

EXTRACTION AND IMMEDIATE RESTORATION OF THE MAXILLA USING INTRA ORAL WELDING CONCEPT- A CASE REPORT WITH ONE YEAR FOLLOW UP

Dr. Ganaraj Shetty^{1*}, Dr. Nivya John²

¹ Reader, Department of Prosthodontics and Crown & Bridge, A B Shetty Memorial Institute of Dental Sciences, NITTE (Deemed to be University), Mangaluru, 575018, India

² Assistant Professor, Department of Implantology, A B Shetty Memorial Institute of Dental Sciences, NITTE (Deemed to be University), Mangaluru, 575018, India

*Corresponding Author

Dr. Ganaraj Shetty

Email: drganarajshetty@nitte.edu.in

Abstract:

Immediate rehabilitation of full arch ridges has always been challenging due to long time frame and tedious surgical procedures. With the dawn of the intra oral welding concept, clinicians have been able to deliver definitive restorations supported by a titanium bar. Here we have reported a case that presented with failing dentition which was extracted and rehabilitated with immediate provisional with a titanium welded substructure. The provisional was then resored with a screw retained prosthesis. The one year follow up of the case showed sustained crestal bone levels around the implants and dimensional stability of the prosthesis.

Key-words: intra oral welding, immediate loading, maxillary extraction placement

Introduction:

The field of Implantology is in a state of constant metamorphosis, be it surgical concepts, prosthetic rehabilitation or material science. Although implant rehabilitation shows promising results, laborious two stage procedure and temporary edentulousness for full arch rehabilitations has been a dilemma to the patients as well as the clinicians. Immediate loading and provisionalisation of implants have been recorded as a successful treatment in

various studies. 1-5

Evolved from works of Mondani and Hruska, Intra oral welding concept (Degidi et al), enables the clinician to fabricate a provisional prosthesis for full arch rehabilitation, strong enough, to be functionally loaded the same day of surgery. A provisional prosthesis reinforced with metal bar splinted with immediately loaded abutments would provide rigidity and stress distribution over larger area. This in turn would reduce micro movements and promote faster healing. 6-7

Degidi et al recorded immediate loading of threaded implants with a metal reinforced acrylic resin provisional restoration on the day of surgery in 40 consecutive patients.

The results of this study indicated that adequate rigid splinting of multiple immediately loaded implants has reduction of treatment time and provided the patients with immediate temporaries. 8

Rehabilitation of maxilla is challenging as the clinician is forced to place implants in sites where bone is more prevalent. This is due to the fact maxillary bone has sinuses that undergoes pneumatization and that extraction of the teeth would further compromise the topography of the bone due to fractures of the cortical plate. So careful preoperative analysis is imperative to plan a treatment. Here we have described a case

of a 45 year old female patient who was rehabilitated immediately with welded prosthesis after the extraction of the failing dentition.

CASE REPORT:

Preoperative Stage:

A female patient aged 45 years, presented with failing FDP in the Maxillary and Mandibular ridges. Preoperative procedures such as facial profile analysis, intra oral examination (Fig 1a,1b) and radiographic analysis were performed (Fig 2). The failing FDP was discarded and patient was advised oral prophylaxis to reduce soft tissue inflammation. Diagnostic impressions were made, occlusion and vertical dimensions were established. A provisional restoration was fabricated with high strength composite and hollowed out (pro shell) to house the metal framework. (Fig 3)

Surgical phase: Antimicrobial prophylaxis was obtained with the use of 500 mg of Amoxicillin thrice daily for 5 days, starting 1 day and 1 hour before surgery. 0.2% Chlorhexidine Gluconate mouth rinse was also prescribed one week and one hour prior surgery. Perioral disinfection of the patient was done with 5% w/v Povidone Iodine solution. The surgery began with the administration of local anaesthesia (2% lignocaine hydrochloride). Extraction of the teeth was done preserving the buccal and palatal walls. A full thickness flap was elevated and implants were placed (Ankylos C/X Sizes 3.5/ 9.5 -3.5/14) 0.5-1 mm sub-crestally without bone augmentation as the jumping distance was less than 1mm. The implants were immediately loaded with multi unit abutments and titanium welding sleeves were placed (ANKYLOS) in the maxillary ridge (Fig 4a, 4b). However, it was decided that rehabilitation of the mandibular ridge would be done during the final rehabilitation of the maxilla.

Welding : The welding of the sleeves to the titanium wire was performed using the intra oral welding protocol. (Degidi et al). Protective eyewear was used for the entire process. A subtle click confirmed the completion of the weld. A 2.0-mm-diameter titanium (grade 2) bar was welded on to the temporary sleeves intraorally. (Fig 5a) Welding of 1.2 mm titanium wires to the framework was done extraorally for additional retention. (Fig 5b)

Prosthetic phase I : The adaptation of the pro shell was confirmed intraorally so that it could accommodate the metal framework and the relined material. The provisional restoration was trimmed, polished and placed back into the mouth. The occlusion was adjusted intraorally keeping light contact in centric occlusion. Interferences when performing eccentric movements were eliminated. Immediate Post operative OPG was then taken. (Fig 6)

Post operative care: Postsurgical analgesic treatment was performed using 100 mg of aceclofenac twice daily for five days along with the antibiotics and mouth rinse. Oral hygiene instructions were provided. Patient was advised to be on soft diet for 6 weeks.

Prosthetic phase II : After 3 months, The implants along with the remaining teeth in the mandibular region was restored with metal ceramic crowns. The provisional restoration in the maxillary ridge that housed the temporary sleeves and the bar was replaced with a screw retained PFM substructure and cement retained crowns wrt 11,13,21 and 23 regions. (Fig 7a,7b)

Follow up: X-rays were taken at the time of surgery and after 3 months (Fig 8a) and 1 year post op (Fig 8b). Oral hygiene instructions were given and patient was recalled for oral prophylaxis every six months.

Discussion:

In the past, the loading of implants was delayed in order to avoid any unfavourable micro movements that were thought to cause fibrous encapsulation and hinder osseointegration. However, Cameron et al reported that osseointegration can be achieved even with micro movements and suggested that a movement of 30µm or less has no adverse effect on integration.⁹

Splinting multiple implants distributes the stress over a larger area thereby reducing the mechanical strain and micromotion in the implants. In 2006, Degidi et al, published a protocol for the immediate loading of multiple implants by welding a titanium bar to implant abutments directly in the oral cavity, so as to create a customized metal-reinforced provisional restoration.⁸ It is known that the peri-implant bone adjusts its architecture according to its capacity to withstand functional

loading, Thus the provisional restoration provides bone training to the ridges during the healing period.¹⁰

The provisional restorations used in the intra oral concept are all free of cement, which would reduce the risk of peri-implantitis. A study by Fanali et al concluded that even though there was higher inflammatory and reparative responses in the welded areas, the plaque accumulation was low and there was no visible fractures or radiographically detectable alterations of the welded frameworks.¹¹

In this case, after the extraction of the failed dentition in the maxilla, we immediately rehabilitated the patient with composite provisional, reinforced with welded titanium framework.

A case done by Fogli et al showed that rehabilitation of the maxillary ridge after extraction, with the welding concept, allowed improved healing and stabilization of the prostheses in the ridge that otherwise could not be rehabilitated immediately.¹² Various studies showed same positive outcomes in the rehabilitation of the edentulous ridges on a long term basis.¹³⁻¹⁴

Unfortunately the patient returned with chipping of the provisionals three months later. Thus a screw retained prosthesis was planned. Although screw retained prosthesis provides better retrievability and a lesser risk to peri-implantitis, ideal implant position is required to maintain aesthetics which is hard to achieve.¹⁵ In order to restore the angulated abutments, we delivered a screw retained PFM substructure with cement retained crowns in 13,11,21,23 regions.

It is possible on the same day of surgery to successfully rehabilitate the edentulous atrophic maxilla with a fixed definitive restoration supported by an intraorally welded titanium framework attached to axial and tilted implants.¹⁶ Studies also have recorded few drawbacks that are associated with the prosthesis such as superficial chipping of the resin and fractures of the cantilevered areas due to decreased tensile strength. The need for relining the intaglio surface of the prosthesis has also been recorded in a few studies.¹⁷ Nevertheless, Immediate rehabilitation, time saving procedures, higher psychological comfort and high social acceptance make intra oral welding a promising alternative to a delayed loading protocols.

Conclusion:

The immediate rehabilitation of the edentulous patient using the intraoral welding approach is a promising solution for those patients who deter from implant treatment due to delayed rehabilitation or who do not accept conventional complete dentures. However, Further studies on the long term success rates of intra oral welding in extraction cases would be of great interest and also substantiate this concept.

References

1. •Misch CE, Degidi M. Five-year prospective study of immediate/early loading of fixed prostheses in completely edentulous jaws with a bone quality-based implant system. *Clin Implant Dent Relat Res.* 2003;5:17-28.
2. Fischer K, Stenberg T, Hedin M, Sennerby L. Five-year results from a randomized, controlled trial on early and delayed loading of implants supporting full-arch prosthesis in the edentulous maxilla. *Clin Oral Implant Res.* 2008;19:433-41.
3. Iban~ez JC, Tahhan MJ, Zamar JA, et al. Immediate occlusal loading of double acid etched surface titanium implants in 41 consecutive full-arch cases in the mandible and maxilla: 6- to 74-month results. *J Periodont.* 2005;76:1972-81.
4. Degidi M, Lezzi G, Perrotti V: Comparative analysis of immediate functional loading and immediate non-functional loading to traditional healing periods: a 5-year follow-up of 550 dental implants. *Clin Implant Dent Relat Res.* 2009;11:257-66
5. Strub, J. R., Jurdzik, B. A. and Tuna, T. Prognosis of immediately loaded implants and their restorations: a systematic literature review. *J Oral Rehab.* 39: 704-17.
6. Mondani PL, Mondani PM. The Pierliugi Mondani intraoral electric solder. Principles of development and explanation of the solder using syncrystallization. *Riv Odontostomatol Implantopotesi.* 1982;4:28-32.
7. Hruska AR. Intraoral welding of pure titanium. *Quintessence Int.* 1987;18:683-88.
8. Degidi M, Gehrke P, Spanel A, Piattelli A. Syncrystallization: A technique for

- temporization of immediately loaded implants with metal-reinforced acrylic resin restorations. *Clin Implant Dent Relat Res* 2006;8:123-134.
9. Cameron HU, Macnab I, Pilliar R. Porous surfaced vitallium staples. *S Afr J Surg*. 1972; 10(2):63-70.
 10. Brunski JB. Biomechanical factors affecting the bone-dental implant interface. *Clin Mater* 1992;10:153-201.
 11. Fanali S, Perrotti V, Riccardi L, Piattelli A, Piccirilli M, Ricci L, Artese L. Inflammatory Infiltrate, Microvessel Density, Vascular Endothelial Growth Factor, Nitric Oxide Synthase, and Proliferative Activity in Soft Tissues Below Intraorally Welded Titanium Bars. *J Periodont*. 2010; 81: 748-57.
 12. Fogli V, Michele C, Lauritano D. Intraorally welded titanium bar for immediate restoration in maxilla: Case report and review of the literature. *Annals of Oral & Maxillofacial Surgery*. 2014;2:6.
 13. Degidi M, Nardi D, Piattelli A. Immediate loading of the edentulous maxilla with a final restoration supported by an intraoral welded titanium bar: A case series of 20 consecutive cases. *J Periodontol*. 2008; 79:2207-13.
 14. Fischer K, Stenberg T. Prospective 10-year cohort study based on a randomized, controlled trial (RCT) on implant-supported full-arch maxillary prostheses. Part II: Prosthetic outcomes and maintenance. *Clin Implant Dent Relat Res*. 2013; 15:498-508.
 15. Lee A, Okayasu k, Wang H.L. Screw-Versus Cement-Retained Implant Restorations: Current Concepts. *Imp. Dent*. 2010 ;19:8-13
 16. Degidi M, Diego N, 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 Implant*. 2010;25:1175-82
 17. Degidi M, Diego N, Piattelli A. Immediate definitive rehabilitation of the edentulous patient using an intraorally welded titanium framework: A 3-year prospective study. *quintessence int*. 2010.41;651-59

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Figures:

Fig 1a: Pre operative view-maxilla



Fig 1b: Pre operative view-mandible

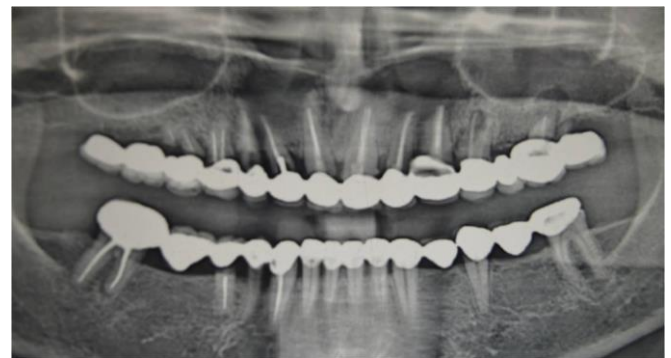


Fig 3: Proshell for provisonalisation



Fig 4a: Immediate Loading of the implants with multiunit abutment.

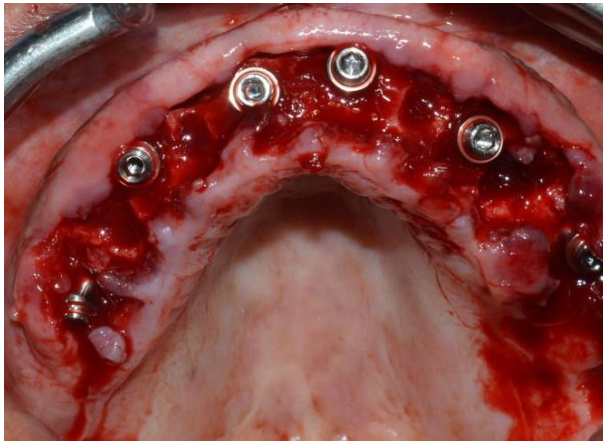


Fig 4b: Fixation of the temporary titanium sleeve

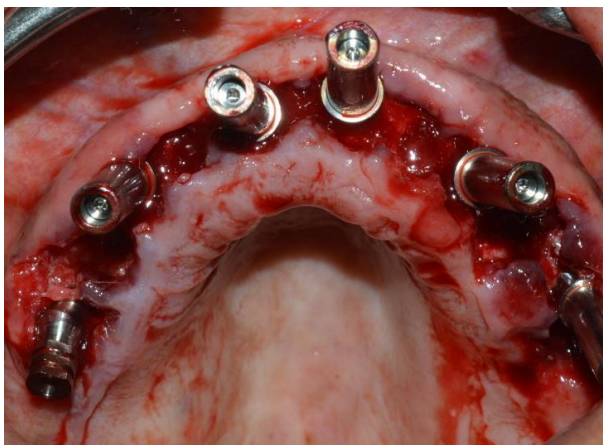


Fig 5a: Intra oral welding of the titanium wire with the sleeves.

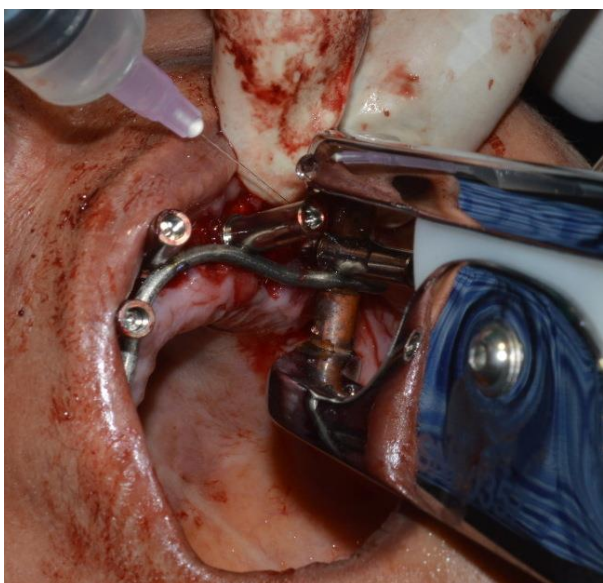


Fig 5b: Extra oral welding of the retention wires.

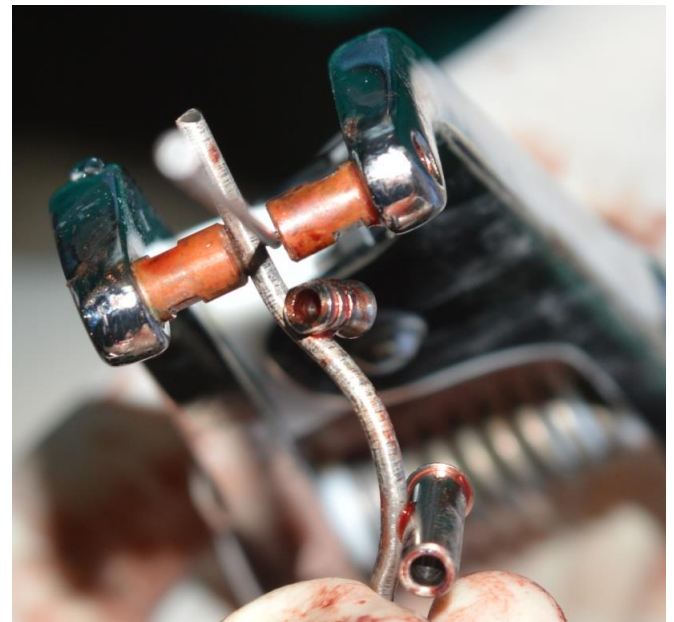


Fig 6: Immediate post operative OPG

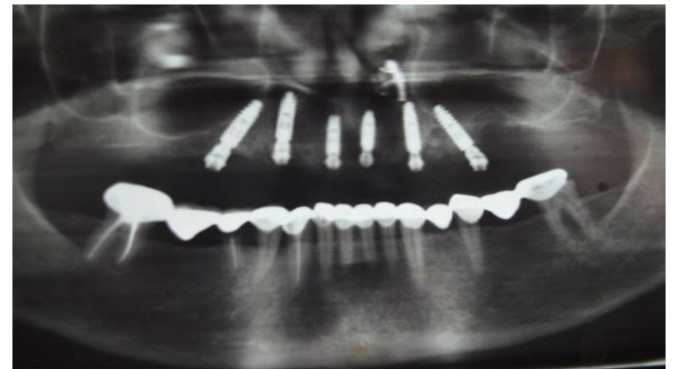


Fig 7a: Final Prosthesis .



Fig 7b: Smile view of the patient.



Fig 8a: Three month post operative OPG.

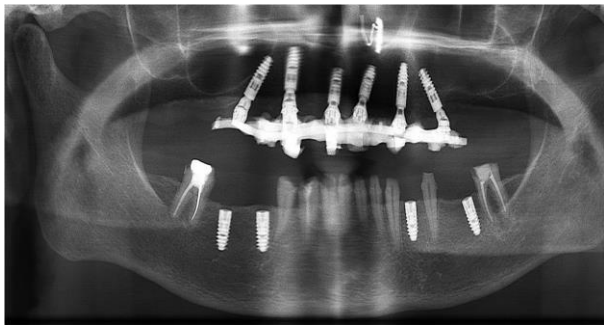


Fig 8b: One year post operative OPG.

