

Composite crown-form crowns for severely decayed primary molars: a technique for restoring function and esthetics

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Current developments in esthetic dentistry center around new techniques and materials that improve the ability of the clinician to provide esthetic services. This article describes a step-by-step method of placing composite crown-form crowns on severely decayed primary mandibular molars. The described technique allows for restoring, as close as possible, form and function lost to caries in an esthetic mode in cases of severely decayed primary molars that would have required stainless steel crowns had they been treated traditionally. Disadvantages of this treatment mode are that dryness may not be prevented in the proximal margins, especially where subgingival carious involvement is encountered and the margin areas may be contaminated with gingival fluid or blood. Although no long-term follow-up has been reported for the technique, when strong opposition by the parent or child to the stainless steel crown is encountered, and a desire for esthetic restoration is strongly expressed, the composite crown-form crowns may be considered as an alternative.

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INTRODUCTION

The restoration of severely decayed primary teeth is often a clinical challenge. Not only the teeth are difficult to restore, but the behavior of the patient can affect the treatment negatively. Requirements for an acceptable restoration include: natural color; durability; adhesive bonding that is bio-compatible with the pulp; easily and rapidly placed; requires only one treatment visit.

While in primary incisors, which are severely decayed, the use of composite strip crowns is widely accepted^{1,2} in molars, compared to other options, stainless steel crowns are the treatment of choice for many years.^{3,5}

Increased expectations of patients and parents towards esthetics as well as function, together with improved diagnostic and material advances, have expanded the boundaries of esthetic dentistry.

Current developments in esthetic dentistry center around new techniques and materials that improve the ability of the clinician to provide esthetic services. These developments include the availability of improved composites for anterior and posterior use.^{6,7} New bonding techniques to dentin enable practitioners to perform difficult restorative procedures in a conservative manner, producing results that are highly esthetic and physiologically tolerable.

A most attractive restoration for these cases today is the adhesively bonded composite crowns, made by using acetate crown-form matrices. This article describes a step-by-step method of placing composite crown-form crowns on severely decayed primary mandibular molars.

CASE REPORT

A six-year old girl presented to the dental clinic of the Department of Pediatric Dentistry at the Hebrew University Hadassah School of Dental Medicine in Jerusalem with the complaint by the parents of decayed mandibular left molars.

Clinical and radiographic examinations revealed the first mandibular molar with a large disto-occlusal amalgam restoration with secondary caries. On the occlusal surface of the second primary molar, a broken amalgam restoration was observed with caries around the restoration extending to the distal surface (Figure 1). There was no periapical pathology in either of the teeth.

On the right side, small occlusal carious lesions were noted on the two molars. No other carious lesions were observed. Due to the extent of caries on the mandibu-

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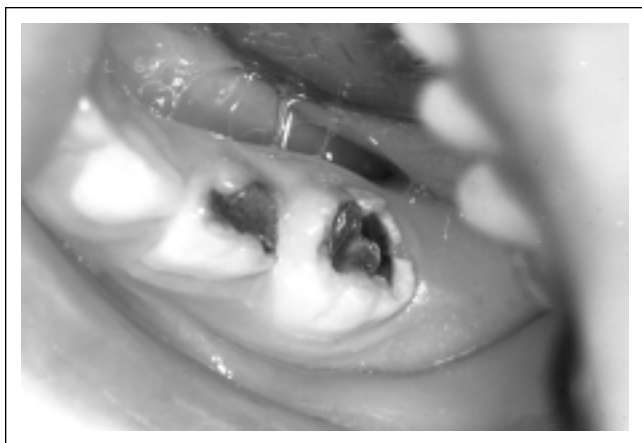


Figure 1. A clinical view of the decayed molars: The severely decayed first mandibular molar with the extensive involvement of the distal surface. On the occlusal surface of the second molar, a broken amalgam restoration is observed with caries around the restoration.

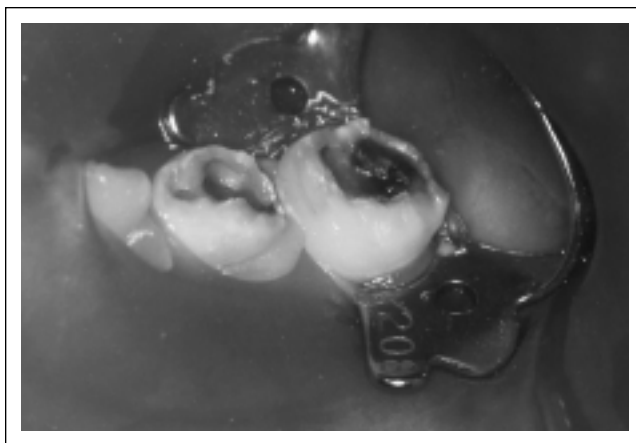


Figure 2. Occlusal height is minimally reduced less than 1 mm using a water-cooled, high-speed 330 tungsten bur.



Figure 3. Trimming of the matrix to ensure proper placement and coverage the decayed first primary molar

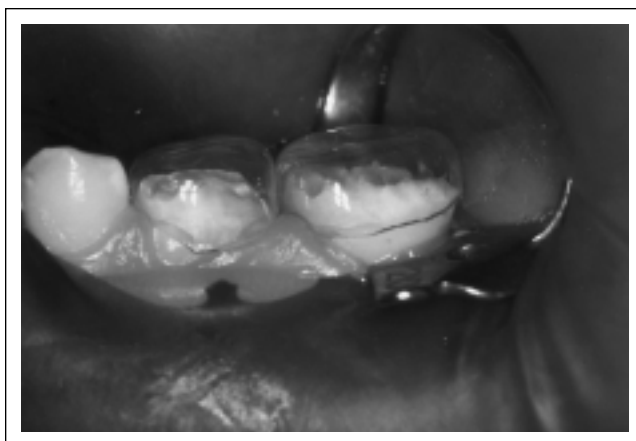


Figure 4. The trimmed crown-form matrix of the right primary molar placed into tooth.

lar left molars, stainless steel crowns and composite-sealant restorations for the right mandibular molars were suggested. The parents refused to the stainless steel crowns on the left molars and insisted on esthetic restorations. Therefore composite crowns with crown forms were suggested. The treatment was explained to the parents in detail, including the possible problems of this type of restorations: microleakage at the gingival margins and breakdown of the composite material. Nevertheless, the parents insisted on the esthetic restorations.

TECHNIQUE

After mandibular block and rubber dam placement, occlusal height of the two primary mandibular left molars was minimally reduced less than 1 mm using a watercooled, high-speed 330 tungsten bur (Figure 2). Then, proximal preparation was performed by using an El high-speed diamond bur. A proper crown-form

matrix (Success Essentials™, Space Maintainers Lab, Chatsworth, CA, USA) was selected first for the first molar that was the smallest in the mesio-distal dimension. At this stage, trimming of the crown-form matrix was required to ensure proper placement and coverage of the decayed teeth (Figure 3). The trimmed crown-form matrix of the first primary molar is observed in Figure 4.

Caries was removed from the two teeth. No pulp therapy was needed. Etching was performed followed by bonding (Single Bond™, 3M Co., St. Paul, MN, USA) and curing with halogen light. Then, the crown-form matrices were filled with a composite resin (Z100™ 3M Co., St. Paul, MN, USA), and placed over the decayed teeth from lingual to buccal (Figure 5). Excess of material (mostly observed in the buccal and lingual aspects) was removed with a carver. After 80-second curing (20 seconds on each side of the tooth) the crown-form matrix was removed with the sharp



Figure 5. The crown-form matrix filled with composite and placed from lingual to buccal. Note the excess of material on the buccal and distal areas.

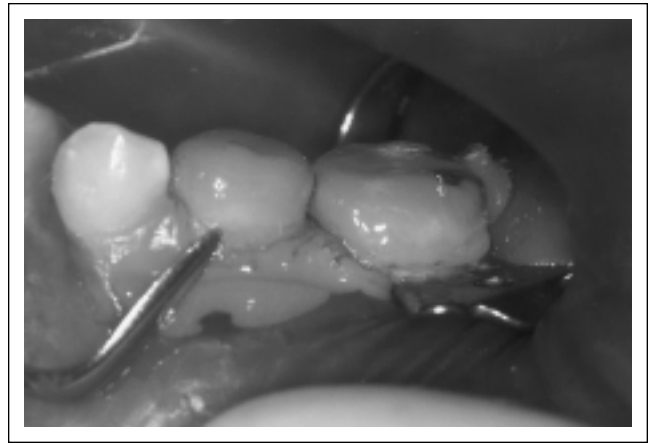


Figure 6. The crown matrix is removed with the sharp edge of the carver after 40-second curing.

edge of the carver (Figure 6). Minor polishing was required in the margins. The rubber dam was removed and occlusion was properly checked with articulation paper (Figure 7).

DISCUSSION

The described technique allows for restoring, as close as possible, form and function lost to caries in an esthetics mode in cases of severely decayed primary molars that would have required stainless steel crowns had they been treated traditionally. The use of the crown-form matrices enabled the clinician to place a homogeneous composite material inside the cavities, and at the same time ensured good coverage of the preparation margins. The minimal occlusal reduction allows for conserving tooth material and better bonding of the composite to the enamel.

Disadvantages of this treatment mode are that dryness may not be prevented in the proximal margins, especially where subgingival carious involvement is encountered and the margin areas may be contaminated with gingival fluid or blood.

These problems resemble to some extent those of Class II composite restorations, but while preparing a Class II composite restoration, a matrix is placed around the tooth and tightened with a wedge, no such tightening can be performed when preparing the crown-form posterior composite matrix. The problems in making the posterior crown-form composite restorations resemble more to those of anterior strip-crown preparations for primary teeth.⁸ However, the relatively high success rate of the anterior crowns and the continuous improvement in the composite materials are encouraging factors for performing the crown-form composite restorations on posterior teeth.

In light of the above mentioned possible problems, it is the authors' opinion that stainless steel crowns should still be the treatment of choice when severely decayed

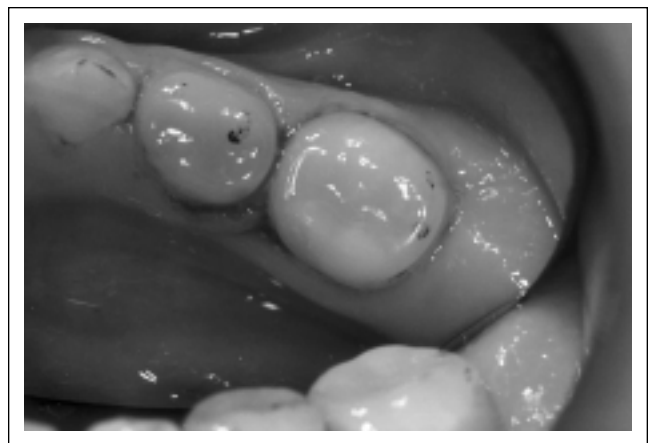


Figure 7. Occlusal view of the restored teeth after occlusal adaptation.

primary molars. However, when strong opposition by the parents of child to the stainless steel crown is encountered, and a desire for esthetic restoration is strongly expressed, the composite crown-form crowns may be considered as an alternative.

No longitudinal follow-up has yet been reported for the composite crown-form crowns, therefore parents and patients must be warned about the possible failure of the restoration, and the need for periodic follow-up appointments.

Further research is needed to eliminate the possible disadvantages of the present crown-form composite restorations in order to meet with the increasing demand for esthetic restorations.

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