

MODIFIED IMPRESSION TECHNIQUE FOR TOOTH-SUPPORTED CEMENTED INDIRECT RESTORATIONS

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ABSTRACT:

This report describes a modified impression technique in conventional fixed prosthodontics which utilizes directly fabricated resin coping from light-curable, single-component provisional restoration resin. This allows simple, predictable and atraumatic gingival displacement and preserves periodontal health and patient comfort while facilitating accurate capturing of the three dimensional tooth preparation geometry.

Key Words: Gingival displacement, Impression technique, Provisional restoration resin.

INTRODUCTION:

Indirect restorations that satisfy biological, mechanical and aesthetic requirements can only be made if there is an exact transfer of both the three dimensional geometry of the entire preparation and surrounding intra-oral tissue from the patient's mouth to a definitive cast through accurate final impressions.

Using the correct impression material and appropriate techniques are mandatory to have fine details of preparation, especially at the margins. Preparation margins must be fully visible in the final impression, in addition to an intact and uninterrupted cuff of impression material present 0.5-1 mm beyond every margin, to facilitate precise die trimming in the resultant working cast [1, 2]. Unfortunately, this can be problematic, especially if the prepared tooth margin is located at (or apical to) the gingival crest and the clinician needs to temporarily displace (retract) the gingival tissue laterally more than 0.5 mm

to give the impression material access to the prepared margins in adequate thickness.

Different techniques have been used for gingival displacement such as mechanical, chemical, surgical, and combinations of the three [3, 4]. Hansen et al [5] and Ahmed et al [6] reported that the method used by the majority of clinicians is a combination of mechanical and chemical displacement using gingival retraction cords along with hemostatic agents.

Unfortunately, many clinicians reported difficulty in retraction cord placement [3], and inadequate impressions are encountered frequently in dental laboratories. The main fault seen in such impressions is inadequate (missing, unclear, or inaccurate) recording of the preparation margins due to insufficient tissue displacement [7, 8].

Other shortcomings of mechanical gingival displacement using retraction cord are: 1. packing of the retraction cord inside the

gingival sulcus may destroy the uppermost Sharpey fiber [3]. As a result, gingival recession and loss of attachment may occur [9], especially if the clinician used heavy packing force to place the cord when the patient is anesthetized and does not feel any pain [10]. 2. Prolonged stay of the cord in the sulcus causes destruction of the junctional epithelium due to the interruption of blood supply [9]. 3. Removal of the retraction cord before the impression-making may tear and remove the crevicular epithelium [10], thereby causing an inflammatory reaction and inducing bleeding that will obscure the margins' details in the impression.

The traditional method of mechanical gingival displacement with retraction cords is difficult to master and harmful to the periodontium, as reported by several studies [8-13]; therefore we present a modified impression technique in conventional fixed prosthodontics that allows simple, reliable, and atraumatic gingival displacement while preserving periodontal health. This technique facilitates accurate reproduction of the preparation geometry, especially at the margins and 0.5-1 mm of unprepared tooth structure apical to the margins. The technique uses directly fabricated resin coping from light-curable, single-component provisional restoration resin and polyvinyl siloxane (PVS) impression material in fixed prosthodontics Single-Step Double-Mix Impression technique.

CASE DETAIL:

STEP 1: After teeth preparation step is accomplished (Figure 1, 2), dispense the

required amount of light-curable, single-component provisional restoration resin (REVOTEK LC™, GC dental products corp. lot # 1401271) using the plastic spatula provided by the manufacturer. Adjust the shape of the resin with gloved fingers to allow easy placement onto the prepared tooth (Figure 3).

STEP 2: Press the material onto the margins and axial walls of the prepared tooth and roughly contour with the plastic composite instrument (Figure 4).

STEP 3: Adapt the margin and contour the facial, proximal and lingual surfaces. Using the plastic instrument, remove any excess material, particularly from interproximal spaces. The resultant resin coping will only cover the prepared tooth margin and one-third to one-half of the preparation height.

STEP 4: Before removing the resin from the prepared tooth, cure (tack cure) each surface of the resin coping for 2-3 seconds with a light-emitting diode (LED) visible light-polymerizing unit (SmartLite® Max LED Curing Light Dentsply/ Caulk, Milford, Del, USA) in order to prevent possible deformation during removal. Remove the resin.

STEP 5: Cure each surface of the resin coping for 20 seconds outside the patient's mouth with the LED visible light-polymerizing unit.

STEP 6: Mark the margins with a sharp HB pencil, eliminate the excess resin with an acrylic bur (CH-9434 Au/SG edenta, Switzerland) (don't touch the pencil marks) (Figure 5) and slightly relive the

intaglio surface of the coping's axial walls with a diamond bur (REF 892 104 020 Komet, Brasseler GmbH, Lemgo, Germany).

STEP 7: Try to fit the cured resin coping, and confirm the marginal fit with a sharp probe (Figure 6).

STEP 8: Apply adhesive (VPS Tray Adhesive 3M/ESPE, Neuss, Germany lot # 537725) to the intaglio surface of the coping and leave it to dry completely for 5 minutes (figure 7).

STEP 9: Dispense the wash medium-consistency PVS impression material (Express™ XT VPS Impression Material Regular Body, 3M ESPE, St. Paul, MN, USA) from an automixing gun (Garant Dispenser) by placing the intraoral delivery tip so that it touches the preparation margin and expelling the material slowly, starting from the most distal embrasure. At the same time the assistant should be loading the tray with heavy-consistency PVS impression material (Express™ XT Penta™ H – heavy-bodied consistency, 3M ESPE, St. Paul, MN, USA) from a Pentamix Automatic Mixing Unit.

STEP 10: When coverage of the marginal area and 1/2 of the axial wall height is completed, slowly seat the resin coping into place with gentle pressure. Then continue expelling additional medium-consistency material over the seated resin coping, the rest of the preparation and any critical areas like edentulous spaces, lingual concavities of the anterior teeth

and occlusal surfaces of the posterior teeth.

STEP 11: Seat the heavy body-loaded tray and firmly press into position for a few seconds only. Then hold the impression tray in place for 5 minutes while the material undergoes polymerization.

STEP 12: Remove the impression from the patient's mouth. Evaluate, disinfect and send the impression to the laboratory for pouring and fabricating the working model (Figure 8, 9).

DISCUSSION:

This report presents a technique for impression-making in fixed prosthodontics, utilizing resin coping fabricated from light-cured, single-component, sculptable provisional restoration resin. The simple, atraumatic tissue displacement allows predictable and accurate reproduction of the preparation margin geometry. Seating of the fabricated resin coping over the tooth preparation which is partially covered by thixotropic medium-consistency PVS will gently displace the gingiva laterally and generate hydrostatic pressures which cause pushing of the impression material in adequate thickness on and around the preparation margin. This is a simplified procedure and does not require extra laboratory steps. Moreover, the single-component provisional restoration resin used does not need a prolonged setting time and will not interfere with the setting of the PVS impression material, contrary to other provisional restoration resins [14]. This technique is more acceptable to the

patient because the material has no unpleasant odor ^[15], generates minimal heat during polymerization ^[16, 17] and requires a less-invasive placement than the conventional retraction cord technique.

Conflict of Interests: The author declares that there is no conflict of interest.

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FIGURES:



Figure 1. Teeth after Preparation (Labial view).



Figure 3. Placement of Revotek LC™ on prepared tooth.



Figure 2. Tooth after Preparation (Occlusal view).



Figure 4. Pressing of Revotek LC™ on the margins using plastic instrument.

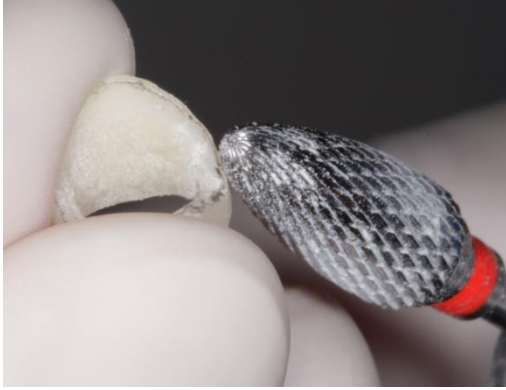


Figure 5. Elimination of excess by Acrylic Bur.

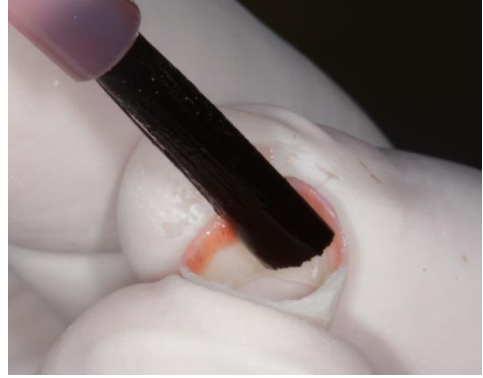


Figure 7. Apply Try-adhesive to the intaglio surface of the coping.



Figure 6. Confirm the marginal fit with a sharp probe.

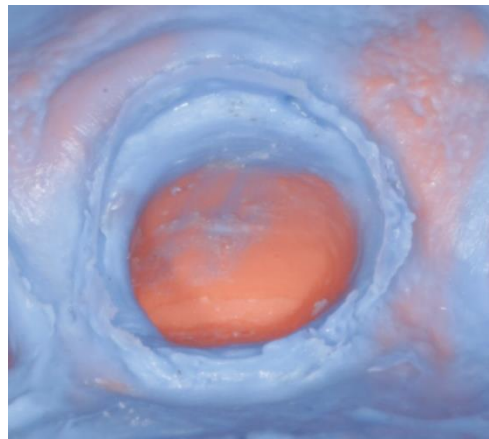


Figure 8. Final impression showing Clear margins and cuff of impression material present 1 mm beyond margins.



Figure 9. Working cast showing clear margins ready for die trimming (A) in comparison to prepared tooth (B).