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## Case Series

# Syncrystallization aka intra-oral welding for rehabilitation of basal implants: A case series

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## ABSTRACT

Dental implant rehabilitation has become a common treatment modality. Attempts to increase the predictability and success rate of implants are constantly been advocated. Syncrystallization/ Intra-oral welding is one such method that has the potential to enhance treatment outcomes. Welding the implants together not only favors undisturbed healing but also creates even distribution of forces. A case series is presented demonstrating the use of intra-oral welder to create splinting of dental implants for rehabilitation of full mouth and segmental rehabilitation. Immediate implant placement was performed in the cases followed by intra-oral welding. The welding technique has proven to be effective for immediate stabilization and loading of dental implants.

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## 1. Introduction

Basal implantology for rehabilitation of missing teeth has become an emerging trend in today's dentistry. Insufficient bone volume and density is a common challenge encountered by clinicians while considering treatment options for replacement of missing teeth.<sup>1,2</sup> This loss of alveolar dimension can be managed successfully by taking support from the cortical bone.<sup>3-5</sup> The need for complicated augmentation surgical procedures to increase the alveolar bone support is eliminated.<sup>1,6</sup> Several other good success rate, immediate loading, minimally invasive procedure, reduced treatment time, minimal chances of peri-implantitis are some of the advantages that come in hand with the use of basal implants.<sup>6</sup>

Immediate loading with rigid fixation is commonly practiced in basal implantology as these implants undergo osseoadaptation or osseofixation. Any movement over 100 microns during the healing phase may lead to fibrous integration. Thus, the rigid fixation becomes crucial.

One technique to achieve this is by performing intraoral welding also known as Syncrystallization.<sup>1</sup> This concept is also advocated by the term "implant solidarization".<sup>7</sup> Dr. Pier Luigi Mondani in 1976 presented his intraoral welder in collaboration with Modena University. This was a breakthrough as it finally paved a way for joining the implants together firmly creating a single functional structure.<sup>8</sup>

Concept of intraoral welding deals with joining the implants permanently by a bar or wire made of titanium to create a single unified functional structure. The enhanced success rates of immediately loaded implants that function as a single unified structure is documented in the literature.<sup>9-11</sup> This article describes series of cases that show immediate implant rehabilitation performed after intraoral welding. Intra-oral welding can be performed for full mouth as well as segmental cases.

## 2. Case 1: Full Mouth Case of Welding

The 58-year-old patient with terminal dentition having difficulty in mastication reported for oral rehabilitation.

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Based on clinical and radiographic examination, the patient had generalized chronic periodontitis affecting all the remaining teeth. One unloaded conventional endosseous implant was also present in the mandibular left molar region. (Figure 1) Treatment plan for the case comprised of full mouth extraction and immediate placement with intra-oral welding of basal implants followed by prosthesis after 3 days.



**Figure 1:** Pre-operative ortho-pantomogram (OPG)

On day of extraction, 10 cortico-basal implants (BCS Rline System, Israel) were placed in the maxillary jaw and 7 cortico-basal implants (BCS Rline System, Israel) were placed in the mandibular jaw. Intra-oral welder (Smart Welder Trisa Enterprise) was used for welding (Figure 2). Titanium wire of 1.6 mm was used for connecting the basal implants and the endosseous implant. The wire was pre-curved as per the arch and placed as cervically on the implant abutment as possible. Close contact was maintained during welding (Figure 3) and water spray was used to dissipate the excess heat. The welding is initiated from the distal most abutment in the arch. All the implants are connected. Conventional osseointegrated endosseous implant was also included in the splinting (Figures 4 and 5). Impressions were made and final Porcelain fused to metal (PFM) prosthesis was delivered (Figure 6).



**Figure 2:** Intra-oral welder

### 3. Case 2: Segmental Welding

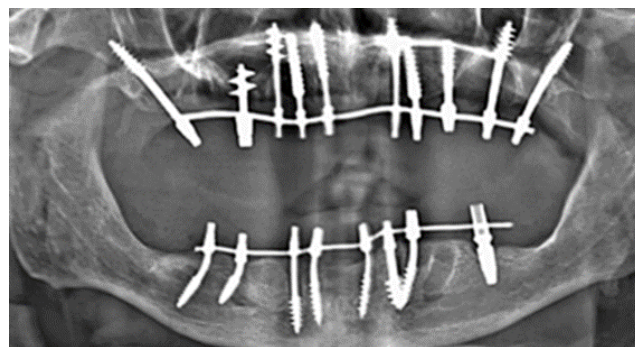
A young 26-year-old patient having history of trauma to the maxillary anterior region reported to the clinic. On



**Figure 3:** Placement of intra-oral welder



**Figure 4:** Intra-oral welded implants in maxillary and mandibular arch



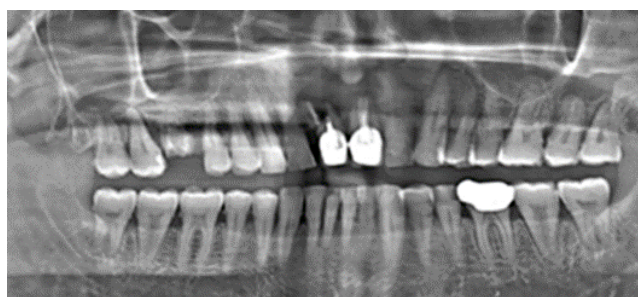
**Figure 5:** Post-operative orthopantomogram (OPG) showing single welding wire





**Figure 6:** Intra-oral post-operative prosthesis

examination, mobility was seen with the maxillary incisors. Based on radiographic (Figure 7) and clinical findings, treatment plan of extraction of maxillary central incisors followed by immediate implant placement was formulated.



**Figure 7:** Pre-operative OPG showing pathology in maxillary incisor region

After extraction, 2 cortico-basal implants (BCS Rline System, Israel) were placed engaging the nasal cortical bone. The 2 implants were then splinted together using titanium 1.6 mm wire. (Figure 8) Final PFM prosthesis was delivered on the third day. (Figure 9) Segmental welding was thus successfully accomplished for connecting 2 implants. Welding can also be performed for connecting three or more implants. (Figure 10) Double welding by using 2 titanium wires for additional rigidity can be successfully performed to achieve long-term stability. (Figure 11)

#### 4. Discussion

Successful oral rehabilitation can be performed by intraoral welding of implants.<sup>12</sup> The cases discussed in this report highlight an effective and predictable welding technique to achieve successful rehabilitation with immediate loading. No complications were encountered during the intra-oral welding as well as the prosthetic phase. Excellent outcomes were achieved on both esthetic and functional aspects. The intra-oral welder was used for rehabilitation of partial as well as completely edentulous cases with no difficulties.

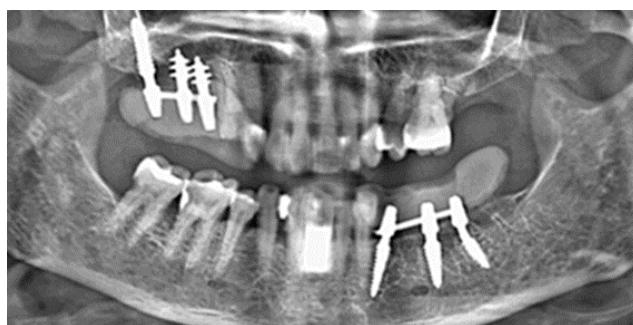
The solidarization benefits by reducing any micromovements and aids in effective desired healing.<sup>12</sup> The stresses on the individual implants are reduced and



**Figure 8:** Welding done connecting the two one piece implants



**Figure 9:** Post-operative final prosthesis



**Figure 10:** Segmental welding done for splinting 3 posterior implants

there is optimal distribution of occlusal as well as lateral forces.<sup>13</sup> The stability of the implants is increased and there is good osseous healing without any connective tissue interposition.<sup>14</sup>

The intraoral welding is a process the electric current passing through the joint zone creates heat required to bring the attached surfaces to their melting point. The difference in conductivity of the titanium and copper electrodes of the welder create a favorable situation wherein no heat is transmitted to the peri-implant bone structures.<sup>1</sup> No



**Figure 11:** Single arch double wire splinting performed in maxillary arch.

inflammatory tissue reactions have been noted due to the presence of the titanium bar.<sup>15,16</sup> The intra-oral welder is a simple versatile device.<sup>14</sup> The welded structure has good micro structure with limited porosities. Thus, under functional loads the chances of fracture of the welded joint are significantly reduced enhancing the result of treatment.<sup>13</sup>

Despite the several advantages that accompany the use of intra-oral welder it has certain limitation. Intra-oral welders cannot be used in patients that have pacemakers. The prosthesis can become bulky due to the welded wire. Maintenance of hygiene remains a crucial factor.<sup>1</sup> The clinicians also have to invest in buying the intra-oral welder. However, the long term benefits and the success rates achieved with the use of intra-oral welding outweigh the investment.

## 5. Conclusion

Intra-oral welding is a simple and effective clinical method that has the potential to elevate the success rates in basal implantology. Immediate loading can be made achievable and predictable with the use of this technique. Enhanced force distribution and stabilization of implants aid in undisturbed osseous healing. These benefits make it a safe and worthy investment in the growing dental practice.

## 6. Source of Funding

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## 7. Conflict of Interest

None


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