Dentistry Clinical

Aesthetic success: it's all in the achievement of natural fit

Tom Bereznicki reveals a technique for the duplication of the created emergence profile in short-span implant-supported bridgework

Introduction

When providing aesthetic fixed partial dentures for the patient with a low lip-line, the aesthetic result achieved is usually assessed with the lips in normal function. The emergence profile from the gingival tissues of the definitive restoration provided is not a priority. However, in high lip-line aesthetic cases, the emergence profile is paramount to the success of the restoration provided, particularly in short span bridges supported by implants.

The aesthetic result achieved in the case shown in Figures 1a, 1b and 1c would not have been possible with the use of pink porcelain on the four unit definitive bridge replacing the anterior teeth. Figures 1c and 1d clearly show the difficulties associated with the addition of pink porcelain to the bridgework in the posterior quadrants – the challenges of colour matching and disguising the junction between the pink porcelain and the natural tissues.

Figures 1a, 1b, 1c and 1d

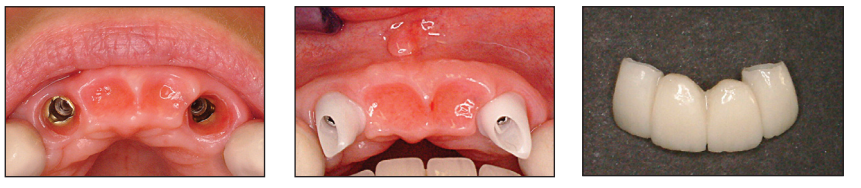
The success of the case was dependant on the creation of a natural emergence profile of the abutment and pontic teeth from the gingival tissues using a screw retained composite resin temporary bridge prior to the provision of the definitive bridgework. The temporary bridge is shown on initial fit (Figure 2a) and following adaptation and modification – Figure 2b

Figures 2a and 2b

The clinical problem encountered with the reproduction of the created emergence profile is clearly seen in another case – Figures 3a, 3b and 3c. The soft tissue profile is only maintained by the passive support provided by the ovate pontics and subgingival shape of the material around the screw retained titanium temporary abutments of the temporary bridge. On removal of the bridge, the soft tissues start to collapse almost immediately, in this case one hour later, and cease to resemble the desired shape and form. Any impression taken after removal of the temporary bridge will duplicate the collapsed tissues at the time. A permanent bridge made on a working model made from this impression will lack the necessary support to maintain the developed shape of the tissues.

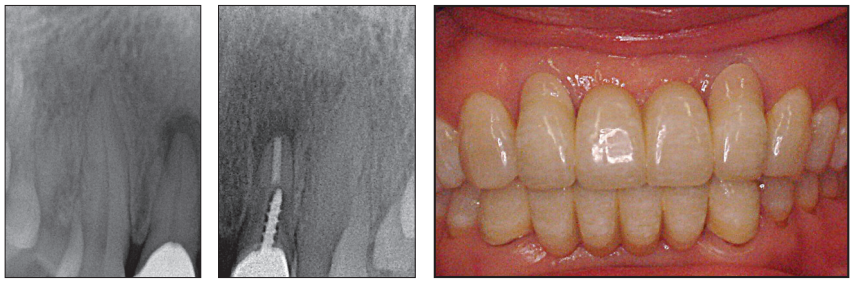
Figures 3a, 3b and 3c

The challenge was to develop a practical problem clinical technique which could be used to predictably reproduce this idealised soft tissue profile. This, in turn, would allow the technician to fabricate a permanent bridge which faithfully reproduces the subgingival shape of the temporary bridge passively supporting the gingivae (Figures 4a, 4b and 4c)



Figures 4a, 4b and 4c

Figures 5a, 5c and 5b



Case presentation

A failing case is shown in Figures 5a, 5b and 5c. There is an endodontic problem associated with the right lateral incisor and a root fracture of the left lateral

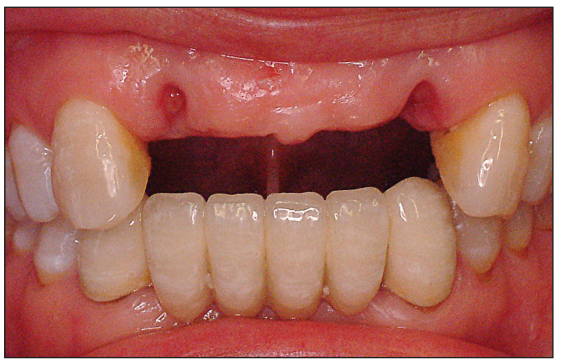


Figure 6

incisor. The bridge and associated abutment teeth were scheduled for extraction. The patient would not consent to the preparation of both caries-free canines to carry a conventional bridge, preferring the option of a four-unit bridge retained by implants placed in both lateral incisor regions.The case is shown in Figure 6 following a month post extraction of healing. A removable acrylic partial denture was provided as an interim restoration

After allowing for three months of bony infill and soft

Figure 7

tissue healing following the extractions, two implants (NobelBiocare Replace Narrow Platform 13mm) were placed by Dr Andrew Dawood using a flapless technique. Following a further four-month period of osseo-integration, the healing abutments were removed. An impression was made to allow the construction of

Figures 8 a and 8b

a laboratory made composite resin temporary bridge (Figure 8).

It is not within the scope of this article to describe the technique for developing the emergence profile using the temporary bridge. The final appearance of the temporary bridge and the resultant emergence profile are shown in Figures 8a and 8b. The technique developed to duplicate the created emergence profile is based on fabricating a stent which accurately replicates the fit surface of the temporary bridge.

The steps involved are as follows:

• Two closed-tray impression copings (narrow) are fitted to the implants intra-orally and splinted together using an old bur and light-cured Triad Gel (Dentsply) – Figure 9a. Although an open-tray impression technique will ultimately be used to ensure that the created stent is removed from the mouth within the impression, the author has found that with the Replace system the design of the closed-tray impression coping gives both a better and taller shape to allow splinting of the copings in the mouth and subsequent addition of the stent to it (Figure 9b).

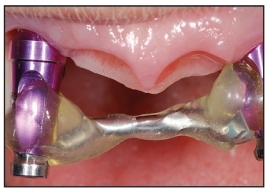
• The splinted copings are then carefully removed from the mouth ensuring that there is no movement of one coping in relation to the other (Figure 9c)

• Analogue replicas are then tightly screwed into the splinted impression copings (Figure 9d)

• The replicas are in turn splinted together with an old bur and Triad Gel

• The replicas are again carefully unscrewed from the splinted impression copings (Figure 9e)

• The patient's temporary bridge is screwed tightly into the replicas (Figure 9g). As most temporary bridges in these cases are made with non-engaging screw retention, the sequence outlined so far must be adhered to in order to ensure that the orientation of the implants in the mouth



Figures 9a, 9b and 9c

Figures 9d, 9e and 9f

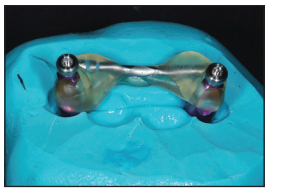
Figures 9g and 9h

"The technique developed to dpulicate the created emergence profile is based on fabricating a stent which accurately replicates the fit surface of the temporary bridge"

is correctly reproduced in the stent. Failure to do so will result in an inability to seat the stent in the mouth.

• Impression putty (Provil Novo Fast Set) is then mixed and the temporary bridge/replica combination submerged into the putty until set. It is helpful to try to avoid creases and folds in the area of around the bridge as these will inadvertently be reproduced in the stent (Figure 9h).

• The temporary bridge is then unscrewed and removed. Excess putty is trimmed away with a scalpel blade (Figure 10a) – care should be taken to ensure that sufficient height is retained so that the stent, when fabricated, will protrude above the gingival tissues when fitted in the mouth. A useful tip is to have a line drawn on the temporary bridge at gingival level when still fully seated

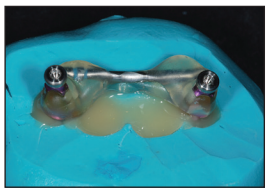


Figures 10a and 10b

in the mouth and then to ensure that the putty is at least 1mm above this line.

• The previously splinted copings are then fitted back to the replicas in the putty (Figure 10b). A radiograph of the putty can be taken at this point to ensure that the copings are fully seated.

• Light-cured flowable composite (Venus Flow – Heraeus Kulzer) is incrementally injected around both copings and cured. It is advisable to build up the composite around the copings first, then to slowly extend into each pontic area before joining the two pontics together. This ensures that the polymerisation shrinkage associated with composite resin is kept to a minimum, reducing distortion during the process, which could lead to a degree of distortion.



Figures 11a and 11b

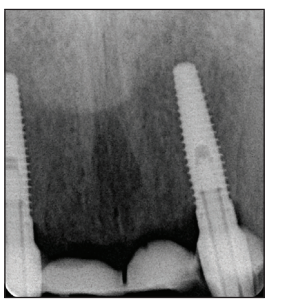
In turn, this could lead to difficulty in fitting the stent to the implants in the mouth or fracture of the stent on tightening the copings to the implants.

• The completed stent is shown before and after removal from the putty in Figures 11a and 11b.

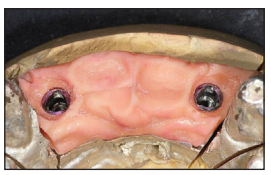
• The stent is then fitted to the implants in the mouth and tightened (Figure 12a).

• A radiograph is taken at this point to ensure that the assembly is fully seated (Figure 12b).

• The final impression is made in this case with Impregum Penta – 6 Minute Hard (3M ESPE). The author prefers



Figures 12a, 12b and 12c



Figures 13 a, 13b and 13c



Figures 14a, 14b and 14c

this material as it ensures that there is no unwanted movement of the stent within the impression at the time of removal. Once the material has set, the coping screws are unscrewed and the impression along with the stent removed from the mouth (Figure 12c)

As can be seen from the photo of the temporary bridge (Figure 7) the access cavities to the screws are located in the incisal area of the bridge. This access could not reasonably be reproduced within the final porcelain bridge without compromising the aesthetics and integrity of the porcelain.

Although angled abutments could be fitted to allow a screw-retained design final bridge, the resultant collar of metal might become visible and compromise aesthetics. This drove the decision to provide a cement retained Zirconium bridge cemented onto Milled Zirconium Procera Abutments (NobelBiocare). The author has found that it is easier for the technician to reproduce the emergence profile in porcelain if working on a solid model. The 'bounce' encountered when working on a soft tissue model can lead to discrepancies in the fit surface. This is less of a problem with a screw-retained design.

The degree of accurate reproduction of the soft tissues in both the soft and hard tissue models, is clearly seen in in Figures 13a, 13b and 13c. The screw retained Milled Zirconium Procera abutments and final bridge are shown in Figures 14a, 14b and 14c.

The passive yet supportive fit of the abutments and final bridge around the created emergence profile are shown in Figures 15a and 15b and the improved appearance when compared to the original bridge on presentation – Figure 15c. Only one trial fit of the final bridge was required to check the occlusion and allow small modifications to the shade. The aesthetic improvement achieved in the soft tissues around the lateral incisors is self-evident.

Conclusion

The technique presented is a simple method of accurately reproducing the emergence profile created by a carefully adapted temporary restoration made in composite. A simple bespoke stent is used for this purpose. Time spent at this stage eliminates the need for numerous time-consuming trial fits to create an aesthetic appearance with the final bridge in the porcelain phase of treatment. The stent can be undertaken by ancillary staff between patient visits further reducing surgery time. A natural fit against the matured tissues can be comfortably and predictably achieved and a highly aesthetic restoration delivered.

Acknowledgements

My thanks to Mick Kedge for all his help and support in developing this technique and for all the technical work.



Figures 15a, 15b and 15c

Tom Bereznicki graduated from Edinburgh Dental Hospital and School in 1976. He moved to London and, after various house surgeon appointments at Guy's Hospital and the Royal Dental Hospital, he entered general practice and started his own private practice in Queensgate, London, in 1982. His area of special interest is the creation and duplication of the created emergence profile in conventional and implant retained crown and bridgework.

Tom will be joining the Dawood & Tanner dental practice in Wimpole Street, W1, London as a restorative dentist from 3 January 2011.

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