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

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Intraoral welding was developed by Pierluigi Mondanari of Genoa, Italy, in the 1970s to permanently connect submerged implants and abutments to a 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 close or possible to the number of teeth to be replaced, achieving primary stability by engaging both cortical plates (bicortical), 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 using intraoral welding.2

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 process is performed directly in the mouth. Intraoral welding can fulfill a great need for business and socially active...
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, masticatory force is effectively transferred more “lingually” to the ridges during working side excursions, the “molar and molars” type of occlusion maximizes the occlusal contact area providing for more efficient food broken up and elimination of the precise intercuspation that can complicate the arrangement of anatomic occlusions. Lingualized occlusion also prevents check biting by holding the buccal mucosa off the food table by eliminating occlusal contacts on the mandibular buccal cusps, transitions mucosal discharges cleansed from errors in jaw relationships, denture processing changes and settling of the denture base, and simplifies setting of denture teeth, balancing the occlusion and any subsequent occlusal adjustments.

After 90 days, a panoramic radiograph suggested complete integration (Fig. 6) and a healthy mucosa was observed (Fig. 7). The definitive full-arch gold-ceramic fixed prosthesis was inserted, which greatly pleased the patient and her family. In the lower arch, the first right and second bicuspids were extracted and implants placed in the first bicuspids and first molar regions. The implants were welded together intraorally (Fig. 8), followed by the fabrication and cementation of a three-tooth fixed prosthesis (Fig. 9).

7-year follow-up radiograph (Fig. 10) shows protection of bone surrounding all of the implants. An intraradicular view of the definitive prosthesis shows healthy gingival tissue (Fig. 10). References


Clinical report

A healthy 25-year-old caucasian woman presented for treatment at the office of one of the co-authors (LOD) with a mobile, painful, 12-tooth semiprecious alloy-ceramic fixed prosthesis (Fig. 1). The prosthesis was removed and all of the remaining abutment teeth were found to be recontourable with extraction indicated (Fig. 2). After removal of the retained teeth, eight SynCone pieces were inserted in one session (Fig. 3).

Immediate stabilization of the eight implants and 2 additional implants that were previously inserted in the posterior regions was achieved by welding (Fig. 4). A provisional gold-ceramic bridge (Fig. 5) was attached and cemented in centric occlusion, masticatory forces centered over the ridge crest and synchrocrystallization. Riv Odontostomatol Implantoprotei (in press).

Provisional prosthesis and tooth arrangement

During the surgical session a temporary overdenture base, posteriorly supported Occlusal plane height must be corrected. 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 used, provided that an adequate horizontal overlap is included to guard against interference within the functional range.

Discussion

The number of implants placed for an edentulous patient should be based upon whether the design is to be implant-assisted or implant-supported. If the goal is a minimalistic design utilizing the soft tissue support, two implants using locator attachments are appropriate to retain a mandibular denture and will provide a predictable outcome. However, when more than two implants using resilient overdenture retainers are employed, them is not a corresponding linear increase in retention of the denture and the result may suffer. Therefore, when at least four implants are planned, the restoration should be designed as implant-supported to maximize the value of the patient’s greatest investment.

This article discusses just such a situation where a patient had experienced repeated low value from her investment of five implants. By redesigning her treatment to become implant-supported through the use of the ATLANTIS Conus concept, a successful result was achieved without the greater expense of a fixed hybrid. The final result was functionally related to a fixed restoration while providing lip and cheek support of a removable prosthesis without complicating or obstructing oral hygiene.

The lingualized occlusion design of the ATLANTIS Conus concept provides outstanding retention of the prosthesis distributed between the abutment teeth of patients chew in a relatively flat elliptical pattern and the bridge can be only be removed vertically. The abutments themselves are patient-specific and can be modified for all major implant systems, allowing recovery of many frustrating results with overdentures. As long as there is sufficient interarch space (at least 12 mm), existing finished dentures can be retrofit with ATLANTIS Conus abutments, reducing patient cost while providing a stable result. Cast chrome frame retainer is advised for all new ATLANTIS Conus prostheses as the tremendous increase in strength of the bridge by the frame more than offsets the slight increase in cost and may actually reduce required interarch space. The clinical procedure is relatively simple and comparable to implant overdentures, however, because the abutments are patient-specific tooth position must be established before the design of the abutments is begun.

Conclusion

A patient with an 11-year history of frustration with her dental implant investment was treated successfully with the ATLANTIS Conus concept using patient-specific abutments and SynCone caps, providing an implant-supported, removable bridge with all of the benefits of a fixed design and none of the limitations.

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Figure 17. ATLANTIS Conus abutments torqued to specified level, obturated with Teflon tape and composite resin

Figure 18. Laboratory processed, clear duplicate prosthesis with weldable caps.

Figure 19. Panoramic radiograph of the abutments seeded on the four selected implants. Because the restorative crown is not supported, gradual diminution of the residual ridge will present no consequence to the patient.

Figure 20. Completed bridge in place showing flange length suitable to preserve food

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