

Technique for rebasing and tooth replacement of the implant retained fixed complete denture incorporating an existing metal framework

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ABSTRACT

This article describes a simplified impression technique for replacement of acrylic resin denture base material and teeth for an implant retained fixed complete denture utilizing the existing metal framework. This method permits precise alignment of the impression and framework to implants and residual ridges, and simultaneously provides a cast and record for articulation of replacement teeth at the appropriate vertical dimension of occlusion.

Keywords: impression, modification, resorption, prosthesis



Introduction

A common maintenance procedure for the acrylic resin and metal implant-retained fixed complete dental prosthesis (IRFCDP) is replacement of base material and denture teeth following long term use.^[1] Replacement of the base resin is often complicated by ongoing residual ridge resorption, and requires revision of tissue surface contours for optimum hygiene and comfort. In addition to capturing altered soft tissue form, the clinician must be able to accurately relate this shape to the existing framework and implants. This article describes a simplified impression technique based on a method of Drago and

Peterson,^[2] that allows the clinician to reconstruct an IRFCDP utilizing an existing satisfactory metal framework.

Case Report

The patient was a 69-year-old white male, who presented to our clinic with a chief complaint of recent food accumulation under his lower denture. A review of his previous dental history and preliminary examination revealed maxillary and mandibular implant-retained fixed complete dental prostheses (IRFCDPs) that had been initially inserted 6 years ago. Before placement, the patient was informed that the acrylic resin denture

teeth would likely need replacement after approximately 5 years' use. The patient had returned every 6 months for dental prophylaxis and examination following placement, and no problems were noted or reported with the mandibular prostheses other than wear and staining of the artificial teeth until this visit. The maxillary denture teeth and base material had been replaced approximately 3 months ago due to fracture of several teeth and crazing of the base. At that time, the patient elected to postpone the recommended replacement of the mandibular teeth and base material due to financial constraints. The occlusion of the mandibular prosthesis was modified at insertion of the refurbished maxillary prosthesis with a clinical remount procedure to preserve the ideal, unworn configuration of the new maxillary replacement teeth.

The mandibular left posterior region, just anterior to the distal abutment, was pointed out by the patient as the problem area. No movement of either the maxillary or mandibular prosthesis was evident with palpation, and no areas of missing base material could be found. All abutments appeared to be seated well on the implant platforms. The original design was a splinted metal bar framework made with 4 Nobel Biocare Gold Adapt nonengaging abutments, encased in heat polymerized acrylic resin base material, with resin denture teeth. Four mandibular implants supported the prosthesis, with three 4.3mm diameter Nobel Biocare Replace Select Tapered TiUnite Regular Platform implants in the 19, 27 and 30 sites, and one 5.0 mm diameter Replace Select Tapered TiUnite Wide Platform implant in the #22 site. The tissue surface was formed into a modified ridge-lap configuration,^[3, 4] and a slight gap was seen between the

residual ridge and the tissue surface of the IRFCDP in the area indicated by the patient. No inflammation was apparent with the prosthesis in place.

Removal of the prosthesis for closer inspection showed that the base material was intact on the entire tissue surface. The presence of a gap was confirmed with disclosing medium (Disclosing Wax, Kerr Corp, Orange, CA) placed on the tissue surface of the reseated IRFCDP. Because of the time interval since initial placement, the entire tissue surface was evaluated, and additional areas of resorption found. Wear of the mandibular denture teeth, loss of occlusal vertical dimension, and degradation and discoloration of the acrylic resin base were also noted. Tissue inflammation was minimal, and confined to the region of the patient's complaint. He felt that he had injured the tissue with a toothpick recently while trying to remove fibrous food trapped there.

Technique

1. A centric relation record was made at the appropriate occlusal vertical dimension with a polyvinylsiloxane (PVS) occlusal registration material (Blu-Mousse Classic, Parkell Inc, Edgewood, NY) utilizing a leaf gauge (Huffman Leaf Gauge, Huffman Dental Products LLC, Springfield, OH) as an occlusal stop. (Fig. 1) Standard disinfection protocol was followed throughout the procedure.



Figure 1- Making centric relation record with leaf gauge.

2. The occlusal registration material was removed from the mouth after set and retained for later trimming and mounting procedures. Any material covering the prosthetic screws was cleared away, the screws loosened, and the prosthesis removed from the mouth

3. The prosthesis was cleaned thoroughly. An alginate impression of the opposing arch was made and poured in type III dental stone (Microstone, Whip Mix Corp, Louisville, KY). The tooth shade and mold, and base resin shade of the existing prosthesis were recorded.

4. The acrylic resin intaglio surface was relieved 1-1.5 mm with an acrylic resin trimming bur (Brasseler E-Cutter H79E-050, Brasseler USA, Savannah GA). Contact with implant components was avoided. Note: If desired, implant or abutment analogs may be attached with laboratory screws to protect the prosthesis' implant components.

5. The prosthesis was dried thoroughly. The tissue surface and gingival one-third of the facial and lingual surfaces of the prosthesis were painted with a thin layer of PVS impression material adhesive (V.P.S. Adhesive, Kerr Corp) and allowed to dry for 10 minutes. Care was taken to avoid placing adhesive on implant component mating surfaces.

6. A facebow record for mounting the opposing cast on the articulator was obtained.

7. The prosthetic/abutment screws were inserted into the appropriate access channels for use in orientation and securing the prosthesis during the impression procedure. Several large gauze squares were placed over the areas to be impressed, and the patient directed to gently close on gauze to keep the areas dry.

8. Medium body PVS impression material (Kerr Extrude- Medium, Kerr Corp) was placed on the tissue surface, and gingival regions of the facial and lingual of the prosthesis. Application of impression material into the abutment areas was avoided.

9. The gauze was removed from the mouth. The prosthesis was placed intraorally with steady, firm pressure to ensure complete seating on the implants/abutments. Several screws were finger-tightened to secure the IRFCDP. Necessary border molding movements were performed until setting of impression material.

10. The fasteners were loosened, and the prosthesis carefully removed to avoid tearing or separation of the impression material. The impression was inspected for voids, thin areas, or material caught between the implant platform and abutment that would require remaking the impression. (Fig. 2)

Note: Show-through of the original base material in the impression should be relieved at least 1 mm. to prevent possible compression of the soft tissues and resultant distortion of final tissue contours, and the impression remade.

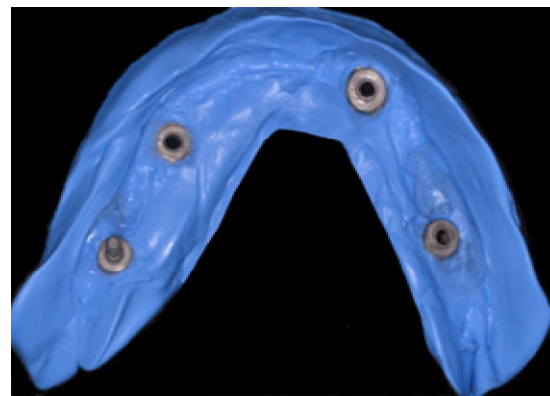


Fig. 2 Tissue surface of mandibular polyvinylsiloxane impression made with IRFCDP

11. Implant replicas were attached to the prosthesis with laboratory screws, and complete seating confirmed (Fig. 3).



Fig. 3 Implant analogs fitted to impression

12. Separating agent (Gi-Mask Universal Separator, Coltene/Whaledent Inc, Cuyahoga Falls, OH) was sprayed onto the tissue areas of the impression and allowed to dry.

13. Soft tissue replica material (Gi-Mask, Coltene/Whaledent Inc) was injected around implant analogs to create a soft tissue cast.

14. The impression attached to the prosthesis was boxed and poured (Fig. 4) with type IV dental stone (Prima-Rock Die Stone, Whip Mix Corp.).

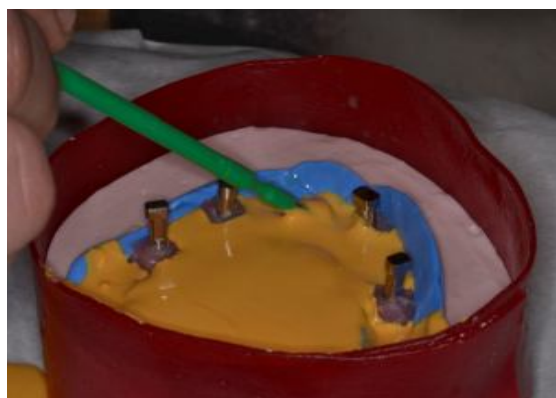


Fig. 4 Master cast being poured following addition of soft tissue replica material and boxing

15. Upon setting of the stone, boxing materials were removed from the cast, the prosthesis separated from the cast, and all impression material attached to the prosthesis removed.

16. The prosthesis was cleaned thoroughly, and all adhesive residues removed.

17. The prosthesis was re-attached to the cast, and complete seating verified.

18. The opposing maxillary cast was mounted to articulator with facebow record.

18. The PVS centric relation record was trimmed, and mandibular cast with prosthesis mounted to maxillary cast using record and casts luted together prior to mounting. Note: If desired, place orientation grooves into the land area of the soft tissue cast, and fabricate a PVS putty matrix (Kerr Extrude XP Putty, Kerr Corp) to record present tooth positions as an aid in set up of the replacement teeth and tissue contouring.

19. The prosthesis was removed from soft tissue cast. The existing teeth and acrylic base resin were removed, and framework cleaned thoroughly.

20. The teeth were set up in the appropriate occlusal scheme.

21. Trial insertion is now performed, (Fig. 5) if desired, and any required modifications made.



Fig. 5 Esthetic trial of mandibular set up on original prosthesis bar, with border extensions to be modified for oral hygiene access.

22. The final prosthesis was processed, finished and polished. The laboratory remount procedure was performed, intraoral occlusion, tissue adaptation/contours, comfort and esthetics checked, and adjusted as needed. Implant fasteners were torqued appropriately, and screw access openings sealed. (Fig. 6)



Figure 6- Final prosthesis following insertion.

Discussion

Advantages of the method presented here are that it eliminates the considerable expense of fabricating an entirely new prosthesis,^[5] permits precise realignment of the framework to the implants and residual ridges for the impression, and provides a cast and record for mounting and articulation of replacement teeth at the appropriate vertical dimension of occlusion. A disadvantage is that requires the patient to be without prosthesis during laboratory procedures, unless an interim or provisional prosthesis is available.

For frameworks designed with metal tissue surfaces rather than acrylic resin, an identical procedure could be used with the addition of a method to secure the new base material to the tissue surface of the original metal framework. Silicoating^[2] or tin plating and oxidation^[6] are two chemical bonding techniques that can be performed by the commercial dental laboratory during processing.

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