



## Intra-Oral Welding and Immediate Loading of Dental Implants to Restore Partial Edentulism. A Case Series Study of Four Cases

**Karem Mahmoud Ibrahim<sup>1\*</sup> and Hebatallah Abdou Mattar<sup>2</sup>**

<sup>1</sup>Clinical Instructor, Implantology Division/Faculty of Dentistry, Misr International University, Masters of Oral Implantology Goethe University Frankfurt am Main, Cairo, Egypt

<sup>2</sup>Assistant Researcher, Implantology Division/Faculty of Dentistry, Misr International University, Cairo, Egypt

**\*Corresponding Author:** Karem Mahmoud Ibrahim, Clinical Instructor, Implantology Division/Faculty of Dentistry, Misr International University, Masters of Oral Implantology Goethe University Frankfurt am Main, Cairo, Egypt.

**Received:** September 01, 2019; **Published:** September 24, 2019

### Abstract

The aim of this case series study is to evaluate the effects of splinting dental implants using intra-oral welding technique and immediately loading the implants placed in extraction sockets or in healed bone sites using full occlusal loading in cases of partial edentulism in the maxillary or mandibular arch. The “weld one” system will provide the method for intra-oral splinting and welding of the implants and outcomes will be measured in relation to survival rate and patient satisfaction.

Four patients with missing teeth and partial Edentulism will undergo this treatment protocol. The temporary prosthesis shall be placed in a way that utilizes occlusal contact in centric and lateral excursions. (I.e. full occlusal loading). The patient will receive their final restorations 6 months after surgery.

**Keywords:** Intra-Oral Welding, Immediate Loading; Splinted Implants; Partial Edentulism Restoration; Screw Retained Prosthesis

### Introduction

The concept of using dental implants to replace missing natural teeth is not a recent one, not since Branemark, *et al.* first demonstrated the concept of osseointegration in 1977 [1]. According to the success and failure criteria documented by Zarb and Alberkston in 1986 a nonfailing implant without obvious soft or hard tissue problems and good function is considered a successful therapy [2]. Lederman, *et al.* [3] in 1979 where the first to document implants loaded immediately, and they were thereafter followed by many authors who attempted to follow similar protocols to achieve the same result [2-7].

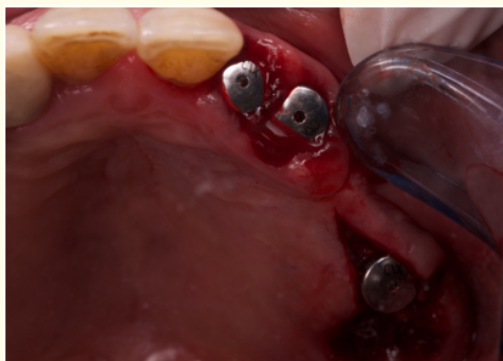
But since the problem with immediate loading was always overload that would lead to micro-movement of implants more than the allowable, it was a positive idea to think about using rigid titanium bars to splint multiple unit implants. This was attempted

first by Hurska in 1987 [8] followed by several authors up to Marco Degidi and his team in 2006 [9] whom invented a device that allows syncrystallization and welding of the implants together intra-orally. This facilitated the idea of splinting the multiple implants together and provided patients with an immediate chair side fabricated screw retained prosthesis to give an acceptable function and aesthetics [10]. Not only that, but also this modality allowed for full occlusal loading. They also conducted a series of studies to demonstrate the success of this technique [11-21]. Therefore and according to the aforementioned protocols the following case series presents multiple clinical cases that were done to rehabilitate partial edentulism in several non identical situations in an aim to test the hypothesis that immediate loading and intra-oral welding gives fairly acceptable aesthetic and functional results for the patients in addition to 6 months stability of the temporary restoration until the final restoration can be delivered.

### Case Presentation and Clinical Report

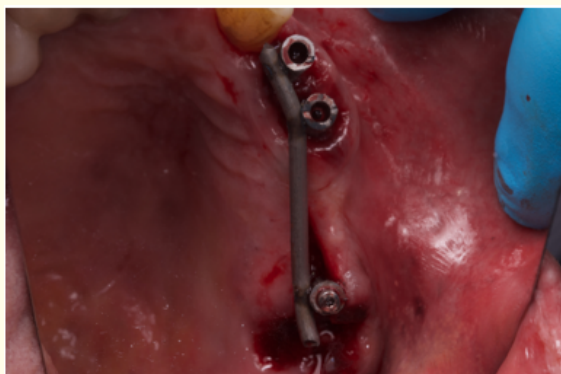
#### Case 1

In the first case a 50 years old male patient attended the outpatient clinic DCC Complex at Misr International University missing maxillary teeth no 7, 6, 5, 4, 3, 2 and 1. and so three dental implants where placed to restore these missing teeth (Figure 1).



**Figure 1:** Three implants placed to restore missing natural teeth.

These implants had welding abutments fixed to them and intra oral welding for the abutments was done (Figure 2 and 3).



**Figure 2 and 3:** Intra-oral welding of the welding abutments with titanium bars.

Then a shell of resin re-enforced acrylic material was constructed and fitted to the abutments and picked- up with them to act as a screw retained interim prosthesis to be used by the patient for the 6 months period of provisionalization (Figure 4-7).



**Figure 4-7:** Shell picked up with the welding abutments to form a screw-retained restoration and temporary cementation of it.

Post-operative panoramic view (Figure 8).



**Figure 8:** Post-operative Panoramic view.

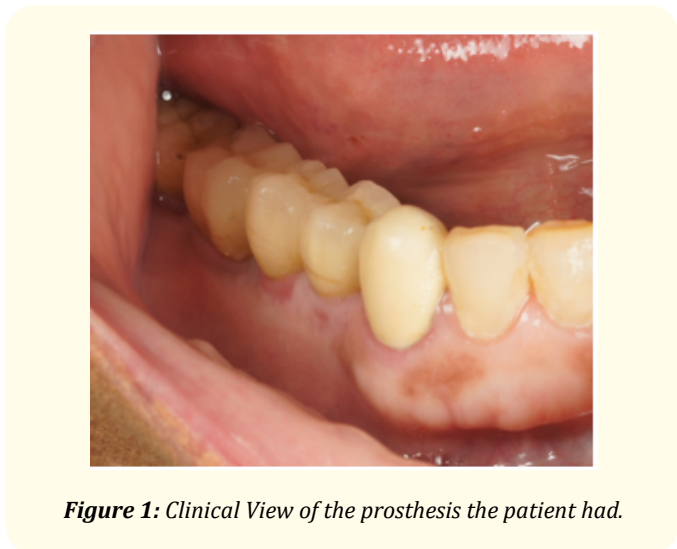
6 months later after delivery of final restoration (Figure 9).



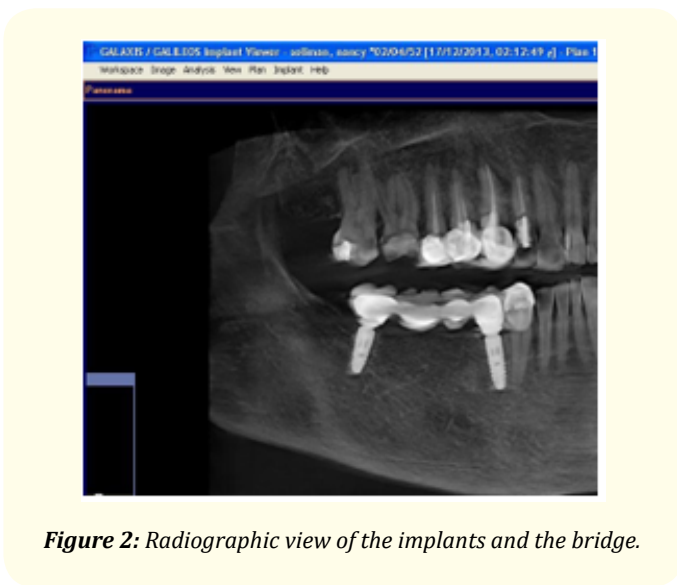
**Figure 9:** Post-restorative view after final restoration.

**Case 2**

In the second case a 38 years old female patient came to the outpatient clinic DCC complex at Misr International University missing mandibular teeth no 44, 45, 46 and 47. With already inserted two implants 1 year ago to replace teeth no. 44 and 47 with a final prosthesis over them (Figure 1 and 2).

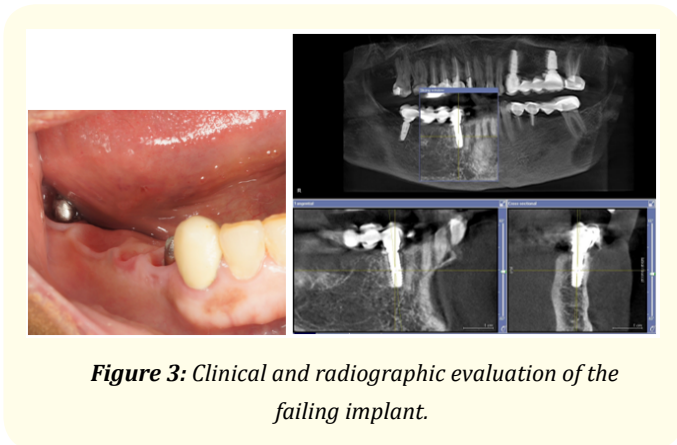


**Figure 1:** Clinical View of the prosthesis the patient had.

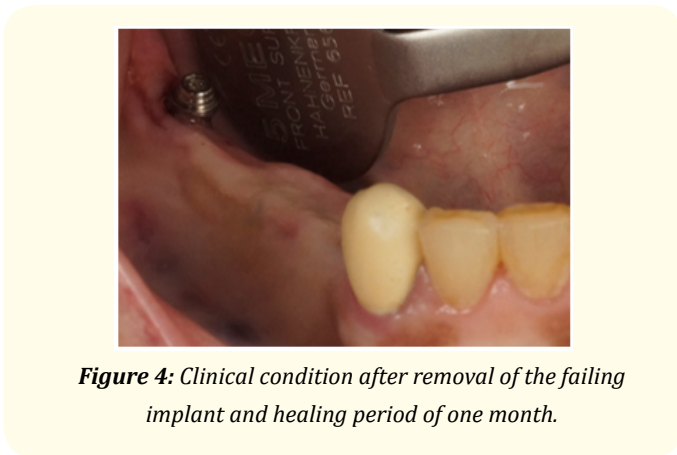


**Figure 2:** Radiographic view of the implants and the bridge.

But the patient complained of pain and mobility related to the implant replacing tooth no. 44 and so after removal of the bridge restoring the two implants (Figure 3) this implant was shown to be a failed implant and had to be removed (Figure 4). This was followed by a healing period of one month.

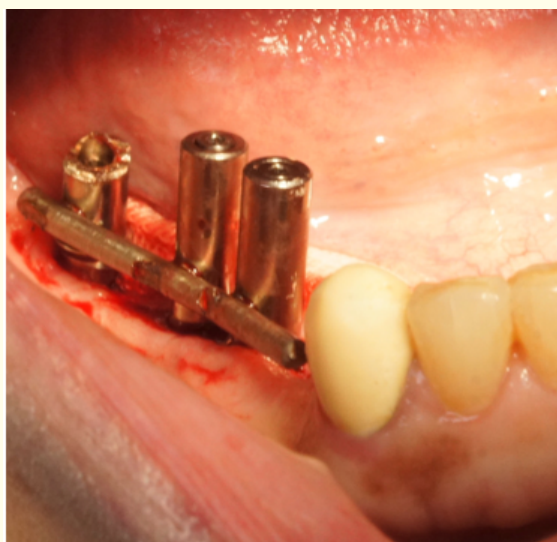


**Figure 3:** Clinical and radiographic evaluation of the failing implant.



**Figure 4:** Clinical condition after removal of the failing implant and healing period of one month.

And so the decision was made to replace the failing implant and restore the missing teeth to place two new implants to replace teeth no. 44 and 45, and immediately load them using intra-oral welding of all three implants now present (Figure 5) and restoration via a temporary restoration made out of resin re-enforced acrylic resin shell (Figure 6-9).



**Figure 5:** Intra-oral welding was done to splint all three implants together via a rigid titanium bar.



**Figure 6:** A shell constructed as a temporary restoration to restore the welded dental implants.



**Figure 7:** Try in of the shell to ensure proper fitting to the welded abutments.



**Figure 8:** After pick-up with the shell and its temporary cementation.



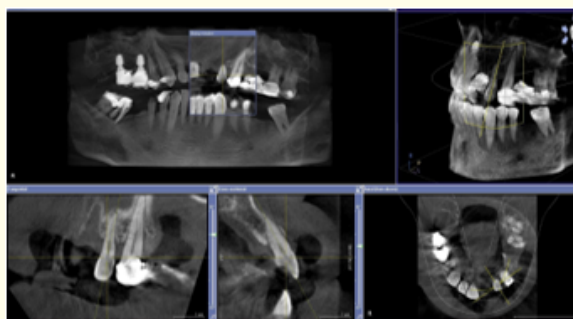
**Figure 9:** Radiographic evaluation after intra-oral welding of all three dental implants.

**Case 3**

A 44 years old male patient arrived to the outpatient clinic DCC at Misr International University following a traumatic accident that led to loss of tooth no. 21 and severe grade 3 mobility of teeth no. 22, 11 and 12 (Figure 1). Radiographic analysis revealed loss of buccal plate of bone related to the traumatized teeth (Figure 2) that led to the indication for their extraction (Figure 3) and immediate implants placement using 4 dental implants to restore all four missing teeth (Figure 4).



**Figure 1:** Clinical view of the patient upon arrival after traumatic accident.



**Figure 2:** Radiographic analysis of the traumatized anterior mobile teeth.



**Figure 3:** Extraction of the rest of the traumatized teeth.



**Figure 4:** Immediate placement of four dental implants to replace the missing teeth.

Followed by that, intra-oral welding was performed to stabilize all four dental implants together (Figure 5 and 6) to provide immediate loading for the patient using a temporary restoration constructed from resin initially being used as a “shell” (Figure 7) that is fitted to the framework and picked-up to form a temporary screw retained restoration (Figure 8 and 9). This restoration was temporarily cemented to be used by the patient for a temporary rehabilitation period of 6 months (Figure 10).



**Figure 5:** Intra-oral welding of the 4 implants.



**Figure 6:** Welded abutments extra-orally.



**Figure 7:** Shell constructed to be used for temporization.



**Figure 8:** Screw retained temporary restoration after pick-up of the welded abutments with the shell.

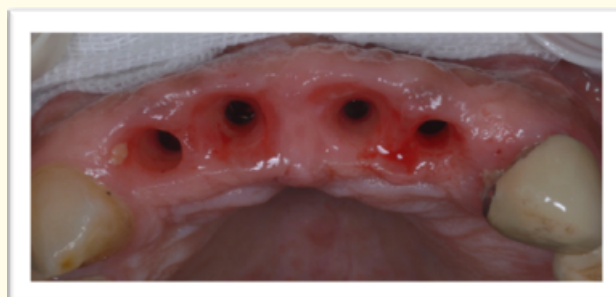


**Figure 9:** The screw retained restoration showing the screw access holes.



**Figure 10:** Clinical appearance after temporary cementation of the temporary restoration.

After 6 Months following temporary cementation the patient returned for construction of the final framework. Clinically the patient revealed soft tissue healing and preservation of buccal contours that was significant (Figure 11). Impressions were made using closed tray technique (Figure 12) and final restoration was constructed and cemented for the patient (Figure 13 and Fig 14).



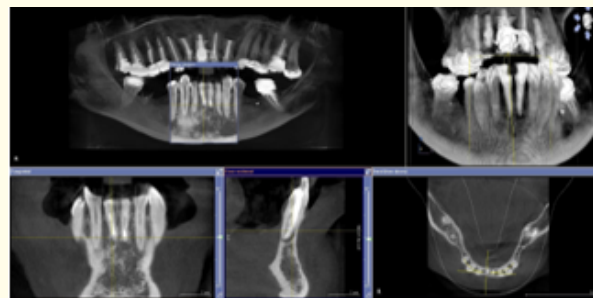
**Figure 11:** Clinical appearance of healing of soft tissue and preservation of buccal plate of bone and soft tissue after temporization period.



**Figure 12:** Impression making for the construction of the final restoration.



**Figure 13:** Final restoration constructed for the patient.



**Figure 1:** Radiographic view showing condition of mobile periodontally hopeless teeth with lack of bony support.



**Figure 14:** Final Restoration After final Cementation.



**Figure 2:** Clinical image following the extraction.

Radiographic follow up was made for this patient 6 months after delivery of the final restoration (Figure 15).



**Figure 15:** 6 months Post cementation radiograph.

**Case 4**

A 29 years old patient was submitted to the outpatient clinic DCC at Misr International University, requiring extraction of periodontally hopeless teeth no 31, and 41 (Figure 1 and 2).

Followed by that, 2 implants where placed to restore the missing teeth (Figure 3) and intra-oral welding was performed to rigidly splint the two immediately placed implants together to allow for immediate loading (Figure 4).



**Figure 3:** 2 implants immediately placed in the fresh extraction socket.



**Figure 4:** Intra-oral welding performed to splint the two implants together.

A Pre-constructed “shell” was used to be picked up and for fabrication of a temporary screw retained prosthesis (Figure 5-8).



**Figure 5:** Shell of resin modified acrylic resin before picking up of the welded abutments.



**Figure 6:** Shell of resin modified acrylic resin after picking up of the welded abutments.



**Figure 7:** Temporary Screw Retained Prosthesis.



**Figure 8:** Clinical view after insertion of the screw retained temporary prosthesis.

Six months later, the patient was re-admitted for construction of the final prosthesis. Showing proper soft tissue contour after the provisionalization stage (Figure 9). Figure 10 shows radiographic evaluation 6 months after delivery of the final prosthesis.



**Figure 9:** Soft tissue contour following the provisionalization period of 6 months.





**Figure 10:** Radiographic evaluation 6 months after cementation of final restoration.

### Discussion

In Cases where patients lose their teeth, especially at a young age, due to trauma or in the anterior region such as the cases presented above, it is always a wish of theirs to find an immediate solution to their problem. All previously mentioned cases rely on rigidly splinting the dental implants placed either immediately or in healed bone to restore partial edentulism. This technique using the “intra-oral welding” protocol suggested by Degidi., *et al.* [9-21] allows a chance to provide these patients with properly constructed aesthetically and functionally pleasing immediately placed restorations for the period of temporization (3-6) months to prevent collapse of soft and hard tissue contours.

### Conclusion

All cases described in this case series reported incidences of loss of teeth and partial edentulism in different situations. Immediately loading the dental implants using the concept of intra-oral welding and temporary screw retained prosthesis construction had proved to be a successful line of treatment both aesthetically and functionally for the patients. Increasing patient’s motivation and sense of security as well as preserving the natural contours of soft and hard tissue until a final restoration can be delivered to the patient afterwards. More long term studies are definitely required in multiple challenging cases to evaluate this improvement in soft and hard tissue contours.

### Bibliography

1. Bränemark PI, Hansson BO, Adell R, Breine U, Lindström J, Hal- len O, Öhman A. Osseointegrated implants in the treatment of the edentulous jaw. Experience from a 10- year period. *Scand J Plast Reconstr Surg Suppl.* 1977;16:1-132.

2. Albrektsson T, Zarb G, Worthington P, Eriksson AR. The long-term efficacy of currently used dental implants: a review and proposed criteria for success. *Int J Oral Maxillofac Implants.* 1986;1(1):11-25.
3. Ledermann p.d. steg prothetische versorgung des zahn- losen unterkiefers mit hilfe von plasmabeschichteten titan- schraubenimplantaten. *deutsche zahna“rztliche zeitschrift.* 1979;34:3-7.
4. Schnitman P, Wöhrle PS, Rubenstein JE, DaSilva JD, Wang NH. Ten years results for Bränemark implants immediately loaded with fixed prostheses at implant placement. *Int J Oral Maxil- lofac Implants.* 1997 Jul-Aug;12(4):495-503.
5. Tarnow DP, Emtiaz S, Classi A. Immediate loading of threaded implants at stage 1 surgery in edentulous arches: ten consecu- tive case reports with 1 to 5-year data. *Int J Oral Maxillofac Implants.* 1997;12(3):319-324.
6. Lozada JL, Tsukamoto N, Farnos A, Kan J, Rungcharassaeng K. Scientific rationale for the surgical and prosthodontic protocol for immediately loaded root form implants in the completely edentulous patient. *J Oral Implantol.* 2000;26(1):51-59.
7. Testori T, Szmukler-Moncler S, Francetti L, Del Fabbro M, Tri- si P, Weinstein RL. Healing of Osseotite implants under sub- merged and immediate loading conditions in a patient: a case report and interface analysis after 2 months. *Int J Periodontics Restorative Dent.* 2002;22(4):345-353.
8. AR Hruska. Intra-oral welding of pure titanium. *Quintessence Int.* 1987;18(10):683-688.
9. Degidi M, Perrotti V, Piattelli A. Immediately loaded tita- nium implants with a porous anodized surface with at least 36 months of follow-up. *Clin Implant Dent Relat Res.* 2006;8(4):169-177.
10. Degidi M, Gehrke P, Spanel A, Ing D and Piatelli A. Syncrystalli- zation: A Technique for Temporization of Immediately Loaded Implants with Metal-Reinforced Acrylic Resin restorations. *Clin Implant Dent Relat Res.* 2006;8(3):123-134.
11. Degidi M, Nardi D, Piattelli A. Immediate loading of the edentu- lous maxilla with a final restoration supported by an intraoral welded titanium bar: A case series of 20 consecutive cases. *J Periodontol.* 2008;79(11):2207-2213.

12. Degidi M, Nardi D, Piattelli A. Immediate Rehabilitation of the Edentulous Mandible with a definitive prosthesis supported by an intraorally welded titanium bar. *Int J Oral Maxillofac Implants*. 2009;24(2):342-347.
13. Degidi M, Nardi D, Piattelli A. A comparison between immediate loading and immediate restoration in cases of partial posterior mandibular edentulism: a 3-year randomized clinical trial. *Clin Oral Impl Res*. 2010;271: 682-687.
14. Degidi M, Nardi D, Piattelli A. Immediate loading of the edentulous maxilla with a definitive restoration supported by an intraorally welded titanium bar and tilted implants. *Int J Oral Maxillofac Implants*. 2010;25(6):1175-1182.
15. Degidi M, Nardi D, Piattelli A. Immediate Definitive rehabilitation of the edentulous patient using an intraorally welded titanium framework: a 3-year prospective study. *Quintessence Int*. 2010;41(8):651-659.
16. Degidi M, Nardi D, Piattelli A. Prospective study with a 2-year followup on immediate implant loading in the edentulous mandible with a definitive restoration using intra-oral welding. *Clin Oral Impl Res*. 2010;21(4):379-385.
17. Degidi M, Daprile G, Piattelli A. Implants inserted with low insertion Torque values for intraoral welded full-arch prosthesis: 1-year follow up. *Clin Implant Dent Relat Res*. 2012;14(1):e39-e45.
18. Degidi M, Nardi D, Sighinolfi G, Piattelli A. Immediate Rehabilitation of the Edentulous Mandible Using Ankylos SynCone Telescopic Copings and intraoral welding: A pilot Study. *Int J Periodontics Restorative Dent* 2012;32(6):189-194.
19. Degidi M, Nardi, Piattelli A, Malevez C. Immediate loading of zygomatic implants using intraoral Welding Technique: A 12-Month Case Series. *Int J Periodontics Restorative Dent*. 2012;32(5):154-161.
20. Degidi M, Nardi D, Sighinolfi G, Merla A, Piattelli A. In vitro infrared thermography assessment of temperature peaks during the intra-oral welding of titanium abutments. *Infrared Physics and Technology*. 2012;55(4):279-283.
21. Degidi M, Nardi D, Piattelli A. A six year follow-up of full-arch immediate restorations fabricated with an intraoral welding technique. *J Implant Dent*. 2013;22(3):224-231.

**Volume 2 Issue 10 October 2019**

**© All rights are reserved by Karem Mahmoud Ibrahim and Hebatallah Abdou Mattar.**