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.1

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.2

Misch suggested a terminology for immediate restoration or occlusal loading.3 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. 4: Three months postoperative view of the provisional bridge

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

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

Fig. 7: One-year postoperative radiograph

CASE 2 (FIGS 8 TO 23)

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

Fig. 9: Mandibular ridge

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. 12: Punch technique for flapless implant placement

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

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

Fig. 15: Intraoperative view of maxillary implant insertion

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

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

Fig. 18: Impression posts placed four months after implant placement to facilitate fabrication of the final hybrid prosthesis
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.4,5

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.1,3,6 Moreover, some review papers have been published on immediate loading.7-19 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.21 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.20 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.20,22

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

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

Some authors have chosen insertion torque as a measure of implant stability and torque values of 40 Ncm and
higher.\textsuperscript{26} 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.\textsuperscript{27,28}

In single tooth implant cases, immediate restoration with or without occlusal contact have been advocated by some authors.\textsuperscript{26}

**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**


