



An Update on Aesthetic Crowns

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Abstract

Early Childhood Caries has been known to cause severe decay in children at a global level. Most commonly we see involvement of upper incisors followed by the molars. This affects the phonetics and most importantly the aesthetics of the child. Treatment of decayed anterior teeth can be done by a variety of techniques which includes Strip crowns, Polycarbonate crowns, Cheng crowns, Acrylic crowns, Zirconia crowns and the most recent is Figaro crowns. This article gives an overview of few of the aesthetic options for rehabilitation of ECC cases.

Keywords: ECC; Aesthetics; Strip crowns; Zirconia crowns; Figaro crowns

Introduction

Early childhood caries is defined as the presence of carious lesion in one or more teeth in children less than 71 months of age and the labial surface of the upper anterior teeth is one of the most commonly affected. As a consequence, pain, aesthetic problems, phonation, swallowing and even loss of anterior space can be found. This not only affects the oral health but also the general health and well being of the child. This affects the speech and aesthetics of the child which in turn affects the self-esteem of the child. Hence aesthetic rehabilitation plays a pivotal role [1].

Esthetic rehabilitation in children plays a key role in phonetics, speech and elevating the self esteem of the child. These treatment options should be cost effective and also be durable enough to stay till the exfoliation of the teeth. They should not take much time as patient co operation is difficult in case of pediatric patients [2].

The color, shape and texture of the teeth surface are essential for a beautiful smile since children also have aesthetic perception of their teeth. Esthetic treatment options comprises of a variety of prefabricated crowns such as Acrylic crowns, Strip crowns, Polycarbonate crowns, Cheng crowns, Pedo Jacket crowns, New Millennial crowns, Zirconia crowns and the latest one being Figaro crowns [3-5].

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Classification

These prefabricated crowns can be classified under the following broad headings. These crowns are also available in a range of sizes depending on the dimensions of different primary teeth [4,5].

Based on method of cementation to tooth

- Bonded crowns - Polycarbonate crowns, Strip crowns, Pedo jacket crowns, Artglass crowns
- Luted crowns - stainless steel crowns with facing, Kinder crowns, Cheng crowns, NuSmile crowns, Dura crowns, Whiter Biter crowns, Pedo Compu crowns, High density polyethylene veneered crowns

Based on the material of the crowns

- Polymer - polycarbonate crowns, strip crowns
- Pre veneered stainless steel- Nu- smile Signature
- Zirconia - EZ pedo, Nu-Smile ZR
- Aluminium veneered with tooth colored material - Pedo pearls

Strip crowns

Strip crowns are prefabricated transparent celluloid crowns forms for anterior teeth. They are first introduced in 1979 by Webber et al. and today remains to be one of the most commonly

used crown forms. The crown automatically contours the restorative material and when it is stripped off, it leaves a smooth surface, so no polishing is needed. The crown forms are filled with composite and then bonded to the tooth. Although esthetically they are better, its retention is dependent on the amount of tooth structure remaining after excavation of caries. Because resin composite is used, moisture and hemorrhage control is important as it can lead to resin placement failure. Also discoloration of composite resin overtime has been seen [4,5].

CEREC crowns

CEREC crowns use CAD/CAM technology for the fabrication of the crowns. The whole procedure can be completed in a single visit. A digital image of the prepared tooth is taken and then converted into 3D computerized model of tooth, which is used as a model for fabrication of the crown. The ceramic blocks come in a wide variety of shades and colors and it is matched and selected as per the adjacent teeth [4].

Pedo jacket crowns

Pedo jacket crowns are made up of a tooth-colored co polyester material, which is filled with resin material and left on the tooth after the polymerization instead of being removed as it is done in strip crowns. These crowns are available in only one shade, which is very white, so matching the up adjacent, non restored teeth can be hard. Also, because the crowns are made of co polyester, so they cannot be trimmed or reshaped with a high-speed finishing bur which may lead the material to melt to the heat produced by the bur [4,5].

Zirconia crowns

It was introduced by John P Hansen & Jeffery P Fisher in 2010. Zirconia is a form of crystalline dioxide of zirconium. The mechanical strength of these crowns is similar to that of stainless steel crowns. Zirconia has demonstrated high wear resistance, excellent biocompatibility, and superior corrosion resistant. Three type of zirconia are currently used in dentistry; these are Ytria-stabilized Tetragonal Zirconia Polycrystal (Y-TZP), magnesia partially-stabilized zirconia and zirconia toughened alumina. Y-TZP is a monolithic zirconia that consists of equiaxed partially stabilized tetragonal grains. Because of the superior mechanical properties of Y-TZP ceramics, these materials have a wide range of clinical applications, from implant abutments and single tooth restorations to fixed partial dentures involving several elements. Although zirconia crowns offer excellent strength and aesthetics it requires extensive tooth preparation subgingivally, has a passive fit and is expensive. The crown has high chances of breakage if the patient bites on it during cementation. It cannot be crimped or trimmed. It also cannot be placed adjacent or opposite to stainless steel crowns as it will lead to abrasion. It has also shown very good outcome on 29 month follow up [4,6,7].

Figaro crowns

Figaro crowns are made of medical and dental-grade Fiber glass and resin. It is metal free and highly biocompatible. It has many advantages such as active fit which is termed flex-fit by which the crown fits the tooth like a glove and has very close adaptation. It can be trimmed and crimped. Studies have shown that Figaro crowns are the strongest preformed crowns available in the market at present and they have 2.5 times stronger more compressive strength than stainless steel and Zirconia crowns in ball bearing and compression



Figure 1: Pre-operative frontal view.



Figure 2: Post-operative frontal view with Figaro crowns.



Figure 3: Post-operative intra oral view with Figaro crowns.

tests. The only drawback with this crown is that it is not visible on a radiograph (Figures 1-3).

Steps for tooth preparation for aesthetic crowns

Crown selection: The mesio-distal measurement of the crown is measured and the size closest to it is selected from the size range.

Occlusal preparation: Using a wheel shaped bur with diamond points the occlusal reduction is done. It should be flat and there should be adequate clearance from the opposing tooth.

Proximal preparation: It is done using a thin tapered fissure bur with diamond points and the contact should be broken.

Subgingival preparation: The preparation should extend 1 mm to 2 mm subgingivally down to the cemento-enamel junction while carefully avoiding damaging the gingival tissues. Circumferential reduction should be done. We paid special attention to sufficiently reducing the circumference of the tooth and to the removal of all of the coronal contours above the cement-enamel junction to allow for a good fit and placement of the crown.

Case Presentation

A 4.5 year old child reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of discolored anterior teeth. His parents gave history that pulpectomy was done and strip crowns were placed which had discolored overtime.

On clinical examination - Discolored Strip crowns were placed with 51, 61, dislodged restoration with 52.

After clinical and radiographic examination, it was decided to go for Figaro crowns with 51, 61 and composite core build up followed by Figaro crown with 52.

Clinical Procedure

The crown size was selected by checking the mesio-distal dimensions using a divider. Shade selection was done and composite core build up was done with 52. Tooth preparation was done using Crown cutting burs. For occlusal preparation wheel shaped diamond bur was used to remove 2 mm of the incisal edge, then proximal preparation was using thin tapered fissure bur. A feather edge finish line was given sub-gingivally all around the tooth. Then a probe was used to check for any undercuts or ledges. Then the trial fit of the crown was done.

The crowns were cemented using Type 1 Glass Ionomer cement. The excess cement removed and an IOPA was taken. The patient was recalled after 1 week for follow up.

On follow up visit it was seen that the crown had changed color and was matching the adjacent teeth. There was good gingival healing and marginal adaptation.

Discussion

Deciduous teeth play a key role in phonetics, eating, aesthetics and maintaining space for permanent teeth [7]. Thus, pediatric dentistry should invest efforts to keep these dental elements healthy until the time of their exfoliation. In ECC cases, problems such as pain, edema, irritation, poor nutrition, among others, can cause anguish and discomfort in the child, affecting their behavior, appearance, chewing capacity and phonation [8].

Anterior aesthetic rehabilitation in pediatric dentistry is a challenging procedure and requires skill, patience and most importantly patient co-operation. In today's era of modernization there is increased interest in aesthetic treatment options in primary teeth. In most cases of ECC there is severe decay in the anterior teeth which mainly affects the aesthetics of the patient and in turn affects the self esteem and morale of the child. Hence aesthetic rehabilitation has become the need of the hour in case of children.

In pediatric patients there are many anterior aesthetic options which have been used since decades. The earliest aesthetic crown used was open faced Ceramic crowns but this was discontinued to many drawbacks. Ceramic facing stainless steel crowns were introduced next and had better properties. Following this many aesthetic crowns were introduced in the market like Strip crowns, Acrylic crowns, polycarbonate, cheng, etc.

Strip crowns have stood the test of time and is the most widely used till today. The most recent ones currently used in the market are Zirconia and Figaro crowns. Zirconia crowns have become very popular among the pediatric age group due to its excellent aesthetics and mechanical strength. But some do not prefer Zirconia due to its extensive tooth preparation and its high cost. Figaro is still new in the market and now people are beginning to use it, hence may get popularized in the years to come.

Conclusion

There are various aesthetic options available for primary teeth. Each has their own benefits. A strip crown which was introduced many decades ago is still the most commonly used for aesthetic rehabilitation of ECC cases. Zirconia crowns gained momentum in the market but only few studies have been performed to check long term follow up results. Similarly Figaro crowns have been introduced in the market very recently. This crown showed tissue friendly marginal adaptability and was easy to place in pediatric patients. Hence this could be a promising crown in rehabilitation of pediatric esthetics. More studies have to be done to gain more knowledge about the different aspects of these crowns and for follow up results [9].

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