<sup>25</sup>

Some authors have chosen insertion torque as a measure of implant stability and torque values of 40 Ncm and

higher.<sup>26</sup> However, currently there is no proven threshold value indicating that immediate loading will be successful.

Besides high initial stability, it has been stressed that implants in multiple unit situations should be rigidly splinted by their superstructures. However, it was shown that high success rates may be achieved with superstructures that were not metal reinforced.<sup>27,28</sup>

In single tooth implant cases, immediate restoration with or without occlusal contact have been advocated by some authors.<sup>26</sup>

## CONCLUSION

Current literature shows that all these different approaches to immediate loading can lead to survival rates in controlled studies comparable with conventionally loaded implants. Immediate loading protocol can be successful in judiciously selected cases, wherein high initial stability has been achieved in good bone volume and quality.

## REFERENCES

- Aparicio C, Rangert B, Sennerby L. Immediate/early loading of dental implants: Areport from the Sociedad Espanola de Implantes World Congress consensus meeting in Barcelona, Spain, 2002. *Clinical Implant Dentistry and Related Research* 2003;5:57-60.
- Nkenke, et al. Immediate loading and success. *Clin Oral Imp Res* 2006;17(suppl):19-34.
- Misch CE, Hahn, Judy, et al. Immediate function consensus conference. Workshop guidelines on immediate loading in implant dentistry. November 7, 2003. *Journal of oral Implantology* 2004a;30:283-88.
- Romanos GE, Toh CG, Siar CH, Swaminathan D, Ong AH, Donath K, et al. Peri-implant bone reactions to immediately loaded implants. An experimental study in monkeys. *Journal of Periodontology* 2001;72:506-11.
- Romanos GE, Johansson CB. Immediate loading with complete implant supported restoration in an edentulous, histologic and histomorphometric analysis. *International Journal of Oral and Maxillofacial Implants* 2005;20:282-90.
- Cochran DL, Mortan D, Weber HP. Consensus statements recommended clinical procedures regarding loading protocols for endosseous dental implants. *International Journal of oral and Maxillofacial Implants* 2004;19(Suppl):109-13.
- Misch CE, Wang, et al. Rationale for application of immediate load in implant dentistry part2 *Implant Dentistry* 2004b;13:310-21.
- Szmukler-Moncler, et al. Considerations preliminary to the application of early and immediate loading protocols in dental implantology. *Clinical Oral Implants Research* 2000;2:12-25.
- Gapski R, Wang, et al. Critical review of immediate implant loading. *Clinical Oral Implants Research* 2003;4:515-27.
- Castellon P, et al. Immediate loading of edentulous mandible: Delivery of final restoration or a provisional restoration-which to use? *International Journal of Oral and Maxillofacial Surgery* 2004;62(Suppl 2):30-40.
- Chiapsco M. Early and immediate loading of implants in completely edentulous patients. *International Journal of Oral and Maxillofacial Implants* 2004;19(Suppl):76-91.
- Esposito M, Worthington, et al. Interventions for replacing missing teeth: Different times for loading dental implants. *Cochrane Database of Systematic Review* 2004; 3:CD003878.
- Ganees J, Wismeijer, et al. Early and immediately restored and loaded dental implants for single tooth and partial arch applications. *International Journal of Oral Maxillofacial Implants* 2004;19(suppl):92-102.
- Lazzara, et al. Immediate Occlusal loading of dental implants: Practical Procedures in aesthetic dentistry 2004;16:3-15.
- Morton, et al. Immediate restoration and loading of dental implants: Clinical considerations and protocols. *International Journal of oral and Maxillofacial Implants* 2004;19(suppl):103-08.
- Penarrocha M. Immediate implant after extraction. A review of the current situation. *MEDICINA Oral* 2004;9:234-42.
- Attard and Zarb. Immediate and early implantloading protocols: A literature review of clinical studies. *Journal of Prosthetic Dentistry* 2005;94:242-58.
- Ioannidou E, Doufexi, et al. Does loading time affect implant survival? A meta-analysis of 1,266 implants. *Journal of Periodontology* 2005;76:1252-58.
- Uribe R, Penarrocha, et al. Immediate loading in oral implants. Present situation. *Medicina Oral, Patolgia oral y Cirurgia Bucal* 2005;10(suppl 2);E143-E153.
- Cannizzaro G, Leone M. Restoration of partially edentulous patients using dental implants with a microtextured surface; A prospective comparison of delayed and immediate full occlusal loading. *International Journal of oral and Maxillofacial Implants* 2003;18:512-22.
- Chiapasco M, Abati, et al. Implant-retained mandibular overdentures with Branemark system: A prospective comparative study between delayed and immediate loading. *International Journal of oral and Maxillofacial implants* 2001;16:537-46.
- Ericsson I, Nilson Lindh, et al. Immediate functional loading of branemark single tooth implants. An 18 month clinical pilot follow-up study. *Clinical Oral Implants Research* 2000;11:26-33.
- Rocci A, Martignoni, et al. *Clinical Implant Dentistry and related research* 2003a,b;5(Suppl1):57-63 and 88-98.
- Maniatopoulos C, Pillar, et al. Threaded versus porous-surfaced designs for implant stabilization in bone-endodontic implant model. *Journal of Biomedical Materials Research* 1986;20:1309-33.
- Chausha, et al. Immediate loading of single tooth implants: Immediate versus non-immediate implantation. A clinical report. *International Journal of oral and Maxillofacial Implants* 2001;16:267-72.
- Wohrle PS. Single tooth replacement in esthetic zone with immediate provisionalization: 14 consecutive case reports. *Practical periodontics and Aesthetic Dentistry* 1998;10:1107-14.
- Nikellis I, Levi, et al. Immediate loading of 190 endosseous implants: A prospective study of 40 patients with upto 2-year data. *International Journal of oral and Maxillofacial Implants* 2004;19:116-23.
- Van Steenberghe, D Molly, et al. The immediate rehabilitation by means of aready made final fixed prosthesis in the edentulous mandible: A 1-year follow-up study on 50 consecutive patients. *Clinical Oral Implants Research* 2004;15:360-65.