Accurate Transfer of Peri-implant Soft Tissue Emergence Profile from the Provisional Crown to the Final Prosthesis Using an Emergence Profile Cast

NICOLAS ELIAN, DDS*
GERARD TABOURIAN, DDS, MS†
ZIAD N. JALBOUT, DDS‡
ANTHONY CLASSI, DMD‡
SANG-CHOON CHO, DDS§
STUART FROUM, DDS¶
DENNIS P. TARNOW, DDS||

ABSTRACT

Background: The use of impression copings to make the final impression results in a master cast in which the soft tissue configuration around the implant platform is circular. Therefore, any soft tissue sculpting developed clinically by the provisional restoration is squandered.

Purpose: The purpose of this report was to present a method for the precise transfer of the peri-implant soft-tissue developed by a customized provisional restoration to an emergence profile cast.

Materials and Methods: The emergence profile cast is obtained from an impression of the implant-supported provisional restoration and poured with a soft tissue model material. It is used for the fabrication of the emergence profile of the implant abutment and the cervical section of the crown.

Conclusion: The technique described is simple, accurate, predictable, and does not require additional chair time for the customization of the impression coping or the fabrication of a new provisional restoration.

CLINICAL SIGNIFICANCE

This article describes a technique that results in an implant restoration that mimics accurately in its emergence profile that of the carefully crafted and customized provisional restoration. The reproduction of the soft tissue contour from the provisional to the final restoration results in an improved esthetic outcome of the final restoration.

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*Associate professor, head of the division of implant dentistry, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA
†Adjunct assistant professor, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA
‡Assistant clinical professor, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA
§Assistant research scientist, assistant clinical professor, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA
¶Director of clinical research, clinical professor, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA
||Chairman and professor, Department of Periodontology and Implant Dentistry, New York University College of Dentistry, New York, NY, USA

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INTRODUCTION

A successful esthetic implant restoration should have an emergence profile that mimics the natural tooth. The emergence profile of the final restoration is affected by the shape, size, and location of the implant platform.[1] In the esthetic zone, implants are placed 3 to 4 mm apical to the facial free gingival margin of adjacent teeth.[2] This provides the space necessary to profile the prosthesis from a round implant platform to the three-dimensional shape of a tooth as it emerges from the soft tissue. Most healing abutments and impression copings are cylindrical in shape and do not mimic the contours of the natural teeth. The use of such components to make the final impression results in a master cast in which the soft tissue configuration around the implant platform is circular. The laboratory technician is left to either fabricate a prosthesis with a cylindrical emergence profile or remove the soft tissue portion of the master cast and hypothetically design the emergence profile. Therefore, any soft tissue sculpting developed clinically by the provisional restoration is squandered.

Several techniques have been reported for the accurate transfer of the intraoral peri-implant soft tissue developed by a provisional restoration. They may be summarized as follows:

1. fabrication of a customized impression coping that is adapted to the peri-implant soft tissue profile[3–5]
2. use of provisional restoration as an impression coping[6–9]
3. injection of impression material around a provisional restoration seated on a master cast[10]

The purpose of this report was to present a method for the precise transfer of the peri-implant soft-tissue developed by a customized provisional restoration to an emergence profile cast. The clinical steps required to obtain the emergence profile cast and its technical laboratory use will be illustrated.

MATERIALS AND METHODS

Custom-guided soft tissue contouring is achieved with the aid of a provisional crown, which is adjusted and contoured chairside to the desired emergence profile (Figure 1). A period of 2 months is allotted to allow the peri-implant soft tissue to remodel around the provisional restoration with an ideal emergence profile. At this time, an emergence profile impression is made, with the provisional crown in place, using polyvinylsiloxane. The temporary cylinder is subsequently dismantled and connected to the appropriate implant laboratory analog (Figure 2). The provisional crown is placed on the temporary cylinder, and the whole entity is carefully inserted in the

Figure 1. Provisional crown fabricated with ideal contour on a cast generated following an impression at the implant level with a round impression coping.

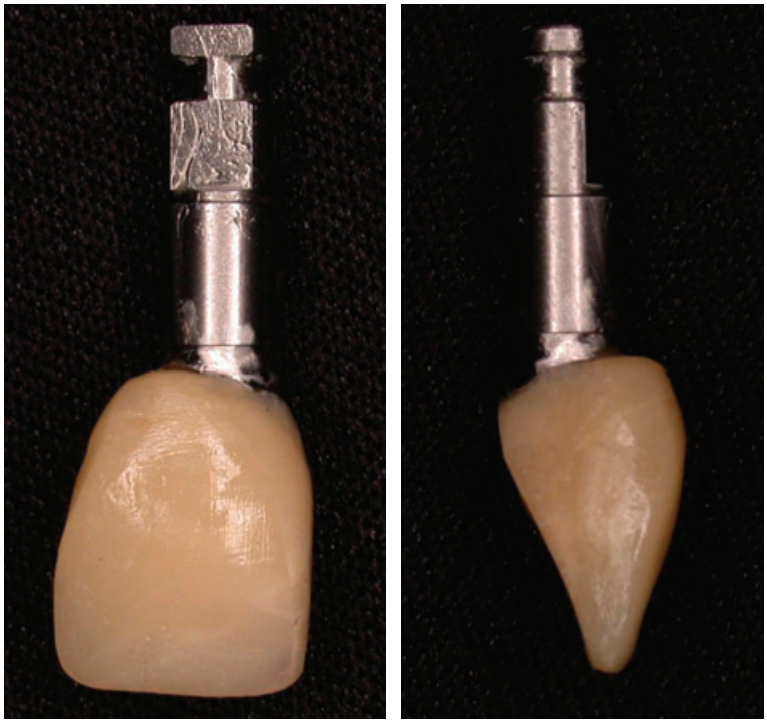

Figure 2. A, *Buccal view of a provisional crown connected to a laboratory analog. Note the smooth transition from a round implant to the emergence profile of the crown.* B, *Interproximal view of a provisional crown connected to a laboratory analog.*

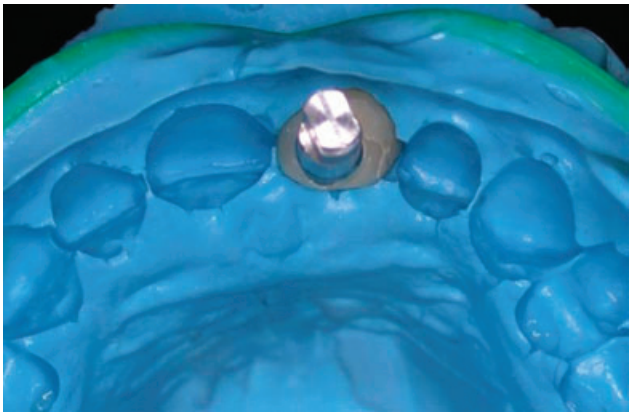

Figure 3. The provisional crown connected to the laboratory analog inserted in the emergence profile impression prior to pouring.

emergence profile impression (Figure 3). The impression is then poured with soft tissue material (Gingitech, Williams and Silicone system, Ivoclar North America Inc., Amherst, NY, USA; Gi-Mask, Coltene, Whaledent Inc., Cuyahoga Falls, OH, USA). A separator should be applied to the impression prior to pouring the soft tissue material to prevent adherence. Slow injection of the soft tissue material starting from the incisal edge of the teeth helps to minimize voids. The resulting cast is the emergence profile cast in which the implant laboratory analog is embedded and around which the peri-implant soft tissue is an exact replication of the intraoral soft tissue topography (Figure 4).

At this stage, the laboratory technician proceeds with the wax-up of a customized abutment directly on the emergence profile cast, intimately following the soft tissue contours (Figure 5). The wax-up is then completed on the master cast, which is in occlusion and accurate in platform position, before casting. While fabricating the metal coping of the final crown (porcelain fused to metal), the technician relies on the emergence profile cast for the wax-up and porcelain buildup of the cervical third of the restoration. The prosthesis is then finalized (Figure 6). The customized abutment is then torqued and the crown delivered. The outcome of

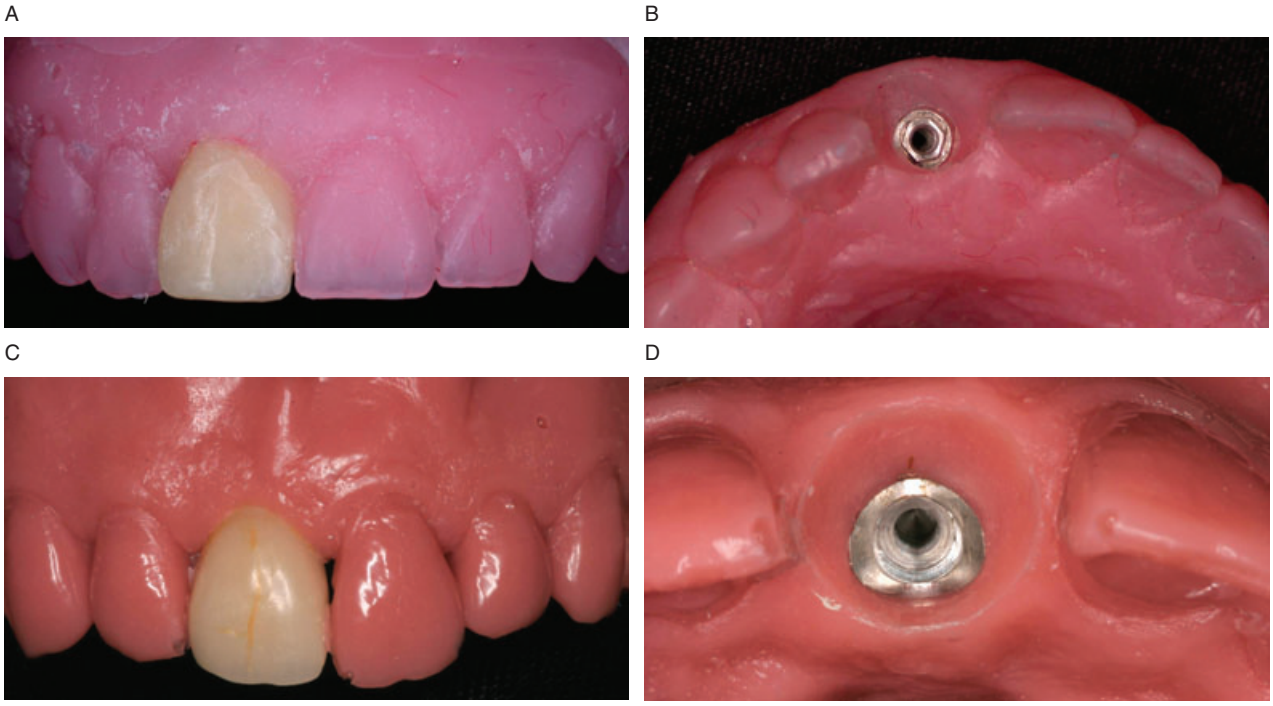

Figure 4. A, *Emergence profile cast immediately after recovery from the emergence profile impression. The provisional crown is still embedded in the emergence profile cast.* B, *Occlusal view of the emergence profile cast after removal of the provisional crown. Note the asymmetric anatomical profile of the gingiva.* C, *Emergence profile cast immediately after recovery from the emergence profile impression. The provisional crown is still embedded in the emergence profile cast.* D, *Occlusal view of the emergence profile cast after removal of the provisional crown. Note the asymmetric anatomical profile of the gingival.*

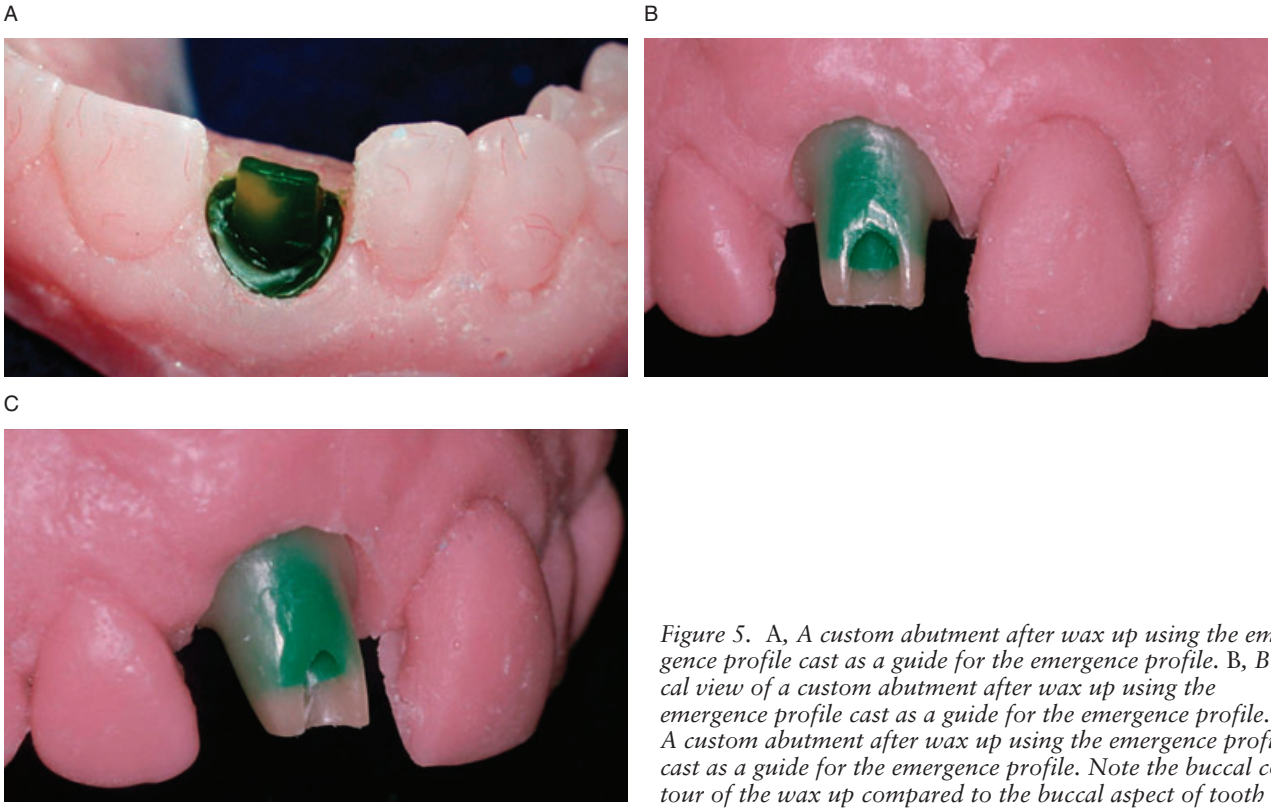

Figure 5. A, *A custom abutment after wax up using the emergence profile cast as a guide for the emergence profile.* B, *Buccal view of a custom abutment after wax up using the emergence profile cast as a guide for the emergence profile.* C, *A custom abutment after wax up using the emergence profile cast as a guide for the emergence profile. Note the buccal contour of the wax up compared to the buccal aspect of tooth #9.*

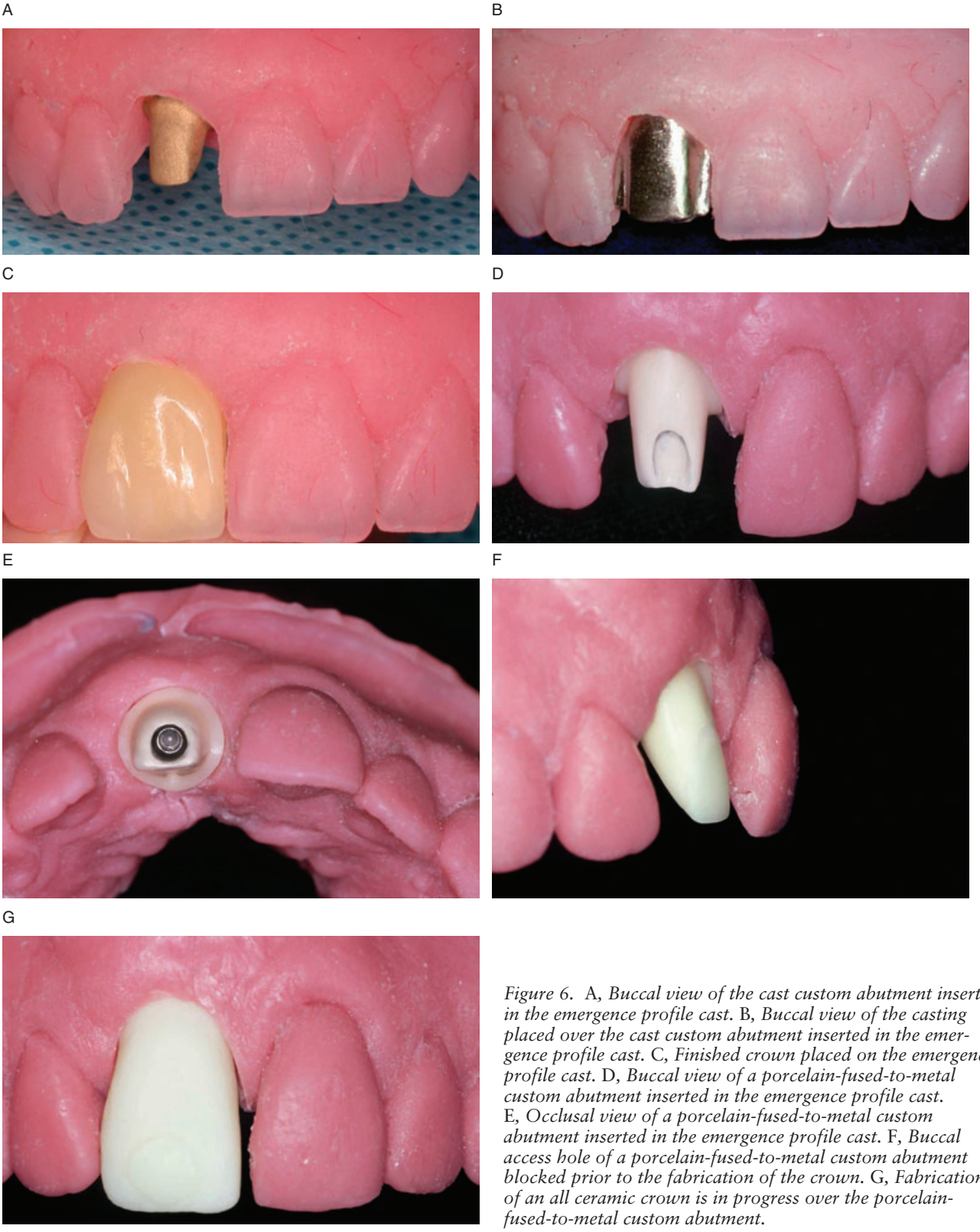

Figure 6. A, *Buccal view of the cast custom abutment inserted in the emergence profile cast.* B, *Buccal view of the casting placed over the cast custom abutment inserted in the emergence profile cast.* C, *Finished crown placed on the emergence profile cast.* D, *Buccal view of a porcelain-fused-to-metal custom abutment inserted in the emergence profile cast.* E, *Occlusal view of a porcelain-fused-to-metal custom abutment inserted in the emergence profile cast.* F, *Buccal access hole of a porcelain-fused-to-metal custom abutment blocked prior to the fabrication of the crown.* G, *Fabrication of an all ceramic crown is in progress over the porcelain-fused-to-metal custom abutment.*

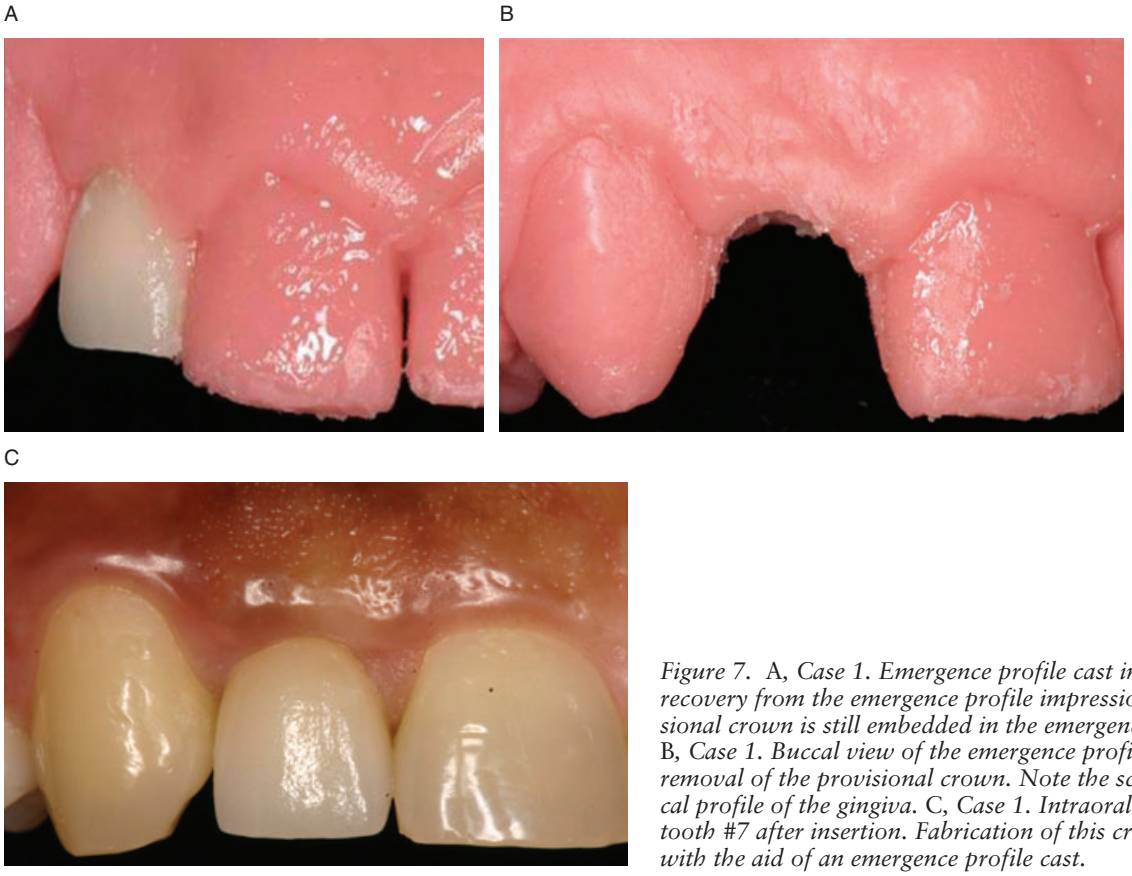

Figure 7. A, *Case 1. Emergence profile cast immediately after recovery from the emergence profile impression. The provisional crown is still embedded in the emergence profile cast.* B, *Case 1. Buccal view of the emergence profile cast after removal of the provisional crown. Note the scalloped anatomical profile of the gingiva.* C, *Case 1. Intraoral buccal view of tooth #7 after insertion. Fabrication of this crown was done with the aid of an emergence profile cast.*

the case from an esthetic standpoint was entirely as expected: the prosthesis was in total harmony with the surrounding soft tissue. No blanching of the periodontium was observed because the final prosthesis respected the peri-implant soft-tissue confines (Figures 7–8; Table 1).

DISCUSSION

The emergence profile of an implant-supported restoration has a significant effect on the hygiene, peri-implant health, and esthetics of the prosthesis. A properly contoured provisional prosthesis is the best approach to sculpting the peri-implant soft tissue.[11] The final prosthetic reconstruction must follow soft tissue modifications established intraorally with the provisional restoration. However, the challenge remains as to the precise transfer of the peri-implant soft tissue to a cast, and therefore duplicating the emergence profile of the provisional prosthesis into the final prosthesis. Because impression copings are cylindrical in shape, they cannot replicate the soft tissue around an implant accurately. Moreover, the dental technician will find difficulty in creating the ideal emergence profile, which may compromise the final esthetics of the definitive restoration.

This article has illustrated a simple technique for obtaining an emergence profile cast. The emergence profile cast is easily obtained in a time-efficient manner as the regular implant-level impression is made. It

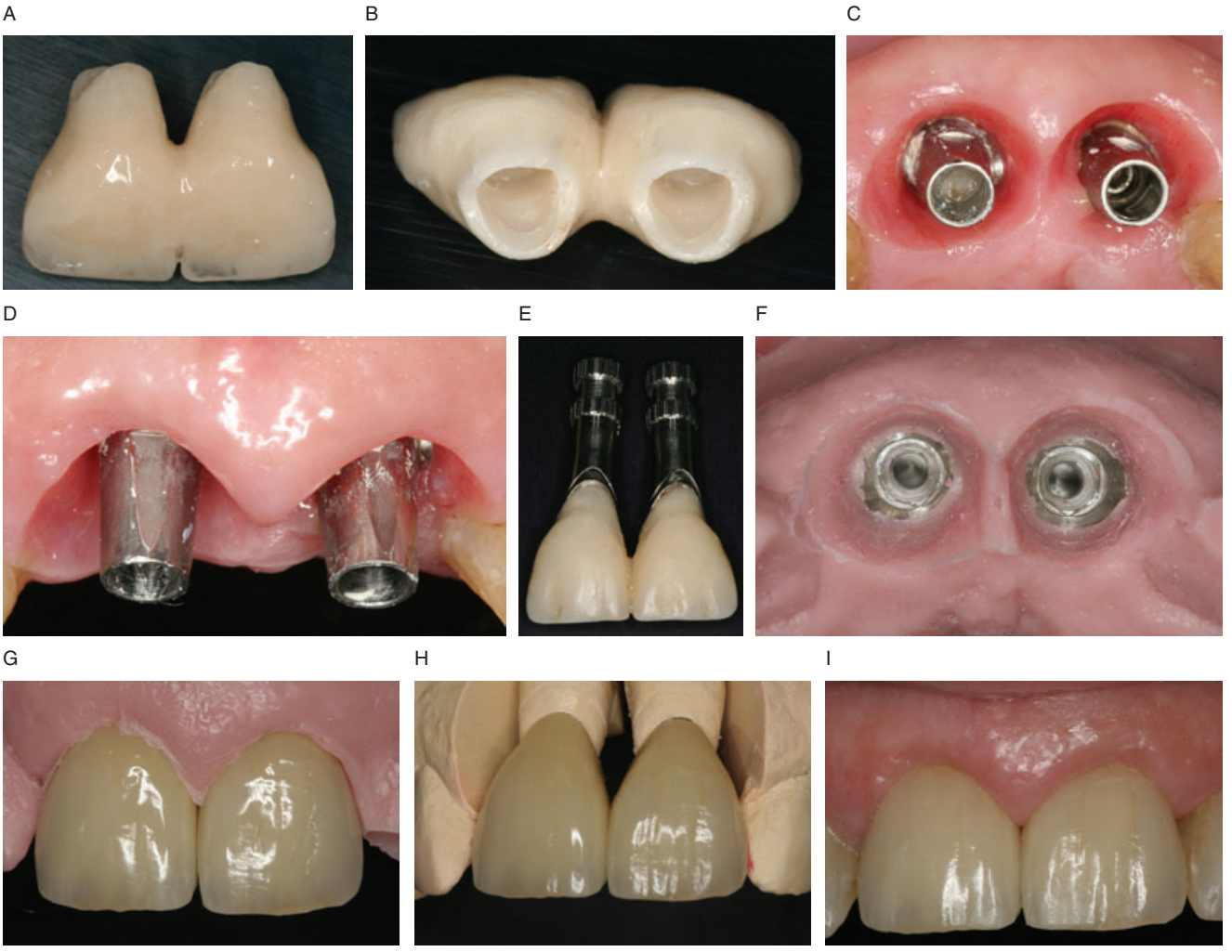

Figure 8. A, *Case 2. Buccal view of two provisional crowns ideally contoured to create the optimum soft tissue profile.* B, *Case 2. Apical view of two provisional crowns ideally contoured to create the optimum soft tissue profile.* C, *Case 2. Occlusal view of the soft tissue contour following immediate removal of the anatomically correct provisional crowns. Note the asymmetric contour of the gingiva.* D, *Case 2. Buccal view of the soft tissue contour following immediate removal of the anatomically correct provisional crowns. Note the scalloped contour of the gingiva.* E, *Case 2. The provisional crowns and temporary abutment are connected to a laboratory analog. The provisional crowns act as a transfer coping for the making of the emergence profile cast.* F, *Case 2. Occlusal view of the emergence profile cast after removal of the provisional crown. Note the asymmetric anatomical profile of the gingiva. Compare to Figure 3B.* G, *Case 2. Buccal view of final crowns placed on the emergence profile cast.* H, *Case 2. Buccal view of final crowns placed on the master cast. Note the missing information around the cervical aspect of the crowns that is critical in achieving an aesthetic restoration. Compare to Figure 8G.* I, *Case 2. Intraoral buccal view of tooth #8 and 9 after insertion. Fabrication of these crowns was done with the aid of an emergence profile cast. Compare to Figure 8G.*

TABLE 1. MATERIALS AND USAGE OF THE EMERGENCE PROFILE CAST VS. THE MASTER CAST.

	Emergence profile cast	Master cast
Impression	Emergence Profile Impression Before removal of the restoration which is used to develop the desired emergence profile	Final impression At the implant level using a standard impression coping
Impression material	Alginate or PVS	Rigid material: Polyether, PVS
Material used to pour the impression	Soft tissue material Gingitech™,* Or Gi-Mask, Coltene®.†	Stone
Laboratory use	Emergence profile from implant platform to cervical 1/3 of crown	Accurate platform position, contact point, occlusion, final crown contour

PVS = polyvinylsyloxane.
*Williams and Silicone system, Ivoclar North America, Inc., Amherst, NY, USA.
†Whaledent Inc., Cuyahoga Falls, OH, USA.

aids the laboratory technician in developing the emergence profile from the implant platform to the cervical third of the clinical crown, whereas the master cast is used for the accurate platform position, contact point, occlusion, and final crown contour.

Several techniques for transferring the peri-implant soft-tissue emergence profile from a provisional to a final prosthesis have been reported. Jansen[6] fabricated two identical provisional restorations and used one of them as a transfer impression coping. This technique does not account for chairside modifications to the provisional restoration to accomplish the optimum emergence profile. Hinds[3] customized the impression coping prior to making the final impression. In this technique, the provisional restoration was removed and connected to a laboratory analog. The assembly was then placed in an impression material, which recorded the cervical third of the crown. Subsequently, the provisional restoration was removed from the laboratory analog, to which an impression coping was then connected and customized using a resin material. In this approach, the patient has to be without the prosthesis as the customized impression coping is made in the laboratory. Inaccuracies are incorporated in this indirect technique because of the volumetric changes in all the materials used. Additionally, the patient soft-tissue profile may collapse during the waiting period, resulting in discomfort when the provisional restoration is reinserted.

Attard and Barzilay[9] described a method in which the provisional restoration is used as an impression coping for the final impression. However, this technique requires that the patient be without the provisional restoration for approximately 1 hour, the time needed for the pouring of the impression and hardening of the dental stone. In addition, the provisional restoration is modified (acrylic dimples) to confirm the proper seating and stability necessary during vibration pouring of the master cast. This is because of the need to obtain an accurate transfer of the implant antirotation feature in the master cast. In the technique described in the present article, this level of accuracy is not required because no vibration is used to generate the emergence profile cast, and a separate master cast is made following conventional implant-level impression.

CONCLUSION

In the technique described, the technician has two casts: an emergence profile cast and a master cast. The

emergence profile cast is obtained from an impression of the implant-supported provisional restoration with polyvinylsiloxane, preferably, or an irreversible hydrocolloid and poured with a soft tissue model material. This cast replicates the contoured soft tissue and records the peri-implant sulcus. Therefore, it is used for the fabrication of the emergence profile of the implant abutment and the cervical third of the crown. The master cast is obtained at the implant level using the impression coping. This cast is used for the fabrication of the definitive restoration in the standard way. The technique described has several advantages: it is a very accurate method for transferring the contoured soft tissues into the definitive restoration; it is a quick chairside procedure, as the patient will not stay for an extended time without a prosthesis; it does not require the fabrication of another provisional restoration; it does not require customizing the impression coping; and it may be used for screw- or cement-retrained prostheses. The clinical significance of the technique is an implant restoration that mimics accurately in its emergence profile that of the carefully crafted and customized provisional restoration. This reproduction of the soft tissue contour from the provisional to the final restoration results in an improved esthetic outcome of the final restoration.

DISCLOSURE AND ACKNOWLEDGMENTS

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Reprint requests: Ziad Jalbout, DDS, 2185 Lemoine Ave., Suite 1-K, Fort Lee, NJ 07024. Tel.: 201-592-1676; Fax: 201-592-5221; e-mail: jziad@nj.rr.com