

Functional and esthetic rehabilitation of anterior primary teeth using two different approaches

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ABSTRACT

Esthetic requirement of severely mutilated primary anterior teeth in the case of early childhood caries (ECC) has been a challenge to pediatric dentists. Numerous treatment approaches have been proposed to address the esthetics and retention of restorations in primary teeth. The choice of restoration depends on various factors such as amount of tooth structure remaining, ability to obtain adequate moisture control, child's cooperating ability, esthetic demands, and cost factor. This case report documents comparison of two esthetic techniques for the management of primary anterior teeth.

Key words: Deciduous dentition, Esthetics and Early childhood caries (ECC), functional rehabilitation

INTRODUCTION


Early childhood caries (ECC) is a serious public health problem that is common in both underdeveloped and industrialized population.^[1] Maintaining the integrity of primary teeth till exfoliation is important not only to maintain arch integrity but also to prevent psychological effects associated with loss of teeth.^[2]

The American Academy of Pediatric Dentistry (AAPD) has defined ECC as the presence of one or more decayed (noncavitated or cavitated) lesions, missing (due to caries) or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. Severe ECC is defined as any

sign of smooth surface caries in a child younger than 3 years of age or 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior, or a decayed, missing, or filled score of >4 (age 3 years), >5 (age 4 years), or >6 (age 5 years) surfaces. The clinical appearance of severe ECC follows a particular pattern: Maxillary incisors followed by the maxillary and mandibular first primary molars and the mandibular cuspids.^[3] The management of such mutilated teeth is a challenge due to close proximity of pulp and thin enamel surface area that is available for bonding, cost factor, and to a certain extent the child's cooperating ability. All these factors must be taken into consideration before deciding the choice of restorative material.^[4] The purpose of this article is to review latest materials and techniques in managing primary anterior teeth and case scenarios to decide the choice of the restorative material.

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Indications for full coverage restoration include the following:

1. Caries on two or more surfaces.
2. Extensive cervical decalcification.
3. Following pulp therapy.
4. Following loss of extensive tooth structure.
5. Teeth with multiple hypoplastic defects.
6. Discolored anterior teeth.

Full coverage restorations can be broadly divided into:

1. Luted — Cheng crowns, stainless steel with facing, Kinder crowns, Nu-smile, Dura crowns, Whiter bite, and Pedo pearls.
2. Bonded — Strip crowns, polycarbonate, Pedo jacket, New millennium and Glastech.

Restoration of grossly decayed primary anterior tooth can be divided into:

1. Direct:
 - a. Resin composite short post.
 - b. Orthodontic wires (omega loop).
2. Indirect:
 - a. Indirect composite resin crowns reinforced with fiber glass post.
 - b. Biologic post.

This paper presents cases of various treatment modalities in restoration of primary anterior teeth. These various clinical scenarios enable clinician to formulate an ideal treatment plan for the management of carious anterior teeth.

CASE REPORT

Case 1

A 3-year-old male patient reported to the Department of Paedodontics and Preventive Dentistry with the chief complaint of decayed upper front teeth. The patient's medical history was noncontributory. The patient's mother gave a history of breastfeeding for 1.5 years after which the child was bottle fed for 3 years. Intraoral examination of the child revealed a complete set of deciduous dentition. It was observed that teeth - 55, 54, 53, 52, 51, 61, 62, 63, 64, 65, 75, 84 were affected by dental caries [Figure 1a]. Intraoral periapical radiographs revealed pulp involvement with 52, 51, 61, 62, and 63 [Figure 1b]. Diet analysis, counseling, and oral prophylaxis were done. 75, 54, 64 and 84 were grossly carious and were indicated for pulpectomy followed by a stainless steel crown. 52, 51, 61, 62, and 63 were indicated for pulpectomy, followed by anterior stainless steel crown [Figure 1c and d]. 55, 53, and 65 presented with caries and were indicated for composite resin restorations.

Case 2

A 4-year-old male patient reported to the Department of Paedodontics and Preventive Dentistry with the chief complaint of decayed upper front teeth. Patient's medical history was noncontributory. Patient's mother gave a history

of breastfeeding for 1 year, after which the child was bottle fed for 2 years. Intraoral examination revealed a complete set of deciduous dentition. It was observed that 52, 51, 61, 62, were affected by dental caries [Figure 2a]. Intraoral periapical radiographs revealed pulp involvement with 52, 51, 61, and 62 [Figure 2b]. Diet analysis, counseling, and oral prophylaxis were done. 51, 61, and 62 were indicated for pulpectomy, followed by restoration. In 51 About 4 mm of the obturating material (Metapex, Metabiomed) cement was removed from the coronal end of the root canal and 1 mm of glass ionomer cement was placed. A 0.7-mm stainless steel orthodontic wire was bent using no. 130 orthodontic pliers into a loop in such a way as to allow the ends to be hooked in the entrance of the root canal. The incisal end of the loop of the wire projected 2-3 mm above the remaining root structure. This was done for better mechanical retention and support for the restorative material. After glass ionomer cement set, the canal was prepared to get a space of about 3 mm. The root canal and the remaining coronal structure was etched with 35% phosphoric acid for 20 s. Then, the bonding agent was placed and cured in 20 s. Composite restorative material of the selected shade was placed in the canal. The loop was inserted into the canal with composite. The composite was light cured for 40 s. A strip crown was used and the crown was reconstructed. The occlusion was checked and after the removal of any interference, final finishing and polishing of the restoration was performed using soflex discs [Figure 2c and d].

DISCUSSION

Esthetic management of primary teeth has been a challenge to a pediatric dentist due to various factors such as surface area remaining after caries removal, choice of restorative material, cost factor and most importantly cooperating ability of child. With advent of newer materials restoration of grossly decayed anterior teeth has become easier.^[4,5]



Figure 1: Case 1. (a) (top left) and (c) (bottom left) — intraoral view of the maxillary arch exhibiting dental caries and restored teeth, respectively. (b) (top right) and (d) (bottom right) — intraoral periapical radiograph showing dental caries and restored teeth, respectively

Table 1: Description of stainless steel crown, preveneered crown, and strip crown

Type of crown	Aesthetics	Durability	Time for placement	Selection criteria
Stainless steel crowns (open faced)	Fair, but may show metal hue below	Good durability, but the resin facing may dislodge	Long	Grossly destructed tooth, root stumps
Preveneered crowns	Good	Good durability but facing may dislodge	Less when compared to open faced crowns	Grossly destructed tooth, parental concern about esthetics
Strip crowns	Excellent	Requires adequate tooth structure for retention, fractures faster	Short	Adequate tooth structure and ability to isolate



Figure 2: Case 2. (a) (top left) and (c) (bottom left) — intraoral view of the maxillary arch exhibiting dental caries and restored teeth, respectively. (b) (top right) and (d) (bottom right) — intraoral periapical radiograph showing dental caries and restored teeth, respectively

Common practice of restoration of primary anterior teeth is by using stainless steel crown, which uses its cervical crimping and adaptation features for retention. It can be quickly adapted onto to grossly destructed tooth even in the presence of moisture and salivary contamination. But due to its unaesthetic appearance, it is rarely accepted. A modification of this is by preparing a labial window after cementation and restoration using a tooth colored bonded cement. The advantage of open-faced stainless crowns is that they are relatively inexpensive. However their disadvantages include time-consumption, need for moisture control during resin placement and also metal hue below the facing.^[5-7]

Another important aspect of restoration of grossly destructed anterior teeth is the requirement of intracanal retention. Custom-made post and crown, which are commonly used in permanent teeth, cannot be used in primary teeth as it interferes with physiologic root resorption and creates internal stress leading to root fracture.^[4,8] Another method of obtaining intracanal retention is by building resin composite post and mechanically creating undercut and restoring with crown. The disadvantage of this technique is that composite posts have poor loading strength.^[8,9]

Restoration using biologic post is another option but it is not followed commonly due to the need for stringent infection

control policies and availability of tooth bank.^[10] Fiber glass composite posts provide excellent esthetics and good retention. But the main disadvantage being its high cost^[11] [Table 1].

A practical and chair side method of retention was proposed by Mortada and King where orthodontic wires are bend into various shapes such as omega or alpha and used as post. The diameter of omega loop should be about 3 mm and should extend 3 mm into the root canal. This loop can be cemented using luting glass ionomer cement. The final restoration is usually done using composite and strip crown.^[4,5,9]

The newer form of esthetic anterior primary tooth restorations is the veneered stainless steel crown. The facing materials, such as composite resin or thermoplastic resin, are bonded to the stainless steel crown. The advantages include enhanced esthetics and retention comparable to that of traditional stainless steel crowns. Most notable disadvantage with veneered stainless steel crowns includes problems with contouring and crimping that could cause fracture and loss of the veneer. Preveneered crowns are substantially more expensive than traditional stainless steel crowns.^[1,6,7]

CONCLUSION

Currently, there are many options for restoration of primary anterior teeth. But there is not enough evidence to show the superiority of one over the other. The choice of restoration depends on various factors such as the amount of tooth structure remaining, ability to obtain adequate moisture control, child's cooperating ability, esthetic demands, and finally cost factor. A thorough knowledge about the available materials, clinical technique, and the abovementioned factors will help in clinical success as well as good patient satisfaction.

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Conflicts of interest

There are no conflicts of interest.

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