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Esthetic restoration of deciduous anterior teeth using prefabricated zirconia crowns: A case report

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Abstract

Loss of anterior teeth in children can lead to hampered esthetics, decreased masticatory efficiency, speech disturbance, development of parafunctional habits and psychological problems. With the growing awareness of the esthetic options available, there is a greater demand for solutions to problems such as caries, discolored teeth, hypoplastic defects, fractures and missing teeth in children. There are different types of restorations for complete crown coverage like polycarbonate crowns, stainless steel crown (SSC), open-faced SSC with veneer placed on chair side, commercially veneered SSC, Figaro crowns and Zirconia crowns. This article presents an overview of zirconia crowns in Pedodontics and a case report of full coronal restoration using zirconia crowns.

Keywords: Esthetic, primary teeth, zirconia crown

1. Introduction

The goal of esthetic dentistry should be “bright, beautiful, but believable.” At present, there are many solutions available for esthetic problems in Pediatric Dentistry. But the biggest dilemma is choosing the best treatment modality for a particular patient and situation which depends on various factors like the age of the patient, motivation of the parents, the child’s behavior in the dental clinic and the socio-economic status of the patient. Over the last two decades, a higher esthetic standard is expected by parents for restoration of their children’s carious teeth [1-3]. While the traditional concept of Jean Piaget stated that a child’s perception of self and care about their appearance only developed by the age of 8 years; there have been recent studies in the field of child psychology that have challenged this concept, showing that, with increased media exposure, children as young as 3-5 years of age have a sense of consciousness of body image [2-5].

2. Background

In 2008, zirconia crowns were introduced to pediatric dentistry as an alternative restorative option. Advantages of the pediatric zirconia crowns included: excellent esthetics, resistance to fracture, biocompatibility, reduced plaque accumulation, color stability, and potentially less technique sensitivity. Excellent esthetics were reported by clinicians and parents. Biocompatibility and reduced plaque accumulation were found to be due to the polished surface of zirconia crowns leading to less gingival inflammation, when compared to veneered stainless-steel crowns. Color stability being visually compared to natural adjacent teeth. The disadvantages of the zirconia restoration are the inability to crimp the crown for mechanical retention, inability to change its color, the limited ability to trim the crown or alter its shape, and the need for more tooth reduction than a traditional preformed metal crown. The zirconia crowns are also more expensive [6-9].

This case report describes the use of preformed zirconia crowns in a 4 year old child patient for the esthetic rehabilitation of her anterior teeth which showed excellent patient and parent satisfaction and boosted the confidence of the patient giving her a beautiful smile.

3. Case Report

A 4 year old girl child reported to the outpatient with the chief complain of decayed milk teeth in the upper front teeth region.

The parents wanted esthetic correction along with the prevention of further aggravation of this problem. On clinical examination it was seen that the child has carious 51, 52, 53, 61, 62, 63 (Fig 1) which were sensitive to cold food and beverages without any history of pain. Radiograph revealed no pulpal involvement (Fig 2). After discussion with her parents it was decided that the incisor teeth should be restored using Zirconia crowns and composite restorations for the canines was planned.

After obtaining parental consent, diet counselling was done and oral hygiene instructions were given to the parents. Behavior modification was done and MI Varnish was applied on the first appointment. On the next appointment alginate impression of the maxilla was obtained using a sectional tray and cast was made. The mesio-distal dimensions of the anterior teeth were measured at the cervical region using a divider and scale. The dimensions were noted and matched with the dimension chart provided by the manufacturer of the crown (kids-e-crown) Accordingly the appropriate sizes of

crowns for 51,52,61,62 were procured and the patient was informed (Fig 3).

Teeth were then prepared using a tapered diamond bur in a high-speed handpiece. The length of crown was first reduced incisally by 1.5–2 mm. Labial surface was reduced with a minimum of 0.5–1.0 of tooth structure in three planes (gingival-middle-incisal thirds). The lingual surface was removed by removing .75–1.25 mm of tooth structure from the lingual surface, extending from 1 to 2 mm subgingivally to the middle of the incisal edge of the prep following the natural contours of the existing clinical crown. Occlusion was checked to ensure there is adequate clearance from opposing dentition. Mesial and distal slices were made, tapered to a knife edge at gingival margin. The final passive fit of the crown was confirmed and cemented with Type 1 GIC. (Fuji type I) (Fig 4). The occlusion was checked and post operative radiographs taken (Fig 5). The patient was advised to come for regular checkups^[9, 10].



Fig 1: pre operative view

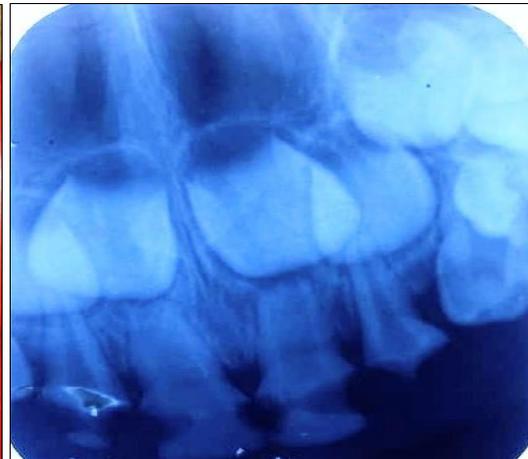


Fig 2: Pre operative radiograph



Fig 3: Preformed zirconia crown



Fig 4: Cementation of crowns



Fig 5: Post operative radiograph

4. Discussion

Today there are several options available for the esthetic rehabilitation and restoration of anterior teeth in children. Many factors are responsible for the choice to be made and the true success depends on the case selection and the restorations used. Resin strip crowns, pre-veneered stainless steel crowns, and open-faced crowns with a window have historically been offered as alternatives for the classic anterior preformed metal crown. Each of these restorations has advantages and disadvantages. Newer options available are the newly introduced fiberglass Figaro crowns and preformed zirconia crowns [6, 7].

Resin strip crowns have been considered for a long time to be the most esthetic option, as the color and shape can be changed accordingly; however, they require proper isolation, are technique sensitive and takes a longer time. Pre-veneered stainless steel crowns do not require as much isolation as strip crowns, since they can be cemented with glass ionomer cement. However, they require a more aggressive preparation and have a resin facing that can debond over time. Open-faced crowns offer a more conservative preparation and are more moisture tolerant for cementation but require isolation for placing the resin facing [2-6].

The preparation of tooth for zirconia crown takes more time, and so this crown not recommended for children who are fearful and unable to cooperate for longer procedures. It is difficult to adjust a zirconia crown because it is ceramic and cannot be trimmed with scissors like a traditional SSC, it is necessary to use a high speed, fine diamond burs with lots of water because excessive heat could cause fractures in the crown's ceramic structure. Teeth restored with resin composite, and preveneered SSC showed an increase in mean gingival index score, while corresponding values decreased in zirconia crowns at 6-month follow-up [11-15]. Studies to compare parental satisfaction were conducted using three different tooth-colored anterior crown which showed that parents had the highest satisfaction with zirconia crowns, followed by strip crowns and preveneered SSCs [8, 9, 16].

5. Conclusion

It is important to understand that esthetic harmony can lead to a better psychological health and higher self-assurance; it improves peer relationships and strengthens self-confidence in a growing child. Operator preferences, esthetic demands by parents, the child's behavior, socioeconomic status and moisture and hemorrhage control are all variables which affect the decision and ultimate outcome. Zirconia crowns offer high-end esthetics, superior durability, and easy placement compared to composite restorations and strip crowns, so can be considered as a method of esthetic rehabilitation in child patients.

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