



# 20-MINUTE "FEATHER TOUCH" ULTRA CROWN

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## INTRODUCTION

What is important for a clinician?

What is important to a patient?

We must listen to our patients, staff and ourselves. We can only learn when we are willing to listen and discover.

| Importance | Clinician | Patient |
|------------|-----------|---------|
| Time       | Yes       | Yes     |
| Money      | Yes       | Yes     |
| Quality    | Yes       | Yes     |
| Comfort    | Yes       | Yes     |

Table 1

It is apparent that the clinician and the patient have the same goals! Wonderful! We can move forward with our pro-active patients to provide quality crowns in less time.

Dental college curriculums have little or no true business education. Every clinician must address some simple business principles. There are a finite number of working hours each week.

The appropriate combination and application of multiple technologies can allow a clinician to provide a quality crown in a shorter amount of time. This translates to more potential crowns a day or shorter days! More crowns a day means more income. Shorter days means decreased staff expenses with the same production goal achieved! Either way the clinician is more efficient and more profitable. The patients also benefit from this paradigm shift.

There are the intangible benefits of greater self-satisfaction knowing that you provide more quality services to more patients. Patients are grateful for respecting the value of their time. Patients are happy with fewer traumas during shorter appointments. Doctors and patients both appreciate quality results. There appears to be no obvious downside to this philosophy.

The authors have compiled a simple straightforward 20-minute crown method that includes:

- Feather Touch Preparation (**Great White™ Ultra Burs**)
- Impression (Rigid Tray impression)
- Temporization (Rapid set auto-polymerizing injectable polymer)

Basic pre-requisites must be fulfilled prior to treatment. These include:

- Periapical radiographs
- Examination
- Periodontal health
- Patient approval

## ANESTHESIA & INITIATION

The clinical case for presentation is a woman in her 50's who desired cosmetic restoration of all of her maxillary anterior teeth, #13-23 (international tooth numbering designation) (Fig. A).



Fig. A Pre-op Mx full occl view.



Fig. A Pre-op Mx MD full occl.



Fig. A Pre-op Mx MD full occl Right view.

Lollicane® 20% benzocaine topical anesthetic gel (**Centrix**) was applied where appropriate. Lidocaine with 1:100,000 epinephrine local anesthesia was slowly infiltrated at each tooth to provide profound anesthesia.

A triple tray such as **3.n.ONE™** triple impression tray (**Centrix**) or **Big Bite Trays™** (**Harry J. Bosworth**) locks your impression material in place with unique undercut ridges. Non-tear flexible webbing and a rigid frame design provide accuracy. This triple tray with **O-Bite®** bite registration polyvinyl siloxane (**DMG**) is taken of the area prior to preparation while waiting for profound anesthesia (Fig. B).



Fig. B Triple Tray in mouth Up lip retract.



Fig. B Triple Tray out mouth maxillary arch impression.



The patient prior to preparation approves the desired crown porcelain shade. There is no time wasted waiting. Multi-tasking has been shown to be inefficient. This is worse for men than women for some unknown reason. The authors advocate utilizing every second of time to be productive. A protocol must be used with a definite schedule of tasks. This can appear to be multi-tasking. It is not. It is simple efficiency.

**REPAIR & RESTORATION**

Any decay, fractures or old restorative materials are removed prior to preparation of the teeth. A number 2 or 4R **Great White™** bur (SS White Burs, Inc.) allows for fast and clean removal of caries and old restorations (Fig. 1).

An original **Fissurotomy®** bur (SS White Burs, Inc.) is ideal for removing fractures as necessary (Fig. 2).



Fig. 1 GW 4R

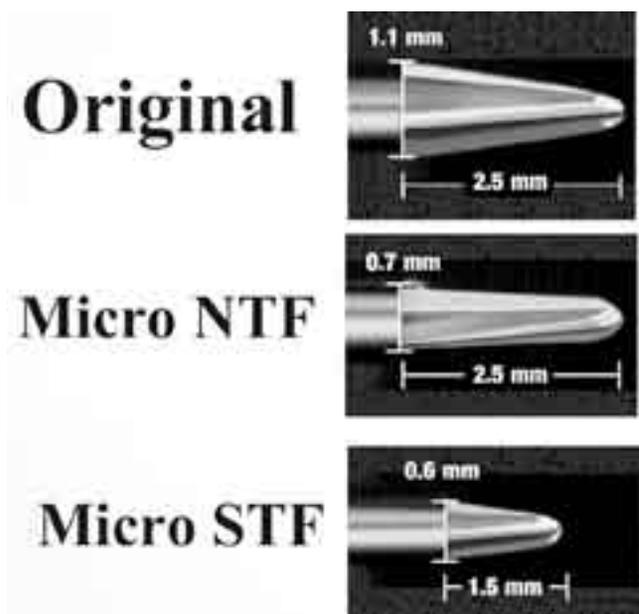


Fig. 2 All 3 Fissurotomy Burs 1.07 MB.PDD

The unique size of 1.1 mm (diameter) x 2.5 mm (length) tapered head of the original Fissurotomy® bur allows excellent access and control of caries and fracture removal (Fig. 3).



Fig. 3 Fissurotomy Cross Section Molar.

Fig. 3 Fissurotomy Original in Cross Section Molar

The tooth is cleaned with pumice and a rotary brush or air abrasion. The tooth is treated with **Riva conditioner (SDI, Australia)** for 10 seconds. The Riva conditioner is agitated with a small brush like **Medium Point (SDI, Australia)** (Fig. 4) or **Micro Benda™ Brush (Centrix)**. The conditioner is removed with water and air from an air-water syringe for 10 seconds. Excess water is removed with a **Medium Point** or **Micro Benda™** Brush.

A capsule of **Riva Light Cure glass ionomer (SDI, Australia)** is activated (Fig. 5) and triturated for 10 seconds in an **Ultramat 2**



Fig. 4 (SDI, Australia) Points-Medium



Fig. 5 Riva Activate Capsule

(SDI, Australia) triturator/mixer.

This machine is almost silent (Fig. 6)! The triturated capsule is placed in a delivery gun (Fig. 7).



Fig. 6 Ultramat 2 Triturator-mixer.



Fig. 7 Riva Glass Ionomer Cement Capsule in gun horizontal.

The **Riva** is injected into the prepared areas of the tooth. A flat bladed composite instrument (**Zoll Dental Instruments**) is used to shape the restoration (Fig. 8).



Fig. 8 Zoll Flat Bladed Composite Instrument.

20 seconds of light curing with a **Radii Plus ((SDI, Australia))** LED light cure unit hardens the glass ionomer (Fig. 9).



Fig. 9 (SDI, Australia) Radii LED Light Cure.

**ROTARY CUTTING INSTRUMENTS**

The **Great White™ Ultra burs (SS White Burs, Inc.)** have unique proprietary engineering with increased number of “teeth” to cut into enamel and dentin (Fig. 10).

**Great White™** carbide steel burs cut smoothly and very quickly. A “Feather-Touch” must be used with the **Great White™ Ultra burs** due to its fast cutting rate. Diamonds chip and fracture tooth structure rather than cut it. Diamonds cut significantly slower than carbide burs. Why use diamonds? This is definitely a good question. Has it been a limit of our past technology that propelled dentists to use diamond-coated burs? Probably. Now there are choices for the clinical dentist.

**Great White™ Ultra burs** have the same shape and description designation as traditional diamond coated burs (see TABLE 2 and Fig. 11).



Fig. 10 GW Ultra.

Fig. 11 GW Ultra & Dia-  
mond bur (comparison)

**TABLE 2**

| Great White™ Ultra Bur (GWU) | Crown Shoulder Flat-end Taper | Crown Chamfer Round-end Taper | Inlay/Onlay Short Flat-end Taper | Occlusal-Lingual Reduction Egg shape |
|------------------------------|-------------------------------|-------------------------------|----------------------------------|--------------------------------------|
| 379-023                      |                               |                               |                                  | X                                    |
| 845-016                      |                               |                               | X                                |                                      |
| 845-018                      |                               |                               | X                                |                                      |
| 845-025                      | X                             |                               | X                                |                                      |
| 847-016                      | X                             |                               |                                  |                                      |
| 847-018                      | X                             |                               |                                  |                                      |
| 847-020                      | X                             |                               |                                  |                                      |
| 855-025                      |                               | X                             |                                  |                                      |
| 856-016                      |                               | X                             |                                  |                                      |
| 856-018                      |                               | X                             |                                  |                                      |
| 856-020                      |                               | X                             |                                  |                                      |
| 856-023                      |                               | X                             |                                  |                                      |

All-porcelain or ceramic crown preparations require an 847-016 (847-018 or 847-020) Great White™ Ultra bur (Fig. 12) to produce a shoulder with a 90° axial-gingival line angle (Fig. 13). Porcelain fused to metal crowns with cosmetic porcelain butt margins are also candidates for the 847-series. When a clinician requires a chamfer with a rounded axial-gingival line angle (Fig.

14) as for porcelain-over-metal crowns and some ceramic crowns an 856-016 (856-018 or 856-020 or 856-023 or 856-025) **Great White™ Ultra bur** is necessary (Fig. 15).



Fig. 12 GWU



Fig. 13 Ultra Ant Ceramic & PFM GWU847



Fig. 14 Ultra POM prep GWU856



Fig. 15 GWU

**PREPARATION**

Adjacent teeth are protected with stainless steel bands or strips to avoid damage from the rapid cutting **Great White® Ultra® burs**. Proximal contacts can be opened with a narrow diamond-coated bur until the clinical dentist feels confident to do the entire preparation with a **Great White® Ultra® bur**.

Retraction cord can be placed as necessary. **Ultrapak (Ultradent Products, Inc.)** retraction cord is knit in a hollow-tube design that is easily placed. It is resistant to damage with a bur. “00” **Ultrapak** cord was placed on all the teeth to be prepared (Figs. 16i & 20b). Healthy gingiva are resistant to double retraction cord layers due to a lack of sulcus depth. The hollow-tube design allows for easy sulcus adaptation. This is why only one layer was used.

The **Great White® Ultra® bur** is moved in a counter-clockwise direction during the fast preparation of tooth 11 (Figs. 14 & 16 a-i).



Fig. 16a #9 Start - prep Ultra GWU847-018



Fig. 16b #8&9 MB Mesial break contact Ultra GWU847-018



Fig. 16c #8 DB start prep - Ultra GWU847-018



Fig. 16d #8 DB start prep - close-up Ultra GWU847-018



Fig. 16e #8 Palatal prep - Ultra GWU847-018



Fig. 16f #8 DB end circumferential prep - Ultra GWU847-018



Fig. 16g #8 MB prep - Ultra GWU847-018



Fig. 16h #8 Incisal prep - dist



Fig. 16i #8 Final prep Palatal view

Usually two laps around the tooth are sufficient to prepare the periphery of the tooth. Tooth number 12 was prepared in a likewise manner (Figs. 17a-e).



Fig. 17a #7 DB start prep Ultra GWU847-018



Fig. 17b #7 DB Dist break contact Ultra GWU847-018



Fig. 17c #7 Lingual prep - GWU847-018



Fig. 17d #7 facial end circumferential prep - Ultra GWU847-018



Fig. 17e #7-8 Final prep - Palatal view

The canines were prepared for porcelain veneers (Fig. 18a-d).



Fig. 18a #6 MB start prep - veneer Ultra GWU847-018



Fig. 18b #6 MB prep - veneer Diamond



Fig. 18c #6 Facial prep - veneer Diamond



Fig. 18d #6 DB prep - veneer Diamond

There is a learning curve to using carbide burs for crown preparations. The dentist must be patient and alert in learning new techniques. This is similar to cutting warm butter with a knife. The clinician must use a "feather-light" touch and smooth counter-clockwise movements around the teeth.

The occlusion is reduced using an American Football shaped 379-023 Great White® Ultra® bur (SS White Burs, Inc.) (Fig. 19).



Fig. 19 GWU 379 023.

Occlusal and incisal clearance can easily be determined by having the patient occlude on soft wax. Trans-illumination of the occluded wax demonstrates "thin" spots in the wax that corresponds to areas on the teeth that need further reduction. This is a fast and accurate low-tech method to determine inter-arch clearance for the metal and porcelain of the prosthesis.



**Astringedent (Ultradent Products, Inc.)** was used to control bleeding. The teeth must be washed with water before and after use of **Astringedent**. The haemostatic action depends on “burnishing” the **Astringedent** into the bleeding gingiva with a cotton pellet, **Medium Point, Micro Benda™ Brush or a Dento-Infusor Tip (Ultradent Products, Inc.)** that has a fiber tip mounted on a syringe. The **Astringedent** can increase the setting time of impression material. The **Astringedent** must be thoroughly cleaned off of the tooth and gingiva prior to the impression (Fig. 20a-b).



Fig. 20a #6-11 Final prep in occlusion



Fig. 20b #6-11 Final prep occlusal view

### IMPRESSION TECHNIQUE

There are many impression techniques and materials. The authors suggest using a simple and accurate method of the full arch disposable **Tray Aways® (Harry J. Bosworth, Inc.)** with adhesive and addition polyvinyl siloxane impression material. A combination of very high and low viscosities was used in this case. Impression trays must be rigid as are **Tray Aways®** that are made of high-impact FDA approved styrene. Flexible impression trays generate distortions in the impression. The tray must be smooth with rounded edges, interior retention slots and vertical perforation for enhanced material retention.

Polyvinyl siloxane impression material adhesive is placed on the impression tray prior to the preparation of the teeth. The adhesive must have time to “mature” and become “tacky”. The combination of impression tray perforations that form “rivets” of impression material and adhesive provide retention of the impression in the tray. Stable retention of the impression is necessary to avoid distortion of the final impression.

Putty or very heavy-body impression material such as **Silagum® (DMG)** or **Flexitime® Xtreme heavy body (Heraeus Kulzer)** was placed in the tray first. The lower extra-oral temperature extends the setting time of the impression material. This is why the putty or heavy bodied impression material must be mixed and placed in the tray before the intra-oral impression material is placed. Different rates of setting of the very heavy (tray) and light bodied (intraoral) impression materials can cause final impression distortions.

Low-viscosity impression material such as **Honigum®-Light (DMG)** or **Flexitime® Xtreme Correct Flow (Heraeus Kulzer)** was injected on top of the putty or very heavy-body impression material then around the prepared teeth. The intraoral delivery tip is moved around each tooth completely in one motion. The tip is kept immersed in impression material and moved to the adjacent teeth with continuous injection of light-bodied material until completed. This is to avoid incorporation of air-bubbles in the light bodied

impression material. The higher intraoral temperature accelerates the setting time. This is why the low viscosity intra-oral impression material is placed last.

The putty/ very heavy-body loaded tray is slowly placed over the prepared teeth arch. This allows the impression material to flow and adapt to the teeth. Final impression distortion can be produced by quick placement of the impression tray. This is because the very heavy bodied material is not allowed to adapt and “flow”. The patient is instructed to bite lightly and consistently on the plastic impression tray until the impression materials are set (Fig. 21). The impression tray is removed when all of the impression materials are set (Fig. 22).



Fig. 21 Maxillary impression in mouth



Fig. 22 Maxillary final impression

### TEMPORIZATION

While the impression material is setting the clinician can recontour the triple-tray impression/bite-registration to achieve ideal alignment and shape of the teeth. An acrylic bur can be used to quickly recontour the impression (Fig. 23).

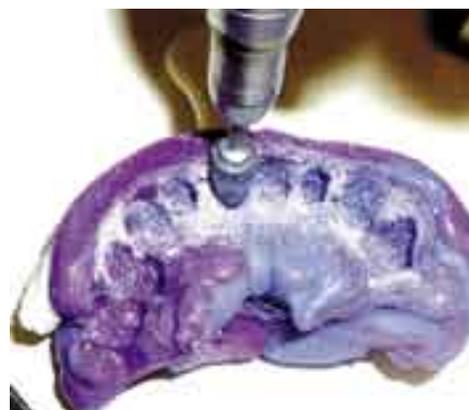


Fig. 23 #8 Reshape Bite-register for temps

**Luxatemp® Fluorescence (DMG)** bis-acrylic temporary crown material is injected into the prepared teeth in the triple-tray impression/bite-registration. The injection tip must be kept immersed in the acrylic during the injection to avoid incorporation of air bubbles. The fluorescence of natural teeth is mimicked with this material. This results in natural appearing provisional restorations. This was extremely important in this case of maxillary anterior teeth. Soft wax is placed in any adjacent teeth undercuts that may impede the removal of the temporary crowns after polymerization. Glycerin is painted on the prepared and adjacent teeth with a **Medium Point or Micro Benda™ Brush** to provide





easy release of the acrylic. Within 45 seconds of loading, the triple-tray impression/bite-registration is slowly placed over the prepared teeth to allow flow and adaptation of the temporary restorative material. The patient bites slowly and firmly into the triple-tray impression/bite-registration. The patient maintains firm closure. Setting is observed and tested with an instrument on exposed acrylic. In about 2-3 minutes after injection of the **Luxatemp®** the acrylic is still in a rubbery consistency but starting to become solid. This is when the triple-tray impression/bite-registration is removed from the patient's mouth. The temporaries are delicately removed from the tray (Figs. 24a-b).



Fig. 24a #6-11 temporaries.



Fig. 24b #6-11 temps on counter

The hard temporaries are shaped and adjusted with acrylic and composite finishing burs (**SS White Burs, Inc.**). Sometimes air bubbles or defects are apparent in the temporary crowns. **LuxaFlow-Fluorescence®** flowable, light-cured composite can be used to fill in these defects. Due to its fluorescence, the temporary restorations appear more lifelike than ever before! Polishing was achieved with **Min-Identoflex™ Polisher (Centrix)** rubber points, wheels and cups. The finished temporaries are coated with **Luxatemp® Glaze & Bond (DMG)** for a smooth and durable finish. The patient desired very white teeth. This was tested in the temporaries as an ultra white shade (Figs. 25a-d).



Fig. 25a Temporaries in place.



Fig. 25b Temporaries in place.



Fig. 25c Temporaries in place.



Fig. 25d Temporaries in place.

### CEMENTATION

The outsides of the temporary crowns are coated with glycerin for easy cement removal. **NoMIX® (Centrix)** non-eugenol temporary cement is placed inside the provisional restorations. The patient is instructed to occlude. **NoMIX®** is a single component, moisture activated, non-eugenol, white temporary cement. **NoMIX®** has a low initial film thickness and slight expansion upon setting that improves the seal. **NoMIX®** can be used with fixed prosthetics made of temporary or permanent materials (acrylic, composite, porcelain to metal crowns, etc). It was chosen because it is extremely easy to use, dispense and clean up. Excess cement is removed (Fig. 26a-c). The patient is dismissed.



Fig. 26a #6-11 Temporaries full face



Fig. 26b #6-11 Temporaries partial face view in mouth.



Fig. 26c #6-11 temps palatal view in mouth

### EMPRESS IPS CROWNS & VENEERS

The second appointment was for the delivery of the 11, 12, 21, and 22 Empress IPS Crowns and 13 and 23 Empress IPS Veneers (Figs. 27a-e). The patient decided that the ultra white was excessive. She approved of a **Vita Lumin® A-1** shade.





Fig. 27a #6-11 Close-up facial view



Fig. 27b #6-11 Facial view IPS Empress



Fig. 27c #9-11 right Facial view IPS Empress



Fig. 27d #6-9 Facial view IPS Empress



Fig. 27e #6-11 Incisal view IPS Empress

### DISCUSSION and CONCLUSION

This combination of innovative proprietary technologies can improve your technique and reduce your time spent working. The **Great White™ Ultra burs** are unique technologies that can revolutionize restorative dentistry in the 21st Century. Imagine this, a quality crown in 20 minutes if you keep moving. This increases to 30 minutes or more if you are having a bad day. These proposed techniques can provide a significant reduction in time and increase in quality and profit margins for the clinical dentist. This philosophy appears to be a true professional advancement!

#### REFERENCES

1. Freedman, George, Goldstep, Fay, Seif, Tomas, Pakroo, Jaffar. *J Can Dent Assoc.* 1999; 65:579-81.
2. Eames W. B., Nale, J. L., "A comparison of cutting efficiency of air-driven fissure burs", *JADA*, 1973, Volume 86, pages 412-415.
3. Farah, J. W., Powers, J. M., editors "Great White # 2", *The Dental Advisor*, February 1994.
4. Siegel, S. C., von Fraunhofer, J. A., "Comparison of Sectioning Rates Among Carbide and Diamond Burs Using Three Casting Alloys", *J. Prosthodontics*, 1999, December, Volume 8, # 4, pages 240 - 244
5. Shannon, Andrew, "Predictable Clinical Protocol for Ceramic Onlays", *Contemporary Esthetics and Restorative Practice*, July 2005, pages 28-33.
6. Strassler, Howard E., Connelley, Thomas B., "An Improved Eugenol-Free, Self-Mixing Temporary Cement", *Contemporary Esthetics and Restorative Practice*, December 2004, pages 2-4.
7. Tagami J, Tao L, Pashley DH, Hosoda H, Sano H. "Effects of High-Speed Cutting on Dentin Permeability and Bonding". *Dent Mater* 1991; 7:234-239.
8. Sekimoto T, Derkson GD, Richardson AS. "Effect of Cutting Instruments on Permeability and Morphology of the Dentin Surface". *Oper Dent* 1999;24:130-136.
9. Taylor DF, Bayne SC, Sturdevant JR, Sturdevant CM. "Instruments and Equipment for Tooth Preparation". In: Sturdevant CM (ed). *The Art and Science of Operative Dentistry*. St. Louis: C.V. Mosby, 1995;209-211.
10. Ayad MF. "Effects of Rotary Instrumentation and Different Etchants on Removal of Smear Layer on Human Dentin". *J Prosthet Dent* 2001;85:67-72.

