Stainless Steel Crown

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Introduction

The restoration and preservation of carious teeth is one of the most important services that we perform for the child patient. Premature loss of both primary and permanent teeth can produce effects which are not just temporary in terms of the masticatory apparatus, but permanent in terms of the patient's physiological (occlusion) and general psychological development (loss of an anterior tooth). While multiple restorative options will exist for a carious primary tooth, this article will focus on the use of the stainless steel crown for the restoration of badly broken-down primary molars.

Background

Until the advent of the stainless steel crown by Humphrey1 in 1950, the badly broken-down primary molar presented a variety of problems in its restoration. Techniques incorporating the use of cast gold or silver amalgam have been used in the past but these restorations were either not practical or were not of significant durability. In 1981, Dawson et al2 showed the stainless steel crown to have a longer clinical life-span than the two surface amalgam restoration and on the whole stainless steel crowns are considered to be far superior to large multi-surface amalgams in terms of life-span and replacement rate.3

Indications for Use of Stainless Steel Crowns4

1. Restoration of primary or young permanent teeth with extensive carious lesions.
2. Restoration of Hypoplastic primary or permanent teeth.
3. Restoration of primary teeth following pulpotomy or pulpectomy procedures.
4. Restoration of teeth with hereditary anomalies such as dentinogenesis imperfecta or amelogenesis imperfecta.

5. Restorations in special needs individuals or others in whom oral hygiene is extremely poor and failure of other materials is likely.
6. As an abutment for space maintainers or prosthetic appliances.
7. Temporary restoration of a fractured tooth.

Stainless Steel Crown Types

The early stainless steel crowns presented problems in technique because of poor anatomy and unfestooned gingival contours. The crowns in use today present the clinician with few problems because of their shallow cuspal anatomy, festooned gingival contours, and wide size range.

The two most commonly used stainless steel crowns today are:

1. Pre-trimmed, non contoured stainless steel crowns (3M™ Espe™ Unitek™, St. Paul, MN): These crowns have straight sides but are festooned to follow a line parallel to the gingival crest. They still require contouring and some trimming.
2. Pre-contoured stainless steel crowns (3M™ Espe™ Unitek™, St. Paul, MN): These crowns are pre-contoured and festooned to more closely resemble primary molar anatomy and to reduce chair-side operating time. On occasion some additional trimming and/or contouring may be necessary.

Procedure5

A)Tooth Preparation:

1. Evaluate the preoperative occlusion.
2. Administer appropriate local anaesthesia ensuring that all soft tissue surrounding the tooth to be crowned are well anaesthetised
3. Place a rubber dam
4. Reduce the occlusal surface by at least 2 mm so that the tooth is out of occlusion. Since the stainless steel crowns have a shallow cuspal anatomy, the occlusal table may be flattened and there is no need to follow the cuspal outlines.
5. Following occlusal reduction, all caries should be removed with a large bur in the slow handpiece.
6. If pulp therapy is indicated, it should be performed now, before any smooth surface reduction.
7. Using a tapered diamond bur angled between 10 and 15 degrees, depending on how bulbous the tooth is, mesial and distal slices are prepared. It is important to prepare these slices so that a dental explorer may be freely passed between the adjacent teeth.
8. The taper diamond bur is similarly angled for the reduction of the buccal and lingual surfaces to just below the free gingival margin of the tooth. It is important at this stage to leave the undercut at the neck of the tooth.

9. If the tooth is now observed from the occlusal aspect, it will be seen that sharply angled corners exist mesio- and disto-bucaaly and mesio- and disto-lingually. These corners must be rounded off using the tapered diamond bur prior to stainless steel crown adaptation.

B)Stainless Steel Crown Selection and Adaptation:

1. A stainless steel crown of correct mesio-distal width is selected for the prepared tooth. When trying various crown sizes the crown should always be applied to the tooth from the lingual to the buccal.
2. The crown height must be checked at this stage to ensure proper occlusion. If the crown is the correct size, but too high, then the crown height is reduced by using a pair of crown and bridge scissors at the gingival contour of the crown. The cut edges are then polished with the abrasive stones and rubber wheels.
3. To ensure a proper fit contouring is necessary. The amount of contouring the crown requires is dependant upon how closely the crown fits the tooth initially, since the general effect of contouring is to reduce the gingival diameter of the stainless steel crown.
4. The initial contour is applied peripherally using a pair of ball and socket pliers with the beaks placed just below the cusps of the crown. The effect of these pliers is to produce a bulge around the crown. This bulge is then smoothed out with a pair of band contouring pliers. In most instances the crown fits sufficiently well that the initial contouring may be started with the band contouring pliers. The result of this contouring is to produce a stainless steel crown of rounded smooth surface contour and reduced gingival diameter.
5. The final crimp is applied at the gingival margin of the crown with the crown crimping pliers to ensure a snug fit at the gingival undercut of the prepared tooth. When trying on the crown after crimping it should audibly snap on to the tooth and an explorer run around the margin will reveal any areas which may require further adaptation.
6. Prior to cementation the crown should be cleaned and dried and the tooth should be cleaned, dried and isolated. The crown should be cemented with glass ionomer or polycarboxylate cement.
7. Once cemented remove all excess cement and check occlusion.

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