

The Creation of an Emergence Profile, Part 2

Pontic-Guided Implant Placement in the Aesthetic Zone



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This is part 2 of a 2-part article series. Part 1 of Drs. Bereznicki and Dawood's article was published in the April 2012 issue of *Dentistry Today* and can be found in our archived articles on dentistrytoday.com.

INTRODUCTION

Part 1 of this series dealt with the creation of an emergence profile prior to implant placement, along with implant placement and provision of an immediately-loaded fixed partial denture (FPD) used to support and maintain the created profile. In part 2, the authors' technique for the duplication of the created emergence profile will be demonstrated. This technique provides both accurate working models and a predictably-shaped final prosthesis, making use of a stent that accurately replicates the fit surface of the provisional fixed prosthesis.

Observations Related to the Technique

In order to follow the steps described later in this article, it is important to understand the following points:

- Although the technique described in this case relates to the NobelActive (Nobel Biocare) implant system, it can also be adapted to other implant systems.
- Irrespective of the implant system used, it is important to select the tallest impression coping available to allow adequate clearance for the initial splinting of the impression copings intraorally, and subsequent stent creation. For example, the open-tray impression copings available for the NobelBiocare Replace System are shorter than the open-tray copings; in the case presented herein, the authors have used the closed-tray copings, with an open-tray impression technique as described below.
- The provisional FPDs used to create the emergence profile, whether the immediate load as shown in this article or one fabricated at a later stage of treatment, are usually constructed on nonengaging, screw-retained titanium temporary abutments. In order to ensure that the implant



Figure 1. The provisional fixed prosthesis is shown after a 4-month period of osseointegration.



Figure 2. The created emergence profile, upon removal of the prosthesis.



Figure 3. The splinted impression copings, in place.

head orientation is accurately reproduced in the working laboratory model, it is necessary to begin the stent fabrication by splinting the chosen impression copings intraorally.

The Technique

The case described in part 1 of this article is shown prior to removal of the immediate-

load FPD (Figure 1), after a 4-month healing period. Although it is not within the scope of this article to describe the details of the technique used to refine the emergence profile, which may sometimes take place during several visits, the final profile achieved is shown on removal of the provisional FPD just prior to stent creation (Figure 2).

The clinical steps involved in creating the impression stent are as follows:

1. Since the implants placed in this case were 2 NobelActive RP implants, 2 open-tray impression copings (narrow) were fitted, and a check-radiograph was taken at this time to ensure that the copings were correctly seated within the implants. The copings were then splinted together using

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an old bur and a light-cured resin (Triad Gel [DENTSPLY Caulk]) (Figure 3). In order to minimize the effect of polymerization shrinkage, it is advisable to apply and cure the resin on one coping before applying and curing the resin on the other.

2. The splinted impression copings were then carefully removed from the mouth (Figure 4a), ensuring that there was no movement of one in relation to the other, and analogue replicas were securely fitted to the copings. Next, these replicas were also splinted together using an old bur and light-cured resin as described in Step 1 (Figure 4b).

3. The splinted replicas were then carefully removed from the impression copings (Figure 4c) and the provisional FPD securely fitted to the splinted replicas (Figure 4d).

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4. This is the stage of reproduction of the fit surface of the provisional FPD. The use of a silicone impression putty has proven to be the most accurate method. A laboratory impression putty (Provil Novo Fast Set [Heraeus Kulzer]) was mixed according to the manufacturer's instructions and the FPD/replica combination pushed into it and, while still soft, the putty was adapted onto the gingival one third of the FPD (Figure 5a). It is advisable to keep the replica end submerged in the putty rather than allowing it to protrude

through it. It is also preferable to avoid creases and folds within the putty around the FPD, as these will be subsequently reproduced on the fit surface of the stent during manufacture. In turn, this could affect accurate seating of the stent prior to impression taking.

5. Once the putty had set, the provisional FPD was carefully unscrewed and removed. Any thin excess of putty can be cut away with a scalpel, but it is imperative that excessive height is not removed. If in doubt, a pencil line can be drawn on the provisional FPD to indicate the portion which relates to the area that is located subgingivally and must be reproduced in the

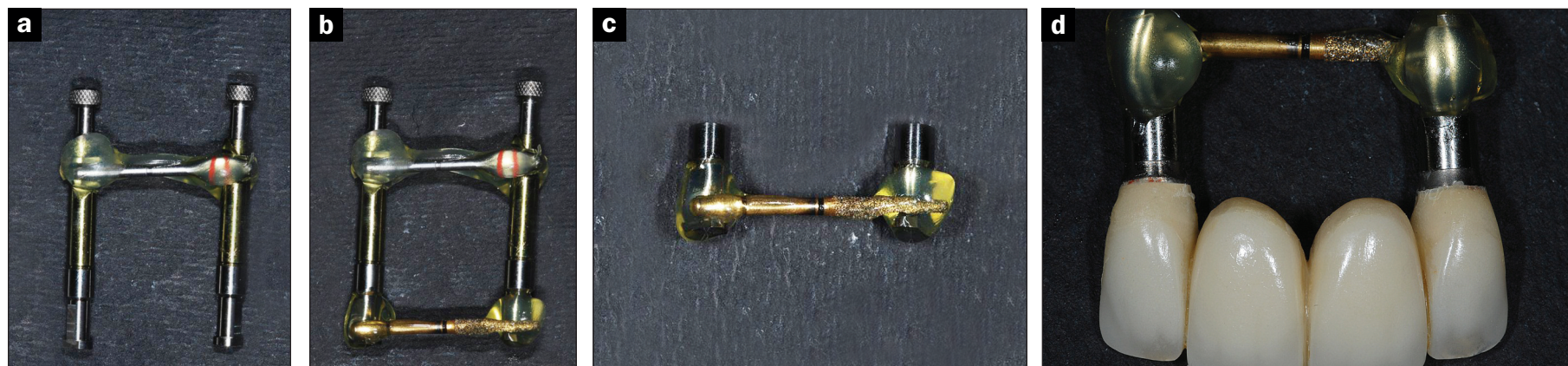
stent at the next step (Figure 5b).

6. The previously splinted impression copings were then accurately re-fitted inside the silicone putty. It is advisable to take a check-radiograph at this stage to ensure accurate location.

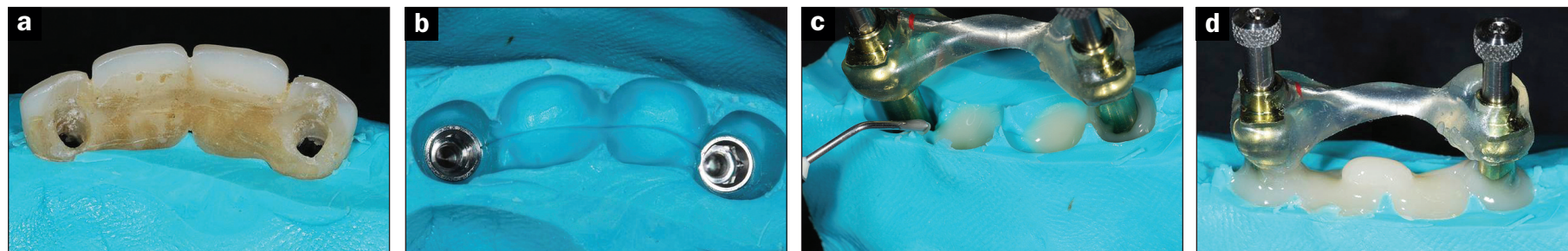
7. The combination is now ready for fabrication of the stent. Flowable light-cured composite resin (such as Venus Flow [Heraeus Kulzer]) was used. To minimize polymerization shrinkage (and the potential in-built stresses that can lead to distortion and difficulty in seating the finalised stent), the composite was initially incrementally applied around the copings and then light-cured. Subsequent additions were

made and light-cured toward the midline (Figure 5c), with the final additions being made across the midline. Since this area of unsupported composite resin is vulnerable to fracture during manipulation, it is advisable to reinforce it with the addition of a further bulk of composite resin.

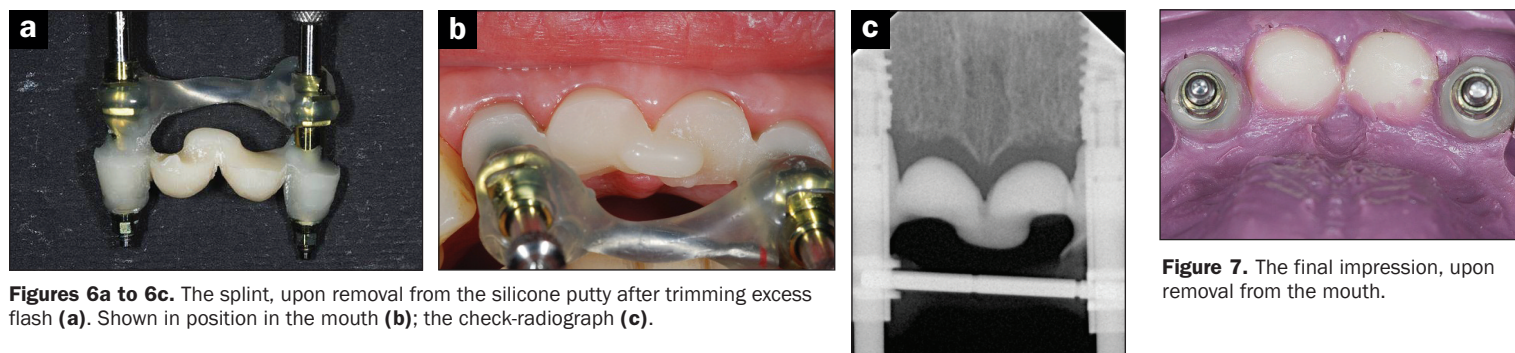
8. The impression stent could now be removed from the putty. Excess composite resin "flash," along any protruding sharp "spikes" created by any creases or voids within the putty, was trimmed away (Figure 6a). The stent was then fitted in the mouth (Figure 6b). If it was fabricated at chairside, rather than between visits, a certain



Figures 4a to 4d. The sequence of steps with the splinted impression copings.

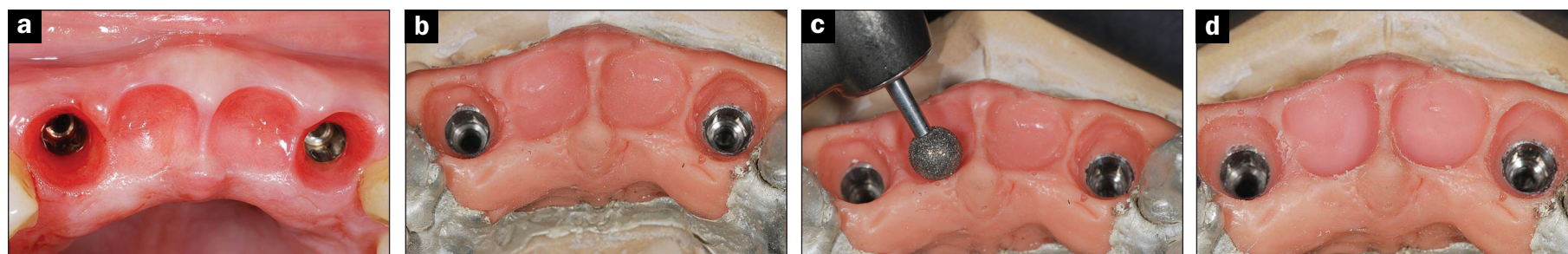


Figures 5a to 5d. The sequence of steps taken with the silicone putty.



Figures 6a to 6c. The splint, upon removal from the silicone putty after trimming excess flash (a). Shown in position in the mouth (b); the check-radiograph (c).

Adjustments are rarely required to the emergence profile of the porcelain....



Figures 8a to 8d. The emergence profile prior to impression taking (a), and the degree of accuracy of reproduction of the soft tissues on the initial working model (b). The model prior to refinement with a round diamond bur (c), and the final working model (d).

degree of collapse of the emergence profile will be encountered, taking up to 10 minutes for any tissue blanching to disappear. For this reason, it is preferable to reach Step 5 at a previous visit and complete stent fabrication at leisure, before the impression appointment. A check-radiograph may be taken at this stage to ensure that the stent and impression copings are fully seated (Figure 6c).

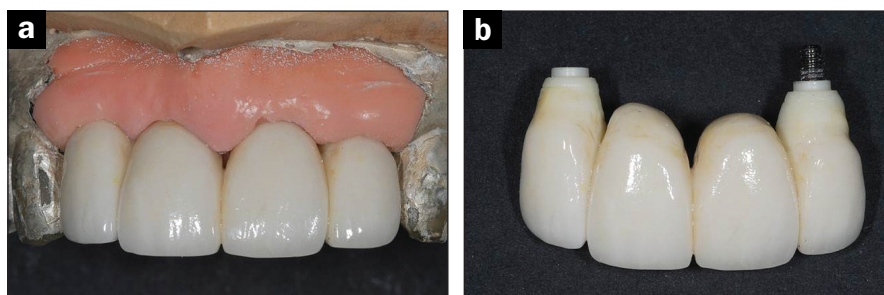
9. If the stent is correctly seated, the final impression can now be made; in this case a polyether impression material (Impregum Penta, 6 Minute Hard [3M ESPE]) was used in a custom impression tray. The authors prefer this hard impression material as it ensures that the stent remains within the impression upon removal. Once the impression material had set, the impression copings were unscrewed and the tray was removed from the mouth (Figure 7).

10. The degree of accuracy of the duplication technique is seen when comparing the clinical picture (Figure 8a) with that seen in the working soft-tissue model (Figure 8b). At this stage, final minor modifications to the emergence profile can be carried out with a diamond bur (Figure 8c). Care must be taken not to undermine the buccal tissue support, which could lead to an alteration in buccal tissue height intra-orally. The refined emergence profile is shown after trimming (Figure 8d).

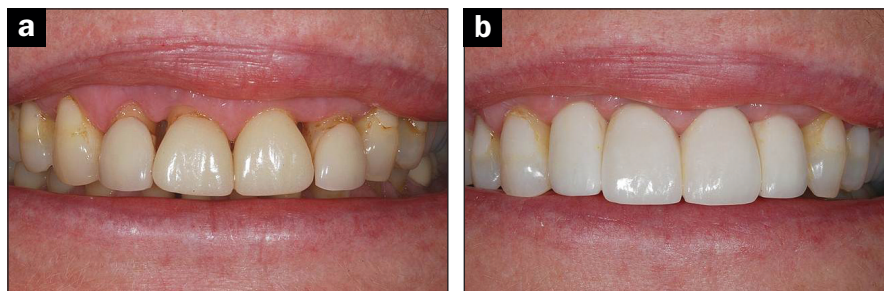
As shown in part 1 of this series, the access cavities to the screws are ideally located in the palatal area of the provisional screw-retained prosthesis. This access could therefore easily be reproduced within the final prosthesis without undermining the integrity of the surrounding porcelain.

In this case, the decision was made to provide a screw-retained zirconium oxide fixed prosthesis as the final design (Figures 9a and 9b). However, in those cases where the access cavities are located in the incisal (or even the buccal areas) of the provisional screw-retained prosthesis, this access could not reasonably be reproduced within the final porcelain prosthesis without compromising the aesthetics and integrity of the porcelain. These cases are more successfully restored if screw-retained abutments are provided, and the definitive FPD is designed to be cemented rather than screw-retained. Although angled abutments can be used to palatally realign the access cavities to the screws within the FPD, invariably the metal collar of the abutments will shine through the buccal gingiva of the abutments, or worse, show at or above the gingival margin.

If the final design selected is



Figures 9a and 9b. The definitive zirconium oxide fixed partial denture (FPD).



Figures 10a and 10b. The clinical picture at the start of treatment (a), and on the day of the FPD fitting (b).



Figure 11. The soft tissues; one month after initial FPD placement.



Figure 12. Close-up view of the completed case, showing the excellent and predictable aesthetic outcome.

cement-retained, the authors have found that it is preferable for the technician to work on a solid as well as a soft-tissue model in order to accurately reproduce the “porcelain” emergence profile. If refinements were made to the emergence profile on the initial working model, these have to be reproduced. It is, therefore, advisable to take a new impression of this model. Impression copings should be fitted and splinted together, and a conventional impression taken in the custom tray. The “bounce” encountered when working on a soft-tissue model is rarely an issue when the definitive FPD is screw-retained. However, when the design is cement-retained, this “bounce,” and unwanted uncontrollable movement, could lead to discrepancies in the fit surface of the final restoration.

The preoperative presentation is shown in Figure 10a. The minor modifications to the working model allowed space for the slightly rounded papillae (that were visible at the provisional stage) to fall into place and provide a more pleasing aesthetic result. The passive yet supportive fit of the final bridge (Figure 10b) fabricated around the created emergence

profile clearly improved the final appearance of this case. If the technique is accurately carried out, it is unlikely that multiple trial fits will be required. Adjustments are rarely required to the emergence profile of the porcelain, and they are usually associated with refinement of the occlusion and shade matching. The aesthetic improvement achieved in the soft tissues around the lateral incisors is self-evident.

The healthy appearance of the gingival tissues was obvious upon removal of the restoration one month after the initial delivery (Figure 11). The completed FPD is shown in Figure 12.

CONCLUSION

The case, as presented in parts 1 and 2 of this article series, demonstrates a combination of techniques which can be used to predictably provide an excellent aesthetic result with short-span implant-supported FPDs in high lip-line cases. If followed as outlined, it is a straightforward method of accurately reproducing the emergence profile created by both a provisional FPD prior to implant placement and a carefully adapted provisional screw-retained restoration or cemented FPD

on screw-retained abutments. Time spent fabricating the stent not only reduces the need for numerous time consuming and frustrating trial fits, it also improves tissue stability; disruption of the tissue attachment is known to be damaging.¹ Fabrication of the stent can ideally be undertaken by ancillary staff between patient visits, further reducing clinical time. The natural fit against the matured tissues, which was refined in the provisional phase of treatment, can be easily and predictably achieved, resulting in a highly aesthetic restoration. ♦

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Reference

1. Abrahamsson I, Berglundh T, Lindhe J. The mucosal barrier following abutment dis/reconnection. An experimental study in dogs. *J Clin Periodontol*. 1997;24:568-572.

Dr. Bereznicki graduated from Edinburgh Dental Hospital and School in 1976. He moved to London and entered general practice and started his own private practice in Queensgate, London, in 1982. Recently, he has joined the Dawood & Tanner Dental Practice in London as a member of the restorative team. His area of special interest is aesthetic dentistry, and in particular the creation and duplication of the created emergence profile in conventional and implant retained crown and bridgework. He can be reached via e-mail at tbereznicki@google-mail.com.

Disclosure: Dr. Bereznicki occasionally lectures and demonstrates for Nobel Biocare.

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