

Strip Crowns Technique for Restoration of Primary Anterior Teeth: Case Report

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Abstract: Dental caries is the single most common chronic childhood disease affecting worldwide. In early childhood caries, there is early pulp involvement and gross destruction of maxillary anterior teeth as well as posterior teeth. Treatment of such caries represents a challenge to pediatric dentists especially, when teeth are badly destroyed. By the time the dentist sees the child, most of the coronal structure is lost. This case report describes challenging task of a Case of early childhood caries patients with mutilated maxillary incisors restored with a strip form composite restorations.

Keywords: Early childhood caries, Resin composite, Strip crowns

I. Introduction

Aesthetic restoration of primary teeth in children has been an ongoing challenge for the pediatric and general dentist, while the most effective aesthetic materials and techniques for restoring deciduous teeth are still in question. With the advancement of dental materials and techniques in conservative dentistry, a multitude of aesthetic treatment modalities have been introduced for the management of dental caries and trauma in the primary dentition[1].

Aesthetic treatment of severely decayed anterior primary teeth is one of the greatest challenges to pediatric dentists. In the last half century the emphasis on treatment of extensively decayed primary teeth shifted from extraction to restoration[2]. Early restorations consisted of placement of stainless steel bands or crowns on severely decayed teeth. While functional, they were unaesthetic and their use was limited to posterior teeth[1,2,3].

In severely decayed primary incisors with minimal enamel remaining for bonding, subgingival caries, and uncontrolled moisture and hemorrhage, stainless steel crowns are the restorations of choice [4,5]. Over the years, many clinical studies including the longitudinal studies by Messer et al. (1988) and Einwag et al. (1996) have demonstrated the superiority of stainless steel crowns in restoring primary molars with multisurface involvement[6,7]. However, there are no published studies that have reported on the use of stainless steel crowns for primary anterior teeth. Despite this lack of data, stainless steel crowns appear to be the most durable and technique-friendly restorations to place on decayed primary anterior teeth [8].

The most popular type of preformed esthetic crowns for primary incisors is the composite resin strip crown. This type of crown was first introduced in 1979 by Webber and colleagues [9]. The indications for strip crowns include extensive decay of the primary anterior teeth, fractured or malformed teeth, teeth that exhibit discoloration, and as coverage for teeth that have received pulp therapy [1,9]. Conversely, strip crowns are contraindicated in cases where primary teeth are too severely decayed that they present with insufficient tooth structure for retention and bonding, deep overbites, and in children with periodontal disease [1,9].

Composite crowns (strip crowns) using celluloid crown forms are a popular method of restoring primary anterior teeth. These composite crowns provide superior esthetics than other forms of anterior coronal coverage. Because it is a popular procedure, the expectation is that there would be a plethora of clinical data on its clinical efficacy[1]. Although the technique has been well described, surprisingly, very little clinical data exists on the longevity of these crowns. The procedure is very technique sensitive, and any lapses in patient selection, moisture and hemorrhage control, tooth preparation, adhesive application and resin composite placement can lead to failure. The difficulty in application is reflected in a study that only 21% of general dentists surveyed perform strip crowns compared to 73% of pediatric dentists.[1]

Composite resin strip crowns are now widely accepted because of their better esthetics as they resemble more closely the natural appearance of teeth [10]. There are numerous case reports and articles in the literature that describe the technique for placement of these crowns [9,10]. The technique involves the reduction of all surfaces of a primary anterior tooth and caries removal, selection of an adequately-sized celluloid crown form, trimming of the crown form, acid etching and conditioning of the prepared tooth, filling of the crown form with a composite resin material, and seating of the filled crown onto the tooth [4]

The composite resin is then polymerized, the celluloid crown form is peeled off or "stripped" with a hand scaler, and the remaining composite resin is finished at the margins and polished using a burn[11].

This case report describes challenging task of a Case of early childhood caries patients with mutilated maxillary incisors restored with a strip form composite restorations.

II. Case report

A five year old boy reported to my private dental clinic ,with a chief complaint severely decayed teeth. The child was shy because of always getting teased by his friends due to black teet . Fig1

Intraoral examination revealed a complete set of deciduous dentition, in relation to 55, 54, 53, 52, 51, 61, 62, 63, 64, 65, 83, 84, 85, 74, 75 were affected by dental caries.

Diet analysis, counseling and oral prophylaxis were done.Glass Ionomer restoration with 53, 54, 55, 63, 64, 65, 74, 83, 84. Composite restoration (strip form) in 51, 52, 61, 62 done as surface was grossly destructed.

Preparation of the strip crown may be accomplished prior to the treatment visit. The crown is pierced with a sharp explorer at the mesial or distal incisal angle to create a core vent for the escape of any air bubbles entrapped in the crown . Care must be taken not to damage the proximal doubt of proximal seam integrity, the crown should be discarded. All crowns may be trimmed to an approximate level and can be fine-tuned chairside during treatment Fig.2 Fig.3

Following the application of a resin-modified glassionomer liner/base for dentin protection, all crowns should be fitted and placed . It is suggested to fill and cure each crown individually with unfilled crown forms in place on their respective teeth to ensure proper spacing between restorations . Special care should be taken to carefully remove (prior to filled crown placement) a collar of cured bonding agent, which will interfere with proper seating of the crown form if it is left in place . Another cause of failure is over-filling the crown with composite material, resulting in the tearing of the mesial and distal seams of the crown. Minimal filling is highly recommended. Fig.4, Fig.5

Instead of using a rotary instrument to remove the crown form a sharp, hand-held instrument such as a cleoid/discoid carver is recommended to peel off the strip crown shell . This results in only minimal damage to the cured restoration and, consequently, little if any polishing is necessary and the luster of the labial crown surface is preserved. Care should be taken to apply contra-digital pressure for the patient's benefit. Fig.6 An excellent result was obtained following the use of theabove-described method and is presented.

The preoperative view is presented in Figs 4a and 8a. In cases of black-colored arrested caries , a masking agent may be used). Otherwise, due to the transparent characteristic of resin composites, the dark color of the excavated lesion will be seen through the restoration. Fig.7

Placement of the highly technique-sensitive strip crown can be successfully achieved with the right planning and execution. The clinical tips required and the materials used are easy to master.

III. Discussion

In early childhood caries, there is early pulp involvement and gross destruction of maxillary anterior teeth as well as posterior teeth. Treatment of such caries represents a challenge to pediatric dentists especially, when teeth are badly destroyed. A variety of esthetic restorative materials are available for restoring primary incisors[1,3,11].

However, strip crowns are also the most technique sensitive and may be difficult to place. The bonded resin composite strip crown is perhaps the most esthetic of all the restorations available to the clinician for the treatment of severely decayed primary incisors Operator preferences, esthetic demands by parents, the child's behavior, and moisture and hemorrhage control are all variables which affect the decision and ultimate outcome of whatever restorative treatment is chosen[11,12].

Some authors have introduced modifications to the technique of strip crown placement. An author described the "sandwich technique" in which a layer of resin-modified glass ionomer is placed to cover all exposed dentin prior to the seating of the crown form filled with composite resin [13]. This dentin replacement with a resin-modified glass ionomer was used to prevent debonding of composite materials in areas where enamel was lacking, including the gingival margins [13].

Kenny et al. (1986) introduced the composite resin short post, or "mushroom undercut" in the dentin, to aid in the retention of the crown [14]. The authors evaluated retrospectively the clinical performance of 243 patients with 625 composite resin strip crowns with the short post technique. They found that with proper case selection and mechanical design of the short post, as well as adequate crown-root ratio, these composite resin strip crowns could be retained until normal exfoliation. The authors did not report on the details of the retrospective study and the lack of a controlled study design was a major limitation[14].

Judd and colleagues (1990) in a prospective clinical study with a 1-year follow-up. The study reported a 100% retention rate of the composite resin strip crown in a sample of 92 teeth [15]. Grosso et al. (1987) and a case report by Mendes et al. (2004) also described the use of a composite resin short post in the pulpal chamber of an anterior tooth that had received a pulpectomy [16,17].

Rifkin described restoring primary anterior teeth with post and crown which we have used in the first case, But it was not widely accepted because of potential for interference with physiologic root resorption if the wire extends long way into the root. In addition, it can increase internal stresses within the root leading to fracture if the post is forcibly fitted into the narrow canal. In the first case, custom made

posts was used in anterior teeth. Threaded posts used in permanent teeth represent an excessive cost for pediatric dentist because it is bought as a kit, which never totally utilized. Further, more apical tensions may be created, which may lead to root fracture during installation[18].

Kupietzky et al. (2003) reported on the clinical and radiographic success of 112 composite resin strip crowns in 40 children [19]. It was determined that the crowns had an 88% retention rate with a mean follow-up time of 18 months. Although none of the crowns were completely lost, partial loss of the resin occurred in 12% of the teeth. Other than loss of resin material, less than ideal crown contour and crown discoloration, mainly in pulp treated teeth, were the main drawbacks of the crowns [19]. The same retrospective study sample was used 1 year later to assess parental satisfaction with the esthetic appearance of the strip crowns [20]. 78% of parents reported to be “very satisfied” with crowns, with durability being significantly related to their overall satisfaction with the crowns [20]. In 2005, the same authors published another retrospective study with clinical and radiographic data on strip crowns after 3 years of follow-up [21]. The study sample consisted of 145 composite resin strip crowns in 52 children and the results showed a 78% retention rate for a period of over 36 months [21]. Similar to the previous study, the crowns that were considered “lost” only exhibited partial loss of the composite resin material. Ram and Fuks found similar results for crown retention in a 2006 retrospective study (Ram et al., 2006). After a 2-year follow-up, 80% of the resin-bonded composite strip crowns were successful at the final examination [22].

Eidelman et al. (2000) compared the durability of restorations placed in children under sedation to those placed under a general anesthetic [23]. In a sample of 34 children followed between 6 and 24 months, successful marginal adaptation and anatomic form were found in 90% and 86%, respectively [23]. In comparison, out of 31 children who were treated with sedation, marginal adaptation and anatomic form were considered successful in 63% and 65%, respectively [23]. This difference between successful treatment under general anesthesia and conscious sedation was statistically significant. The results of this study suggested that strip crowns placed under general anesthesia may exhibit superior longevity [23].

Waggoner WF documented Parental satisfaction with bonded resin composite strip crowns for the treatment of primary incisors with large or mult isurface caries was excellent[12].

Al-Eheideb and Herman (2003) reported a 70% success rate for 23 teeth with composite resin strip crowns followed between 6 and 27 months . Overall, from the above mentioned retrospective chart studies, the retention rate for composite resin strip crowns ranges from 49% to 100% with follow-up periods from 6 months to 27 months [24]

The clinical success of composite resin strip crowns by comparing the success rate of treatment under conscious sedation with that under general anesthesia [23]. Eidelman found that the performance of strip crowns placed under general anesthesia was superior to those placed under sedation. A few authors have also completely eliminated patient cooperation as a variable affecting treatment outcome by evaluating treatment success in patients having received anterior crown restorations under general anesthesia [23,24]. Overall, the data suggests that treatment under general anesthesia may result in better quality of treatment due to the elimination of patient cooperation, which invariably affects the clinical conditions at the time of restoration. This is especially true for fearful young children where poor cooperation and a lack of good moisture control may interfere with the successful placement of composite resin strip crowns.

IV. Conclusion

The bonded resin composite strip crown is perhaps the most esthetic of all the restorations available to the clinician for the treatment of severely decayed primary incisors It was easy to perform and benefitedthe child immediately. Also parental satisfaction with bonded resin composite strip crowns for the treatment of primary incisors with large or multi-surface caries were excellent.

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Legendes



Fig1; Clinical photograph of case at first visit



Fig2; Pre operative intra-oral facial view showing carious primary incisors



Fig3; Caries removal



Fig4 The enamel surface was prepared using a diamond bur, creating space for composite placement



Fig4 Trimming of strip crown with scissors.



Fig5; Peeling off the strip crown shell.



Fig6; Restored primary maxillary incisors



Fig7; Final close up of finished restoration