

DENTAL TECHNIQUE

Transferring the finish line of an interim restorative to the definitive cast in biologically oriented preparation technique (BOPT) procedures: A dental technique

Ferran Llansana, DDS,^a Igne Magne, CDT,^b Guillermo Bauza, PhD,^c and Juan Mesquida, DDS^d

The biologically oriented preparation technique (BOPT) for tooth vertical preparation was first described by Loi and Felice¹ in 2013. The authors hypothesized that the gingiva performed during preparation, together with the controlled stabilization of the resulting blood clot with the interim restoration, can lead to gingival thickening and increase control over the vertical position of the gingiva.

Contrary to what other authors have proposed for crowns with feather edge margins,² the BOPT technique introduced “a new concept based on the observation that it is the gingival profile that adapts itself in a specular way to the coronal emergence profile and not the opposite (adaptation forms and profiles concept).”¹ An accurate transfer of the position of the finish line of the interim restoration is pivotal, as the morphology of the interim restoration will determine the gingival architecture. A failure in transferring the finish line will lead to alterations in the morphology achieved during the interim restoration stage.

The purpose of this article was to describe a method to replicate the position of the finish line of the interim restoration and its emergence profile in the definitive cast. The procedure is illustrated with a 42-year-old woman with a high smile line³ who sought the replacement of a failing metal-ceramic crown on her maxillary right central incisor, which presented an asymmetric gingival architecture in relation to the contralateral

ABSTRACT

The biologically oriented preparation technique (BOPT) uses a vertical tooth preparation and simultaneously a controlled rotary instrumentation of the gingival sulcus. The resulting blood clot is stabilized with the interim restoration. However, accurate transfer of the emergence profile of the interim crown to the definitive restoration is essential to maintain the gingival architecture. This technique article describes clinical and laboratory procedures to predictably transfer the emergence profile of the interim crown to duplicate the gingival architecture in the definitive restoration. (J Prosthet Dent 2021;■:■-■)

natural tooth (Fig. 1). The tooth had been endodontically treated, and a metal post-and-core placed, leading to discoloration. The treatment proposed involved a zirconia crown on the maxillary right central incisor with the BOPT approach, a feldspathic porcelain veneer on the maxillary right lateral incisor, and a direct bonded



Figure 1. Preoperative view of esthetically compromised maxillary right central incisor with metal-ceramic crown.

^aPrivate practice, Palma de Mallorca, Balearic Islands, Spain.

^bPrivate practice, Puerto Portals, Balearic Islands, Spain.

^cResearcher, Center for NanoHealth, Swansea University Medical School, Swansea, UK.

^dAssistant Professor, Advanced Education in Implant Dentistry, Loma Linda University, Loma Linda, Calif.

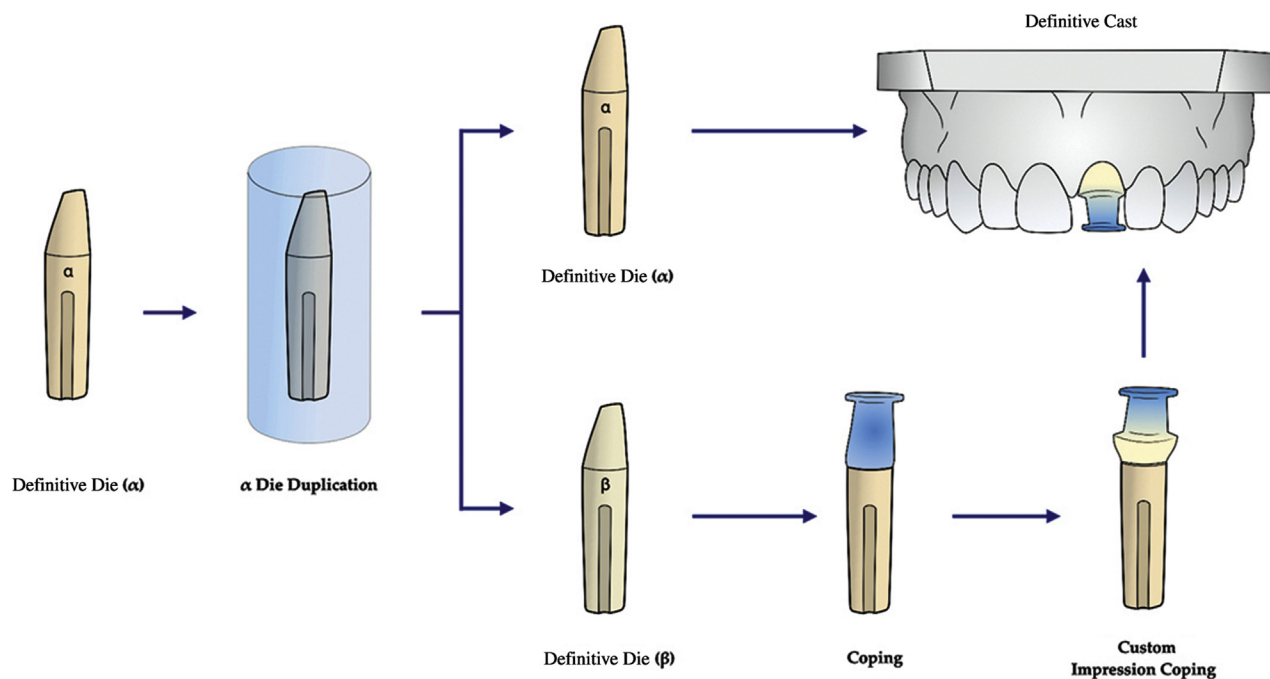


Figure 2. Soft tissue profile transfer method in clinical and laboratory stages.

composite resin restoration on the maxillary left central incisor. A description of the soft tissue profile transfer method used is presented in 5 clinical and laboratory stages (Fig. 2).

TECHNIQUE

Fabrication of a diagnostic stone cast and diagnostic wax pattern

1. Make a diagnostic impression with a polyvinyl siloxane (PVS) material (Aquasil Ultra Monophase Regular set and XLV Fast set; Dentsply Sirona) and pour it in Type IV die stone (GC Fujirock EP; GC Corp).
2. Articulate the casts (Artex CR; Amann Girrbach AG), and fabricate and index a wax pattern with guidance from a PVS matrix (Aquasil Putty Fast Set and XLV Fast set; Dentsply Sirona).

Removal of the horizontal finish line and creation of a new emergence profile

3. Prepare the tooth by removing the previous horizontal finish line and simultaneously performing the gingival curettage to obtain an appropriate axial path of withdrawal.⁴
4. To make the interim crown, place a bis-GMA resin (Integrity; Dentsply Sirona) in the PVS matrix and into the prepared subgingival area of the abutment.

After the recommended polymerization time, the interim restoration will record the required gingival contours and the finish line.

5. Use the horizontal space generated between the external (inner aspect of the gingiva) and internal (axial walls of the preparation) landmarks depending on the desired future gingival margin position. If the interim restoration is widened subgingivally, an apical displacement of the gingival margin will occur. However, if it is thinned apically or moved coronally, the gingival margin will be advanced coronally.
6. Adjust the vertical position of the finish line, ensuring that the biologic width is not violated.^{4,5}
7. When the appropriate design of the interim restoration has been accomplished, cement it (Integrity TempGrip Temporary Crown and Bridge Cement; Dentsply Sirona) and allow the soft tissues to heal. If further gingival architecture modification is needed, reshape the contour of the interim crown.

Impression of the vertically prepared abutment tooth

8. Use a double cord technique (UltraPak cord 000 and 1; Ultradent Products, Inc) for the PVS impression (Aquasil Ultra Monophase Regular set and XLV Fast set; Dentsply Sirona) to generate the definitive refractory die (α die) for fabrication of the definitive restoration.^{6,7}



Figure 3. α Die and coping with retentive element extended to apical limit of impression. Interim crown adjusted to fit on β die, and finish line marked with pencil. Custom impression coping trimmed apically to interim crown finish line.

Emergence profile and finish line transfer procedure

9. In the first phase of the laboratory procedure, fabricate the definitive cast. Pour the impression in refractory stone (G-CERA ORBIT VEST; GC Corp) to be used as the definitive refractory die (α die), which will be subsequently transferred to the maxillary cast⁸ for the fabrication of the definitive restoration.
10. Duplicate the definitive refractory die by using a laboratory PVS (Elite Double 8; Zhermack SpA) (β die) and use it to fabricate a custom impression coping with retentive elements in light-polymerizing composite resin (Rigid Transparent plus Blue light cure resin; Zirkonzahn SRL). Stabilize the definitive refractory die stone replica (β die) with a heavy body PVS (Virtual Putty and Virtual Extra Light Body; Ivoclar Vivadent AG) to facilitate manipulation.
11. In the second phase of the laboratory procedure, transfer the finish line and emergence profile to the pick-up impression coping. Once the definitive refractory die stone (α die) and its replica (β die) have been fabricated, proceed to adapt the interim crown to the β die.
12. Retrieve the interim restoration, clean its intaglio surface, and adjust it to the β die by transferring the information regarding the position of the finish line marked with a pencil on the stone abutment and providing the apical margin of the definitive crown.
13. After the position of the interim restoration finish line has been marked on the β die, place the custom impression coping on the β die and trim it to match the finish line of the interim restoration (Fig. 3).

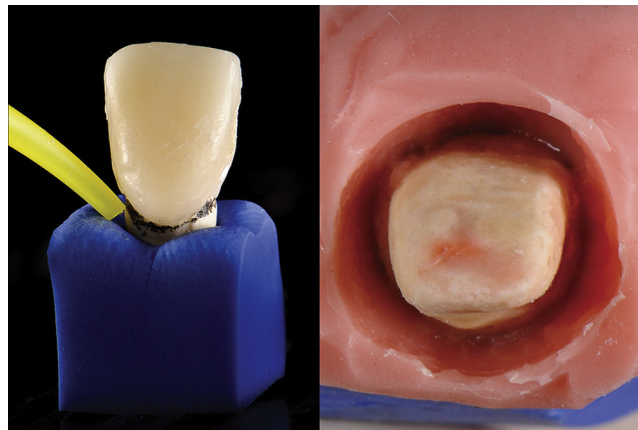


Figure 4. β Die stabilized in laboratory putty, and cervical area filled with gingiva-colored polyvinyl siloxane. Note emergence profile captured from interim crown.

14. Capture the horizontal dimensions of the interim restoration with a modification of the implant emergence profile transfer technique⁹ by adapting and seating the interim restoration on the β die abutment replica (Fig. 4).
15. Inject gingival colored PVS (Gingifast Rigid; Zhermack SpA) around the cervical area and extend it a few millimeters coronal to the finish line and further coronally over the height of the estimated proximal tissues to transfer the surrounding gingival architecture.
16. Obtain a negative duplicate of the interim restoration emergence profile where the die abutment replica (β die) is embedded and replicate the interim restoration emergence profile on the custom impression coping by adapting it to the definitive die and filling the empty space with a flowable composite resin (Tetric Evoflow; Ivoclar Vivadent AG) that will be incorporated into the coping (Fig. 5).

Definitive impression with custom impression coping and fabrication of the maxillary cast and definitive restorations

17. Seat the custom impression coping onto the prepared abutment with a small quantity of interim cement (Integrity TempGrip; Dentsply Sirona) and produce a pick-up impression with the double-mix technique (Aquasil Ultra Monophase Regular set and XLV Fast set; Dentsply Sirona) (Fig. 6). The dental laboratory technician will develop a maxillary cast and adapt the definitive refractory die (α die) to the custom impression coping of the right maxillary central incisor.
18. Fabricate the definitive restorations on the maxillary cast (Fig. 7) and subsequently deliver them (Fig. 8).

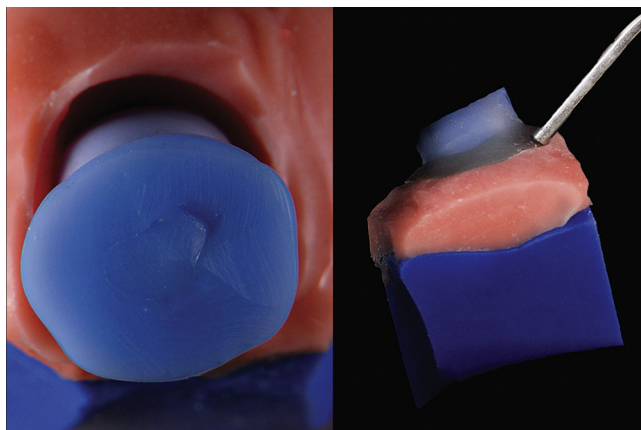


Figure 5. Impression coping positioned on stabilized β die, and space generated previously with interim crown filled with flowable composite resin to transfer emergence profile to impression coping.



Figure 6. Custom impression coping positioned on prepared abutment.



Figure 7. Zirconia crown fabricated on α die. Note vertical discrepancy between initial impression apical limit and finish line on crown. Ceramic coping fabricated on refractory die.

DISCUSSION

The long-term stability of harmonious gingival architecture is a key factor in the design of complete coverage restorations.^{10,11} One of their main complications is apical migration of the labial mucosa over time, leading to poor esthetics.^{12,13} To overcome this complication, Loi and Felice proposed the BOPT¹ to increase the width of the gingival tissues, preventing recession and maintaining a stable long-term outcome. Furthermore, the authors of BOPT hypothesized a higher degree of control of the position of the gingival margin than other preparation techniques. Despite promising initial clinical reports, clinical trials are needed to validate the clinical observations of Loi and Felice.^{14,15}

A prerequisite for a successful execution of the BOPT is the ability to accurately transfer the gingival environment generated during the interim restoration stage to the definitive restoration in terms of finish line position and



Figure 8. Definitive zirconia crown on maxillary right central incisor and ceramic veneer on maxillary right lateral incisor. Note harmonious tissue contours.

interim restoration emergence profile.¹ An arbitrarily positioned finish line between the gingival margin and the apical limit of the sulcus was proposed with the double cord gingival displacement technique. The position will depend on the esthetic demands of the restoration.¹ Furthermore, the degree of convexity or concavity of the emergence profile will be determined arbitrarily by the dental laboratory technician, as Loi and Felice stated that the prosthesis will produce an “especular morphology” in relation to the definitive restoration.¹ However, the present authors find an inherent incongruence in the description of the procedure, as any modification in the profile of the restoration may alter the gingival margin location and periodontal status of the prepared tooth.

The technique presented requires 2 impressions for the fabrication of the definitive restoration and labor-intensive procedures for the fabrication of the impression transfer coping and the definitive cast. Furthermore, an accurate initial PVS impression is essential for the fabrication of the α die, as the definitive crown will be fabricated on the cast produced from this initial

impression. The subsequent impression will determine the emergence profile and the finish line position on the α die. Hence, it is important to have an accurate, adequately extended initial impression for the success of the technique, as the fit of the definitive restoration will depend on its accuracy.

SUMMARY

This technique report describes a method of transferring the position of the interim finish line together with the emergence profile achieved during the interim restoration stages to the definitive cast, which will help the dental laboratory technician provide an exact reproduction of the interim restoration in terms of subgingival morphology.

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Corresponding author

Dr Juan Mesquida
Berenguer de Tornamira 6-3I
Palma de Mallorca 07012
Balearic Islands
SPAIN
Email: jmesquida@llu.edu

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