Intraoral welding and lingualised (lingual contact) occlusion: a case report

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Intraoral welding was developed by Pierluigi Mondaini of Genoa, Italy, in the 1970s to permanently connect submerged implants and abutments to titanium wire or bar by means of an electric current (Fig. 1). The current is used to permanently fuse the titanium to the abutments in milliseconds, so the heat generated does not cause any pathology or patient discomfort.

If possible the implants are placed without flaps. The titanium wire or bar is bent and aligned passively to the contour of the labial and lingual surfaces of the implants before applying the electric current to permanently connect titanium implants.

The technique follows a strict surgical and prosthodontic protocol, which includes using a number of implants as possible to the number of teeth to be replaced, achieving primary stability by engaging both cortical plates (osseosynthesis), immediate splinting of the implants utilizing intraoral welding and immediate insertion of a fixed provisional prosthesis with satisfactory occlusion. The technique provides for immediate loading and does not jeopardize the integration process.

Although intraoral welding has been used successfully in Europe, especially Italy, for many years, it has yet to achieve everyday use in the United States.

Members of the Italian affiliate of the American Academy of Implant Prosthodontics, NuovoGISI, have long and successful experiences with immediate loading of maxillary implants connected together by intraoral welding.

By inserting the prosthesis with adequate retention and stability the same day as the surgery, patient complaints and discomfort can be avoided or substantially reduced. The instantaneous stability that results from the splinting can reduce the risk of failure during the healing period. Intraoral welding can also eliminate errors and distortions caused by unsatisfactory impression making, as the procedure is performed directly in the mouth.

Intraoral welding can fulfill a great need for business and socially active persons, as the surgical and prosthodontic procedures are accomplished on the same day. Patients can leave the dental office with a stable, esthetic and retentive prosthesis.

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Fig. 1. Schematic drawing of Mondaini intraoral solder unit
Fig. 2. Preoperative panoramic radiograph of 50-year-old caucasian woman
Fig. 3. Nonrestorable teeth visible after removal of the patient’s prosthesis
Fig. 4. Eight titanium one-piece implants are inserted
Fig. 5. Immediate stabilization of the eight implants and two additional implants previously inserted in the posterior regions, by welding each implant to a 1.5 mm supporting titanium bar
Fig. 6. Panoramic radiograph after 90 days suggests complete integration
Fig. 7. Healthy gingiva was observed after 90 days
Fig. 8. Lower implants welded together intraorally
Fig. 9. Three-tooth mandibular fixed prosthesis
Fig. 10. Seven-year follow-up radiograph shows satisfactory preservation of bone surrounding all of the implants
Fig. 11. Intraoral photograph of the definitive prosthesis shows healthy gingiva
The flapless technique, first proposed by Tramonte, can be performed when the bony crest is wide and an adequate amount of attached gingiva is present. The technique allows for uneventful healing, a reduction in postoperative inflammation and only moderate inconvenience for the patient, who can eat efficiently the same day.

**Provisional prosthesis and tooth arrangement**

During the surgical session a temporary resin prosthesis is inserted. Occlusal plane height must be correct. A lingualized (lingual contact) scheme of occlusion is recommended. The upper anterior teeth are best arranged without any vertical overlap. The amount of horizontal overlap is determined by the jaw relationship. A vertical overlap for appearance can be provided, provided that an adequate horizontal overlap is included to guard against interference within the functional range.

**Lingualized (lingual contact) occlusion**

Lingualized (lingual contact) occlusion maintains the esthetic and food penetration advantages of anatomic teeth while maintaining the mechanical freedom of nonanatomic teeth. Among the advantages of a lingualized occlusion are occlusal forces centered over the ridge crest in centric occlusion, mandibular force is effectively transferred more “lingual” to the ridges during work side excursions, the “mortar and pestle” type of occlusion minimizes the occlusal contact area providing for more efficient food bolus penetration and elimination of the precarious interruption that can complicate the arrangement of anatomic denture teeth.

Lingualized occlusion also prevents cheek biting by holding the buccal mucosa off the food table by eliminating occlusal contacts on the maxillary buccal cusps, minimizes occlusal disharmonies created from errors in jaw relationships, denture processing changes and settling of the denture base, and simplifies setting of denture teeth, balancing the occlusal contact and any subsequent occlusal adjustment procedures.

**Clinical report**

A healthy 50-year-old caucasian woman presented for treatment at the office of the co-authors (LDC) with a mobile, painful, 12-tooth semiprecious alloy-ceramic fixed partial denture (LPD) with a mobile, painful, 12-tooth semiprecious alloy-ceramic fixed partial denture (LPD) and a mobile, painful, 12-tooth semiprecious alloy-ceramic fixed partial denture (LPD). The prosthesis was removed and all of the remaining abutment teeth were found to be nonrestorable with extraction indicated (Fig. 3). After removal of the retained teeth, eight titanium one-piece implants were inserted in one session (Fig. 4).

Immediate stabilization of the eight implants and 2 additional implants that were previously inserted in the posterior regions was achieved by welding (Aescher Introral Welding Unit, Casargo, Italy) each implant to a 15 mm supporting titanium bar (Aescher, Casargo, Italy) which previously had been bent to fit passively on the palatal mucosa (Fig. 5).

A provisional resin prosthesis was inserted, which provided an acceptable vertical dimension and lingual contact occlusion. Oral hygiene procedures were demonstrated to the patient and reviewed at all future appointments.

After 40 days, a panoramic radiograph suggested complete integration (Fig. 6) and a healthy mucosa was observed (Fig. 7). The definitive full-arch gold-ceramic maxillary prosthesis was inserted, which greatly pleased the patient and her family.

In the lower arch, the right first and second bicuspid were extracted and implants placed in the first bicuspid and first molar regions. The implants were welded together introrurally (Fig. 8), followed by the fabrication and cementation of a three-tooth fixed prosthesis (Fig. 9).

A 7-year follow-up radiograph (Fig. 10) shows satisfactory preservation of bone surrounding all of the implants. An introral photograph of the definitive prosthesis shows healthy gingival tissue (Fig. 11).

**References**


