

Egyptian Prosthodontic Association (EPA Newsletter)

“Endo-crown”

Different approach for restoring endodontically treated teeth.



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With the successive improvement in the adhesion protocols, bonded restoration can minimize the need for conventional retention means in root canal treated (RCT) teeth such as height and taper of the preparation (1). The endo-crown is an alternative treatment option especially in teeth with extensive destruction that does not allow adequate ferrule preparation. Moreover, fewer clinical steps make it more practical and timesaving than post, core, and crown coordination. It is indicated in cases of extensive loss of the coronal tooth structure accompanied with limited interocclusal space (1-3). However, it is contraindicated when the pulp chamber depth is less than 3 mm, when cervical margin width is less than 2 mm and when adequate isolation can't be obtained. Thus, RCT molars rebuilt with endo-crowns have been advised with clinical success (2).

Steps of preparation:

- 1. Occlusal preparation:** At least 2 mm overall axial reduction in the height of the occlusal surface is needed which can be achieved by drilling 2-mm-deep grooves as guides (Fig. 1), then using a diamond wheel stone held parallel to the occlusal plane to complete the occlusal surface reduction and ensures a flat surface (Fig. 2). The cervical margin or “cervical sidewalk” should be supragingival.

- 2. Axial Preparation:** A tapered diamond stone with a total occlusal convergence of 7° is used to make the coronal pulp chamber and endodontic access cavity continuous (Fig. 3). With the bur orientated along the long axis of the tooth, the preparation is carried out to obtain at least 3 mm cavity depth.

- 3. Polishing the Cervical Band:** A larger diameter stone with the same taper and finer particle size is used to remove micro irregularities and produce a flat, polished surface (Fig. 4) with a sharp edge (Fig. 5a and b).

- 4. Preparation of the Cavity Floor:** The entrance to the pulpal canal should be opened and gutta percha should be removed to a depth not exceeding 2 mm to take advantage of the saddle-like anatomy of the cavity floor (Fig. 6). No drilling of dentin is carried out.

- 5. Cleaning the Pulp Chamber** Ultrasound is recommended to clean the pulp chamber and its floor thoroughly



Figure 1: Making the depth orientation grooves.



Figure 2: Preparation of the cervical margin or “cervical sidewalk” using a wheel stone.



Figure 3: Axial preparation using a tapered diamond stone.

Choice of Materials:

A wide collection of available restorative materials such as glass ceramics, hybrid ceramics, reinforced composite resin and high-performance polymers (PEEK) through pressing, subtractive or additive manufacturing to obtain final restoration with improved esthetics (3). But high-performance polymers (PEEK) still need surface conditioning to improve bonding with resin cement and veneering composite resin. Those having low elastic modulus may theoretically improve the mechanical behavior of the tooth-restoration system due to their better stress distribution and consequently reducing catastrophic fractures (6,7). Despite their lower resistance

to wear, they offer greater resiliency and less abrasion to the antagonists than dental ceramics. Moreover, these materials have better machinability and easier repair and polishing than glass ceramics. However, it would suffer from repeated elastic deformation at the margins that might trigger microleakage and subsequent restorative failure paired with recurrent decay (8)

Adhesion-Bonding: There are general recommendations on bonding, which may vary depending on the producer's recommendations and the personal experience of clinical operators (9). Resin cement has long been the gold standard for the retention and reinforcement of glass ceramics.

A step-by-step bonding procedure (10):

(A) The external surface of the endo-crown is protected by using pink wax.

(B-C) The inner surfaces are etched using 9% hydro fluoride acid (HF) for 60 s, then rinsed and cleansed by 95% alcohol then ultrasonic bath for 4 min.

(D) The bonding agent is applied on the internal ceramic surface without light curing.

(E) The pink wax is removed

(F) prepared teeth surface is etched by applying 37% phosphoric acid etching gel for 30 sec.

(G) Adhesive resin cement is applied for cementation.

(H) Endo-crown was gently positioned with finger pressure for checking marginal fits then initial light cure for 5 sec. and then the excess of the luting agent was removed.

(I) A final photopolymerization was performed for 60 sec.

(L-M) The residual cement is eliminated then dental floss is passed with light friction.

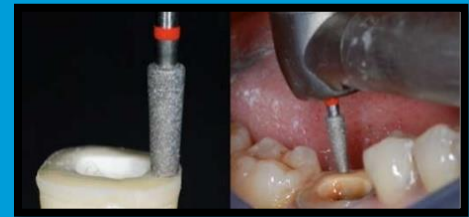


Figure 4: Polishing the cervical band.



Figure 5: Cervical margin before (A) and after (B) polishing.

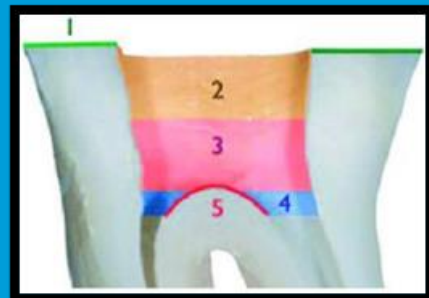
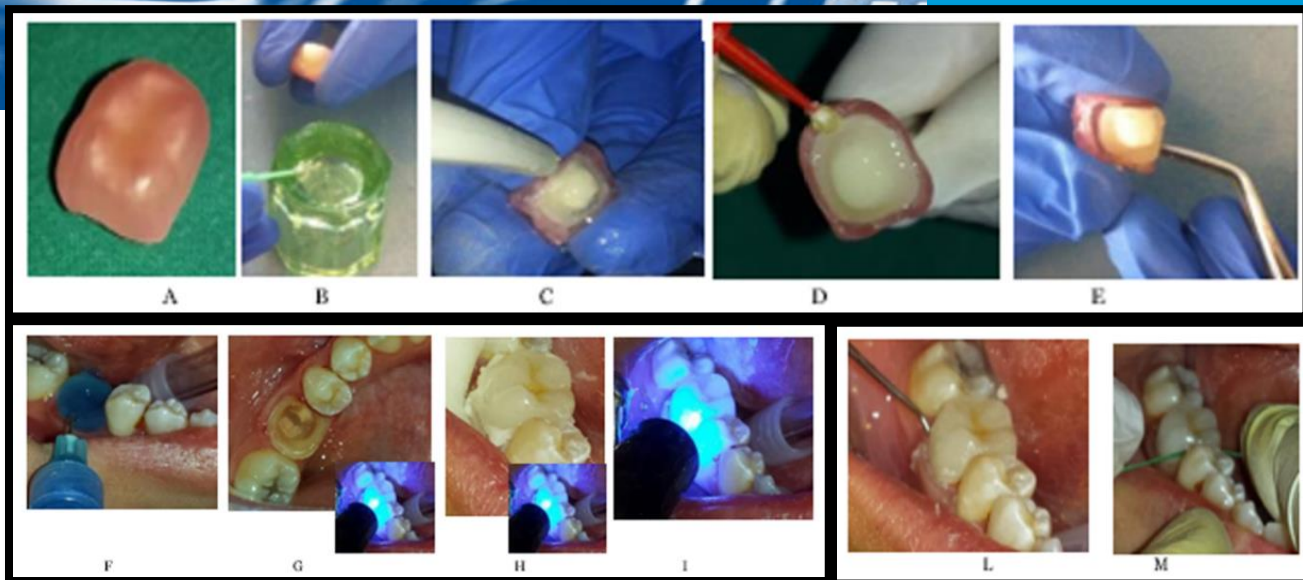


Figure 6: Endo-crown preparation. 1. Cervical sidewalk, 2. Endodontic access cavity, 3. Pulp chamber, 4. Root canal inlet, 5. Saddle-shaped pulpal floor.



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