



DIRECT CUSTOM IMPLANT IMPRESSION COPINGS FOR THE PRESERVATION OF THE PONTIC RECEPTOR SITE ARCHITECTURE

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The direct custom implant impression coping technique is designed to record the periimplant gingiva and pontic receptor site after the tissues have been shaped with a provisional restoration. The technique prevents inaccurate recording of the gingival architecture by using a dual polymerizing composite resin placed into the sulcus and pontic receptor sites and adapted to the open tray implant impression copings. This technique may improve soft tissue accuracy between the clinical condition and the laboratory cast. (J Prosthet Dent 2012;107:203-206)

Although the use of implant provisional restorations has become more useful and predictable in the creation of periimplant soft-tissue esthetics, transferring accurate soft-tissue contours to the cast, particularly with implant-supported partial fixed dental prostheses remains a challenge.

Immediately after the removal of the provisional restoration, the periimplant soft tissues begin to remodel into a flatter gingival architecture resembling that of an edentulous site. If no attempt is made to halt the soft tissue remodeling when the provisional restoration is removed, the resulting cast will not accurately represent the soft tissue contours around the provisional restoration. This will leave the dental laboratory technician to estimate the pliability of the soft tissue in the creation of the pontic design, interproximal contact positions, and subgingival contours of the definitive restoration. As a result, the definitive abutments and restorations are likely either to leave a portion of the gingival embrasure open or exert excessive pressure on the tissue, resulting in an alteration in the position of the papilla or free gingival margin.

To address this challenge, the use of a low viscosity composite resin with closed tray impression copings to

capture the subgingival contours has been proposed.¹ Obvious limitations of this technique include difficulty in accurately transferring the now irregular impression coping body into the impression, inaccuracies of closed tray copings for multiple units,²⁻⁵ difficulties with composite resin polymerization at the depth of the sulcus, and the inability of the closed tray coping/composite resin complex to accurately manage intrainplant pontic sites.

The 2 most commonly used techniques that attempt to capture the soft tissue contours around implants are an impression using the provisional restoration insitu,⁶⁻⁸ and indirectly replicating the subgingival contours of the provisional abutment in an impression material or autopolymerizing acrylic resin.^{9,10} Although the provisional restoration technique does effectively capture both the final intended soft tissue position and the subgingival contours, it requires that the clinician either replicate the provisional restoration or allow sufficient time for the definitive cast to set before reseating the provisional restoration. Additionally, it relies entirely on the provisional restoration being a splinted, transfer-type, custom impression coping to accurately relate the position of the implants, an

assumption which the authors identified no evidence. The autopolymerizing acrylic resin technique is effective in replicating the tissue surface of the provisional restoration, but it does not accurately record the actual tissue position and contour when the provisional restoration is in position (a subtle, but important distinction). The indirect impression of the intaglio surface of the provisional restoration records where it contacts the tissue, but not necessarily the position to which the mature gingiva will be displaced when the definitive restoration is placed. Additionally, intrainplant pontic receptor sites are likely to experience more severe deformation during the fabrication and splinting time involved in creating indirect acrylic resin custom impression copings. The failure to capture this information accurately is of particular importance when significant time and effort has been expended in shaping papilla and pontic sites with the provisional restoration.

After placement of the implant and the provisional restoration, it is often necessary to adjust and refine the provisional restoration to recreate a natural gingival architecture. In particular, additional material must be added to the subgingival portion of the provisional restoration¹¹ as the

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tissue matures in an attempt to mold the papillae into their maximum biologically sustainable coronal position. Sufficient time should be allowed for tissue maturation before manipulation. The initial subgingival contour of the provisional restoration should be as narrow as mechanically possible¹²⁻¹⁴ to ensure that the gingiva has the maximum volume within which to heal and remodel. Once the final coronal position of the gingiva has been achieved with additions to the subgingival portion of the provisional restoration, the remainder of the gingival embrasure can be filled by extending the interproximal contact of the definitive restoration apically while attempting to retain a natural appearance.¹⁵ Clinician and patient

expectations for papilla regeneration should be tempered in light of the research demonstrating expected papilla heights for given situations.¹⁶⁻¹⁹ Once the esthetics of the gingiva and teeth have been established in the provisional restorations and the gingiva has been given adequate time to stabilize, the site is ready for the definitive impression.

The technique described is an attempt to minimize the discrepancy between the soft tissue contours on the cast and those intraorally for implant-supported partial fixed dental prostheses. Use of this technique may enhance the accuracy, efficiency, and ultimately the outcomes of soft tissue sculpting with implant-supported provisional restorations.

TECHNIQUE

1. Remove the provisional restoration and inspect the site to ensure that the implant interface, gingiva, and adjacent structures are free of plaque and debris.

2. Quickly attach metal, open-tray impression copings (Implant Impression Post; Keystone Dental, Burlington, Mass) and hand tighten (Fig. 1). To ensure full seating of the copings efficiently, loosen the screw 1 quarter turn and attempt to rotate the body of the impression coping. Verify that the coping body is properly registered and will not rotate. If the body does rotate, turn it to the position where it engages the implant interface and drops to a fully seated position. Re-



1 Open tray impression copings are immediately attached after removal of provisional restoration; note development of papilla and pontic site.



2 Dual polymerizing composite resin is injected into open gingival emergence to create direct custom implant impression copings.



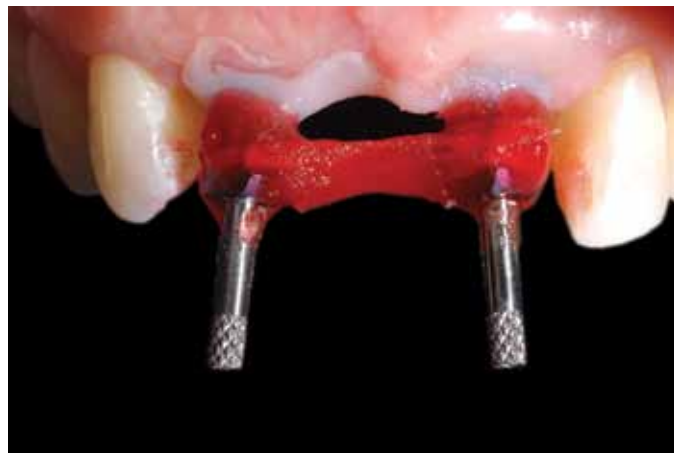
3 Composite resin is placed over papilla and into pontic site.



4 Polymerized composite resin fully supporting developed soft tissue and preventing gingiva from remodeling during time required for impression material to polymerize.



5 Dental floss creates scaffold across which splinting acrylic resin can be added.



6 Incrementally added autopolymerizing acrylic resin used to splint impression copings together.



7 Location of access holes for impression tray recorded with wax and ink marker to facilitate proper positioning.



8 Final impression illustrating composite resin capturing both periimplant and pontic gingival contours.

tighten the coping screws.

3. With the impression copings fully seated, properly indexed, and hand tightened, thoroughly dry the periimplant gingiva, pontic receptor site, and copings.

4. Inject a low viscosity, dual-polymerizing composite resin (Duo-Link; Bisco, Schaumburg, Ill) around the body of the copings to the height of the adjacent papillae (Figs. 2 and 3). Fill and connect the pontic site with the composite resin to the adjacent impression copings. Polymerize the composite resin material incrementally with a dental curing light (Elipar S10 Curing Light-1200 mW/cm², 3M ESPE, St. Paul, Minn) for 40 seconds. Verify that the mature soft tissue is held in the same position it was with the provisional restoration in place (Fig. 4).

5. Incrementally splint the open-tray impression copings together with dental floss and an autopolymerizing acrylic resin (Pattern Resin LS, GC America, Alsip, Ill) (Figs. 5 and 6).

6. Make radiographs to ensure proper seating of the impression copings.

7. Prepare for the impression by creating access over the screw holes in the impression tray. Use soft wax (Utility Rope Wax; Heraeus, South Bend, Ind) inside the tray to aid in accurately locating the access hole position. Mark the indentations in the wax with a marker (Fig. 7), remove the wax, and create access holes.

8. Practice seating the tray over the impression copings before the actual impression to ensure that the screw posts will easily pass through the access holes.

9. Dry the impression area. Sy-

ringe low viscosity impression material (Aquasil Ultra XLV; Dentsply Caulk, Milford, Del) around the impression coping, onto the occlusal surfaces, and along the tooth-gingiva interface. Fill the tray with a high viscosity material (Aquasil Ultra Rigid; Dentsply Caulk) and place intraorally.

10. Approximately 30 seconds before final polymerization of the material, start to remove the impression coping screws.

11. Remove the impression from the mouth and inspect it to ensure that all critical areas are properly recorded and that the composite resin has accurately captured the tissue surfaces and has remained attached to the impression copings (Fig. 8).

12. Inspect the implant sites to ensure that they are free of impression material or debris.

13. Reattach the provisional restoration and obturate the screw access holes with a clear impression material (Tescera Clear Matrix PVS; Bisco, Schamburg, Ill) and composite resin (Filtek Supreme Ultra; 3M ESPE, St. Paul, Minn).

14. Instruct the dental laboratory technician to duplicate the subgingival contours and pontic receptor site in the definitive restoration and extend the interproximal contact apically to the tip of the papilla.

SUMMARY

The use of direct custom implant impression copings can enhance the clinical outcome of implant treatment, particularly for partial fixed dental prostheses in the esthetic zone when efforts have been made to shape the gingiva during the provisional restoration stage. The advantages of this technique are its efficiency and accuracy. However, this technique may be of limited use in situations that involve exceptionally long pontic spans as the composite resin material may not be sufficiently rigid. A major difficulty of the direct custom impression coping technique is that it relies heavily upon the ability of the clinician to attach the impression copings quickly and accurately. The direct custom implant impression coping technique described here increases the communication between the clinician and dental laboratory technician.

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