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Restoring Smiles: Esthetic Rehabilitation Of Anterior Teeth Affected With Severe Early Childhood Caries: A Case Report

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Abstract
Esthetic Rehabilitation Of Anterior Teeth Affected With Severe Early Childhood Caries Poses Challenges In Children. This Case Report Demonstrates The Effectiveness Of Using Customized Polymethyl Methacrylate (Pmma) Crowns To Restore Decayed Anterior Teeth In A 4-Year-Old Child. These Polymethyl Methacrylate Crowns Can Be Fabricated To The Desired Shape And Colour. Prior To Treatment, Radiographs And Intraoral Photographs Were Taken To Assess The Suitability Of The Chosen Approach. The Results Indicated That Customized Polymethyl Methacrylate Crowns Are A Viable Option For Restoring Deciduous Anterior Teeth, Offering Cost-Effectiveness And Reduced Chair Time Compared To Alternative Crown Options. However, Further Long-Term Clinical Studies Are Necessary To Fully Understand The Benefits Of This Restorative Technique.

Keywords: *Early Childhood Caries, Esthetic Crowns, Pmma Crowns*

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I. INTRODUCTION

Pediatric dentistry encompasses various aspects of oral health care for children, including space management, orthodontics, surgery, and trauma management. Among the oral health issues affecting children, dental caries poses the most significant threat.[1] Dental caries is a prevalent chronic disease caused by the presence of high-sugar or high-carbohydrate food particles on the tooth surface. Bacteria in the mouth metabolize these food particles, producing acids that erode the enamel, penetrate the pulp, and result in tooth decay.[2] The occurrence of dental caries in infants is common but varies in patterns. Deciduous teeth exhibit different caries patterns compared to permanent teeth, with maxillary dental caries being the most frequently observed. Previously referred to as nursing bottle caries, dental caries of the maxillary anterior teeth are now recognized as a form of early childhood caries (ECC).[3]

Early Childhood Caries (ECC) is a type of tooth decay that primarily affects the baby teeth of young children. It is often referred to as "nursing bottle mouth," "bottle mouth caries," or "nursing caries." This condition typically leads to severe damage to the primary dentition's upper front teeth and back molars2.[4] Treating ECC can be costly, as it often requires extensive dental restorations and tooth extractions at a young age.[5] The American Academy of Pediatric Dentistry defines this condition as "the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child aged 71 months or younger.[6]

Stainless steel crowns (SSCs) are considered the most durable and reliable restorations for severely decayed or fractured baby teeth, such as those affected by ECC.[7] They are known for their ease of cementation, resistance to fractures and wear, and strong adherence until the teeth naturally exfoliate. However, a major drawback of SSCs is their metallic silver appearance, which compromises aesthetics. Due to the growing emphasis on esthetic concerns, SSCs have become less preferred in recent times. Various types of restorations are employed to repair primary teeth, including open-faced SSCs, pre-veneered SSCs, resin (strip) crowns, and zirconia crowns.[8]

Several modifications and newer esthetic crowns have been presented to overcome the disadvantages of stainless steel crowns. These crowns were introduced to meet the increasing esthetic demands of patient as well as their parents. These modifications include open faced and veneered stainless steel crowns. Open faced stainless steel crowns have a facial window cut wherein composite resin is bonded onto the tooth whereas in pre-veneered crowns (Nu Smile primary crowns, Kinder crowns), esthetic composite veneers are retained onto stainless steel using variety of mechanical and chemical bonding approaches. These crowns have superior esthetics than conventional stainless steel crowns. However, their durability is compromised because these crowns are also bulky, very expensive and lack natural appearance.

Esthetic rehabilitation in children plays a key role in phonetics, speech and elevating the self esteem of the child. Pediatric dentist plays a pivotal role in restoration of the affected teeth. They should not take much time as patient

cooperation is dif cult in case of pediatric dentistry.[1] The color, shape and texture of the teeth surface are essential for a beauti-ful smile since children also have aesthetic perception of their

teeth. Esthetic crowns available for pediatric patients are Acrylic crowns, Strip crowns, Polycarbonate crowns, Cheng crowns, Pedo Jacket crowns, New Millennial crowns, Zirconia crowns and the latest one being Figaro crownsEsthetic rehabilitation in children plays a key role in phonetics, speech and elevating the self esteem of the child. Pediatric dentist plays a pivotal role in restoration of the affected teeth. They should not take much time as patient cooperation is dif cult in case of pediatric dentistry.[1] The color, shape and texture of the teeth surface are essential for a beauti-ful smile since children also have aesthetic perception of their teeth. Esthetic crowns available for pediatric patients are Acrylic crowns, Strip crowns, Polycarbonate crowns, Cheng crowns, Pedo

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Polymethyl methacrylate acrylic (PMMA) milled crowns offer a convenient and reliable temporary solution requiring minimal tooth preparation allowing for efficient chairside time utilization and are very economical. The material's hardness and resistance make it suitable for creating provisional restorations that can be used until a permanent restoration is ready. Polymethyl methacrylate crowns are fabricated using CAD/CAM technology and are available in various shades, providing options to match the patient's natural tooth color. This allows for the selection of an appropriate temporary solution for the patient's specific needs. The unique properties of PMMA, such as its low density, aesthetics, cost-effectiveness, ease of manipulation, and tailorable physical and mechanical properties, make it a suitable and popular biomaterial for these dental applications. To further improve the properties (thermal properties, water sorption, solubility, impact strength, flexural strength) of PMMA, several chemical modifications and mechanical reinforcement techniques using various types of fibers, nanoparticles, and nanotubes have been reported recently. [9]

II. CASE PRESENTATION

A 4-year-old boy reported to the Department of Pediatric and Preventive Dentistry with a chief complaint of pain in the lower left back region since 3 months.). During an intra-oral examination, 51, 52, 53, 61, 62, 63, and 64, were decayed and were assigned an ICDAS score of 3 i.e. localized enamel breakdown in opaque or discoloured enamel. Additionally, 54, 64, 74, 75, and 84 were observed to have extensive decay, receiving an ICDAS score of 6 i.e. extensive distinct cavity with visible dentin (involving more than half of the surface), which signifies advanced caries progression.

ORAL EXAMINATION—FRONTAL VIEW

ORAL EXAMINATION —OCCLUSAL VIEW

51,52,61,62 were restored with composite followed by placement of polymethyl methacrylate crown. 53,63,75,85 were restored using composite resin. Pulpectomy was done irt 54,64,74,84 followed by placement of stainless steel crown. Indirect pulp capping was done for 75 followed by placement of glass ionomer restoration.

PMMA CROWN Wrt: 51,52, 61,62- Frontal view

SS CROWN Wrt: 54,64,74,84 – Occlusal view

FOLLOW-UP OF FOUR MONTHS

III. DISCUSSION

Decay in primary teeth progresses at a faster rate compared to permanent teeth and can lead to more severe symptoms. Untreated ECC can result in the formation of abscesses, pain, and malocclusion. If dental caries reaches an irreversible stage during childhood, it will require not only restorative treatment but also dental and prosthetic interventions. Managing childhood dental caries is crucial for establishing lifelong oral health, as it can contribute to malocclusion and temporomandibular disorders.[10] Moreover, in countries with public healthcare systems, the cost of treatment becomes a significant burden.[11]

There is a growing emphasis on the esthetics rather than just the functionality of anterior deciduous teeth restorations. Pediatric dentists face challenges in achieving esthetic restorations for severely damaged primary teeth, not only due to limited materials and techniques but also because young children requiring such restorations are often the most challenging to manage. Clinicians who treat young children constantly strive to find the most effective materials and techniques for successful restoration of primary anterior teeth.[12] Full-coverage crowns are recommended for deciduous teeth with multiple carious surfaces, involvement of the incisal edge, extensive cervical decalcification, need for pulp therapy, hypoplasia, and difficulties in moisture or hemorrhage control.[13] Various options for full-coverage restorations in deciduous teeth include preformed stainless steel crowns (SSCs), open-faced SSCs, pre-veneered steel crowns, composite resin strip crowns, and polycarbonate crowns. These choices offer different approaches to achieve functional and esthetic outcomes for the restoration of primary anterior teeth.[14-16]

In this report, we presented the esthetic outcomes of using polymethyl methacrylate crowns to treat ECC in a 4-year-old pediatric patient. Over a period of 6 months, the patient exhibited satisfactory esthetic results. polymethyl methacrylate crowns can be particularly beneficial in cases where young patients are uncooperative or when esthetics is a significant concern. However, there is limited clinical data available on this technique. In conclusion, polymethyl methacrylate crowns can be considered a viable alternative to conventional metal-ceramic restorations for restoring deciduous teeth affected by ECC or at high risk of trauma. Nonetheless, further long-term clinical studies are needed to fully assess the effectiveness and utility of this restorative approach.

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