

Triad of Excellence

A Commitment from the Dentist, Ceramist, and Patient

Dawn Wehking, DDS

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Abstract

A single anterior restoration is one of the most challenging procedures in dentistry. The level of skill necessary calls for a “triad of excellence,” requiring commitment from the dentist, the ceramist, and the patient. Matching a single anterior restoration to the surrounding dentition is rarely achieved on the first try. Managing patient expectations and laboratory communication is vital to success in a case of this detail.

Key Words: single crown, PFZ, AACD Accreditation Case Type II

Introduction

Responsible clinicians strive to perform the most conservative dentistry that will achieve the desired outcome.¹ In this case, a crown was indicated due to the significant discoloration (Figs 1a-2b) and the amount of preparation required.

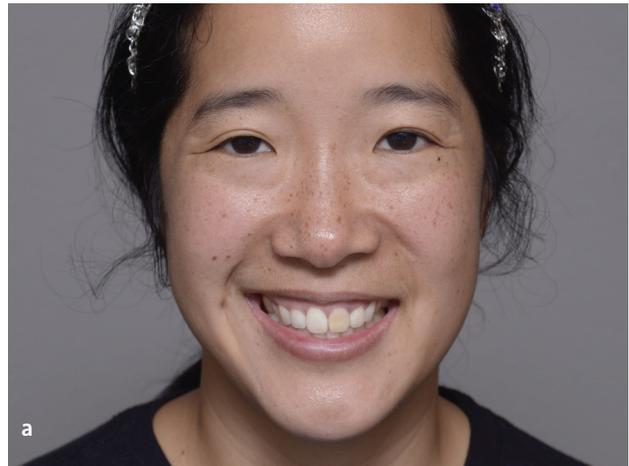
Most dentists continue to use the shade guide they received in dental school throughout their career.² Becoming a master cosmetic dentist, however, requires more detail. The ability to communicate not only the tooth's hue, but also its value to the laboratory ceramist is vital in achieving a natural result.³

Case Presentation

Chief Complaint and Evaluation

The 34-year-old patient's chief complaint was her discolored tooth #9, which she had been self-conscious about since childhood.

A comprehensive examination was completed at the new patient visit, assessing temporomandibular joint health, masticatory muscle function, periodontal health, tooth condition, and esthetics. An oral cancer screening was also completed and a full mouth series of radiographs was taken with no pathology noted. Once the patient decided to proceed with treatment, the required AACD photographs were taken. While the patient had a 1-mm slide from centric relation to maximum intercuspation (MIP), the decision was made to treat her in MIP since her occlusion was functional and symptom-free.



Figures 1a & 1b: Preoperative full-face smile (1:10) and frontal natural smile (1:2) showing #9's low value.



Figures 2a & 2b: Preoperative left lateral natural smile (1:2) and retracted maxillary anterior frontal view (1:1) showing discolored #9.

Treatment Plan

The patient's only concern with the appearance of her smile was the severe discolored tooth #9 (**Fig 2a**). Following endodontic treatment of the nonvital tooth, the patient decided to proceed with esthetic treatment to correct the discoloration. Options discussed included internal bleaching, and a crown. She chose treatment with a crown.

Treatment

Shade

Before preparing the tooth, shade selection was performed using Vita Masters Linear shade guide⁴ (Vita North America; Yorba Linda, CA) and a Nikon D7000 digital camera (Nikon USA; Melville, NY). The shade was communicated to the laboratory by first selecting a value and then selecting the hue.

Material

After discussing the case with the ceramist, we chose to proceed with a porcelain-fused-to-zirconia crown. The high-opacity zirconia base was selected, then porcelain was layered to control and manage the dark #9 stump shade while producing a durable and esthetic restoration. Zirconia demonstrates a unique ability to inhibit crack propagation, which accounts for its low susceptibility to stress fatigue, its superior fracture toughness, and its high flexural strength compared with traditional ceramics.⁵

Tooth Preparation

Because #9 was so badly discolored (**Fig 2b**), an extensive reduction protocol was necessary to achieve the desired outcome. An extensive reduction diamond was used (RW Ext, Brasseler USA; Savannah, GA) to remove enough tooth structure to block out the discoloration, while being careful not to over prepare. Labial, palatal, window, and vertical preparation reduction guides were used to ensure adequate reduction. The tooth was reduced 2.0 mm incisally, 1 mm lingually, and 1.5 mm labially.⁶ The extent of facial reduction was determined by the restorative material selection and the degree of masking required to achieve an acceptable esthetic outcome.⁷

The preparation shade was recorded and verified with photographs. Retraction cords (Ultradent Products; South Jordan, UT) were used with Aquasil (Dentsply Caulk; York, PA) impression material and sent to the laboratory with an opposer and bite registration (Regisil, Dentsply). The temporary was fabri-

cated using Luxatemp (DMG America; Englewood, NJ), cut back, and custom-shaded with Estelite Omega Composite and tints (Tokuyama Dental America; Encinitas, CA). The temporary was cemented with Cling (Clinician's Choice; New Milford, CT). During the patient's temporization phase, she was instructed to use antioxidant products (AO ProToothpaste, ProRinse, and ProVantage gel, PerioSciences; Dallas, TX) to reduce inflammation of the tissue around #9.

Laboratory Instructions

Digital photographs of the preoperative and prepared teeth were taken with a Nikon D7000, using the Vita Master shade guide to communicate value and shade.⁸ The crown was made with a white zirconia core and layering porcelain (Ivoclar Vivadent; Amherst, NY). The crown was tried in at the laboratory with the ceramist present so that custom tints could be added chairside, paying special attention to the characterization of the patient's natural dentition. Surface texture was achieved with carbide burs and diamonds (Brasseler and Kerr Axis; Orange, CA) and hand polished with pumice (Kuraray Noritake Dental; Tokyo, Japan) and diamond paste (Cosmedent; Chicago, IL) in some areas. During this process, photography was very helpful in allowing us to magnify the image to see the patient's unique characterization and mimic her natural tooth structure.

Delivery and Cementation

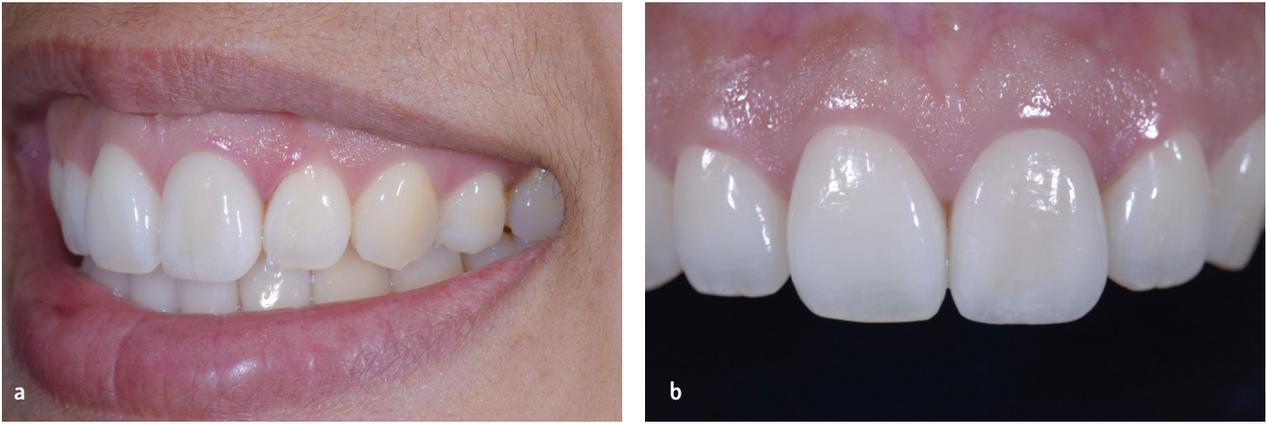
The zirconia intaglio was pretreated by sandblasting with 50- μ aluminum oxide, air dried, and coated with a thin layer of Scotchbond Universal Adhesive (3M ESPE; St. Paul, MN). Occlusion was checked in MIP and excursive movement using 90- μ articulating ribbon (Madame Butterfly, Almore Int.; Beaverton, OR). The preparation was cleaned with isopropyl alcohol, lightly pumiced, and scrubbed with Microprime-G (Danville Materials; San Ramon, CA). The enamel was treated with 35% phosphoric acid (Ultradent) for 15 seconds, rinsed, and the entire preparation coated with a thin layer of Scotchbond Universal Adhesive. The crown was cemented with RelyX Ultimate Adhesive Resin Cement (3M ESPE)⁹ and adjustments were made with Brasseler's porcelain adjustment kit.

Summary

Excellent communication with the patient and laboratory technician allowed us to achieve a natural result, mimicking the unique characteristics, translucency, and morphology of the patient's natural dentition (**Figs 3a & 3b**). Capturing these details of nature and replicating them in ceramic required a superb ceramist and a time commitment from our patient, who was thrilled with her result (**Figs 4a-5**).

Acknowledgment

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Figures 3a & 3b: Postoperative left lateral natural smile (1:2) and retracted maxillary anterior frontal view (1:1) showing a lifelike restoration with beautiful characterization, surface texture, and healthy tissue response to the restoration.



Figures 4a & 4b: Postoperative full-face smile (1:10) and frontal natural smile (1:2) in which the dentistry cannot be detected.



Figure 5: The happy patient.

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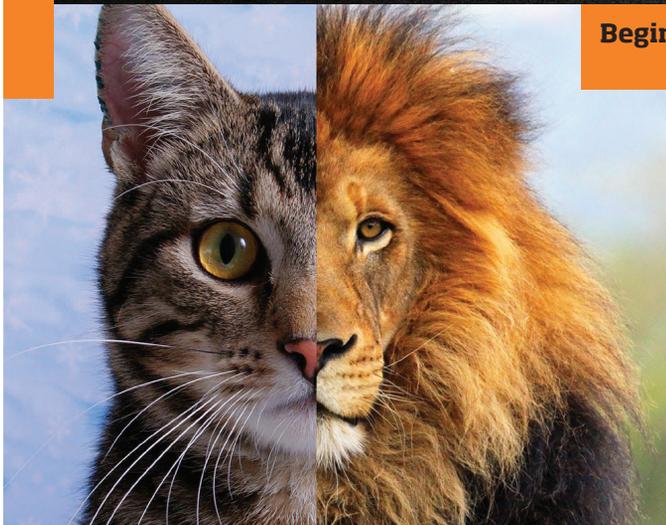


Dr. Wehking maintains a practice in Lafayette, Colorado.

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