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Twelve-month follow-up of a pediatric Lithium Disilicate (E-Max Press) based dental crown: Case report.

Umm Kulthum Tirunilath, Kannan V.P, Arya S Kumar, Shruti Sudarsanan
Postgraduate student, Department of Pedodontics and Preventive Dentistry, Government Dental College, Kottayam.
Professor and Head of the Department, Department of Pedodontics and Preventive Dentistry, Government Dental College, Kottayam.
Postgraduate student, Department of Pedodontics and Preventive Dentistry, Government Dental College, Kottayam.
Postgraduate student, Department of Pedodontics and Preventive Dentistry, Government Dental College, Kottayam.

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ABSTRACT
This case report describes the restoration and twelve-month follow-up of four lithium disilicate crowns (Emax) on primary maxillary incisors. The gingival health, plaque deposition, marginal integrity, marginal adaptation and the wear on the opposing tooth were considered. The Emax crowns allowed sustainable and functional restoration while restoring the natural appearance of the tooth. the clinical performance of the crowns was completely satisfying.

Keywords: Pediatric crowns, Emax crowns, Aesthetic crowns.

I. INTRODUCTION

In children, oral rehabilitation of badly mutilated anterior teeth is crucial to minimize negative effects like difficulty in incising food, formation of deleterious habits like tongue thrusting, difficulties in speech and psychological effects.[1]Pre-veneered, zirconia and strip crowns have all been developed in recent years as aesthetical substitutes for preformed metal crowns.[2] One such premium all-ceramic materials, lithium disilicate, aids in creating more aesthetically pleasing restorations.[3] This material has good compressive strength, surface smoothness, abrasion resistance, gloss, and low plaque accumulation.[4] The porcelain layering looks extremely realistic and blends in with natural teeth. The present case report discusses the clinical protocol using a pediatric lithium disilicate crown for maxillary anterior teeth with twelve months follow-up.

Case presentation

A 3-year-old-year-old male patient visited the Department of Pediatric and preventive dentistry with the chief complaint of decayed upper anterior teeth. The clinical and radio graphic examination showed pulpal involvement on all four upper incisors. (Figure 1) The child was diagnosed with early childhood caries. Full coverage restoration with pediatric lithium disilicate glass-ceramic (IPS e-max Press, Ivoclar Vivadent) for maxillary anterior teeth was planned. The shade match was selected using Vita 3D Master prior to the teeth preparation.

Tooth Preparation

Pulpectomies were performed in all four mutilated maxillary anterior teeth (Figure 2). The treatment was conservative preserving as much of the natural structure of the teeth as possible which in turn would enhance aesthetics and longevity of the teeth.

Peripheral preparation

The reduction followed the natural contours of the teeth which began at the 1mmsubgingival margin and ended with a rounded transition onto incisal contours of the teeth. The labial, lingual and circumferential tooth reduction ranged from 0.5 to 1.25 mm. These steps were performed using a course tapered diamond. A 2mm incisal reduction was done using football diamond bur.

Finish line preparation

The finish line preparations were 1mm subgingival while carefully avoiding damaging the gingival tissues. The tooth preparations were rounded, and sharp angles were removed (Figure2). An impregnated cord (23% aluminum chloride) was used for gingival retraction and then an impression was made using polyvinyl siloxane (Virtual, Ivoclar Vivadent). The impression made was sent to laboratory. Full-coverage crowns were then fabricated by lithium disilicate (Ips-Emax Press) using a layering technique. (Ips-Emax

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ingots). The seating of the pediatric lithium disilicate crown was performed in the next visit.

Crown trial

The crown was carefully placed to see the fit and contour. The tried crown was then washed and dried properly. The intaglio surface of pediatric lithium disilicate glass-ceramic was etched with 9 % hydrofluoric (ULTRADENT™) acid for 15 seconds and then washed and dried. Silane primer (ULTRADENT™) was then applied and dried.

Cementation

The tooth and the crown were cleaned of all residues. The abutment teeth were etched with a 37 % phosphoric acid etchant. Finally, the dual cure luting agent Rely X U 200 (3M ESPE) was used to cement the crowns using the quarter technique. (Figure 3).

Outcome and follow-up

The patient was followed for 12 months. There was minimal plaque accumulation present 12 months follow-up. Excellent biocompatibility was noticed. Good marginal adaptability and marginal integrity and no secondary caries were noted. During the 12-month follow-up, unusual attrition of the opposing teeth was not present. (Figure 4)

Figure1: Early childhood caries.

Figure 2: Tooth preparation done in the maxillary incisors.

Figure 3: Post operative picture of Lithium disilicate crown after one month.

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Figure 4: Post operative picture at the end of one year.

II. DISCUSSION

Anterior teeth rehabilitation of grossly mutilated teeth can positively impact a child's self-esteem and emotional and physical health.[3]Emax crowns have been known over a decade as one of the most outstanding monolithic restorations in the market. They closely mimic the hue and translucency of natural teeth. Because of this, these crowns are used frequently to treat adults' smile zones.[5]Teeth that have received pulp therapy, fractured teeth, discolored or malformed teeth or badly mutilated carious teeth with sufficient tooth structure can be selected for Emax restoration. However, no research is available in children.

Based on our experience with pediatric Emax crowns, some positive observations can be made. These crowns seem to be durable. These crowns were retentive at one-year follow-up after cementation. After one year of follow-up the gingival health was good with minimal plaque accumulation, excellent marginal integrity and minimal attrition of the opposing teeth. The aesthetic integration of these crowns is also excellent. They are translucent in color, which ensures the closest match of the light properties of natural teeth. Lithium disilicate crowns have a vital appearance due to increased light transmission.[6]

As a metal-free substitute, lithium disilicate produces clear and usable diagnostic CT images and lessens the radiation exposure levels unlike metallic restorations. The backscatter effect of metallic crowns, when exposed to radiation during CT scanning and cancer radiation therapy is one of the less obvious characteristics of these materials. Also, the visual artefacts that are caused by electron-dense materials during CT scanning adversely affect the quality of the scan and its diagnostic value. There is decreased dose enhancement around lithium disilicate crowns.[7]

III. CONCLUSION

Pediatric lithium disilicate crowns are an excellent esthetic choice for the rehabilitation of primary teeth. Further studies are needed with follow-up intervals of longer duration to confirm the proposed treatment.

Bullet point

1. Lithium disilicate ceramic crowns have a high strength of 470 Mpa which gives excellent durability and restorative function.
2. These restorations provide excellent translucency and give an aesthetically pleasing appearance.
3. These crowns are metal free and alloy free and can be used in metal allergic patients.

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