

New Dentures from Old: A Duplication Method Using "Appropriatech"

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The article for this month's "Clinical Showcase" section was written by Dr. Owen, a speaker at the 2006 FDI Annual World Dental Congress. Dr. Owen's session, titled "Dental problems in the elderly," will be presented on Sunday, September 24.

Appropriatech is a word coined from the expression "appropriate technology" (in health care) and is used here to denote the use of cost-effective materials and methods without sacrificing any of the accepted principles of care — in this case prosthodontic principles.¹ Appropriatech is most obviously applicable in developing countries, but the concept finds application in any community where cost and time savings are beneficial. The technique described here, for example, is of particular benefit where time savings are required, often because of transportation problems (as might be the case in rural areas or where the population is poor), where cost savings are required because of socioeconomic circumstances (as for poor and elderly patients), and when large changes from old to new are unlikely to be tolerated well (as for elderly patients). The technique is illustrated with a case chosen primarily for its clear demonstration of the principles of this approach, since the patient in this case is physically and biologically younger than her chronological age would suggest.

The duplication method for preparing a new denture is most appropriate when a patient has been satisfied with his or her existing dentures but requests or requires new dentures. For example, the fit may no longer be as good as it was initially, and there may be wear, staining or fracture of some of the teeth. If most other aspects such as arch form, jaw relations, and stability are acceptable, then the duplication technique is ideal. Any changes planned should be minimal, and this procedure should not be used to correct large deficiencies in arch form or vertical dimension greater than about 3 mm.

Many methods have been described for the duplication of dentures, but we have found the method described below to be applicable in a wide variety of circumstances. It takes 3 clinical visits apart from any recalls.

Clinical Procedures — First Visit

Choose box trays slightly larger than the patient's dentures, into which an impression material (normally irreversible hydrocolloid) will be placed to record the external surfaces of the denture (Fig. 1). If cost is of lesser consideration,



Figure 1: Impression material is placed into box tray for upper denture (a) and lower denture (b).



Figure 2: Periphery wax is used to attach a wax sprue to each side of the denture posteriorly.



Figure 3: The box tray is filled with an irreversible hydrocolloid, and the denture is pressed into it.

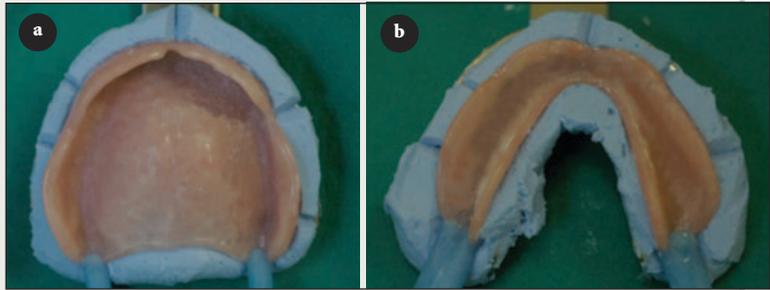


Figure 4: The border of the impression material for the upper denture (a) and the lower denture (b) is trimmed flat, and location grooves are placed.

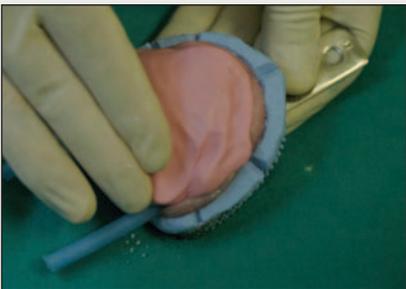


Figure 5: A putty material (laboratory type) is pressed into the fitting surface to cover the remaining periphery visible above the alginate borders.

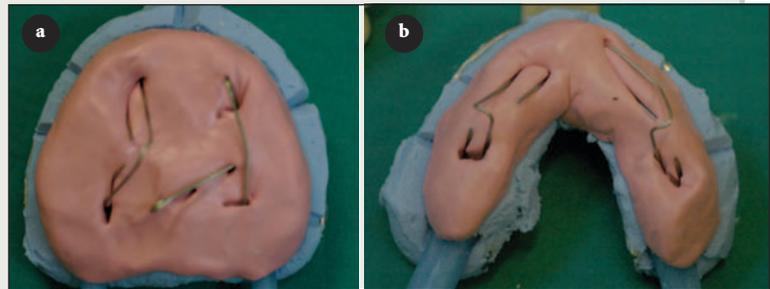


Figure 6: While the putty is still soft, bent paper clips are half buried in the material for retention of the plaster support for the upper denture (a) and the lower denture (b).

polyvinyl siloxane putty may be used for this purpose, but a large quantity will be required. In general, the material used need not be a clinical impression material; a laboratory material, which will be considerably cheaper, is acceptable. Use sticks of periphery wax to attach a wax sprue to each side of the denture posteriorly (Fig. 2). Next, fill the box tray with a mixture of an irreversible hydrocolloid, and press the denture into it so that the impression material extrudes almost flush with the periphery of the denture (Fig. 3). Once it is set, trim this border of the impression material flat, and place location grooves as shown in Fig. 4. For the fitting surface, a putty material (laboratory type) is required because of any undercuts that may be present. Press this putty into the fitting surface so that it covers the remaining periphery visible above the alginate borders (Fig. 5). While the putty is still soft, half-bury bent paper clips in the material for retention of the plaster support (Fig. 6). Then use quick-setting impression plaster to cover

the putty and the adjacent (notched) borders of the impressions so that the entire denture is invested (Fig. 7).

When the plaster has set, separate the impressions of the fitting and polished surfaces, and remove the dentures, along with the periphery wax sprues (Fig. 8). Carefully reunite the 2 halves of the investment, and place sticky wax along the junction (Fig. 9). If any pieces of plaster have fractured off, fit them back together (Fig. 10) and seal with sticky wax. If alginate was used for the external surface impression, keep the whole mould humid by wrapping in moist paper towels and sealing inside a plastic bag.

If the denture has an acceptable vertical height and the teeth allow the denture to be articulated by hand, a jaw registration is not required. However, if the teeth are so worn that the dentures cannot be hand-articulated out of the mouth, or if the vertical dimension must be increased (by no more than about 3 mm), then

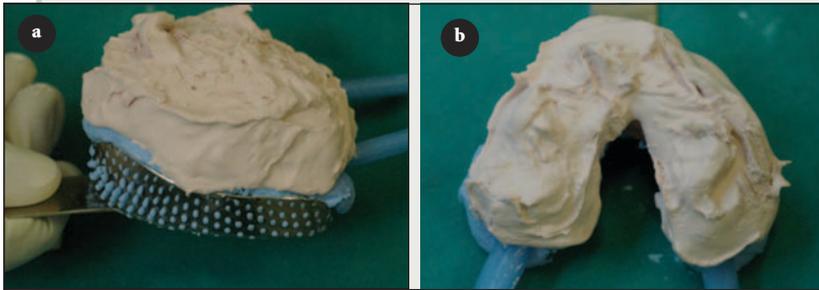


Figure 7: Quick-setting impression plaster is applied to cover the putty and the adjacent (notched) borders of the impressions of the upper denture (a) and the lower denture (b).



Figure 8: When the plaster has set, the impressions of the fitting and polished surfaces are separated and the dentures removed.

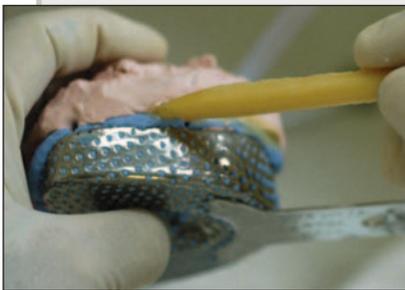


Figure 9: The 2 halves of the investment are carefully reunited, and sticky wax is placed along the junction.

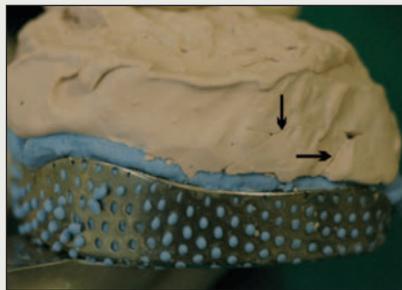


Figure 10: Any pieces of plaster that have fractured off (arrows) are fitted back together and sealed with sticky wax.



Figure 11: If the teeth are very worn or if the vertical dimension must be increased, a jaw registration is made, using a suitable registration material (in this case, Alminax [Whip-Mix Corp., Louisville, Ky.]).

prepare a jaw registration using a suitable registration material (Fig. 11).

If a change in vertical dimension is required, there will have been some wear of the teeth, and a decision must be taken as to whether the positioning of the occlusal plane should be adjusted, usually by lowering the position of the upper arch. If so, this alteration must be conveyed to the technician.

After a suitable shade for the denture is chosen, the patient is dismissed. The mould will usually be the same as for the previous dentures.

Laboratory Procedures after First Clinical Visit

Duplication of the Denture in Wax

Melt pink modelling wax, combined with 10% sticky wax, in a metal jug. The sticky wax makes the wax a little harder, which should prevent any distortion; this is especially useful in tropical climates. Pour the molten wax into the mould through one sprue and wait for it to

overflow out of the other sprue hole (Fig. 12). Use heat-resistant gloves for this step. Keep the moulds moist while waiting for the wax to cool and harden. Then separate the halves of the mould to reveal a wax replica of the denture (Fig. 13).

The half consisting of the silicone impression of the fitting surface, reinforced by the impression plaster, is then trimmed if necessary, in preparation for articulation. The impression of the polished surfaces should not be discarded until an adequate wax replica has been obtained; a plaster model can then be poured using these impressions, if a reference to the previous dentures is required (although this is usually not necessary).

Articulate the 2 wax replicas on their models, by hand or with the jaw registration, seal them together, and mount them on an articulator.

Setting the Teeth

Remove the wax teeth one by one and replace them with artificial teeth of the correct

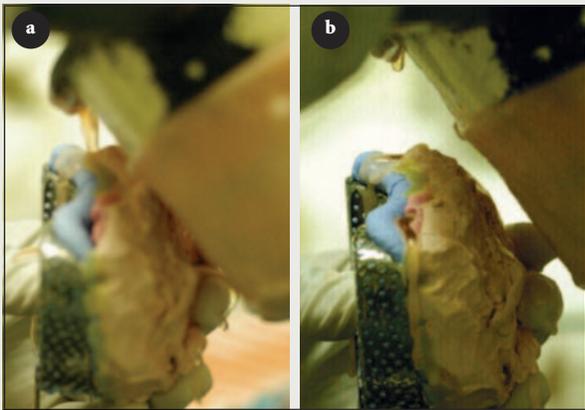


Figure 12: Pink modelling wax mixed with 10% sticky wax is poured into the mould (a) until it extrudes from the opposite sprue hole (b).



Figure 13: The halves of the mould are separated to reveal a wax replica of the denture.



Figure 14: Every other tooth is replaced initially, to help maintain arch form and tooth position.



Figure 15: The completed wax-up of the trial dentures.



Figure 16: Final impressions for the new dentures are made using zinc oxide-eugenol paste or elastomeric impression materials inside the trial base.

shape and size. If a new jaw registration was made at an increased vertical dimension, set the occlusal plane at the previously determined position. Begin by replacing every other tooth, to help maintain arch form and tooth position (Fig. 14). After replacing the anterior teeth, and if an absolute likeness of the old dentures is desired, use the plaster cast of the denture to evaluate the arrangement. Wax up the completed trial dentures in preparation for the next clinical visit (Fig. 15).

Clinical Procedures — Second Visit

Evaluate the trial dentures using conventional clinical techniques. It is important to realize that the trial dentures cannot be repositioned on an articulator after the final impressions are made, so any repositioning of teeth must be done at this stage.

When the trial dentures are satisfactory, make the final impressions for the new den-

tures using zinc oxide-eugenol paste (Fig. 16) or, if cost is less of a consideration, elastomeric impression materials. The impression technique is identical to that used in rebasing a denture, and a “closed-mouth” technique can be used to maintain the proper jaw and tooth relations during the impression procedure.

Laboratory Procedures after Second Clinical Visit

The trial dentures may be immediately flaked but it is generally easier to pour a cast for each, so that final adjustments can be made to the wax work. The dentures are then flaked and processed in the conventional way.

Clinical Procedures — Third Visit

The procedures for the third clinical visit are the same as for delivery of any complete dentures, with the exception that a remount

procedure after deflasking will not have been possible: this can be done at chairside with a suitable check-bite if necessary.

Advantages of the Technique

This technique offers 4 distinct advantages:

- The familiar features of previously successful dentures are retained.
- The new dentures are completed in 3 visits.
- The technique is particularly suited to the treatment of elderly patients.
- The technique is cost-effective and a good example of “appropriattech.”

Disadvantages

The final impressions are the weakest point in the technique: the vertical and horizontal jaw relationships are at risk, and it is generally unsatisfactory to make final impressions in a trial denture, as the wax may become distorted. However, as with all prosthodontic procedures, careful attention to detail will result in a satisfactory impression and a satisfactory fitting surface. ✦

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Reference

1. Owen PC. Appropriatech: prosthodontics for the many, not just for the few. *Int J Prosthodont* 2004; 17(3):261–2.