Method for developing an optimal emergence profile using heat-polymerized provisional restorations for single-tooth implant-supported restorations

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This article describes a method for creating an improved emergence profile with single-tooth, implant-supported restorations. An easily trimmed silicone gingival substitute is used to allow polymerization of acrylic resin provisional restorations to achieve control of the emergence profile. Gingival trauma is minimized by eliminating intraoral use of monomer and minimizing surgical procedures. Provisional restorations can be assessed to ensure the contour is acceptable and the trimmed gingival substitute can be used to fabricate a similar profile in the definitive prosthesis. The provisional restorations may be used instead of standard prefabricated healing abutments to guide the healing contours of the peri-implant gingival tissue. (J Prosthet Dent 2004;91:289-92.)

Proper emergence profile of an implant-supported restoration is important for hygiene, gingival health, and appearance.1 A proper emergence profile should be considered in 3 dimensions to avoid the development of a “ball on a stick” restoration (Fig. 1). Bain and Weisgold2 state that most healing abutments and transfer copings are round and do not simulate the normal cross section of anterior teeth, resulting in an unnatural sulcular form around implant abutments. The provisional restoration must therefore flow from a round shape into a crown shape to develop a natural-looking replacement. Emergence profile is also related to implant placement. The vertical length of the subgingival portion of the restoration is particularly important because guided gingival growth is indirectly proportional to the submergence depth of the implant.3

Several procedures have been described that use soft-tissue substitutes and/or provisional restorations to guide the healing of gingival tissues for implants.1,4-7 Coelho et al4 mentioned the fabrication of provisional restorations at the time of impression making to guide the design of the definitive soft tissue cast for the prosthesis; however, the technique used to design the emergence profile was not described. Neale and Chec1 mentioned a soft tissue substitute in conjunction with a provisional restoration, but the method described required an extra step, using the Nealon technique (liquid and powder on brush) to complete the provisional restoration where a definite discontinuity existed. Bain and Weisgold2 used auto-polymerizing resin directly in the sulcus during definitive impression making. Neale and Chec1 and Chec and Donovan5 advised performing gingivoplasty procedures to recontour the tissues before making provisional restorations. It is conceivable that the surgical recontouring may actually postpone the stabilization of the final position and contours of the free gingival margin. Wise8 determined that it took 20 weeks for the free gingival margin to stabilize on natural teeth after periodontal surgery. A nonsurgical method for developing the shape of provisional restorations to assist in achieving an ideal emergence profile is presented.

TECHNIQUE
1. Make a definitive impression shortly after stage-2 surgery. Place a separating medium (Separator; Zhermack, Badia Polsine, Italy) on the vinyl polysiloxane impression. Syringe the silicone soft-tissue substitute (Gingifast; Zhermack) around the impression coping until the level of the substitute extends beyond the impression coping-abutment replica junction to make the definitive cast (Fig. 2).

2. Shape the internal emergence profile in the soft tissue substitute with a bur, such as a bud-shaped acrylic trimming bur (H77E 029; Brasseler USA, Savannah, Ga). Shape the emergence profile between the outer occlusal-facing margin of the abutment replica and the free gingival margin (Fig. 3). The soft tissue substitute can be removed and replaced on the cast to reduce the chance of damaging the abutment replica. If the abutment replica may potentially be damaged, make a guide to establish limits on the contours using type I, high viscosity silicone putty (CutterSil Putty Plus; Heraeus Kulzer Inc, Armonk, NY) from the original, pretreatment diagnostic wax-up. Section the putty in a buccal-lingual fashion approximately at the midpoint of the tooth to be restored. Place the index on the soft-tissue cast as a guide for the emergence profile (Fig. 4). The emergence profile should flow naturally and in harmony from the

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abutment replica toward the coronal aspect of the
3. Make a new diagnostic wax-up of the definitive
restoration with the restoration contours guided by
the prepared silicone gingival substitute (Fig. 5, A).
Verify the occlusion.
4. Make a new negative index of the diagnostic wax-up
(created in step 3) with silicone putty (CutterSil; Heraeus Kulzer, Inc) in preparation for making an
indirect, heat-polymerized provisional restoration.
5. Place an appropriate provisional cylinder on the
abutment replica. Trim the provisional cylinder so
that the silicone index is seated completely and there
is space for resin between the cylinder and index on
the modified soft-tissue cast. Place a separating
agent (Al-Cote; Dentsply Trubyte, York, Pa) on the
soft-tissue cast.
6. Flow acrylic resin (Duralay; Reliance Dental Mfg
Co, Worth, Ill) into the index and onto the
provisional cylinder, and invert the cast into the
index. Place the entire assembly into a pressure
vessel at 10 psi. Remove the index once the resin has
polymerized. Separate, finish, and polish the pro-
visional restoration (Fig. 5, B).
7. Place the provisional restoration. The soft tissue may
blanch but will usually return to a natural color within
approximately 5 to 10 minutes. If not, adjust the
emergence profile contours. Complete alterations
extraorally.
8. If necessary, adjust the contour of the provisional
restoration by adding additional acrylic resin or
reducing its bulk. Verify the occlusion and emer-
gence profile so that the provisional restoration can
be luted to the abutment with provisional cement.
(Temp-Bond; Kerr Corp, Orange, Calif). Leave the provisional restoration in place for a minimum of 6 to 8 weeks to allow gingival tissue maturation. Repeat the soft-tissue cast modifying procedure in a similar manner when producing the definitive restoration to allow for a nearly identical emergence profile of the diagnostic casts created in step 3 (Fig. 5, C, D, and Fig. 6).

9. The definitive restorations are placed either with the luting agent of choice or appropriate screw retention (Figs. 7 and 8).
DISCUSSION

The technique described in this article differs from other techniques in that it reduces gingival trauma by eliminating the intraoral use of resin monomer and minimizing surgical procedures. There is no chemical or thermal insult to the tissues. By using properly contoured provisional restorations and taking advantage of the elastic nature of the gingiva, the need for additional surgeries may be reduced. The method plans the provisional restoration emergence profile from the beginning so that the developed shape may also be repeated for the definitive prosthesis. Capturing the internal soft tissue for the definitive impression is not as critical because the prosthesis contours will be replicated from the definitive design of the provisional restoration. The gingival substitute can be placed and removed on the cast to allow access to view margins and emergence profile. The method provides a completed provisional restoration that only requires polishing and finishing with no discontinuities to fill. By precontouring in the laboratory, chairside adjustment of the provisional restoration is reduced. Although the example presented involves an abutment-level impression and abutment-level replicas, this method may also be used for techniques that incorporate implant-level impressions, other abutment systems including custom abutments, and/or implant-supported restorations. This method may also be used for cement- or screw-retained definitive restorations.

Disadvantages of the method include additional time preparing the proper emergence profile, potential for damaging laboratory replicas when contouring the tissue substitute (unless the substitute is removed from the cast for the finer detail near the replicas), and incorrectly estimating the amount of expansion that can be attained from the gingival tissues, requiring that the provisional restoration be adjusted.

SUMMARY

A nonsurgical method for developing the shape of provisional restorations using silicone gingival substitute to assist in developing an ideal emergence profile was described. The silicone gingival substitute can be removed to allow assessment of margins and emergence profile of the final restoration and also approximates the form of the patient’s peri-implant soft tissue and can be modified to produce the desired emergence profile contours.

REFERENCES


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