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Clinical Technique/Case Report

The Vented Crown: A Pictorial Case Report

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Clinical Relevance

This case report will describe and show in detail all the clinical and laboratory steps involved with the vented cast gold crown utilizing an external vent or escape channel.

SUMMARY

The venting of crowns has been shown to be one of the important factors in achieving the optimal marginal fit that can lead to improved longevity. This case report describes the technique and demonstrates the preparation, laboratory work, seating, and finishing of the vented cast gold crown. This technique can also be used on porcelain fused to metal crowns.

The venting of crowns has been shown to be one of the factors that can improve the fit and reduce the marginal gap of both cast and porcelain crowns.[1–4] The venting can be accomplished by utilizing an internal[5,6] or external[7] vent, also called escape channels. Tjan[8] compared the two venting methods and stated that "an internal escape channel, die spacing, or occlusal venting substantially enhances the complete seating of full cast crowns." Wilson and others[9] have described other factors that can affect the complete seating of full crowns, such as the viscosity of the cement used, passivity of fit, and die spacing. The following pictorial case report will show the details of the isolation, preparation, impression, laboratory work, seating, cementing, and finishing of a full cast gold crown utilizing the external venting technique with a cemented pin. Using this technique takes only an extra few minutes but can improve the longevity of any crown, assuming that attention to detail is practiced during each step.

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DESCRIPTION OF THE TECHNIQUE

A crown is prepared following the protocol described by Tucker,[10] including almost parallel walls, mesial and distal hollow grinds, and a knife-like margin placed with a flame-shaped 860-014. An impression is made using polyvinylsiloxane. The impression is poured using a die stone and a hinge articulator. The die is trimmed, and a silicon crown mold is used to help wax the occlusal surface. A small hole is placed in the wax-up large enough to allow a plastic burnout pin to fit into the hole. The crown along with the plastic pin are cast utilizing a type 2 cast gold with a ringless investment system. The casting is separated from the button, finished, and polished using sandpaper disks and powders. Following complete seating of the casting on the tooth and cessation of the zinc phosphate cement flowing from the vent hole, the pin being held onto a pin seater

Figure 1. *The mandibular right quadrant has been isolated using heavy dark rubber dam and a #26 retainer on the second molar and a sectioned #212 to help expose the mesial margins on the operating tooth.*

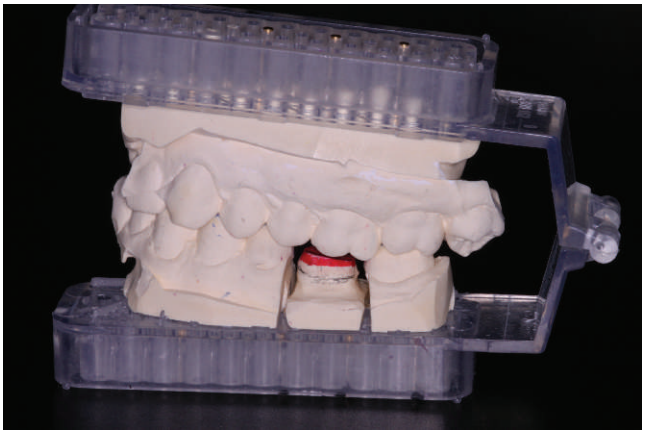

Figure 2. *Completed die model.*

Figure 3. *A thin layer of lining wax being placed on die using electric waxer.*

Figure 4. *Occlusal view of silicon mold on die.*

Figure 5. *Adding modeling wax prior to removal of occlusal mold.*

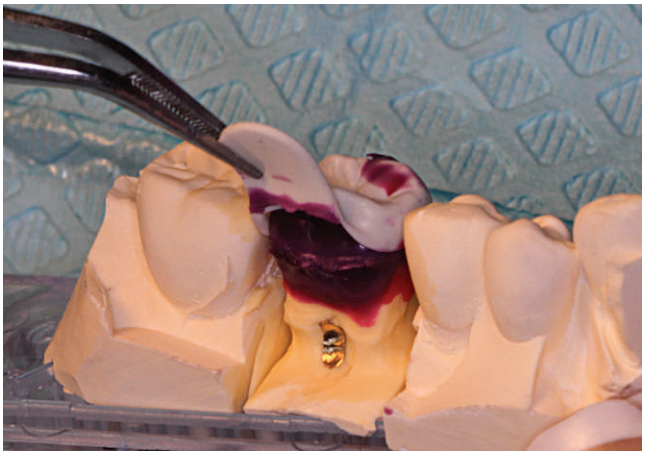

Figure 6. *Peeling mold carefully from die.*

Figure 7. *Handpiece carefully making hole in wax pattern —a small twist drill can also be used for this step. It is important that the hole must be the size of the plastic burnout pins seen in Figure 25.*

with an adhesive dot is very carefully placed into the vent hole and tapped in using a gold foil mallet. Sometimes, if necessary, a small depression is made in the crown prep to allow the pin to completely seat into the crown without hitting tooth structure. The excess pin is then removed using a high-speed diamond and disks of the operator's choice. Finally, the casting is polished using sandpaper disks and aluminum oxide powders.

POTENTIAL PROBLEMS

There are only a couple of potential problems with this technique. The laboratory work must be very exact, and paying attention to every detail is extremely important. A second problem could be the handling of the pin. This can be a little difficult since it is so small. The pin seater used in this case with the adhesive dot facilitated the placement of the pin.

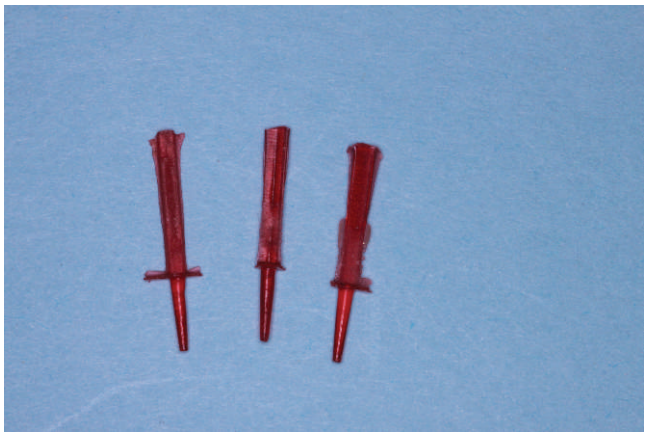

Figure 8. *Plastic burnout pins used for vent pin.*

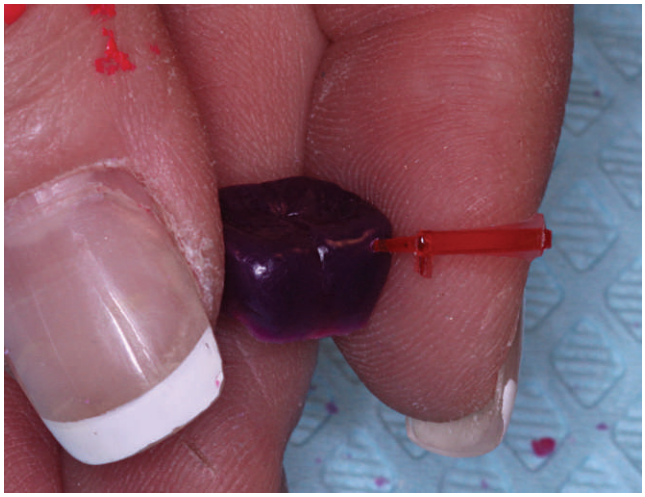

Figure 9. *View showing plastic burnout pin in hole created in wax. The mesio-buccal usually is the best place to place the escape channel since it is easily accessible for finishing.*

Figure 10. *Wax-up and plastic burnout pins on sprue former.*

Figure 11. *Casting following pickling in bath of phosphoric acid water and urea (Pre-Vox, Ivoclar, Amherst, NY).*

SUMMARY OF ADVANTAGES AND DISADVANTAGES

Advantages: Better marginal fit of crown.

Disadvantages: None.

LIST OF MATERIALS USED

Impression material: Aquasil, Dentsply, Milford, DE

Plastic taper pins #700: Wilkerson Company, Post Falls, ID

Emery impression tray: Emery Dental, Salem, OR

Figure 12. *The completed vented crown with pin in place.*

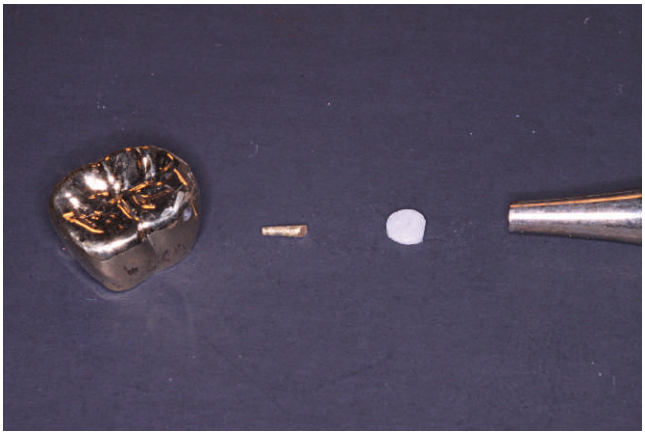

Figure 13. *The crown, pin, adhesive dot, and pin-placing instrument.*

Figure 14. *First step at the seating visit is to try the crown in checking contacts at complete seating on tooth. Make sure that margins are exposed beyond the rubber dam.*

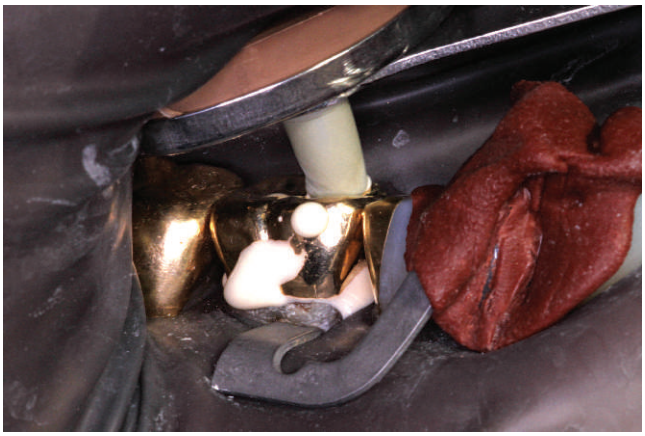

Figure 15. *Crown seated with cement extruding through vent on mesio-buccal. The instrument between the crown and the opposing arch is a Medarts seater (Pearson Dental Supply). When using this seater, make sure that the angle is correct and is allowing full seating.*

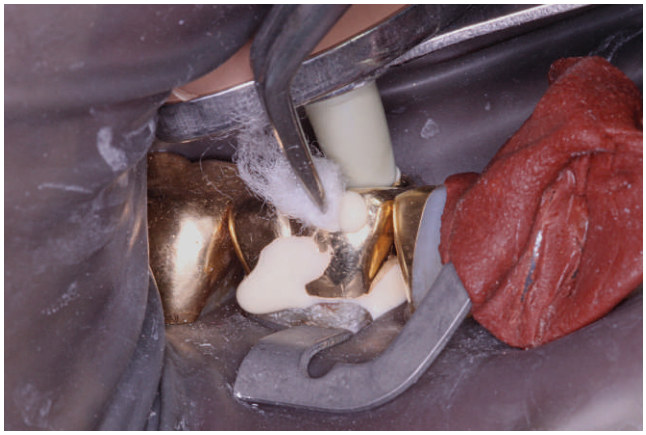

Figure 16. *Image showing the wiping off of the excess zinc phosphate cement.*

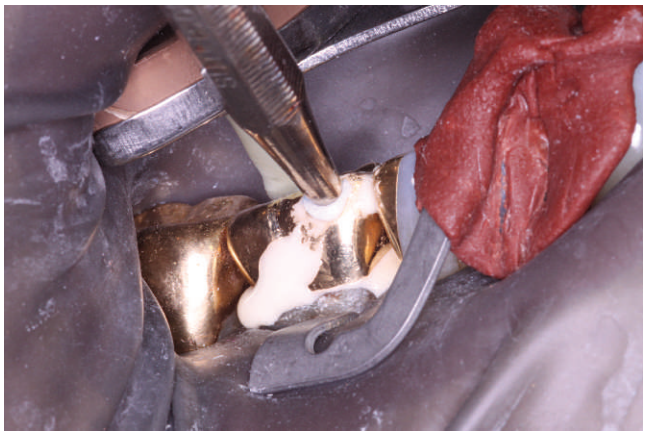

Figure 17. *Cast pin being placed using seating tool. This step can be done with a pair of cotton pliers, but sometimes the very small pin is difficult to hold.*

Figure 18. *A wood stick placed to help achieve complete seating. Note pin on place on the mesio-buccal.*

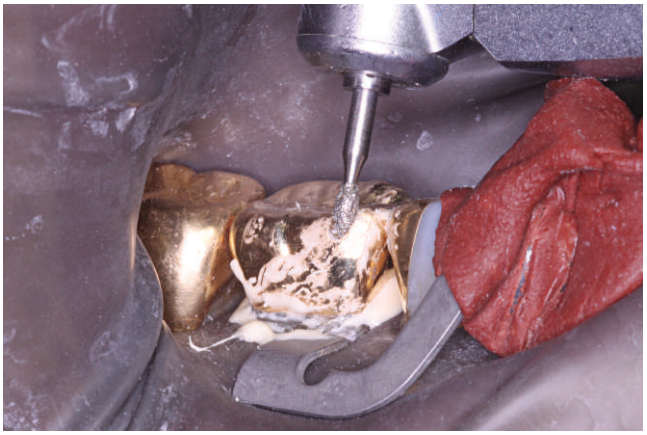

Figure 19. *The excess pin can be removed with a diamond or sandpaper disk and then polished with disks and powders. If the pin does not fully seat, sometimes a small dimple is placed in the tooth at the end on the vent channel to make room for the pin.*

Figure 20. *Buccal view of completed crown.*

Figure 21. *Buccal view of completed crown one year postop.*

Diamonds: Brasseler USA, Savannah, GA

Articulator: WOW, Premier Dental Products, Plymouth Meeting, PA

Dowel pins for articulator: Premier Dental Products

Die stone: Fuji Rock tan, GC America, Alsip, IL

Investment system: Starvest, Emdin International Corporation, Irwindale, CA

Biofit Morphology Occlusal Molds: Jensen Dental Solutions, New Haven, CT

Gold: JRVT, Jensen Industries, New Haven, CT

Leather mallet: James Gourley, DDS, Bainbridge Island, WA

Pin seater: Suter Dental Company, Chico, CA

Medarts seater: Pearson Dental, Sylmar, CA

Adhesive dots: Accudots, Hu Freidy, Chicago, IL

Sandpaper disks: EC Moore Company, Dearborn, MI

Aluminum oxide powders: Universal Photonics, 15- and 1-micron sizes, Hicksville, NY

Conflict of Interest

The authors of this article certify that they have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

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