

Intra Oral Welding - A useful adjunct in immediate loading

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Abstract: Immediate Loading is widely being practiced today all over the world. It is the treatment of choice for most implantologists. Especially with highly specialised designed single piece implants making this treatment modality easier and more reliable. The main risk to a successful immediate loaded implants is micro - movement, more so during the first sigma of bone healing . Splinting helps prevent micro movement and helps distribute stresses. This article outlines the use of Syn-Crystallisation - Intra Oral Welding of Titanium bars to splint multiple implants, in the aim of easily providing immediate, passive and rigid stabilisation to immediate loaded implants.

Keywords: Intra Oral welding, Syn crystallisation, immediate loading, splinting of implants, prevention of micro movement at bone implant interface.

1.Introduction

The two critical factors that determine the success of an immediate functional loaded case is the proper insertion of the implant into sound bone to achieve high primary stability(1,2) and then the prevention of micro movement along the bone implant interface so as to allow for good healing(3,4). During the first sigma of bone remodelling, after the first week there is an onset of osteoclastic activity(5). This causes the decrease in the primary stability that was achieved at the time of insertion (Fig1.). Traditionally Its not until the completion of 3 - 6 months that the implant is considered integrated and has adequate bone implant contact to sustain

masticatory loads(6,7). It is within this period that an immediate functionally loaded implant is at a risk to become mobile as a result of the micro movement at the bone implant interface caused by masticatory forces and a decreasing primary stability due to ongoing osteoclastic activity and bone remodelling(3,4).

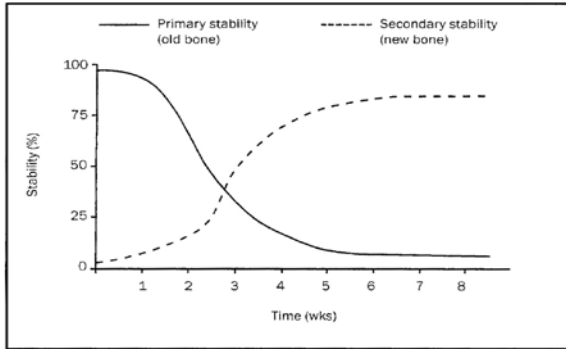


Fig. 1

2. Discussion

Splinting of Multiple implants has been suggested to act as a safety measure to prevent immediate loaded implants from becoming mobile(8), which results in their failure to integrate. Currently metal ceramic or metal plastic bridges cemented with definitive cements are considered safe to prevent this micro movement(8). The major challenges in creating such prosthesis is the time constraint of 3 - 4 days(8) within which the fully fabricated finished prosthesis must be cemented in place. The difficulty in doing this increases as the number of implants and complexity of case increases. Good coordination and a skilled lab technician is required to create the prosthesis in a short time. Also the varied implant angulations make it all the more difficult to fabricate and passively fit a casted metal framework.

Intra Oral welding which is based on the principle of resistance welding or syn crystallisation(9,10) is a very useful tool in this regard. The process involves adapting titanium bars onto the abutments and welding them to the abutment using a device(Fig.2)

that delivers a high pulse of energy for a few milli seconds(10,11). In this manner the implants are splinted to each other by means of the titanium bars that are welded to each abutment. This framework is very rigid, owing to the nature of the materials and method used. It is done chair side immediately post implant insertion and is very passive owing to the fact that it is fabricated intraorally directly on the abutment(11,12)



Fig. 2



Fig. 3

Now that the implants are splinted (Fig. 3), the prosthetic can be fabricated as per the satisfaction of both the patient and the dentist.

Abutments can be prepared intra orally without fear of disturbing the implants.

The lab can fabricate an easy to make all acrylic prosthesis, paying more attention to aesthetics and occlusion. The welded titanium bars connecting the implants act as a rigid framework, the acrylic prosthesis is for aesthetics and function. Even if the prosthesis gets decemented the implants are not affected as they are splinted via the titanium bars.

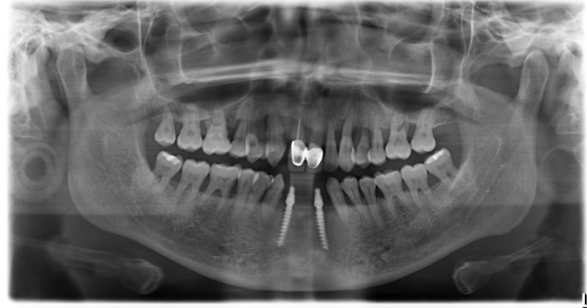


Fig. 4 Pre op

Case1

Female 35 years of age, suffers from periodontal problems (Fig. 4). Her fear of dental treatment has caused a further decline in her oral health status status, so much so that her teeth are grade III mobile. She is now unable to eat well and is concerned about her teeth falling off. After discussing multiple options with her, including periodontal therapy, splinting, extractions, bone graft, conventional delayed loaded implants with grafting, we felt the best option was an immediate loaded implant borne FP3 prosthesis. This option best addressed the patients' needs who was unwilling to go without teeth for even a day and cannot overcome stigma of denture.



Fig. 5 Post op

Treatment Objectives:

Intercept and control the spread of the periodontal condition.

Minimise invasive procedures, limit procedure to those absolutely necessary to obtain acceptable function, aesthetics and control of periodontal condition.

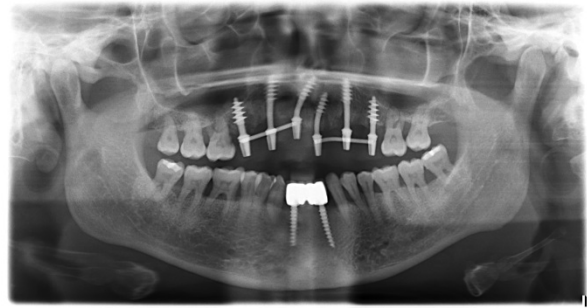


Fig. 6 Implants Splinted by welded titanium bar

Treatment Plan:

Extract teeth irreversibly affected by the periodontal problems. Place smooth surface basal implants that would engage potentially healthy basal and cortical bone. Splint these implants by means of intra oral welding so as to create a rigid titanium framework that would handle functional forces in this compromised case.(Fig. 5 & 6)



Fig. 7 Prosthesis



Fig. 8 FP3 prosthesis immediate functional loading.

Discussion

In a case like this with periodontal infection, the alveolar bone is already compromised. By using the basal bone / cortical bone we were able to do implants immediately following extractions and mechanical and chemical debridement of sockets. To further secure our success we rigidly splinted our implants using the intra oral welding technique. This would almost guarantee a reduction in any micro movement of the implants during function, allowing for a favourable osseointegration activity.

Case 2

A male patient, 72 years, reported to our practice with a failed bridge. He was looking for a permanent solution to get fixed teeth in his lower jaw.(Fig. 9)

Treatment Objective

Immediate functional loading following extractions. Minimise invasive procedures, to those absolutely necessary to obtain acceptable function and aesthetics

Treatment Plan

Extract all remaining root pieces and basal implants in those sockets. Place compression implants in areas of healed ridges where sufficient bone is present. Splint the implants together using an intra-orally welded titanium bar and give an acrylic prosthesis while the soft tissue heals and stabilises. The patient can use this acrylic bridge as a template to check functional ability and later while doing

the final metal ceramic restoration key points can be improved as learned through the acrylic prosthesis. (Fig. 10,11)



Fig. 9 Pre op



Fig.10 Post-op



Fig. 11 Immediate provisional over welded bar



Fig. 12 large open spaces below the acrylic provisional already seen after 15 days

Discussion

Number and design of implants were decided based on the bone available. The patient had financial concerns, so as to get maximum stability and support from the 6 implants we decided to use the Syncrystalliser to rigidly splint all the implants, so they can act as one unit.

The mobile bridge had caused gingival hypertrophy and along with the extraction site healing we expected there to be significant changes in the soft tissue. In a case like this a acrylic provisional is best suited (Fig. 12), followed by the definitive prosthesis after 6 months. This allows for the final prosthesis to be made according to a more stable gingival profile, resulting in an overall better prosthesis.

When the patient came back for a follow up after 2 ½ months from surgery the OPG (Fig. 13) revealed significant improvement in the bone.

Healing was progressing much better than expected and we attribute this to the rigid splinting got from the welded titanium framework. We believe the prevention of micro movements due to the welded titanium splint and micro strain stimuli given to bone by immediate loading has contributed to this. The presence of the bar does not affect the soft tissue healing (Fig. 14), there is no redness seen on cutting of the acrylic prosthesis and the bar.

3. Conclusion

The author feels that using this technique has its advantages, especially if it is required to temporarily restore a patient for a few months. In many locations quick and adequate lab support is not available. It is very difficult to find a trained and adequately skilled lab technician who can create desired metal ceramic restorations in 3 -4 days. Even for the dentist it is a very challenging to execute all the steps required to create a final prosthesis in 3 -4 days. Using this technique a dentist can focus at one task at a time. The dentist has to place the implants well, then can use the Syncrystalliser to weld the

implants and splint them together (process takes 30 min. For a full arch). Once these implants are splinted we have achieved the major criteria of stabilisation and load distribution. Now the much needed 3 – 4 days extra can be spent if required to fabricate a good provisional.

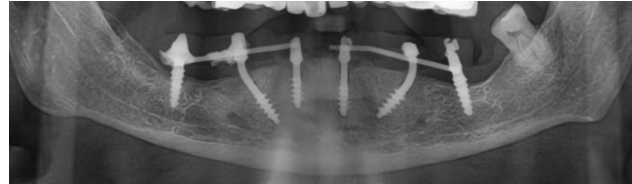


Fig.13 OPG taken 2 ½ months post op. Extraction sockets almost healed and good bone adaptation along the bent implants also. Compare to Fig. 10



Fig. 14 Pink healthy gingiva seen, this photo was taken immediately after removing provisional and cutting the bar.



Fig. 15 Final PFM after 4 months

The author still recommends to complete all prosthetics within 3 – 4 days post insertion of implant. It is much easier make an acrylic prosthesis in 3 days than a casted / sintered prosthesis. The time saved can be dedicated to perfecting occlusion and improving aesthetics.

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