

TIPS FROM OUR READERS

A digital approach to the fabrication of reinforced interim fixed dental prostheses



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Conventional polymethyl methacrylate (PMMA) materials fracture easily when used in long-span interim prostheses for an extended period,¹ but they can be reinforced by embedding a framework of materials such as stainless steel wire,² metal casting,³ denture metal mesh,⁴ or glass fiber.⁵ However, current dental design software programs do not have a feature for designing reinforced interim restorations. Thus, this article introduces a method of designing the recipient bed for the framework that reinforces the interim material by using the attachment design function for removable dentures. This time-saving technique allows dental professionals to digitally design the correct size and location of the recipient bed, reducing excessive material loss and human error. This technique can facilitate the reinforcement of long-span PMMA interim restorations.

TECHNIQUE

1. Import the patient's scan data into the dental computer-aided design (CAD) program (exocad Dental CAD v.6136; exocad GmbH). Design the interim fixed dental prostheses in the conventional manner.
2. Click on "Free-form restorations." Then, select the "ATT" (Attachment) tab. Click on the "Remove" button. Select "Parametric design (extrusion)" and the type "Archway Makro" (Fig. 1A). Click on the mouse button when the attachment is at the appropriate location to reinforce the interim fixed prosthesis with the wire (Fig. 1B). Click on the "Apply" tab (Fig. 1C). Repeat the same process by moving the attachment to the side. Gradually, a long groove will be created at the intended position of the wire (Fig. 1D).
3. Mill the interim prosthesis from a PMMA block (Monolayer PMMA Block; Huge Dental Material Co Ltd) (Fig. 2A).
4. Shape a Ø0.9-mm stainless-steel wire (remanium wire; Dentaurum GmbH & Co KG) to fit in the recipient bed formed on the interim prosthesis (Fig. 2B). Alternatively, glass fibers (everStick C&B; Stick Tech, GC America) could be cut and prepared.
5. After placing the shaped wire or prepared glass fiber in the groove of the interim prosthesis, pour conventional PMMA resin (Jet Tooth Shade; Lang Dental Manufacturing Co, Inc) to embed the wire in the interim prosthesis (Fig. 2C).

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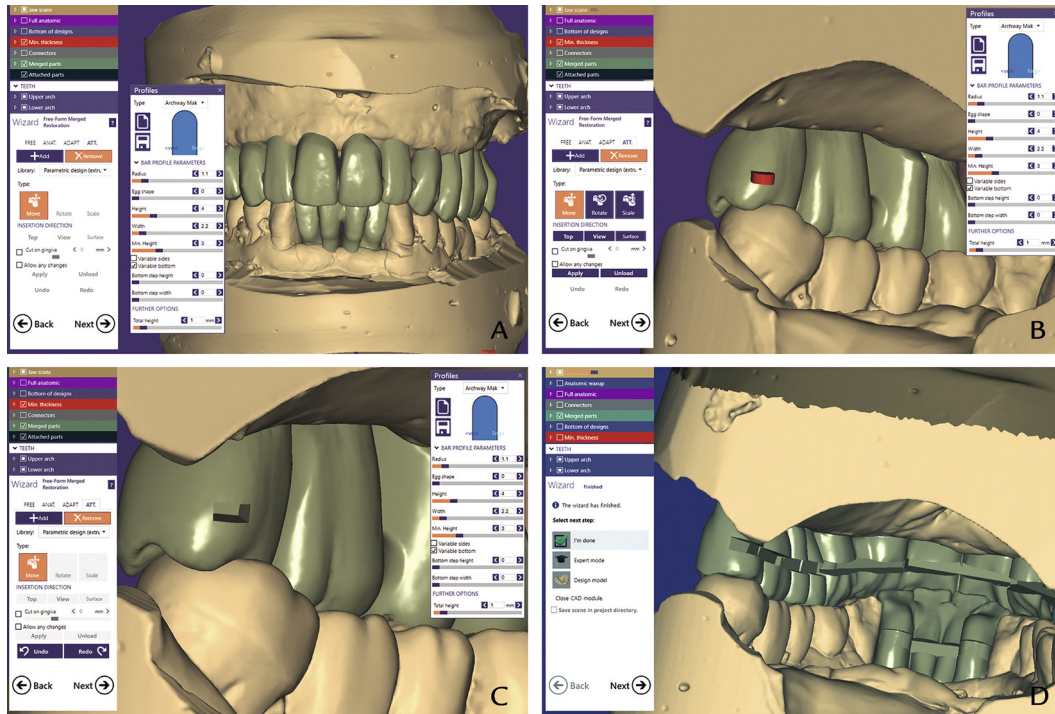


Figure 1. Digital designing of recipient bed for strengthener by using attachment design function for removable partial denture. A, “ATT” (Attachment) tab in menu for “Free-Form Merged Restorations” step selected. “Remove” button selected, following which, “Parametric design (extrusion)” option selected from drop-down menu for attachment library. Next, “Archway Makro” type chosen. B, Located virtual attachment on restoration for reinforcement. C, Virtually formed intaglio after clicking on “Apply.” D, Long groove prepared after repeating same process on lateral teeth to act as recipient bed for reinforcement framework.



Figure 2. Fabrication of wire-reinforced polymethyl methacrylate interim fixed partial denture. A, Milled interim fixed partial denture for reinforcement. Recipient bed prepared on palatal surface of interim fixed partial denture. B, Stainless steel wire shaped to fit into recipient bed prepared on interim prostheses. C, Addition of conventional polymethyl methacrylate interim resin to embed wire in interim prostheses. D, Completed wire-reinforced polymethyl methacrylate interim fixed partial denture.

6. Polish the cameo surface of the interim prosthesis and deliver it to the patient (Fig. 2D).

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CRediT authorship contribution statement

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