

DENTAL TECHNIQUE

## Multiple diastema closure in periodontally compromised teeth: How to achieve an enamel-like emergence profile



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Smile esthetics plays a dominant role in modern society: it influences how people are perceived and how they perceive themselves.<sup>1</sup> The presence of dental diastemas may represent an esthetic problem in the anterior region, especially if it is associated with an apical migration of periodontal tissue. Bone loss with associated gingival migration can affect the esthetics of the interproximal area with an increase in the size of the black triangle. Additionally, root exposure lengthens the clinical crown and alters the height-to-width ratio.<sup>2</sup>

Treatment options for a patient with diastemas and bone loss include orthodontic treatment,<sup>3</sup> direct restoration with composite resin,<sup>4</sup> indirect restoration with porcelain veneers,<sup>5</sup> and crowns.<sup>6</sup> Orthodontic treatment represents a conservative technique but is expensive and time consuming. Additionally, the esthetic improvement may not be achievable depending on the extent of the gingival recession. Ceramic veneers or crowns provide excellent and long-lasting results but may require extensive tooth preparation.<sup>7</sup> Recent improvements to the mechanical and optical properties of composite resins<sup>8</sup> allow clinicians to accurately reproduce the natural anatomy and shade of enamel and dentin with minimal tooth preparation<sup>9,10</sup> and may represent an excellent compromise in term of costs, time, and results.<sup>11</sup>

Direct composite resins still present a challenge for the general dentist, in particular, when restoring the interproximal anatomy. The traditional technique with

### ABSTRACT

This article describes a direct composite resin technique for the closure of multiple diastemas. The described procedure allows an anatomic and esthetic emergence profile of the apical third of the tooth to be obtained in periodontally compromised teeth without the use of interproximal wedges. (J Prosthet Dent 2016;116:642-646)

hybrid composite resins applied with a transparent matrix and a wedge presents problems. The distortion of the transparent matrix by the wedge can distort the emergence profile of the tooth and cause a black triangle.<sup>12</sup> However, achieving stability of the transparent matrix without a wedge is problematic during the application of the restorative material. Moreover viscous hybrid resins are difficult to insert into the space between the transparent matrix and the tooth at the cervical part of the emergence profile.

The purpose of this article was to describe a free-hand technique that uses a flowable composite resin and a transparent matrix without the need for a wedge to recreate the anatomic emergence profile of the tooth in a patient requiring the closure of multiple diastemas.

### TECHNIQUE

The patient illustrated was a 34-year-old woman who was not satisfied with the esthetics of her smile (Fig. 1). The treatment was planned with the aid of image editing software (Keynote; Apple Corp) (Fig. 2). Before restoration placement, a 2-week home-bleaching treatment was performed (Whitening Star Home 10%; Müller & Weygandt GmbH). The restorative appointment was scheduled 2 weeks later to allow the shade to stabilize

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**Figure 1.** Preoperative view.



**Figure 2.** Image editing software used to visualize quantity and shape of interproximal composite resin to displace gingival tissues, close diastemas, and remove black triangles.



**Figure 3.** After preparation of enamel surfaces, rubber dam displaces papillae. Ligatures must not be used.



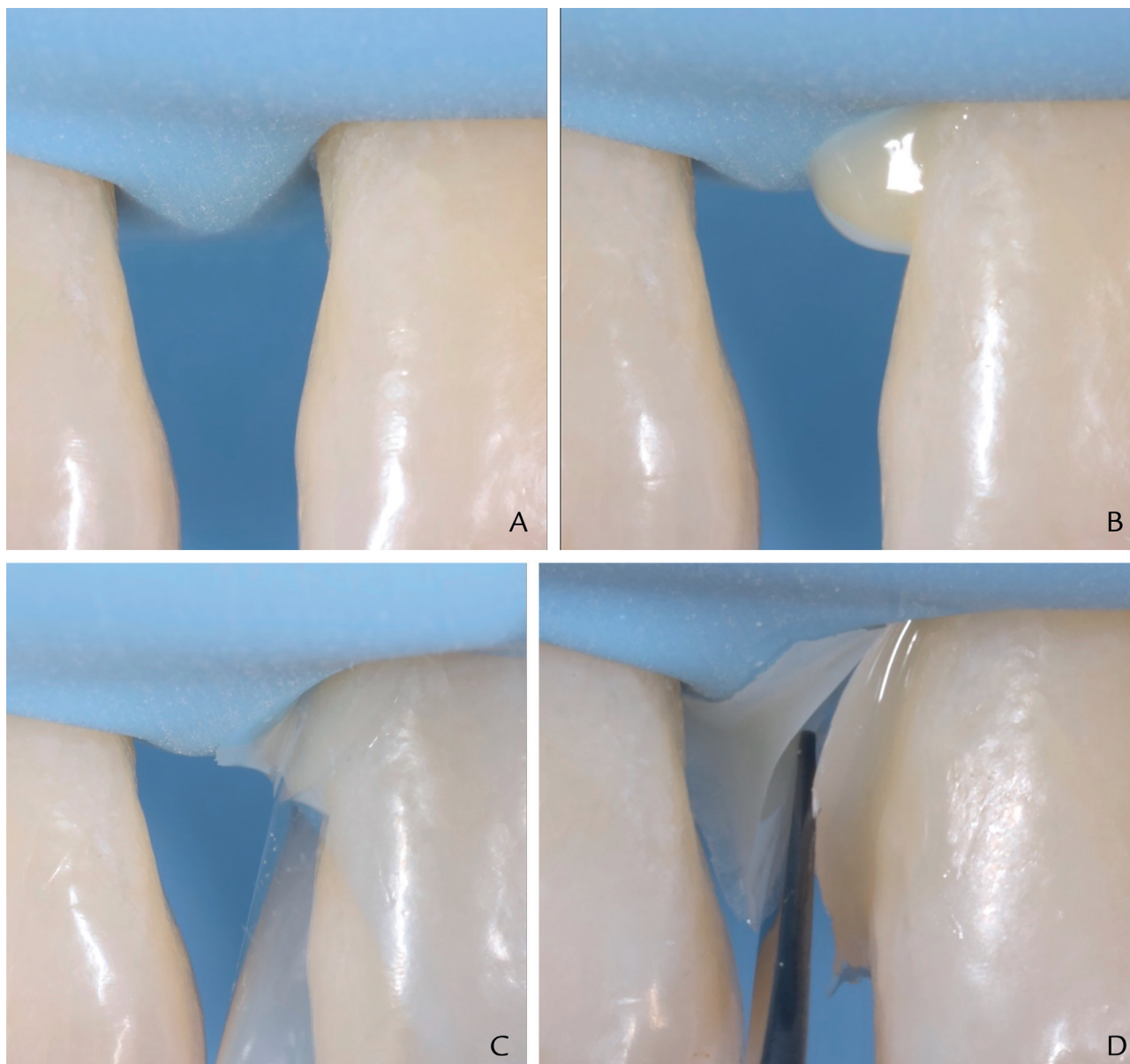
**Figure 4.** Chalky enamel surfaces after etching, rinsing, and drying.

and avoid interference between the bleaching product and the adhesive systems.<sup>13</sup> The composite resin restorations were made in 3 appointments. The canines were restored first, then the lateral incisors, and finally the central incisors. The images in this article document only the last appointment.

1. Clean the enamel surfaces of both central incisors and roughen with a 40- $\mu$ m diamond-coated oscillating file (Intra Lux Precontrol; KaVo Dental) (Fig. 3), especially in the interproximal area and slightly subgingivally, without damaging the soft tissues.
2. Isolate the field with a rubber dam, retract the papilla, and control saliva and crevicular fluid. Do not ligate around the isolated teeth to avoid interfering with the restorative procedures.
3. Apply 35% phosphoric acid gel (Scotchbond Etchant; 3M ESPE) for 30 seconds on all the surfaces of the teeth and slightly subgingival in the interproximal area. Rinse for 30 seconds and dry with oil-free compressed air (Fig 4). Apply the

adhesive system (OptiBond F; Kerr Corp) on all enamel surfaces and slightly subgingival in the interproximal area, and light polymerize for 120 seconds (L.E.Demetron II 1200 mW/cm<sup>2</sup>; Kerr Corp).

4. Apply a small quantity of flowable composite resin (inspiro Flow SW; Edelweiss DR) into the sulcus between the tooth profile and the rubber dam (Figs. 5A,B). The fluidity of the material allows it to be applied without pressure.
5. Place a transparent matrix inside the sulcus and the resin (Fig. 5C) and adapt it with the fingers to give the right emergence profile to the flowable composite resin. After polymerization, remove the composite resin excess outside the matrix (Fig. 5D).
6. Repeat the procedure for the cervical third of each incisor (Fig. 6) and restore the middle and incisal thirds with a restorative nanohybrid composite resin (inspiro SW; Edelweiss DR) (Fig. 7A).
7. Stratify and shape the facial surface of the restoration (inspiro Bi4 and SW; Edelweiss DR) (Fig. 7B) and polymerize for an additional 20 seconds under



**Figure 5.** Resin build-up of new emergence profile. A, Initial configuration. B, Application of flowable composite resin. C, Insertion of matrix in sulcus. Apical extent of matrix should always contact tooth surface. D, Removal of resin excess outside matrix.

a glycerin gel (Liquid Strip; Ivoclar Vivadent AG) to eliminate the oxygen inhibited layer.

8. Polish with medium, fine, and extrafine disks (Sof-lex; 3M ESPE) (Fig. 8).

The completed restorations after 2 weeks are seen in Figures 9 and 10.

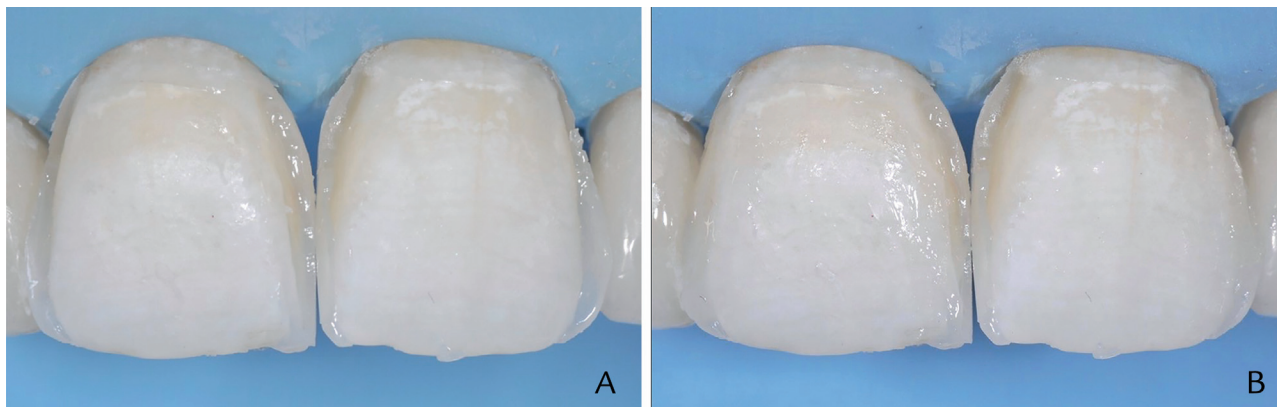
## DISCUSSION

The loss of periodontal support in the anterior region of the mouth may cause esthetic concerns for the patient, especially if combined with diastemas. Closing these spaces with direct composite resins is an appropriate



**Figure 6.** Emergence profile of maxillary central incisors established with flowable resin.





**Figure 7.** A, Interproximal surface completed first with enamel shade. B, Dentin shade placed.



**Figure 8.** Finishing and polishing of restorations under rubber dam.

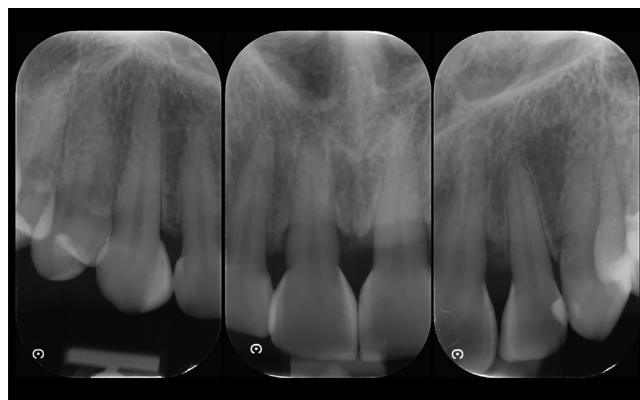
option in terms of time, cost, quality, and tissue preservation. Moreover this approach has been proved to have a good long-term survival rate.<sup>14</sup>

The flowable composite resin, paired with a transparent matrix as described, can easily penetrate the narrow space between the cervical margin and the gingival tissue isolated by the rubber dam almost without pressure. The correct positioning of the matrix and the use of an appropriate quantity of flowable resin are essential to achieve the optimal outcome. When inserted in the sulcus—filled earlier with resin—and preshaped with the fingers, the matrix should always contact the tooth with its apical part before the resin polymerizes. In this way, the resin inside the matrix is spread facially and lingually, while any resin outside the matrix can be easily removed after polymerization. An appropriate quantity of resin is applied to establish the gingival 1 to 2 mm of the restoration but avoiding excessive material. Opaque dentin-like resin is normally selected for this first increment to avoid an unesthetic grayish effect.

The mechanical properties of flowable resins are inferior to restorative composite resins. However, the cervical area where this increment of flowable resin is



**Figure 9.** Postoperative view after 2 weeks.



**Figure 10.** Radiographs of restored teeth.

placed is not directly exposed to contact or wear stresses but is exposed to bending forces.<sup>15</sup> In this context, the lower elastic modulus of the flowable composite resin may be an advantage during function.

## SUMMARY

Composite resins placed with a direct free-hand technique is a reliable approach in restoring diastemas in periodontally compromised teeth. A straightforward

and predictable way to create an anatomically correct interproximal emergence profile without black triangles is presented.

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