

STAINLESS STEEL CROWNS

Introduction

In this issue we will discuss the indications and technique for stainless steel crowns in both primary and permanent molars. Open face stainless steel crowns for primary anterior teeth will also be discussed.

Types of Stainless Steel Crowns

There are two types of stainless steel crowns available for primary and permanent molars.

- ◆ The first type is a Unitek crown (3M Co., St. Paul, MN). This crown has a cylindrical shape from the occlusal surface to the gingival surface. It is easily manipulated with forming pliers and can be fitted to most primary and permanent molars with the proper technique.
- ◆ The second type is a Ni-Chro ion crown (3M Co., St. Paul, MN). These crowns are pre-contoured and are reportedly used so a minimal amount of adaptation is needed. However, if these crowns need to be manipulated or trimmed, often it takes more clinical time to fit properly. The major disadvantage of these crowns is the tendency to develop holes in the occlusal surface.
- ◆ Crowns of both types come in sizes #1-6 for incisors and canines, and sizes #1-7 for the molars.
- ◆ We use the 3M Unitek crown exclusively because it is more durable and it fits a wider variety of tooth shapes.

Indications

- ◆ **Extensive Caries**
After caries removal, insufficient tooth structure remains to retain an amalgam or composite resin restoration.
- ◆ **Rampant Caries**
In primary teeth with multiple surface caries, a stainless steel crown provides a restoration that will last the life of the tooth.
- ◆ **Hypoplastic Teeth**
In primary or permanent teeth that can not adequately be restored with amalgam or composite resin restorations.
- ◆ **Following Pulp Therapy**
In primary teeth after a pulpotomy or pulpectomy, a stainless steel crown will reinforce a brittle tooth.
In young permanent molars that have undergone root canal therapy, placement of a stainless steel crown can provide an excellent interim restoration until the occlusion is mature and a laboratory fabricated crown can be placed.
- ◆ **Hereditary Anomaly**
Amelogenesis or Dentinogenesis Imperfecta.
- ◆ **Fractured Teeth**
Often with fractured teeth there is not enough tooth structure to adequately place a conventional restoration.

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Contraindications

◆ Aesthetically Unpleasing

The recently introduced posterior stainless steel crowns with a tooth colored veneer applied over the metal has been shown to fracture and chip within days of cementation.

◆ Periodontal Problems

In primary molars and incisors gingival inflammation may arise with improperly adapted crowns. In permanent molars periodontal pocket depth may increase and bone loss can occur on improperly adapted crowns.

◆ Patients with Nickel Allergies

Placement of stainless steel crowns on these patients cause a localized or systemic allergic reaction.

Instruments and Burs Required

◆ Burs

High speed handpiece

- * Flame shaped diamond
- * 245 (if pulp therapy is required)

Slow speed handpiece

- * Round burs to adequately remove caries
- * Heatless stone to contour gingival margin of crown

◆ Pliers

- * # 114 Johnson pliers (to contour crowns)
- * 800-41 crown-crimping pliers (crimp margins only)

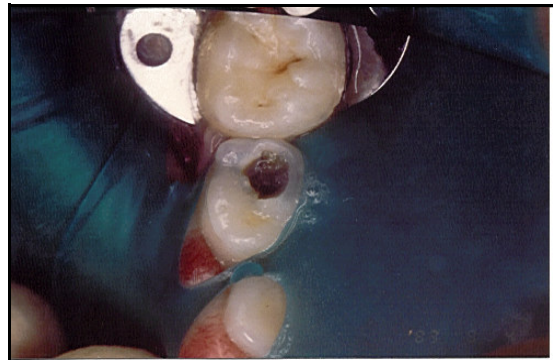


Radiograph of properly adapted permanent stainless steel crown.

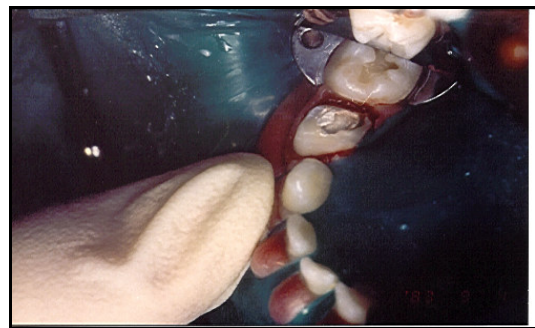
Clinical Procedures for Primary and Permanent Molars

◆ Tooth Preparation

- * Always check the child's occlusion before placing the rubber dam and preparing the tooth in order to reproduce the existing occlusion.
- * Anesthetize.
- * Place rubber dam.
- * Slice mesial and distal surfaces of the molar just below the contact area or below interproximal caries (avoid scarring the adjacent teeth).
- * Reduce occlusion 1-2mm.
- * Round line angles and remove large buccal bulges on first primary molars.
- * Remove all remaining caries with slow speed handpiece (round burs).



Before preparation



After preparation

◆ Crown Selection

- * Select the smallest crown that completely covers the preparation. This crown should have adequate mesio-distal width and proper occlusal height.

◆ Contouring and Adapting Crown

- * After a proper crown is selected, place on prepared tooth from lingual to buccal and seat completely. Mark gingival margin with an explorer or scaler and remove the crown. Reduce the gingival margin of the crown with the heatless stone 1mm below mark on crown.
- * If space loss has occurred, the crown can be squeezed with flat nosed pliers to a cylindrical shape in order to fit in a narrow mesio-distal space. More aggressive buccal and lingual reduction will aid in a more anatomically correct crown and allow a smaller size to be used.
- * Use 114 pliers to contour buccal and lingual surfaces of the crown.
- * Use # 800-41 crown crimping pliers around the entire margin of crown (crown should now be adapted to the normal anatomy of the tooth).
- * Again try crown on by seating in lingual to buccal direction. Crown should "snap" into the correct position.
- * Check margins with a explorer. Margins should be well adapted to the tooth structure.
- * Check occlusion.
- * In order to remove the crown, a large spoon excavator can be used to dislodge the crown off the tooth.

◆ Cementation

- * Several types of cement may be used to cement stainless steel crowns. We most often use zinc phosphate cement or glass ionomer cement.
- * Fill the crown with cement and seat crown on the prepared tooth from lingual to buccal. Use moderate thumb pressure to seat crown (a band seater may be necessary).
- * Remove excess cement with moist cotton 2x2.
- * Once cement has dried, remove excess with a explorer or scaler and floss proximally with knotted dental floss to remove excess inter-proximal cement. (Excess cement can cause gingival inflammation).

Cemented Stainless Steel Crown in Place

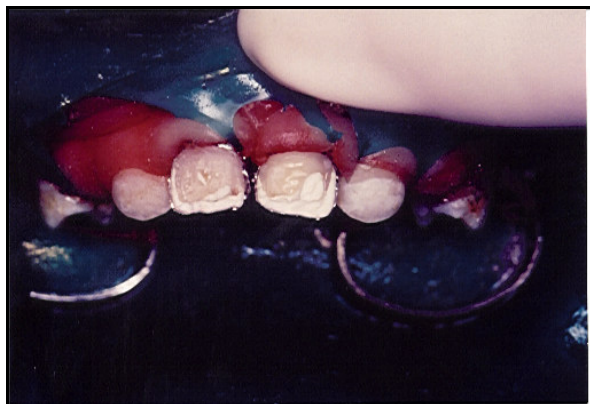


Open Face Stainless Steel Crowns

Restoring primary anterior teeth can be difficult. Often, once all the caries are removed, there remains little tooth structure to bond a conventional composite restoration and have adequate durability over time. This same problem arises with large fractures to primary incisors. In these situations the best restoration is an open faced stainless steel crown.

◆ Preparation is Similar to Molars

- * Again, it is important to check the child's occlusion prior to preparation.
- * Slice mesial and distal surfaces and reduce incisal edge 1-1.5mm, round all line angles and reduce lingual and facial surfaces about 0.5 mm.
- * Remove all caries with round burs on slow speed handpiece.
- * Choose crown of correct size.
- * Adapt margins and crimp appropriately.
- * Cement crown and remove excess cement.
- * After cement has completely set, use a 245 bur to cut out a "window" on the facial surface of the crown (always use water spray when cutting out the window as the metal may become very hot and may damage the soft tissue around the tooth or pulp of the tooth). One can use a white stone to smooth edges of metal on collar. Also it is imperative that the cement around the edges of the "window" is removed to create an undercut for better composite retention.
- * Use all steps for standard composite resin restorations to restore the facing of the primary incisor (use lightest shade available in most cases).
- * A red tint under the composite will help neutralize a grey hue, reflected from the stainless steel.

Stainless Steel Crown with Window Cut Out**Completed Stainless Steel Crown with Open Face**

There are also Prefabricated Colored Anterior Stainless Steel Crowns with Composite Facings Available.

- ◆ **Advantages of prefabricated crowns (with composite facing).**
 - * Very nice aesthetics.
 - * Much faster to place.
- ◆ **Disadvantages of prefabricated crowns (with composite facing).**
 - * The facings often fracture off.
 - * It is difficult to adapt the crown because manipulation can cause the resin facing retention to be compromised.
 - * Can not trim crown.
 - * More expensive.
 - * Will not match adjacent teeth. They are best used when all four incisors are restored.
 - * Can look too full buccally.

BIBLIOGRAPHY

- ⇒ Mathewson RJ, Primosch RE: Fundamentals of Pediatric Dentistry, 3rd ed. Quintessence publishing co, inc. 1995, pp 233-246, 253-255.
- ⇒ McDonald RE, Avery Dr: Dentistry for the Child and Adolescent, 6th ed. Mosby, 1994, pp 418-422, 514-515.
- ⇒ Croll TP, Killian CM: Zinc Oxide-Eugenol Pulpotomy and Stainless Steel Crown Restoration of a Primary Molar, Quintessence International volume 23, number 6/1992, pp 383-388.
- ⇒ Spedding RH: Stainless Steel Crowns for Primary Molars, pp 1-31, unpublished data, 1985.

If an open faced stainless steel crown is placed on a partially erupted primary incisor inform the parent that revision of the composite facing may be necessary in the future if the gingival collar shows too much metal once the tooth fully erupts.

◆ **Examples of companies that make prefabricated anterior crowns.**

- Cheng Crowns
- Kinder Crown
- Nu Smile
- Whiter Briter II

Reasons for Failures of Stainless Steel Crowns

- 1 Poor tooth preparation.
- 2 Poor crown retention and adaptation.
- 3 Poor cementation technique.
- 4 Occlusal surface of crown wears through due to heavy bruxism seen with preadapted crowns made by 3M (Ion crowns).
- 5 Poor distal margin adaptation allows permanent molar to erupt ectopically under a second primary molar.



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