

DENTAL TECHNIQUE

## Positioning handle and occlusal locks for the Teeth-in-a-Day protocol



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Digital denture technology has provided numerous benefits to prosthodontists and patients undergoing both conventional denture treatment and implant-supported prostheses. AvaDent digital dentures<sup>1</sup> bring the precision, speed, and profitability of digital process automation to removable dentistry, using computer-aided engineering. Computer-aided engineering in conjunction with computer-aided design and computer-aided manufacturing (CAD/CAM) improved on traditional CAD/CAM fabrication by using sophisticated, scientific algorithms to aid and control the bulk of design and manufacturing tasks.<sup>2</sup> The technology has dynamically changed the trajectory of removable prosthetics from a labor-intensive, inconsistent process to a consistent, algorithmically driven complete mouth rehabilitation process.<sup>2</sup>

Traditionally, a denture for an immediate loading protocol was processed using individual denture teeth. This will become the conversion prosthesis.<sup>3,4</sup> On the labial aspect of the denture teeth, a heavy gauge wire was secured with orthodontic resin at mid-tooth position (Fig. 1). This provided additional strength for the prosthesis and secured the individual denture teeth when the lingual aspect was thinned in order to accommodate the connection to the prosthetic cylinders. The wire also served as a handle to be able to maneuver and position the prosthesis into the proper orientation with a needle holder when establishing the occlusal relationship with

### ABSTRACT

Positioning handles and occlusal locks have evolved as improvements to the Teeth-in-a-Day protocol. These improvements have enabled a more accurate alignment of the removable dental prosthesis during the conversion prosthesis technique. These improvements can be easily incorporated through computer-aided design and computer-aided manufacturing digital denture fabrication process. (*J Prosthet Dent* 2016;115:274-277)

the opposing arch (Fig. 2).<sup>5</sup> This procedure has been clinically successful for 3 decades.

Use of an AvaDent monolithic milled denture for the Teeth-in-a-Day protocol provides additional strength beyond the traditional conversion prosthesis. Because the teeth and denture bases are a monolithic acrylic resin material, there is no need to reinforce or secure the denture teeth with a heavy gauge wire. Elimination



**Figure 1.** Heavy gauge wire positioned so it will not interfere with opposing occlusion.

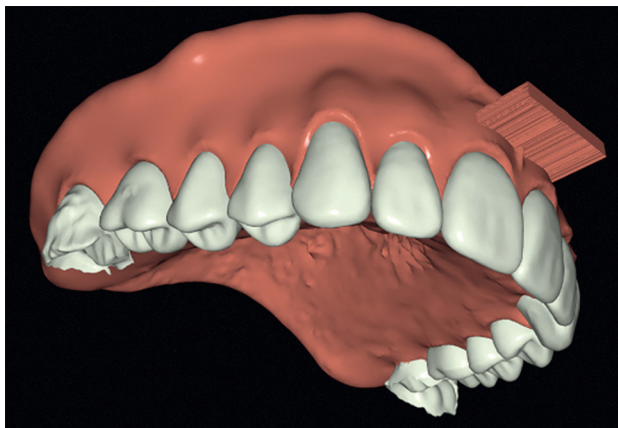
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**Figure 2.** Wire serves as handle to secure conversion prosthesis in place during polymerization of acrylic resin.



**Figure 3.** Positioning handle and occlusal locks were digitally designed before sending production files to milling machines.

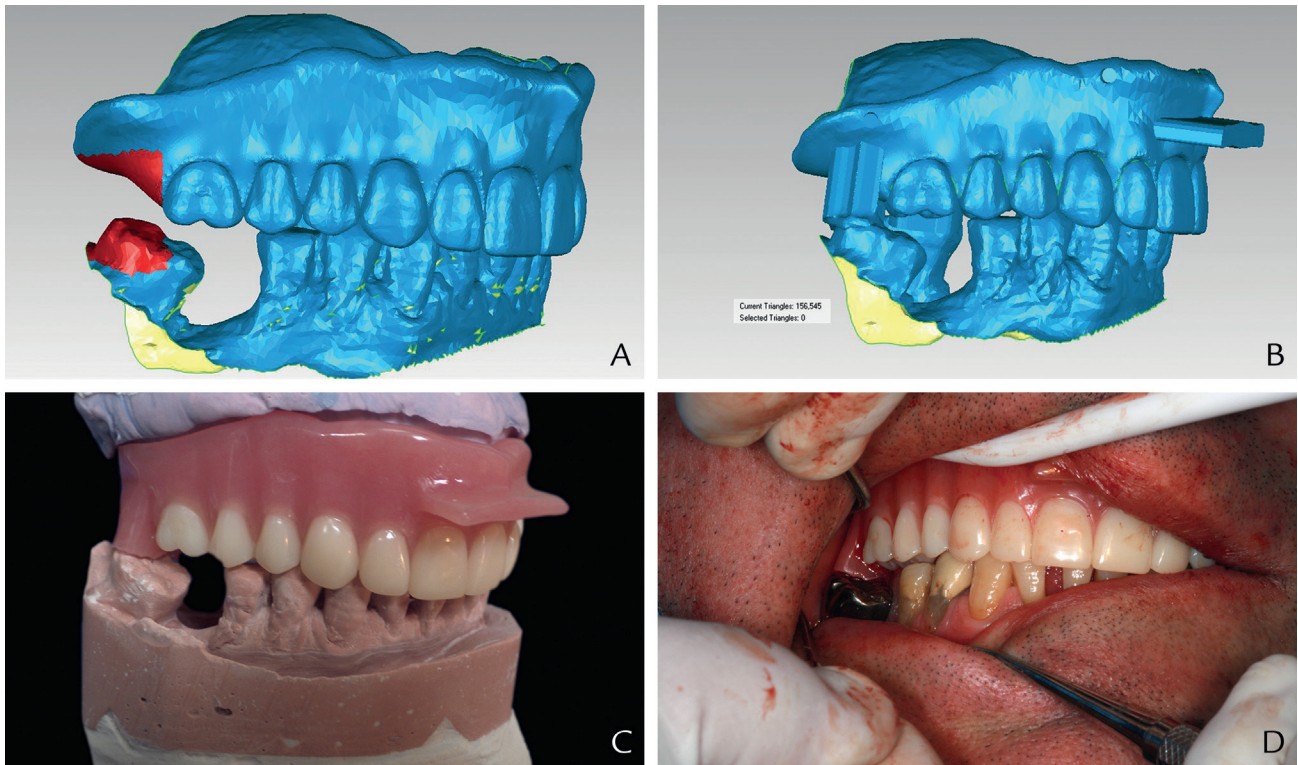
of the wire, however, also eliminates the ability to easily maintain proper position of the conversion prosthesis during the intraoral pick-up of the implant components parts.

**TECHNIQUE**

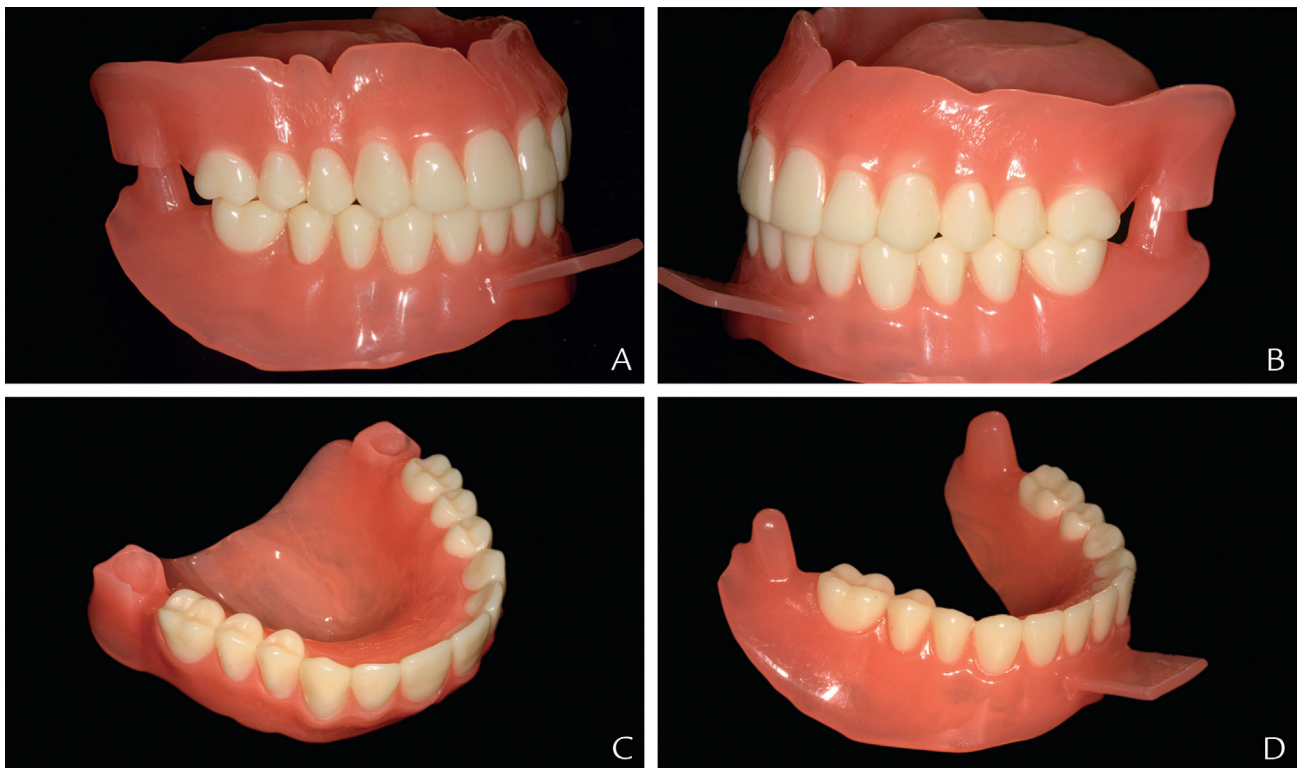
1. Make definitive impressions and provide them to the dental laboratory with a prescription for the digital denture.
2. In the dental laboratory, optically scan the impressions or pour stone casts and create a virtual articulation. Then, a digital tooth arrangement is designed.
3. Design the positioning handle and incorporate it into the production file for milling the monolithic denture (Fig. 3). It replaces the heavy gauged wire in the Teeth-in-a-Day protocol (Fig. 4). Because the handle is designed and milled as part of the denture base, the finishing time for the conversion prosthesis is decreased because the facial aspects of the teeth are unaltered.
4. Design the occlusal locks and incorporate them into the production file for milling the monolithic denture (Fig. 3). They are either robotically milled extensions to the buccal or lingual cusps of the posterior teeth or extensions to the denture base distal to the tooth position. The extensions interdigitate with the opposing dentition by locking onto the buccal or lingual surfaces of the existing dentition (Fig. 5), the buccal or lingual surfaces of the opposing denture tooth (Fig. 4), or the opposing denture base (Fig. 6). The occlusal locks provide verification that the digital denture is positioned properly in relationship to the jaw relation record that was recorded by the optical scanner.
5. After the pick-up of the implant component parts is complete, trim the positioning handle and the occlusal locks with a standard acrylic laboratory bur. This is done as part of the finishing process.



**Figure 4.** Fully milled digital dentures with positioning handles and occlusal locks. A, Left lateral view. B, Right lateral view. In this example, occlusal locks are placed on buccal aspects of maxillary second molars. Maxillary second molars are ultimately removed entirely during conversion prosthesis technique for acrylic screw-retained prosthesis with 4 implants.



**Figure 5.** Occlusal locks for this maxillary denture emerge from denture base distal to first molar and locks securely onto mandibular second molar. Screen captures from CAD software. A, before design of occlusal lock. B, After design of occlusal lock. C, After milling, position confirmed with articulator. D, Occlusal locks aid in assuring denture is seated properly during clinical steps of conversion prosthesis technique.



**Figure 6.** Alternative method of implementing occlusal locks is to have both aspects of locks in denture base distal to tooth position. This design is only possible when both maxillary and mandibular arches are being treated. A, Right lateral view. B, Left lateral view of dentures in occlusion showing locking interface. C, With dentures apart, female aspects of occlusal locks are better illustrated. D, Male aspects of occlusal locks.

## DISCUSSION

Incorporation of a positioning handle and occlusal locks has greatly improved the accuracy of the Teeth-in-a-Day procedure. Use of occlusal locks has facilitated precise alignment of the removable prosthesis by reducing the need for additional wax evaluations and new interim implant-supported prostheses that quite often resulted from inadequate alignment of the conversion prosthesis. Another important advantage is that the occlusal locks, which are generally applied to the posterior areas of the prosthesis, give the clinician the ability to bring the entire dentition into maximum interocclusal relationship. This significantly reduces time required for occlusal adjustments.

The positioning handles are generally located a few millimeters below the cervical margin of the anterior teeth. This location, which is improved over the labial wire of the original conversion prosthesis, eliminates added labial resin on the teeth, which could result in altering the anatomic form of the teeth when removed and polished. Because the positioning handle is only in the gingival material, the finishing contours and final polishing time is significantly reduced.

## SUMMARY

Both the positioning handle and the occlusal locks facilitate construction and delivery of the conversion prosthesis, expediting the clinical procedure.

Positioning handles save laboratory and clinical time. The occlusal locks ensure accurate alignment, improving the accuracy and precision of the Teeth-in-a-Day protocol.

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