Intraorally welded titanium bar for immediate restoration in maxilla: Case report and review of the literature

V Fogli1, C Michele2, D Lauritano3, F Carinci4

Abstract

Introduction
Oral rehabilitation of edentulous maxilla is particularly difficult because of the lack of bone in correspondence of maxillary sinuses. Therefore, the surgeon is forced to place implants in sites where bone is more prevalent. In addition, patients require more frequently oral immediate rehabilitation in order to reduce the discomfort related to wearing a total denture. A viable solution to provide stability and retention of the prosthesis in a short time, is represented by the technique of intraoral welding systems supporting total denture or fixed prosthesis. This goal may be achieved thanks to the technique of welding titanium bars on implant abutments. In fact, the procedure can be performed directly in the mouth eliminating possibility of errors or distortions due to prosthetic procedures. This paper describes a case report and the most recent data about long-term success and high predictability of intraorally welded titanium bar in immediate loading implants.

Case report
A 56 year old male came to our clinic for an examination. A panoramic radiograph evidencing periodontal disease was performed. Subsequently periodontal teeth in maxilla were extracted. It was decided to stabilize his denture by the insertion of six implants in the maxilla, and a computer guided implantology surgery was programmed with the appropriate software. The insertion of the six implants was followed by screwing six abutments on implants. The patient was checked after two days, and fifteen days and during this period no problems were noted.

Conclusion
Titanium bars intraorally welded on prostheses is now a widely proven technology and allows the stabilization of fixed prostheses in edentulous ridges that otherwise could not be rehabilitated, improving the quality of the results, reducing the operative time, and giving greater comfort to the patients.

Introduction
Immediate loading of implants is a proven technology in oral surgery. It has been demonstrated that it is possible to reduce healing time and immediately load implants with prosthesis in the same day of surgery, exposing implants to occlusal and muscular forces, without failures1,2,3,4.

In case of immediate loading, adequate fixation and immobility of the implants are of utmost importance to prevent the risk of micromovements with regard to surrounding bone3.

In fact perimplant bone reshares itself according to the force exerted, and optimum distribution of forces, both at the level of implants and of prosthesis, is an essential requirement for a successful oral rehabilitation. So, in case of immediate loading, adequate fixation and stability of implants are very important conditions to prevent the risk of micro-movements and loss of implants. In this context, a rigid splinting seems to have an important role in the response of perimplant tissues, since it is able to reduce stress on implants.

The immediate fixation of more implants can be achieved by intraoral welding of abutments. Intraoral welding allows getting immediate retention of osseointegrated implants. This method consists of welding a titanium bar directly to the abutments in the oral cavity before immediate loading. Otherwise with this method, many steps related to prosthetic procedures are eliminated, reducing patient discomfort and achieving functional and aesthetic results5,6.

This method was introduced by Degidi and coll.1,2,3,4,5,6,7,8, which have published numerous studies about immediate loading of multiple implants by welding a titanium bar directly on abutments in order to create a metal-reinforced temporary or definitive restoration.

In 2006 Degidi and coll.1 published a new method defined as syncrystallization. This technique consists of splinting multiple implants with a rigid titanium bar welded on abutments. It presents the advantage of immediate restoration on the same day of surgery, stability and retention of implants in the early stages of bone healing, and less implant fractures due to reducing time of restoration. The authors finally concluded that the most reliable devices for immediate oral rehabilitation are one piece implants and the intraoral welding procedure of abutments.

In fact there is no reason to use the two-piece fixtures if they are immediately restored. The abutment-implant junction may represent a critical point in surgery, being the way of bacteria penetration and proliferation, thereby causing the perimplant bone resorption.

Licensee OAPL (UK) 2014. Creative Commons Attribution License (CC-BY)

Case report

A 56 year old male came to our clinic for an examination (Figure 1). The anamnesis was negative for systemic diseases and drugs assumption. Then a panoramic radiograph evidencing periodontal disease was performed (Figure 2). Subsequently periodontal teeth in maxilla were extracted. Before extraction, an impression was taken to perform a provisional denture. It was decided to stabilize his denture by the insertion of six implants in the maxilla (Figure 3), and a computer guided implantology surgery was programmed with the appropriate software. Subsequently, the implants were placed in maxilla in a computer guided way. The insertion of the six implants (Figure 4) was followed by screwing six abutments on implants (Figure 5). Then, a bar

Figure 1: Oral cavity with periodontal teeth.
Figure 2: OPT with periodontal teeth.
Figure 3: Computer-guided implants technique.
Figure 4: Implants positioned in the maxilla.
Figure 5: Abutments screwed to implants.
Figure 6: Titanium bar constructed by the dental technician.
Figure 7: Titanium bar welded on abutments.
Figure 8: Titanium bar removed from mouth and covered with pink opaque.
previously constructed by the dental technician, (Figure 6) was welded intraorally (Figure 7) in order to fix the position. The bar was removed from the mouth with the abutments (Figure 8) and covered with pink opaque (Figure 9). The prosthesis was then connected to the bar with acrylic resin (Figure 10). The patient was checked after two days, and fifteen days and during this period no problems were noted (Figure 11, Figure 12, Figure 13).

**Discussion**

The lack of stability and retention are responsible for oral complains associated with dentures. Immediate loading implants with definitive denture have demonstrated long-term success and high predictability. It’s known that immediate loading exerted at the implant interface may interfere with the process of bone healing and lead to failure. Otherwise acrylic resin restoration may suffer fractures and luting cement failure.

Therefore, stability and rigid fixation of implants and abutments are essential for maintaining the rigidity of provisional restorations on immediately loaded implants on the long term.

Rigid splinting of multiple implants with the intraoral welding technique results in a predictable fixation in the early stage of bone healing with a significant reduction of the micromovement problem and implants loss.

Another interesting aspect of the welding technique is related to inflammatory and reparative processes.

A recent study evaluated, with histologic and immunohistochemical analysis, inflammatory infiltrate, microvessels density, vascular endothelial growth factor, nitric oxide synthase, and proliferative activity in soft tissues below intraorally welded titanium bars, concluding that these tissues underwent a higher rate of inflammatory and reparative processes, not differently in respect to the control group.

**Conclusion**

Titanium bars intraorally welded on prostheses is now a widely proven technology and allows the stabilization of fixed prostheses in edentulous ridges that otherwise could not be rehabilitated, improving the quality of the results, reducing the operative time, and giving greater comfort to the patients.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**References**


Competing interests: None declared. Conflict of interests: None declared. All authors contributed to conception and design, manuscript preparation, read and approved the final manuscript. All authors abide by the Association for Medical Ethics (AME) ethical rules of disclosure.