

A technique to convert a 3D printed cast used in the fabrication of an interim implant-supported crown into a definitive cast capturing the acquired emergence profile

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Background

- An esthetic peri-implant soft tissue contour is a critical element of the success of implant restorations in the esthetic zone. Once the optimal transmucosal soft tissue profile is formed with an interim crown, it needs to be accurately replicated on the master cast. However, the peri-implant soft tissues quickly collapse after the removal of the interim prosthesis. Therefore, special impression-making techniques are required to overcome this challenge and to accurately transfer the emergence profile to the definitive casts.
- Several techniques were reported to customize the impression coping with either direct or indirect approaches. In a direct custom impression coping technique, the peri-implant soft tissues are reproduced by flowable composite [1]; Alternatively, the interim restoration itself is used as a customized impression coping to make the final impression [2]. In indirect custom impression coping techniques, an analog holder or the initial cast used to fabricate interim prosthesis is employed to replicate the emergence profile of interim restoration [3]. More recently, digital approaches have been proposed to received the emergence profile [4,5].

Objective

- In this report, we describe a novel approach to convert the initial cast used in the fabrication of an implant-supported interim crown to a definitive cast that accurately duplicates the peri-implant soft tissue contour.

Technique Steps

- Make a digital impression using an intraoral scan-ner (TRIOS 3; 3Shape, Denmark) and scan body (IO 2B-B SA; Nobel Biocare, Switzerland) to capture and record the position of an implant (NobelActive RP 4.3 × 10 mm; Nobel Biocare) for the restoration of a missing maxillary left central incisor (Figure 1a)
- Fabricate an interim implant-supported crown using the 3D-printed initial cast (Figure 1b).
- Once the desired esthetic result has been achieved using the interim implant-supported crown (Figure 2a), use silicon putty impression material (Aquasil; Dentsply Sirona, USA) to create an index to capture the morphology of the interim implant-supported crown and its associated gingival tissue (Figure 2b, 2c). Apply petroleum jelly to the tissue surface of the silicon putty index as a separating agent.

Figures

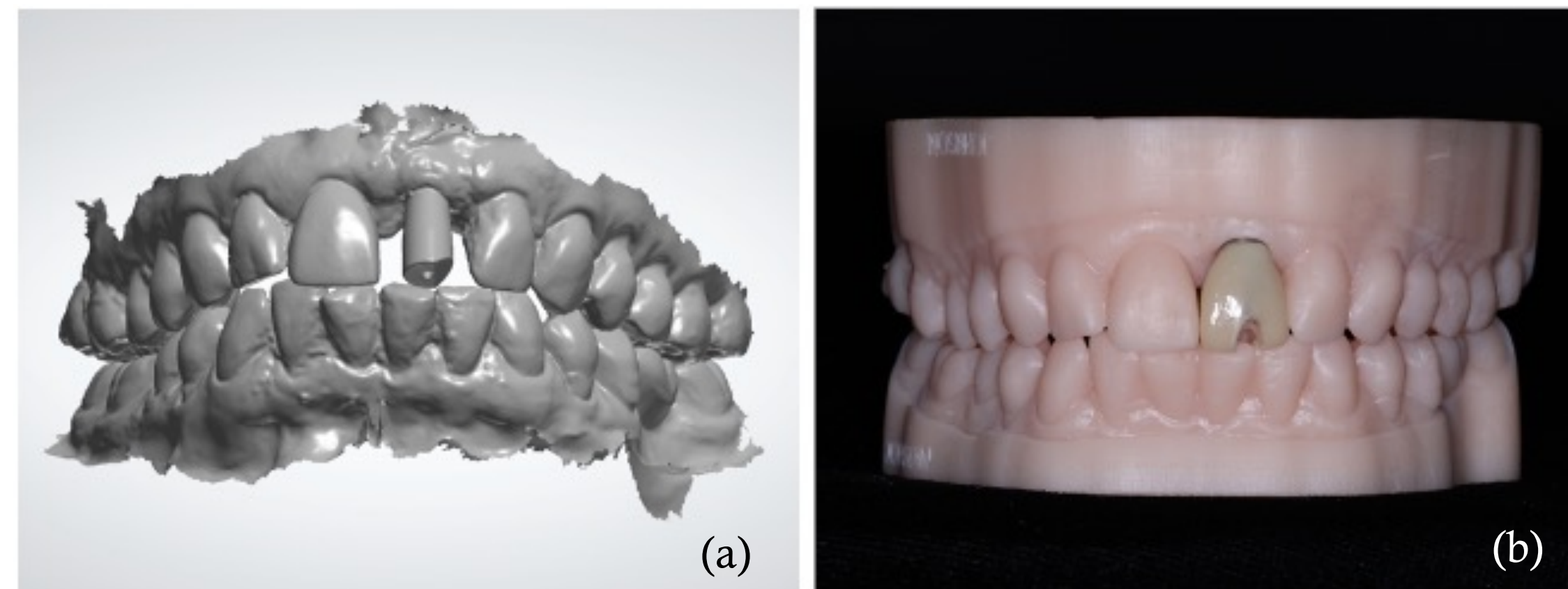


Figure 1 Fabrication of interim implant-supported crown. (a) Digital scan with scan body. (b) Interim implant-supported crown on the 3D-printed cast.



Figure 2 Fabrication of silicone putty positioning index. (a) Clinical appearance of interim implant-supported crown replacing missing left central incisor. (b) Silicone putty is used to register the external morphology of crown and peri-implant tissue. (c) Silicone putty positioning index is removed from the mouth and trimmed.

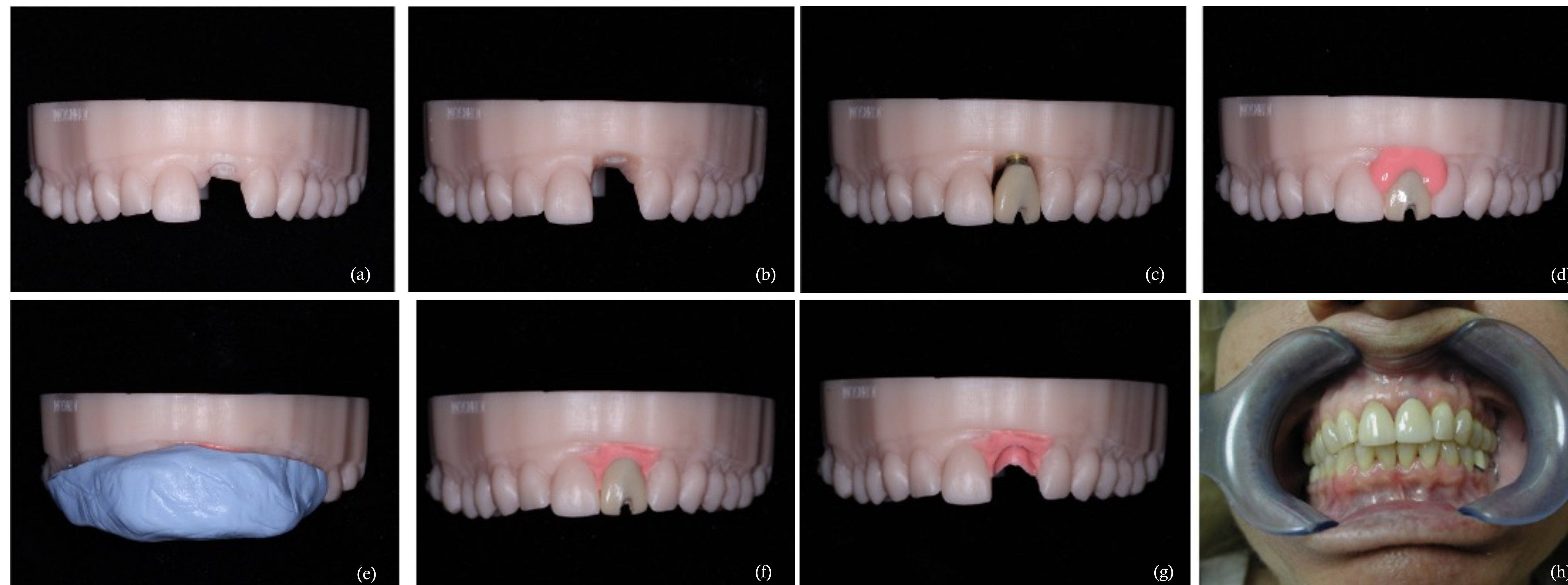


Figure 3 Replicating the external and internal morphology of peri-implant tissue. (a) The 3D-printed cast used in the fabrication of the interim crown. (b) The gingival portion of the peri-implant area is trimmed in the 3D-printed cast. (c) The interim implant-supported crown is seated in the trimmed cast. (d) Pink silicon is injected into the peri-implant area. (e) The silicone putty positioning index is seated on the cast. (f) After the removal of silicone putty positioning index. (g), Definitive implant cast with customized emergence profile. (h) Clinical appearance of the definitive implant-supported crown.

Technique Steps (cont.)

- Trim the coronal peri-implant portion of the initial cast to accommodate the impression material (Figure 3a-b) and remove the interim implant-supported crown from the patient's mouth and place it back onto the relieved initial cast (Figure 3c). It is important to note that the coronal peri-implant portion of the initial cast is slightly over-trimmed to create a spillway for the low-viscosity pink silicon impression material used in Step 5.
- Inject a generous amount of low-viscosity pink silicon impression material (Gingifast; Zhermack, Italy) to fill the space around the interim implant-supported crown (Figure 3d), and firmly seat the silicon putty index onto the initial cast (Figure 3e).
- Once the pink silicon impression material is set, remove the putty index (Figure 3f), and subsequently, remove the interim implant-supported crown to obtain a definitive cast that captures both the internal and external morphology of the peri-implant soft tissue created by the interim implant-supported crown (Figure 3g).
- Fabricate a permanent implant-supported crown using the definitive cast and then insert it in the patient's mouth (Figure 3h).

SUMMARY

- In this poster, we describe an alternative method for transferring the emergence profile and soft tissue contour formed around interim implant restoration to the definitive cast.
- Compared to other reported techniques, a unique feature of this technique is the omission of making a new impression and cast.

References

- Polack MA. Simple method of fabricating an impression coping to reproduce peri-implant gingiva on the master cast. J Prosthet Dent 2002;88:221–23.
- Attard N, Barzilay I. A modified impression technique for accurate registration of peri-implant soft tissues. J Can Dent Assoc 2003;69:80–83.
- Hsieh YL, Aronovich S, Munz S, Liu F. A technique to simultaneously fabricate multiple custom impression posts for implant-supported restorations in the esthetic zone. J Prosthodont 2019;28:339–42.
- Dhingra A, Taylor T, Flinton R. Digital custom impression technique to record emergence profile and fabrication of an esthetic implant supported restoration. J Prosthodont 2020;29:636–39.
- Joda T, Wittneben JG, Brägger U. Digital implant impressions with the "Individualized Scanbody Technique" for emergence profile support. Clin Oral Implants Res. 2014;25(3):395–397. doi:10.1111/clr.12099

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