



Long-term Clinical Performance of Esthetic Primary Molar Crowns

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Abstract

Purpose: The aim of the study was to report the long-term clinical performance of esthetic primary molar crowns and compare them to that of stainless steel crowns (SSC).

Methods: Twenty crowns (10 conventional and 10 esthetic) placed in 10 children who had participated in a previously reported study, were assessed again after 4 years. The crowns were evaluated clinically and radiographically according to the following parameters: gingival health, marginal extension, crown adequacy, proper occlusion, proximal contact, chipping of the facing (for esthetic crowns only), and cement removal.

Results: At the 4 year evaluation, all the esthetic crowns showed chipping of the facing. No difference was found for marginal extension, occlusion, crown adequacy and periodontal health between SSCs and the esthetic crowns.

Conclusions: After 4 years, all the esthetic crowns presented chipping of the facing and, consequently, a very poor esthetic appearance. (*Pediatr Dent.* 2003;25:582-584)

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Stainless steel crowns (SSC) have been used to restore primary and permanent posterior teeth for almost 50 years. They are intended mainly to restore hypoplastic teeth, teeth with extensive caries, teeth after pulpotomy or pulpectomy, and when teeth become brittle and are prone to fracture.¹ No other type of restoration offers the convenience, low cost, durability, and reliability of such crowns when interim full-coronal coverage is required. Preformed SSCs have improved over the years: better luting cements have been developed, and different methods of crown manipulation have evolved.²

Despite the favorable qualities mentioned, SSCs have a major drawback—namely, their poor esthetic appearance. There is a growing demand from parents to provide their children's teeth with esthetic restorations, resulting in an increased use of resin-based composites and glass ionomers.³ Current developments in esthetic dentistry center on new techniques and materials that improve the ability of the clinician to provide esthetic services. The strip crown form, resin-based composite restoration now allows the reconstruction of even the most badly decayed primary incisors.⁴ The use of strip-crown forms to restore posterior teeth also has been reported,⁵ but their use is not as popular as for the anteriors.

Another treatment modality for restoring badly broken-down primary incisors is the use of SSCs with esthetic facings, available commercially under several brand names.⁶ One of the companies (NuSmile, Houston, Tex) also offers these crowns for molar teeth.

The clinical performance of the NuSmile molar esthetic crowns was assessed and compared to that of conventional SSCs in a previous study,⁶ and several impediments were observed. These esthetic crowns:

1. resulted in poor gingival health;
2. were very expensive;
3. were bulky;
4. lacked a natural appearance.

However, after a 6-month follow-up, no chipping of the surface was observed.

The present article reports the clinical performance of the same crowns after 4 years.

Methods

The study was carried out at the postgraduate clinic of the Department of Pediatric Dentistry at the Haddassah School of Dental Medicine, Jerusalem, Israel.

Eleven children who needed at least 2 crown restorations of mandibular molars were included in the previous study.

Table 1. Four-year Clinical-Radiographic Evaluation

Clinical evaluation	Esthetic	Conventional
Gingival health		
No bleeding	9	9
Bleeding	1	1
Marginal extension		
< 0.5 mm	9	9
1 mm	1	1
Occlusion		
Normal	8	10
Rotated	2	0
Chipping		
No	0	-
Yes	0	-
Radiographic evaluation		
Crown adequacy		
Adequate	10	10
Short	0	0
Bone resorption		
Yes	0	0
No	10	10

A matched-pair study design was used, as both the esthetic and the conventional SSC would be subjected to a similar oral environment and comparable hygiene habits.

The esthetic crowns were available in a single color shade, and the cost was almost \$32 each. These crowns are thicker than conventional SSCs due to the composite facing (occlusal=1.7 mm; facial=1.5 mm; cervical=1.2 mm). The thickness of the SSC is 0.2 mm.



Figure 1. Esthetic crown after 4-year follow-up. A=chipping of the esthetic facing; B=gingival margin.

The crowns were evaluated clinically and radiographically according to the same parameters and criteria of the preliminary report (gingival health according to a modified gingival index,¹⁰ marginal extension, proper occlusion and position, chipping of the facing, cement removal, periodontal ligament enlargement or not, and pulp involvement).

Ten of the original 11 children who participated in the study had at least 2 mandibular primary molars, 1 restored with a SSC and the other with an esthetic crown (NuSmile). These children had participated in the previous assessment⁵ were re-examined 4 years after treatment by the same independent clinician that conducted the previous evaluations, and the results of both evaluations were compared.

Results

The results of the clinical parameters evaluated after 4 years of treatment are summarized in Table 1.

Gingival health was rated A (no bleeding) in 9 esthetic crowns and 1 scored B (gingival bleeding present on probing). The same result was obtained with the SSC.

Only 1 patient showed gingival bleeding present on probing of both crowns, the esthetic and the SSC. She presented marginal gingivitis limited to the crowned teeth.

Extension of the crowns in the buccal surface was similar in both groups, as was described in the previous report: all but 1 crown in each group extended 0.5 mm subgingivally (score A), and the remaining crown of each group was rated B (1 mm).

All the SSCs and 8 esthetic crowns occluded in a proper position (score A), while 2 of the esthetic crowns were slightly rotated but in occlusion. This difference was not statistically significant.

All 10 crowns checked presented partial chipping of the facing (rated B). The contact point with adjacent teeth was not recorded, since most of the teeth adjacent to the crowns exfoliated and there was no contact point yet. No excess of cement, or caries was observed in either group, and no bone loss could be seen radiographically.



Figure 2. Conventional stainless steel crown as a control.

Discussion

The restoration of severely decayed primary teeth is often a clinical challenge. Requirements for an acceptable restoration include:

1. natural color;
2. durability;
3. adhesive bonding that is biocompatible with the pulp;
4. easy and rapid placement;
5. ability to be performed in only 1 treatment visit.

Great effort has been made attempting to find an esthetic solution for primary posterior teeth. In the last few years, various esthetic crowns for primary teeth appeared on the market.

No difference was observed in any of the parameters assessed in both the previous and present evaluations, except for gingival health. At the 6-month follow-up, better periodontal health could be observed in the conventional crowns when compared to the esthetic ones. At the 4-year follow-up, no difference was seen in the periodontal health and gingival index between esthetic (Figure 1) and conventional crowns (Figure 2). This might be due to an adaptation of the gingival tissue to the thicker margin of the esthetic crowns.

In the present study, all the crowns presented chipping of the esthetic facing after 4 years (Figure 2). This is in accordance with Roberts,⁷ who found that, while parental satisfaction with treatment of anterior primary dentition caries with prefabricated, resin-faced SSCs is excellent, the high failure rate of the resin facings is problematic.

The chipping is a disadvantage, as is the fact that, initially, these crowns are bulky, not compatible with periodontal health, and very expensive.

The esthetic crowns did not change color after 4 years and remained different from natural teeth.

SSCs have been recommended to restore badly broken teeth, and are considered to be superior to large multisurface amalgam restorations.⁸ However, esthetic dentistry has developed considerably in the last decades, and many techniques are used to restore large decayed teeth, such as the use of condensable composites,⁹ strip-crown form, resin-bonded composites,⁵ and others. These techniques are relatively new and need to pass the test of long-term clinical use.

Crowns remain the best restoration in many cases, and esthetic crowns will have a larger role in pediatric dentistry if improvements are made to reduce the bulk, lessen the thickness of the veneer, improve the bonding between the metal and the esthetic facing, and reduce the cost.

Conclusions

After 4 years, all the esthetic crowns presented chipping of the facing, and, consequently a very poor esthetic appearance.

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