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A Technique to Simultaneously Fabricate Multiple Custom Impression Posts for Implant-Supported Restorations in the Esthetic Zone

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Abstract

Peri-implant transmucosal tissue, an essential element of peri-implant esthetics, is critical to the success of prostheses in the esthetic zone. The optimal transmucosal tissue profile can be transferred to the master cast with the aid of custom impression posts. In this clinical technique, the initial cast used to fabricate provisional prostheses was conveniently used to aid in the time-efficient fabrication of multiple custom impression posts simultaneously using self-cured acrylic resin. This technique also applies to single restorations. In addition, the use of an initial cast as holder makes it easy to transfer custom impression posts to the mouth accurately and efficiently.

An implant-supported prosthesis has become the standard of care to restore missing tooth/teeth in the esthetic zone. In addition to proper 3D placement of the implant, the amount and quality of surrounding soft tissue also plays a critical role in optimal esthetic outcomes.[1,2] The peri-implant soft tissue is initially developed by surgical modalities such as tissue grafting and second-stage implant surgery; however, without the assistance of interim prostheses, it is difficult to form an optimally scalloped gingival contour around the implant, which is in harmony with tissues around natural teeth.[3] The interim prosthesis can guide soft-tissue healing if it is delivered at the same time as the surgical procedures such as implant placement or second-stage implant surgery.[4-6] The adjustments of the emergence profile of an interim prosthesis would continuously optimize the shape and architecture of the surrounding tissue via the mechanism of dynamic compression[3] or selective pressure.[7] With the aid of implant provisional restorations, the architecture of transmucosal tissue around implants and interdental papilla could be optimally sculpted in 8 weeks.[8]

The result of implant restoration in the esthetic zone is greatly influenced by the quality of the master cast, which should accurately duplicate the position of implants and contour of both teeth and transmucosal soft tissue. A proper impression technique is critical for accurate transfer of the tissue architecture from mouth to cast. Nonetheless, the stock impression post is cylinder-shaped, and it cannot support the transmucosal soft tissue while making an impression. Several clinical techniques have been reported regarding the precise registration of peri-implant soft tissue.

First, a direct custom impression post technique using flowable composite resin to fill the peri-implant crevicular space intraorally was proposed.[9,10] This technique is simple and straightforward; however, tissue collapse and irritation are the most common clinical concerns.

Second, an implant provisional crown can be used as the definitive impression post to record the emergence profile accurately.[11,12] However, the clinician must keep the provisional prosthesis while pouring the master cast, which increases the patient's chair time and the risk of damaging the interim prosthesis.

Third, a custom impression post can be fabricated indirectly outside the mouth by registering the emergence profile of provisional crowns using a small container or analog holder.[13,14] The shape of the emergence profile recorded by provisional crowns can be transferred to the impression post using acrylic resin. Using this technique it is difficult to determine the correct orientation of post in mouth, and a reference position must be marked. This technique also requires the repeated

Figure 1 Provisional prostheses secured on the cast.

Figure 3 Space created after the removal of the provisional prostheses.

Figure 2 Impression material is used to register the emergence profile provisional.

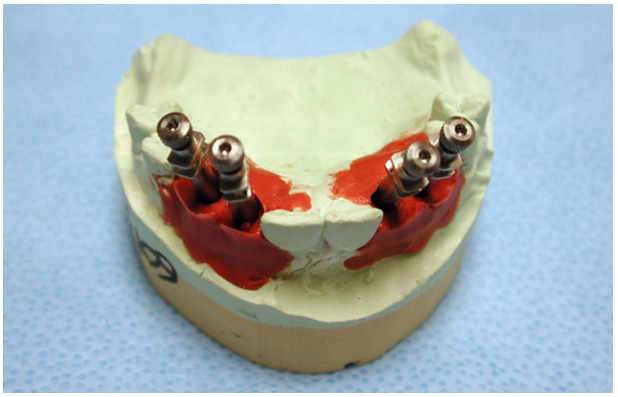

Figure 4 Connect stock impression posts to the initial cast.

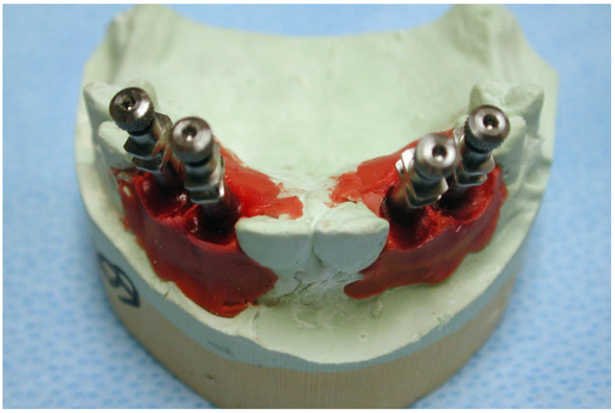

Figure 5 Fill the transmucosal gap with acrylic resin. All the custom impression posts are fabricated simultaneously.

procedure to fabricate each individual custom post in the case of multiple single implant crowns or an implant-supported fixed partial denture (FPD), and can be very time-consuming.

Fourth, a provisional implant-supported FPD can be inserted onto the final cast using a stock impression post; the portion of the impression representing peri-implant soft tissue is replaced later using additional steps.[15] This technique offers a novel approach to record the gingival configuration around a provisional implant-supported FPD; however, the prolonged treatment time and the need to keep the provisional prosthesis in association with this method call for additional approaches to meet clinical needs.

To simplify the fabrication of custom impression posts, especially in the scenarios of multiple single implant crowns or an implant-supported FPD, an efficient, practical, and easy technique to register the transmucosal tissue using the initial cast as fabricating base is presented in this article. The advantages of this technique include one-time fabrication of multiple custom impression posts and straightforward transfer of impression posts to the mouth. The disadvantage of this technique is the necessity to keep the initial cast, which was used to fabricate the provisional prosthesis.

Technique

1. Keep the initial cast on which the provisional prostheses were made.
2. After having achieved the desired esthetic result using the provisional prostheses, disconnect the provisional implant restorations from the mouth and connect them to

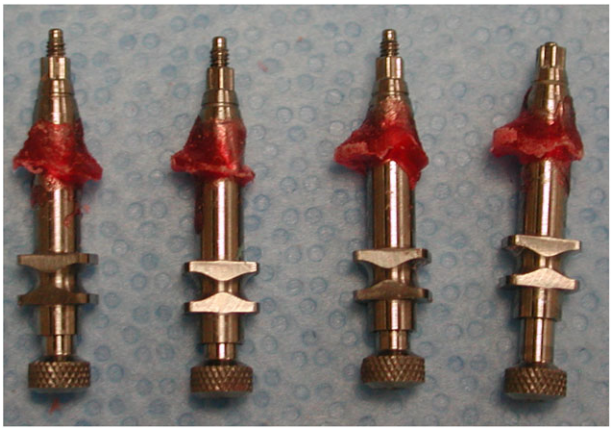

Figure 6 Impression posts removed and smoothed.

Figure 7 Custom impression posts are transferred directly from initial cast to mouth one by one using their positions on the cast as reference.

Figure 8 Frontal view of definitive restorations on left and right maxillary lateral incisors and canines.

the implant analogs (conical connection implant analog, Nobel Biocare US, Raleigh, NC) on the initial cast after the removal of the artificial gingivae (Fig 1).

3. Apply addition reaction silicone elastomeric impression material (Reprosil Putty; Dentsply, York, PA) to fill the gap between the cast and the cervical third of the provisional implant prostheses (Fig 2).
4. Disconnect the provisional implant prostheses from the cast. The emergence profile of the provisional implant restoration will be accurately captured by the silicone impression material (Fig 3).
5. Connect stock impression transfer posts (Nobel Biocare US) to the cast (Fig 4).
6. Fill the space between the silicone material and impression post with autopolymerizing acrylic resin (Pattern Resin LS; GC America, Alsip, IL) to duplicate the emergence profile of all provisional prostheses at the same time (Fig 5).
7. Disconnect the custom impression posts and smooth the surface (Fig 6).
8. Seat the custom impression posts back to the cast after adjustment and transfer them to the mouth one by one according to the corresponding implant position (Fig 7). Direct transfer of custom posts from cast to mouth facilitates the easy and accurate orientation of the custom impression posts in the mouth with less chance of misorientation.
9. After confirming the satisfactory seating of the custom impression posts by radiograph, the patient is ready for the definitive impression. The vinylpolysiloxane impression material and the custom impression posts together register the teeth contour, soft tissue architecture, and the implant position. The master cast made from the definitive impression features the accurate duplication of the transmucosal tissue contour around implants in the patient's mouth, providing excellent reference to the dental laboratory for the fabrication of the definitive prostheses (Fig 8).

Summary

This clinical technique describes a method to fabricate custom impression posts using the initial cast as a fabricating base. Compared to other reported approaches, this technique offers a simple approach to simultaneously fabricate multiple custom impression posts in the treatment of patients requiring multiple single implant crowns or implant-supported FPDs. In addition, transferring the custom impression post directly from the initial cast to the mouth reduces the chance of misorientation. With this technique, the architecture of transmucosal tissue will be efficiently and accurately transferred to the master cast for the fabrication of the definitive prosthesis.

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