

## Restoring Smiles for the Young: Aesthetic and Functional Rehabilitation of 3 Year Old Children with Early Childhood Caries: Case Reports

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### Abstract

Early childhood caries results in early pulp involvement and gross destruction of the anterior and posterior teeth. This leads to decreased masticatory efficiency, difficulty in speech, compromised esthetics, development of abnormal tongue habits and subsequent malocclusion and psychological problems. The restoration of severely decayed deciduous teeth especially anteriors presents a special challenge to dentists, particularly in uncooperative children. The following case reports document the restoration of severely mutilated deciduous teeth in two emotionally immature patients resulting in an improvement in not only their oral and general health but also helping them gain self-confidence.

**Keywords:** Childhood caries; Abnormal tongue habits; Malocclusion; Deciduous teeth

### Introduction

Early childhood caries (ECC) is a disease that involves development of one or more carious lesions, with or without cavitation, by the age of 71 months [1]. Epidemiological studies have indicated that ECC has a strong social element [2-4]. Indeed, higher prevalence in non-developed countries [5,6] and in socioeconomically disadvantaged groups living in low, middle [2-4] and high-income countries [7,8] have been documented.

In general, the prevalence of caries in preschool children is declining or has reached a plateau in most of the developed countries [9,10], but the same may be increasing in some developed and several developing countries [11,12]. In Asia, in the Far East region, the prevalence in three-year-olds ranges from 36 to 85% [13-18] while in India a prevalence of 44% has been reported for caries in 8- to 48-month-old children [19].

The etiology of the disease is multifactorial. In developed countries the primary risk factor is considered to be the use of a nap time bottle that contains a fermentable carbohydrate such as milk with sugar, sweetened milk formula, fruit juice, or other sweetened solutions [20], whereas in developing countries along with the above stated other factors such as linear enamel hypoplasia of primary teeth associated with malnutrition may also contribute to the prevalence of this condition [21]. Complex interaction between the use of sweetened pacifiers, nursing on demand, neglected oral hygiene, Streptococcus mutans, maternal education and dental knowledge, family structure and social status make its etiology complex.

ECC is associated with significant adverse physical, functional, and behavioral consequences. The disease implications are high risk of new caries defects in both permanent and deciduous dentitions, insufficient physical development, hospitalization and emergency room visits, loss of school days and increased days of restricted activity, increased treatment costs and time, diminished ability to learn, and diminished oral health-related quality of life [22]. Due to the aggressive pattern of the disease, treatment should be specific for each individual patient, and should be given by a specialist who can manage the young child and the process of the disease [22]. Treatment options are: 1. Conservative approach which includes recalls and topical fluoride 2. Aggressive restorative approach. In both one should first stop the carious process and encourage prevention. To choose the type of treatment, one should

consider the severity of the lesions, child's age, caries risk, child's behavior, and parents' cooperation and socioeconomic status [22].

Full mouth rehabilitation including the esthetic restoration of severely mutilated primary anterior teeth has always been a challenge for the dentist for a long time, not only because of the limitations of the available materials and techniques but also because the children who require such restorations are usually among the youngest and least manageable group of patients. Most clinicians prefer to treat the emotionally immature children under general anesthesia. Treatment under general anesthesia has its own risks and limitations. The treatment is expensive and out of reach for most of the middle and low socioeconomic status children. It is also associated with a huge range of risks and difficulties [23]. It is unpleasant for the child as well as for the parents.

The following case reports describe the challenging task of treating two 3 year-old patients suffering from early childhood caries presenting with multiple mutilated teeth. Both the children had a Frankel behavior rating of definitely negative (Table 1) [24,25], but were managed using only voice control and other non-pharmacological behavior management techniques. The children were dealt with an extra ordinary amount of patience and hence required multiple sittings. At the end of treatment they walked out of the operatory not only with their oral problems solved but also as stronger and more confident individuals with a positive attitude towards dental treatment developed for life.

### Case I

A 3-year-old female patient reported to the Dept. of Pediatric

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**Received:** September 16, 2014; **Accepted:** October 13, 2014; **Published:** October 17, 2014

**Citation:** Sheeba S, Deepak S, Sumit C (2014) Restoring Smiles for the Young: Aesthetic and Functional Rehabilitation of 3 Year Old Children with Early Childhood Caries: Case Reports. J Interdiscipl Med Dent Sci 2: 155. doi: 10.4172/2376-032X.1000155

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| Rating              | Description  |
|---------------------|--|
| Definitely Negative | Refusal of treatment, crying forcefully, fearful, or any other overt evidence of extreme negativism  |
| Negative            | Reluctant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, sullen, withdrawn   |
| Positive            | Acceptance of treatment, at times cautious, willingness to comply with the dentist, at times with reservation but patient follows the dentist's directions cooperatively |
| Definitely Positive | Good rapport with the dentist, interested in the dental procedures, laughing and enjoying the situation  |

Table 1: Frankle 4-Point Behaviour Rating Index

Dentistry, MM College of Dental Sciences and Research, with a complaint of severely decayed teeth. The child was emotionally immature and highly uncooperative. Intraoral examination revealed multiple carious lesions, with 54,53,52,51, 61, 62, 63, 64, and 74 showing pulp involvement. Crown portions of maxillary incisors were grossly destructed (Figures 1-6).

It was decided to extract 51 and pulpectomize 54,53,52,61, 62, 63 and 64.74 were posted for pulpotomy. Post and core and strip crown was planned for 52, 61 and 62. The posterior teeth (54, 64 and 74) were restored with stainless steel crowns. For the 51 space an esthetic fixed functional space maintainer was planned.

Treatment was carried out in multiple sittings as per the standard norms. Pulpectomy followed by composite restoration (strip crown) and custom-made posts were performed. For core build up in deciduous anterior teeth, about 4 mm of cement was removed from the coronal end of the root canal, and 1 mm of glass ionomer cement was placed. A fiber reinforced composite post was fabricated and cemented with composite in 52,61,62. The incisal end of the post projected 2-3 mm above the remaining tooth structure. The composite was light cured for 40 seconds. A strip crown was used to reconstruct the crown.

This provided good mechanical retention and support for the restorative material. Coronal tooth structure of 51 was fabricated using composite resin and fixed in place to the adjacent 52, 61, 62 and 63 using composite resin and fiber splint. The occlusion was checked and final finishing and polishing of the restoration was performed using soflex tips. The pulp treated posterior teeth were followed by a stainless steel crown. After completion of the procedure, post-operative photographs and radiographs were taken. Home care instructions, including oral hygiene measures and diet counseling, were given to the parents. Recall checkup was scheduled after every 6 months to assess the maintenance.

### Case II

A 3-year-old male patient reported to the Department of Pediatric Dentistry, complaining of pain in severely decayed teeth. The highly uncooperative child had a subnormal IQ and was underweight because of long term inability to eat as most of the teeth were grossly destructed and painful. History revealed that the patient was on blood transfusions for treatment of severe anemia.

Intraoral examination revealed a cleft palate and multiple carious lesions, with pulpal involvement in 54, 53, 52, 51, 61, 62, 63, 64, 74, 84. Crowns of the carious maxillary teeth were grossly destructed. It was decided to do pulpectomy in 54, 53, 52, 51, 61, 62, 63, 64, 74, 84 followed by post and core and strip crown in 53, 52, 51, 61, 62 and 63. 64, 74 and 84 were planned to be restored with stainless steel crowns. 54 could not be crowned as the crown structure was insufficient. It was decided to retain the obturated root stumps of 54 to serve as a passive space maintainer. The other carious teeth with no pulpal involvement

were planned to be restored with resin reinforced glass ionomer cement.

Pulpectomy followed by composite restoration (strip crown) using custom-made posts, were performed in the maxillary anteriors along with the other required treatments. For building core in the deciduous anterior teeth, about 4 mm of 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 an omega loop so as to allow the ends to be engaged at the entrance of the root canal. The incisal end of the loop of the wire projected 2-3 mm above the remaining structure. The loop was inserted into the canal with composite. The composite was light cured for 40 seconds. A strip crown was used to reconstruct the crown.

The occlusion was checked, and after the removal of interferences, final finishing and polishing of the restoration was performed using soflex tips. After completion of the procedure, post-operative photographs and Orthopantomogram were shot. Home care instructions and diet counseling, were given to the parents. Recall checkups were performed every 6 months.

On follow-up visits it was observed that apart from the dental



Figure 1: Case I: (a) Pre-operative maxillary arch; (B) Pre-operative mandibular; (C); (D); (E) Pre-operative radiographs; (F) Patient reluctant to smile.

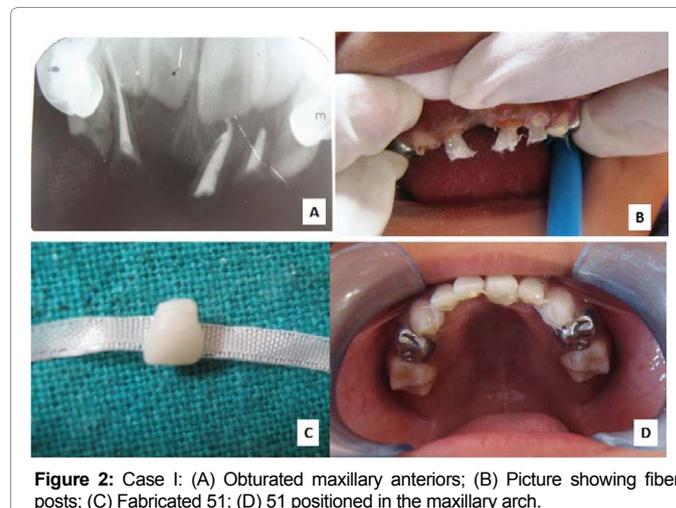
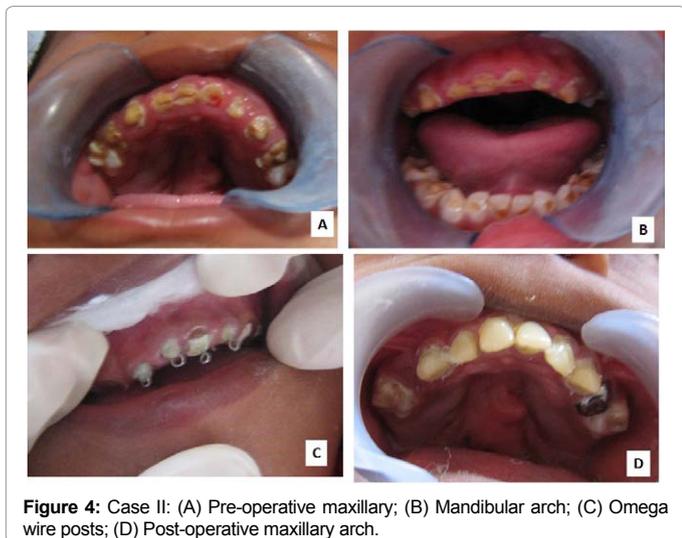


Figure 2: Case I: (A) Obturated maxillary anteriors; (B) Picture showing fiber posts; (C) Fabricated 51; (D) 51 positioned in the maxillary arch.



**Figure 3:** Case I: (A) Post-operative esthetic result; (B); (C) & (D) Posterior post-operative radiographs; (E) Patient smiling confidently; (F) Follow up intra-oral photograph.



**Figure 4:** Case II: (A) Pre-operative maxillary; (B) Mandibular arch; (C) Omega wire posts; (D) Post-operative maxillary arch.

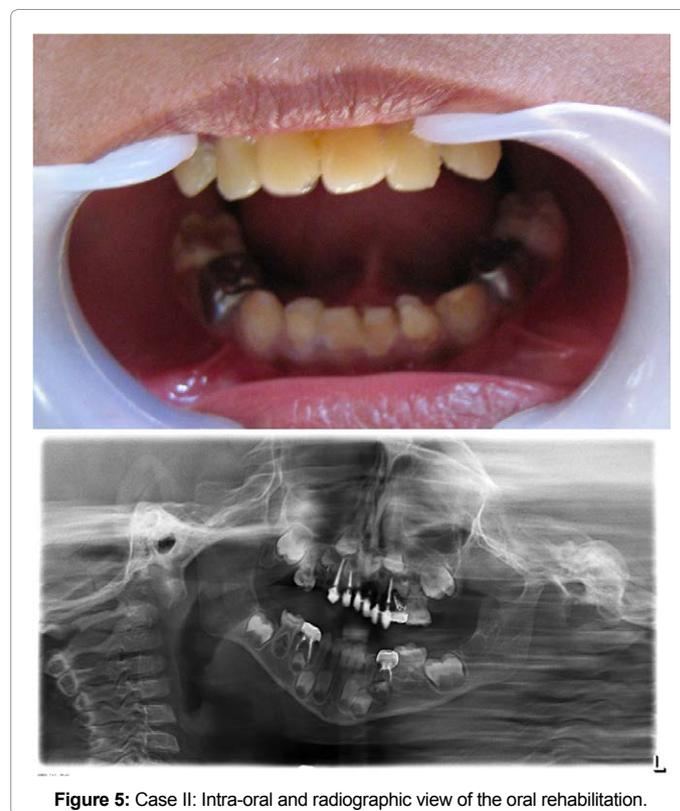
benefits the child also became more confident socially. As no general anesthesia was used the child got over his dental fear and learnt to accept dental treatment. The general health of the child improved as indicated by an improvement in the hemoglobin level and a gain in body weight.

### Discussion

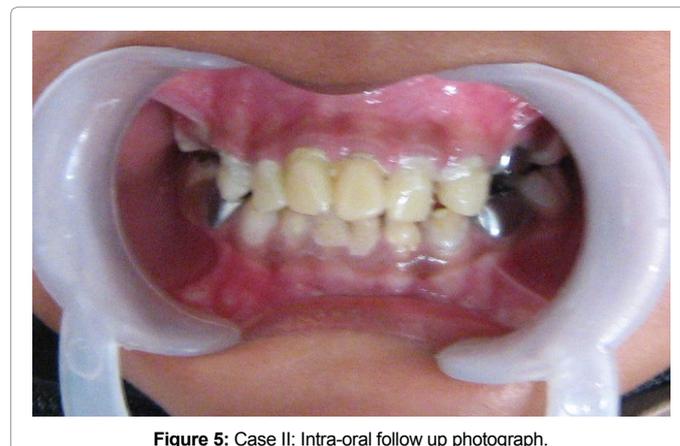
Dental treatment of immature uncooperative children has always

been a challenge. General anesthesia is used for such children, but is an expensive alternative. It is also associated with adverse events and unpleasant side effects. An important consideration for children who are unable to cooperate due to fear, anxiety or young age is their subsequent acceptance of care using other methods with low risk and low impact as general anesthesia does not shape the behavior of a child [26]. Therefore in the presented cases an effort was made by the authors to manage the children without anesthesia or sedation.

In the presented cases, custom-made posts were used in anterior teeth; other available options such as nickel-chromium cast posts, preformed and cast metal posts were not considered they are expensive and require additional lab work. The use of metal posts needs the use of an opaque resin to mask the unaesthetic post and also poses additional problems during the course of natural exfoliation [27].



**Figure 5:** Case II: Intra-oral and radiographic view of the oral rehabilitation.



**Figure 5:** Case II: Intra-oral follow up photograph.

An esthetic option for such cases is a biologic post. The disadvantage of this technique is acceptance and stringent infection control policies.

Available literature shows that intra-canal retention in primary teeth can be obtained by directly building resin composite posts or preparing an "inverted mushroom-shaped" undercut in the root canal prior to the buildup of the resin [28]. However, resin composite posts have low strength of loading. Previous studies concluded that fiber reinforced composite resin posts show higher strength, retention and marginal adaptation [29], this led the authors to use the said material in case I. However the high cost of glass fiber reinforced composite resin post limits its use. In the second case considering the socioeconomic status of the patient a custom-made post using an orthodontic wire followed by strip crowns was used. Literature reveals that this achieves satisfactory results in a child patient [30,31]. However, it is technique sensitive and requires parent's cooperation. Also there is a chance of loss of restoration due to trauma or biting on hard food, so the parents were instructed to teach the child to avoid hard food.

Both the children were very happy and satisfied with the functional and esthetic results, viz., mastication, speech, cosmetic function, etc. Restorations were found to be serving well at the 1 year recall appointment.

In this study, authors take the view that full-mouth rehabilitation without GA can enable children to cope with future dental care and leave them in a position where they may be more amenable to dental care. A child benefits from oral rehabilitation in more than one way. Apart from the dental benefits, oral rehabilitation also contributes towards improvement of general and psychological well-being as was seen in case II.

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**Citation:** Sheeba S, Deepak S, Sumit C (2014) Restoring Smiles for the Young: Aesthetic and Functional Rehabilitation of 3 Year Old Children with Early Childhood Caries: Case Reports. *J Interdiscipl Med Dent Sci* 2: 155. doi: [10.4172/2376-032X.1000155](https://doi.org/10.4172/2376-032X.1000155)