

# Recent esthetic revolutions in Pediatric Dentistry: A Review

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## ABSTRACT

The primary reasons for premature loss of teeth in children are either dental caries or dental trauma. Early childhood caries is quite severe and widely spreading form of caries, which is a serious health problem in both developing and industrialized countries. Premature loss of teeth leads to esthetic and functional problems in children. This has a significant effect on the psychosocial development of a child and interaction with peers. This article mainly focuses on highlighting the various options available for esthetic rehabilitation in pediatric patients so that satisfactory cosmetic outcome is achieved.

**KEYWORDS:** Esthetic , Early Childhood Caries

## INTRODUCTION

A fundamental lack of preventive and restorative care is evident with the dental needs of children and infants in most of the developing and underdeveloped countries. Thus, the untreated carious activity leads to pain, discomfort and further severe mutilation of tooth structure. It further leads to various deleterious effects like compromised mastication, esthetics, phonetics and overall derailed cognitive development of the child. However, in recent times, the scope of pediatric dentistry has been expanded from mere restorative to aesthetic approach. In last half century, the era of pediatric dentistry sees new horizons in terms of wide range of esthetic treatment modalities. The parents have become more positively oriented towards the importance of higher esthetic standards for anterior teeth in children.<sup>1</sup> This article mainly focuses on range of novel techniques and materials available for restoration of primary carious teeth.

## AESTHETIC RESTORATIONS

The best suitable materials for such restorations are composites and glass ionomer cement (GICs).

The retentiveness of restorative material with primary teeth is relatively compromised as compared to retentiveness with permanent teeth. This is because of difference in pulp morphology, dentin and enamel of primary teeth and permanent teeth. Also, the depth of cavity preparation is shallow in primary teeth. The composite resin material is an excellent choice of restorative material for primary teeth.<sup>1</sup> Its compressive, flexural, and tensile strengths, meet or exceed the respective strengths of amalgam. It has excellent esthetics, clinical durability, and other continuously improving characteristics. The use of composite resins in pediatric restorative dentistry is growing owing to its increasing popularity.<sup>2</sup>

**Resin modified glass ionomer cement:** Hybrid restorative materials are the materials comprising resins and components of conventional glass ionomers. The physical and mechanical properties of these materials are better than those of GIC alone, providing more resistance to fracture and potential failure when large occlusal forces are present. These materials are becoming widely popular, with a particular role in the restoration of primary teeth.<sup>3</sup>

**Fiber-reinforced composites:** A fiber reinforced polymer is a composite material consisting of a polymer matrix embedded with high strength fibers, such as glass, aramid, carbon.<sup>4</sup> Although fiber-reinforced composite resins have been developed for dental use, their application in pediatric dental practice is still limited. Severely decayed maxillary anterior teeth can be restored with glass fibre-reinforced composite resin posts (GFRC). Unlike the post and core used in adult dentition, the glass fibers can be used as post in primary anterior teeth which are stabilized by composites and using strip crowns to achieve the final morphology looks like an efficient technique with excellent esthetic and functional results. Also as an alternative to the conventional and commonly used band-and-loop space maintainer, GFRC is becoming quite popular in recent times.<sup>5</sup>

### Crowns:

**Stainless steel crowns:** Prefabricated metal crowns are prefabricated metal crown forms that are adapted to individual teeth and cemented with a biocompatible luting agent.<sup>6</sup> These are considered to be the most durable and reliable means for restoring severely fractured or carious primary teeth. However, the main disadvantage is unsightly metallic appearance. As the population is more conscious of aesthetics, these crowns have become less desirable. As an answer to the esthetic and functional problem of stainless steel crowns, the other crowns which

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are developed are:

#### *Veneered stainless steel crowns*

*Pedo jacket crowns:* The outer layer of these crowns is made of tooth-colored polyester material. The crown is filled with resin and left on the tooth after the procedure of polymerization.

*Pedo pearls:* The metal crown form is similar to the stainless steel crown, but is completely coated with a tooth-colored epoxy paint. These crowns are made of aluminum.

*Art glass crowns:* Art glass crown commonly known as Glastech, is made up of glass which is a polymer glass used for restoration of anterior primary teeth. They have the micro glass and silica as filler materials which provide greater durability and esthetics than strip crown. It has the bondability and feels of composites and longevity and esthetics of porcelains.

*Strip crowns:* Resin-bonded composite strip crowns are the first choice restoration for many clinicians, mainly because of the superior aesthetics and the ease of repair if the crown subsequently chips or fracture. Esthetically, they provide a striking similarity to the original primary tooth.<sup>7</sup>

#### **Zirconia crowns**

It is a well-known fact that zirconia is widely accepted as a restorative material for the permanent dentition. However, its use as a restorative material in primary dentition is relatively new. Zirconia is not only esthetically pleasing but also the strongest dental ceramic available currently. The advantages of zirconia crowns include, less opposing tooth wear, improved the patient appearance and oral hygiene due to excellent esthetics, good fracture resistance, and retention rate. The commercially available zirconia crowns are EZ Pedo, NuSmile, and Kinder Krowns.<sup>8</sup>

## BIOLOGICAL RESTORATIONS

The biologic restoration is a promising alternative to prosthodontic restoration for primary teeth severely destroyed due to caries. Natural crowns and roots, as biological restorations would help to preserve the integrity of patient's natural dentition and also recover function and esthetics. The enamel also has physiologic wear and offer superficial smoothness and cervical adaptation. However, the technique requires professional expertise to prepare and adapt the natural crowns and intracanal posts.<sup>9</sup>

## MICROABRASION

The concept of microabrasion is based on some definite principles by Croll. Microabrasion is minimally invasive technique, simple, safe, atraumatic, conservative and non-restorative. It eliminates defects such as brown and white opacities by removing the superficial part of stained enamel. Microabrasion is evolved from a technique reported by McCloskey in 1984, previously described by Dr. Walter Kane in 1916.

Croll and Cavanaugh further modified the technique by mixing 18 percent HCl with pumice, which was applied to the teeth using wooden applicator.<sup>10</sup>

## BLEACHING

The demand for dental whitening in young patients has increased over the years. Discoloration resulting from a traumatic injury or infection of the related primary or permanent tooth, or intrinsic discoloration is the major indications for bleaching. Usually 10 to 38 percent carbamide peroxide is used in professional techniques of bleaching. While in at-home bleaching products its content usually ranges from 3% to 10%.<sup>11</sup>

## VENEERING

Veneering is usually done for moderate to severe staining, and conservative restoration of malformed, but intact anterior teeth. This basically includes composite resin and porcelain laminate veneers. Direct composite resin restorations present some advantages like conservative tooth preparation, simplicity, being easily changeable and being cost-effective. Porcelain laminate veneers are indirect esthetic fixed prostheses. They offer The advantages of laboratory constructed veneers include less chairside time, superior properties over composite veneers in terms of strength, color stability, resistance to abrasion, surface smoothness, and excellent aesthetics. On the flip side, the disadvantages are that it takes two appointments to complete, high cost and there is a possibility of lab errors.<sup>12</sup>

## DENTAL IMPLANTS IN CHILDREN

A variety of etiological factors, like primary or acquired anodontia, syndromes such as ectodermal dysplasia, cleft lip and palate, or traumatic tooth loss contribute to partially or completely edentulous arches in some children and adolescents.

Implant placement in a young growing child would be an ideal method of treatment for the absence of teeth. They not only restore the function but also preserve the alveolar bone and give excellent esthetics. This boosts the child's confidence and improves social skills. However, before commencing the treatment plan, overall factors which affect the success of implants in growing children should be considered. There is multidirectional, growth that occurs in maxilla and mandible in sagittal, vertical, and transverse planes, which is largely influenced by growth spurts.

**Maxillary Growth:** During early childhood, the transverse growth of the maxilla is influenced by the increasing width of the cranial base and growth at the median suture.<sup>[13]</sup> At the puberty, this sutural growth accelerates. Early placement of implant can give rise to a diastema with the adjacent teeth as transverse growth occurs. Hence, a reduction in arch length and increased crowding during the period of maximum growth can

result in an implant crown that is out of alignment. Resorption occurs at the anterior surface of maxilla for sagittal growth. This brings it downward and forward. Early placement of implant could result in a loss of labial cortical bone for the implant.<sup>14</sup> Vertical growth of the maxilla occurs by sutural lowering. There is growth in the orbits, increase in the size of the nasal cavity and maxillary sinuses. Deposition on the palatal and alveolar surface occurs, and resorption occurs on nasal surfaces. Hence, an early placement of an implant can lead to its presence in the nasal floor after puberty while the permanent teeth have moved down.<sup>15</sup>

**Mandibular Growth:** The transverse growth in the mandible completes very early because of the closure of the symphysis in the 1st year of life. Posteriorly, there is resorption of the bone lingually and deposition buccally that leads to remodeling. This can lead to lingual positioning of the implant in case it is placed early. Thus dental implant insertion is a possible mode of rehabilitation in children and adolescents if the systematic planning of treatment is done, which can result in desired esthetic and functional results.<sup>16</sup>

## CONCLUSION

The newer advances in the field of pediatric dentistry have made it possible for the clinicians to achieve excellent esthetic rehabilitation for children. This is important not only for the dental benefits but also for the overall psychological development of a child. This review mainly focuses on putting together various aesthetic approaches available for a clinician to treat a pediatric patient.

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