

DENTAL TECHNIQUE

## Restoration of a single darkened central incisor with a modified ceramic veneer



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Obtaining the best esthetic result with a conservative approach can be challenging when a discolored anterior tooth is involved, especially matching the color, texture, and shape of the adjacent natural teeth.<sup>1-3</sup> In these situations, determining the cause of the tooth discoloration is essential. Commonly, a traumatic injury may cause internal bleeding into the dental tubules, thus altering the color of a tooth without a loss of vitality. Verifying a patient's dental history in addition to clinical examination is necessary to diagnose the cause of color alteration.<sup>4</sup>

In addition to changes in color, dental trauma can also result in tooth fracture. However, identifying only the extent of the fracture is insufficient to select either direct or indirect restorative techniques because both composite resin and ceramic veneers have similar strength and longevity. Hence, the decision is often guided by factors such as esthetic predictability, color stability, and treatment costs.<sup>5,6</sup>

Ceramic restorations may be an alternative not only because of their better esthetic results but also because of their adequate abrasion resistance, dimensional and chromatic stability over time, and strong bonding between adhesive interfaces.<sup>6-9</sup> In addition, indirect ceramic restorations can be used more conservatively, without substantial tooth structure removal in the preparation.

Moreover, feldspathic dental porcelain best mimics the optical properties of natural teeth because of its

### ABSTRACT

Restoring a single darkened central incisor can be challenging. Both direct and indirect options may be acceptable to mask discoloration and achieve functional requirements. This report describes placement of a modified feldspathic porcelain veneer to reproduce the appearance of a maxillary central incisor discolored after trauma. (*J Prosthet Dent* 2019;121:369-72)

glassy content.<sup>10,11</sup> The objective of this technique article was to present a treatment approach for restoring a maxillary central incisor discolored after trauma by using a feldspathic porcelain–modified veneer.

### TECHNIQUE

The patient required a ceramic restoration to treat her discolored right maxillary central incisor after trauma ([Fig. 1](#)).

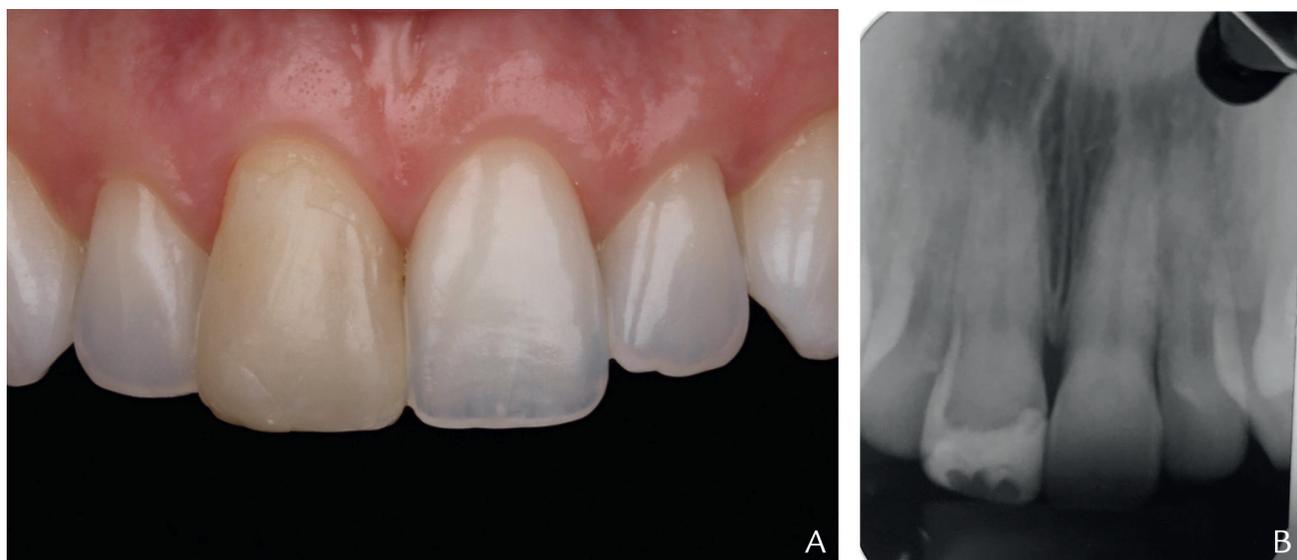
1. Record the shade of the tooth using a shade guide (VITA classical; VITA Zahnfabrik).
2. Make intraoral impressions with polyvinyl siloxane (Silagum; DMG). Diagnostically wax the cast. Make a polyvinyl siloxane (Silagum; DMG) matrix from the waxed diagnostic cast to guide the tooth preparation and to ensure adequate space for the veneer ([Fig. 2A, 2B](#)).
4. Remove the composite resin using 12-fluted tungsten carbide burs (H375R; Cosmedent), preserving the underlying tooth structure ([Fig. 2C, 2D](#)). A dental microscope (ALL 03; Alliance) at  $\times 12$  magnification may facilitate this step.
5. Polish the preparation with a sequence of 12-fluted tungsten carbide burs (#14, #16, and #18, H375R; Cosmedent).

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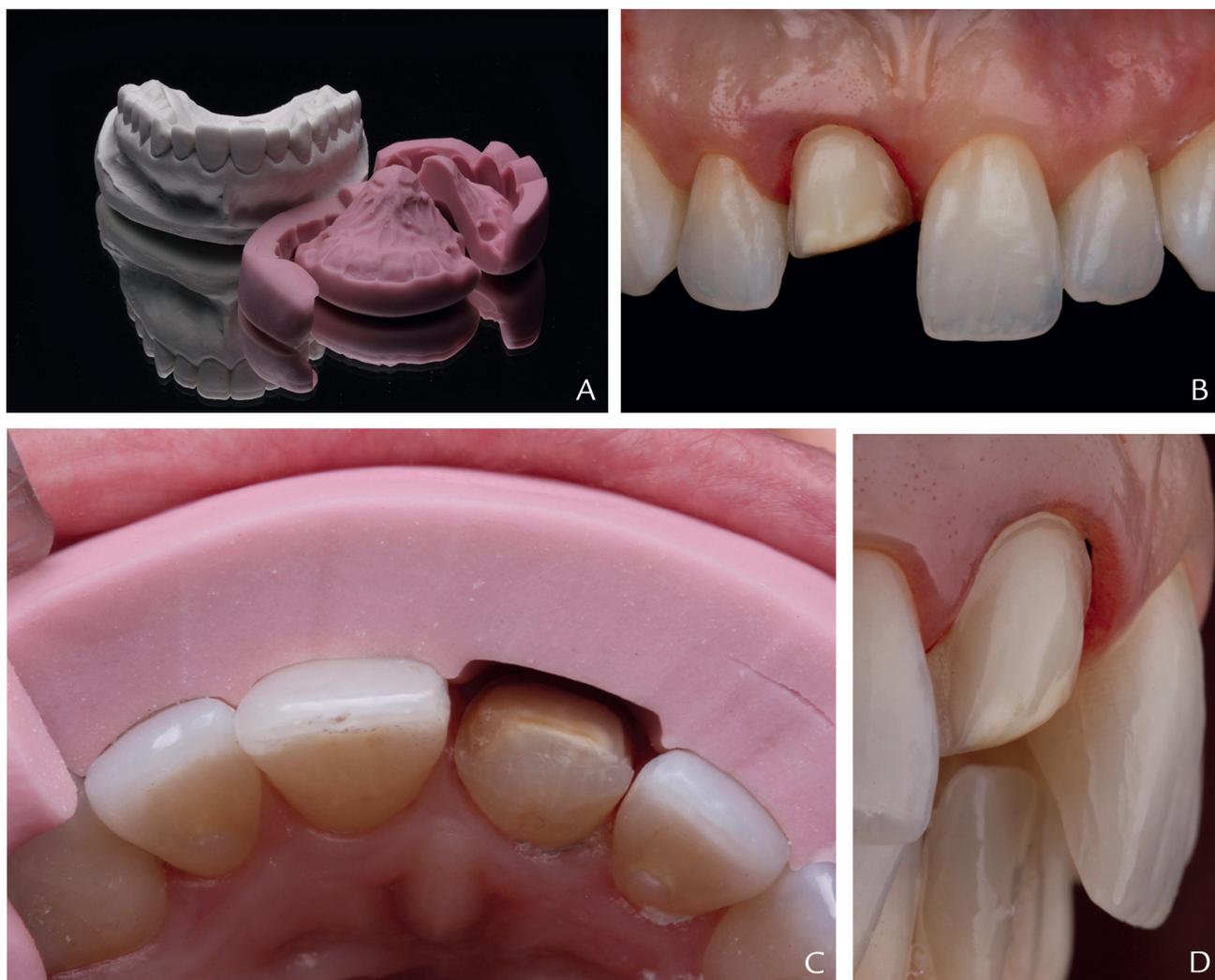
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**Figure 1.** Initial clinical situation. A, Discolored right maxillary central incisor. B, Periapical radiograph.

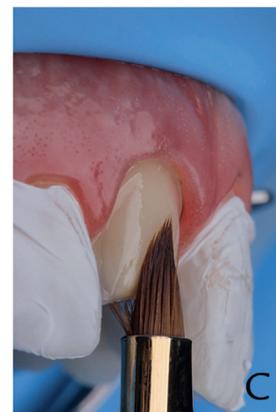


**Figure 2.** A, Waxed diagnostic cast and polyvinyl siloxane matrices. B, Prepared tooth after composite resin removal. C, Polyvinyl siloxane matrix showing adequate reduction. D, Lateral view of preparation.



**Figure 3.** Interim bisacrylic resin restoration.

6. Record the shade of the tooth after the preparation with a shade guide (VITA 3D-MASTER; VITA Zahnfabrik).
7. Make a polyvinylsiloxane impression material with heavy (Silagum; DMG) and light (Honigum; DMG) viscosities.
8. Make an interim restoration from an additional silicone mold obtained from the diagnostically waxed cast. Fill the mold with bisacrylic resin (Protemp 4; 3M ESPE) and insert it into the mouth until polymerization of the resin is complete (Fig. 3). Remove excess resin with an explorer.
9. Before cementation, evaluate the veneer intraorally for fit and select the color of the cement (NX3; Kerr Corp). Isolate the operative field and perform a prophylaxis with pumice and water.
10. Airborne-particle abrade the veneer with 50- $\mu$ m aluminum oxide (Microjato Plus; Bio-Art). Etch the veneer with 10% hydrofluoric acid (Power etching 10%; BM4) for 120 seconds.
11. Rinse the veneer. Etch the veneer with 37% phosphoric acid (Power Etching; BM4) for 20 seconds. Again, rinse the veneer.
12. Dry the veneer and apply the silane coupling agent (Silane Primer; Kerr Corp).
13. Protect the neighboring teeth with polytetrafluoroethylene tape (3M ESPE). Etch the tooth with 37% phosphoric acid gel to the enamel for 30 seconds and to the dentin for 15 seconds (Fig. 4A).
14. Rinse away the acid etchant, eliminate the excess water (Fig. 4B), and apply 2 layers of the adhesive system (Adper Single Bond 2; 3M ESPE) (Fig. 4C). Gently dry it for 5 seconds.
15. Apply a layer of the light-polymerized resin cement (NX3; Kerr Corp) and seat the previously treated ceramic veneer on the tooth. Remove the excess cement and light activate with a photopolymerizing unit (Demi; Kerr Corp) applied at multiple locations on the cemented surface.



**Figure 4.** A, Etching with 37% phosphoric acid. B, Appearance of tooth after washing and drying. C, Application of adhesive system.

16. Evaluate the occlusion and esthetics of the restoration (Fig. 5A, 5B).

**DISCUSSION**

Changes in tooth color are a common concern in clinical practice, and deciding on appropriate treatment first requires determining the etiology of the discoloration. Usually, dental bleaching is the first option because it is a conservative approach capable of achieving good results.<sup>3,12</sup> Bleaching may be performed before veneer preparation to reduce the amount of tissue removed for



**Figure 5.** A, Cemented restoration. B, Eighteen-month follow-up evaluation.

proper masking.<sup>12</sup> However, in the present situation, the substrate was not so darkened as to require a large preparation thickness, and for that reason, bleaching was not considered.

Ceramic veneers are an excellent option for restoring fractured incisors<sup>6-8,13</sup> when the ceramic veneer is typically shaped to replace the lost tooth fragment with minimal preparation of the tooth.<sup>9</sup> In the situation described here, not only was the fractured portion replaced by the ceramic restoration but also the discolored tooth structure was masked without providing a crown.<sup>6,8</sup>

The challenge for this patient was to achieve a satisfactory esthetic result with a veneer without restoring the adjacent teeth but reproducing a natural appearance. Hence, feldspathic porcelain was selected because it has a high degree of translucency and allows the dental technician to perform a layering process that produces veneers that optically approximate the natural teeth.<sup>10,11</sup> Photographs, use of polarized light, waxing, and matrix guides helped in communicating with the dental technician.

A diagnostic waxing was performed before tooth preparation, enabling the preparation of a matrix guide for the removal of the minimum amount of dental tissue necessary for the veneer.<sup>14</sup> In addition, the waxing facilitated the fabrication of a trial restoration that facilitated an accurate preparation and communication with the patient and the ceramist. Furthermore, the matrix guide assisted in the fabrication of an interim restoration.

## SUMMARY

Porcelain veneers are a favorable option for the restoration of a single darkened anterior tooth because of their excellent optical properties. This treatment enables more conservative tooth preparation, thus allowing adhesive cementation to dental tissue and excellent esthetics.

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