

# Single Crown Tooth Preparation: The 80/20 Rule

Written by Howard S. Glazer, DDS Wednesday, 01 November 2006 00:00

We have all heard the 80/20 rule applied to various situations; within dentistry, we can apply this “rule” to crown fabrication. In my practice, as well as in many of my colleagues’ practices, it seems that 80% of the crown and bridge procedures involve single crowns and the remaining 20% are multiple units. Further discussion with fellow dentists around the world tells me I am underestimating the percentages, and that it is more like 85% of all crown and bridge procedures are single units. If we accept this hypothesis, then perhaps we should rethink how we can provide this relatively uncomplicated service for our patients in the most efficient and comfortable manner.



**Figure 1.** Establishing the guide planes.



**Figure 2.** Preparing the margins.



**Figure 3.** Preparation completed, buccal view.



**Figure 4.** Preparation completed, occlusal view.

Two key components of the single crown procedure involve the preparation of the tooth and the impression of the preparation. Let's briefly look at tooth preparation and how we can make it more expeditious and accurate.

For many years I have always prepared crowns using diamond burs in a high-speed handpiece, either air-driven or electric. Recently, I have begun to use carbides to prepare teeth. The reason is simple: carbides cut and diamonds grind. When we are removing enamel it is much more effective to cut it away than to grind it away. The grinding produces more friction with increased heat buildup that could ultimately result in pulpitis. In order to cut smoothly and efficiently, I use the Great White Ultra Carbides (SS White). These are

available in various sizes and shapes that allow for all-ceramic, all-metal, or porcelain-to-metal preparations. There are also shapes highly suitable for inlays and onlays. These burs cut smoothly and efficiently without “grabbing,” “catching,” or “chattering” as you cut into tooth structure, leaving a clean, smooth finish line to preserve marginal integrity (Figures 1 to 4).

Now that we have efficiently prepared the tooth, we need to have an accurate way to replicate the tooth for the laboratory. In the progression of impression materials for crown and bridge procedures, we have gone from the difficult, hard-to-use, foul-smelling rubber base materials to the fast-setting, easy-to-use, vinyl polysiloxane (VPS) materials. During this evolution, technique, accuracy, and stability have become the benchmarks by which all impression materials are measured. The purpose of any impression material is to transfer information from the clinician at chairside to the laboratory technician fabricating the restorations. Consequently, the “best” clinicians with the most ideal preparation, in combination with the “best” technician utilizing the finest porcelains, are at the mercy of the impression process.

Patients, for the most part, tolerate our treatment. However, they constantly report two common complaints. For years, practitioners have heard complaints from patients that the impression materials tasted bad and took too long to set. Complaints from the dentist included too long a setting time and difficulty in handling the material. Laboratory technicians voiced their complaints of tearing at the critical margins and dimensional instability. Add all this up, and you have a lack of harmony between the dentist, technician, and the patient, who ultimately had to endure yet another office visit to repeat an impression. Lost chair time, lab time, patient time, and diminished patient confidence all became “hostage” to the quality of the material used for the impression. Manufacturers have long realized they need to address these concerns, and they have made tremendous progress in that direction.

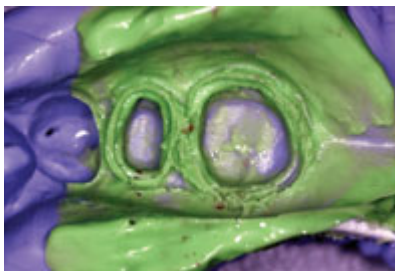
In the case report presented in this article, I use Flexitime Xtreme (Heraeus Kulzer), a vinyl polysiloxane impression material that sets quickly, has a pleasant aroma, and, most importantly from the dental perspective, offers a high degree of dimensional stability.

Flexitime Xtreme is available in Monophase, Heavy Tray, and Correct Flow viscosities just like the regular Flexitime line of impression materials. The big difference is that it sets in only 90 seconds and has a pleasant, wild berry aroma. Working time is also 90 seconds, and the material will not actually set until placed in the patient’s mouth. This is due to ThermoSense technology, which accelerates the setting time based on the body’s temperature to allow for a 90-second hard set. I find this material to be ideal for a single unit. Materials are available in automix cartridges with disposable tips, and the wild berry scent is caused by aromatic oil, not a flavoring. This is a key difference in that a flavoring induces salivary flow, which is not good when taking an impression. Patients really enjoy the pleasant aroma, and more importantly, they enjoy the relatively short setting time. The difference between 90 seconds and 180 seconds can be an eternity to a patient with an active gag reflex.

Many different burs and impression materials are in the marketplace, and a dentist often has a difficult time deciding which bur or material to use. Ultimately, the selection is based on what works well in his or her hands and is easy for the patient to tolerate. Three crucial points to consider are speed, accuracy, and patient comfort. Poor preparation and a poor impression can only lead to a poor restorative outcome. I find that the combination of Great White Ultra Carbides and Flexi-time Xtreme satisfy these requirements.



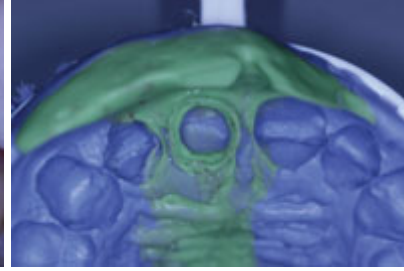
**Figure 5.** Crown preparations, tooth Nos. 13 and 14.



**Figure 6.** Impression of tooth Nos. 13 and 14 with Flexitime Xtreme Heavy Tray and Correct Flow.



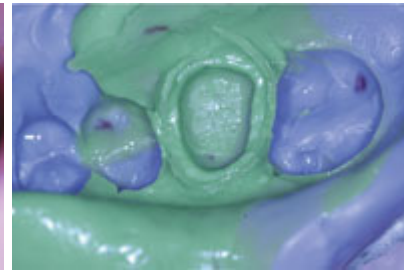
**Figure 7.** Preparation of tooth No. 9.



**Figure 8.** Impression of tooth No. 9 with Flexitime Xtreme Heavy Tray and Correct Flow showing exact replication of marginal detail.



**Figure 9.** Preparation of tooth No. 14.



**Figure 10.** Impression of tooth No. 14 with Flexitime Xtreme Heavy Tray and Correct Flow showing excellent replication of marginal detail.

Upon removal of the impression you will notice great detail and super marginal integrity that will remain stable over an ex-tended period of time. So whether your lab is around the corner or around the world, the impression will remain dimensionally stable (Figures 5 to 10).

#### **CASE REPORT**



**Figure 11.** Tooth No. 25 fractured to gingival crest.



**Figure 12.** Post and core placed.



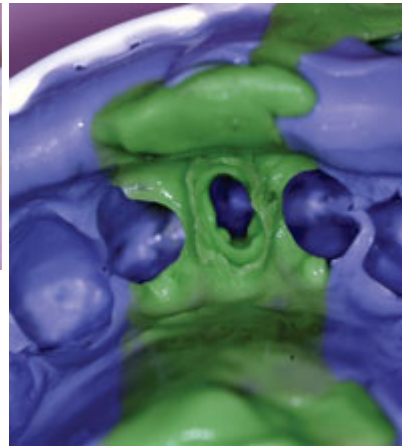
**Figure 13.** Tooth is prepared using Great White Ultra Carbide 847-16 bur.



**Figure 14.** Margins are established with the 847-16 bur.



**Figure 15.** Retraction cord in place and fluids controlled.



**Figure 16.** Impression of tooth No. 25 with Flexitime Xtreme Heavy Tray and Correct Flow.



**Figure 17.** PFM crown cemented in place.

A 81-year-old male presented with a previously unrestored and now fractured lower central incisor (tooth No. 25; Figure 11). The tooth was fractured to the gingival crest and required root canal therapy, a post, core, and modified crown lengthening prior to preparing for a crown (Figure 12).

Tooth No. 25 was then prepared using a Great White Ultra Carbide 847-16 with the Optima MX (Bien-Air) electric motor and hand-piece (Figures 13 and 14). After preparation, Tissue Goo (CLINICIAN'S CHOICE) was syringed around the preparation to control bleeding and act as a lubricant for placement of a Stay-put retraction cord (Roeko; Figure 15). The impression was made with a triple tray using Flexitime Xtreme Heavy Tray and Correct Flow materials (Figure 16).

A porcelain-to-metal crown was fabricated and inserted using Embrace WetBond Resin Cement (Pulpdent; Figure 17).

## **CONCLUSION**

Speed, accuracy, and patient comfort are paramount in the tooth preparation and impression phases of treatment requiring a single crown restoration. The technique and materials discussed in this article meet these requirements.

---

**Dr. Glazer** is a fellow and past president of the AGD and former assistant clinical professor in dentistry at the Albert Einstein College of Medicine (Bronx, NY). He has been a visiting clinician at several universities around the country including the State University of New York (Buffalo), and the Universities of Minnesota, California (San Francisco), Texas (Houston), Florida (Gainesville), and Missouri (Kansas City). He is a Fellow of the American College of Dentists, International College of Dentists, American Society for Dental Aesthetics, and the American Academy of Forensic Sciences, and a Diplomate of the American Board of Aesthetic Dentistry. Dr. Glazer is an attending dentist at the Englewood Hospital (Englewood, NJ). Additionally, he is the deputy chief forensic dental consultant to the Office of Chief Medical Examiner for New York City. He lectures throughout the United States and internationally, and maintains a general practice in Fort Lee, NJ. He can be reached at (201) 224-2705 or [hglazer264@aol.com](mailto:hglazer264@aol.com).