



Placement of a preformed indirect resin composite shell crown: A case report

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Esthetic materials available to the pediatric restorative dentist continue to improve, but the difficulty of obtaining esthetic anterior restorations in the primary dentition remains a substantial problem.

The placement of direct, resin composite restorations is a technique sensitive procedure requiring time, patient cooperation, and careful isolation of the surgical field.^{1,2} In a busy pediatric practice, parameters are sometimes less than optimal. When direct resin composite is placed, polymerization may be incomplete beyond a material thickness of two to three millimeters. Therefore, multiple increments are typically added and polymerized. This adds to the time of placement and increases the risk of contamination and failure. In addition, resin shrinkage of two to three percent can compromise the adhesion as well as the seal of direct restorations. All of these factors make large, direct resin composite restorations a challenge.

Several practitioners have reported using resin composite crowns to reduce chair time, minimize variables associated with direct placement techniques, and to create a more homogeneous, durable, and esthetic result.³ In a five year clinical study, Ulvestad reported on the durability and function of resin crowns.⁴ Custom fabricated crowns can be time consuming and expensive. Recently, however, composite shell crowns have become available made from commercial indirect resin materials.⁵

The purpose of this article is to present a case report describing the placement of a preformed, indirect composite resin crown for primary anterior teeth. These crowns have recently become available in the form of resin composite shells. The technique is efficient and should provide for a durable and functional restoration.



Fig 1. Pre-op photograph on 4-12-99.



Fig 2. Preparation.

Case report

A 3-year-old patient with significant carious lesions on the maxillary anterior teeth was referred for esthetic and functional correction (Fig 1). A comprehensive treatment plan was presented to the parents. All options, advantages and disadvantages of various treatment alternatives were explained. The option of placing preformed composite resin crowns on the anterior teeth was presented and accepted by the parents.

Anesthesia was achieved, isolation was attained with cotton rolls, and preparations were made which consisted of caries excavation, contour alterations, and the establishment of knife-edge margins (Fig 2). (Ninety-degree shoulder or chamfer marginal designs are also acceptable when tooth size and morphology allow.) Hyperplastic and edematous gingival tissue was excised using an electrosurge. Shell, composite crowns were selected according to size, shape, and color, and each crown was adjusted for fit.

The preparations were then etched for 15 seconds with 37% phosphoric acid, rinsed with water, and lightly air-dried. A fourth generation dentin primer was mixed and applied, air-dried and light cured for 10 seconds. A bonding resin was then placed and thinned with an air syringe. Resin composite shell crowns, which were previously made and supplied in stock sizes, were sandblasted with 50 micron aluminum oxide for five seconds. A proprietary liquid adhesive was applied to the inner surface of the crown and a dual curing, resin luting cement was placed into the crown. The crown was then placed over the preparations and pressed into position (Fig 3). Gross excess of resin was removed at the margins and the restorations were exposed to a standard halogen curing light for one minute (Fig 4). Various diamonds and finishing burs were used to remove excess cement and refine the margins. The immediate post-operative result and the two-week recall appearance is illustrated in figures 5 and 6, respectively.



Fig 3. Seat artglass crown like strip crown or pedojacket.

Discussion

Typically, crowns are indirect restorations requiring impressions, dyes, and a laboratory to custom fabricate and size each unit. While this is certainly an option, the use of preformed, composite shell crowns reduces the cost associated with this procedure and can result in a durable, esthetic, and functional restoration for pediatric patients. Impressions are not needed and the restorations are therefore completed in a very short clinical appointment. This indirect method decreases clinical time and allows patients who lack the cooperative ability to endure prolonged direct bonding appointments to benefit from esthetic materials.

Resin cements are ideal for placement of these crowns. First, adhesion to both the crown and tooth can be predictably achieved. The very chemical nature of resin cement and resin crown, makes union between the two optimal in terms of strength. Retention is also optimized. Secondly, resin composite cements can be viewed as non-viscous, durable, restorative materials which should function well at the margins of these crowns. Thirdly, resin cements are available in self, dual, or light-cured versions, as well as various viscosities. These qualities allow for flexibility in handling properties which can be tailored to the clinical circumstance.

Certainly other cements such as glass-ionomers, resin modified glass ionomers, or polyacid modified resin composite cements could be used. However, physical and handling properties would likely be sacrificed in an effort to provide fluoride delivery from the luting agent.

Venting of resin crowns is also an option, but with careful cement placement into the crown, air entrapment can be avoided. The absence of a vent also directs cement under pressure at the margins. This is desirable in that excess is available to encompass the tooth at the marginal area.

Future development, mass production, and availability of these crowns may include standard sizes and shades provided in kit form, which would allow the clinician to select and place indirect crowns chairside.

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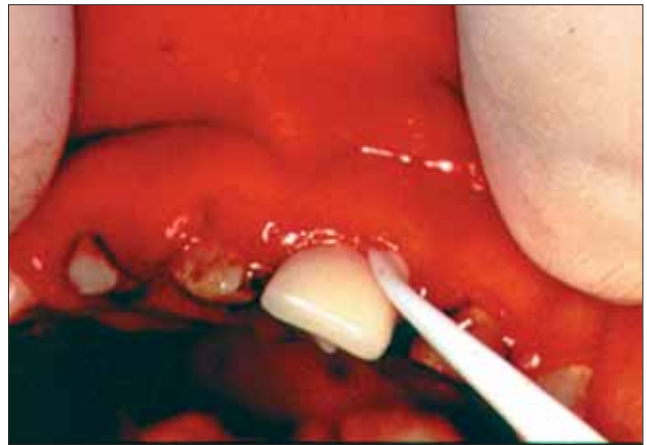


Fig 4. Wipe excess composite from margins.



Fig 5. Immediate post-op photograph.



Fig 6. Two week post-op patient smile.

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