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Optimizing Treatment for Severe-Early Childhood Caries: The Role of Groper's Appliance

Anjani Uprety,[1] Mamta Dali,[1] Bandana Koirala,[1] Gajendra Birajee[1]

[1]*Department of Pedodontics and Preventive Dentistry, College of Dental Surgery, B.P Koirala Institute of Health Sciences, Dharan, Nepal.*

ABSTRACT

Severe-Early Childhood Caries (S-ECC), often leading to serious health issues if left untreated, possesses a great restorative challenge to the pediatric dentist. This case report discusses a comprehensive management of S-ECC in a 5-year-old female patient with high dental caries risk. The patient presented with multiple carious lesions, root stumps, and fenestrated roots, necessitating a staged intervention. Treatment involved restorations with glass ionomer cement, pulpectomy followed by omega loop post build-up on anterior tooth and stainless-steel crowns on posterior teeth. Additionally, extractions were performed and Groper's appliance was inserted for esthetic rehabilitation and space maintenance on maxillary anterior and posterior regions, respectively. Following completion of the planned treatment, overall risk assessment measured low. This case report emphasizes the importance of rehabilitative interventions in S-ECC, showcasing Groper's appliance as a viable and effective treatment option.

Keywords: Groper's appliance; severe-early childhood caries; smooth surface caries.

INTRODUCTION

Severe-Early Childhood Caries (S-ECC) is any sign of smooth surface caries in children younger than 3 years of age.

Correspondence
Dr. Anjani Uprety
Email: uprety.anjani@gmail.com
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Between the ages of 3 and 5, the presence of one or more decayed, missing (due to caries), or filled smooth surfaces in the primary maxillary anterior teeth, or a decayed, missing, or filled score equal to or greater than 4 (at age 3), 5 (at age 4), or 6 (at age 5) surfaces is considered indicative S-ECC.[1] Management of S-ECC involves a spectrum of interventions tailored to the caries progression, ranging from preventive measures to restorative and rehabilitative procedures.[2]

CASE REPORT

A 5-year-old female patient came to the Department of Pedodontics and Preventive Dentistry, with the complaint of pain in the inner aspect of upper lip since more than a month along with the inability to chew food. She gave a history of night pain for one week on the right upper and lower back teeth as well. Her medical history was non-contributory.

Clinical examination revealed ulceration of the labial mucosa secondary to fenestrated roots with respect to 52, 51 and 61 (Figure 1). Caries present were classified according to the following ICDAS criteria: ICDAS 6 on 55, 54, 85, ICDAS 5 on 75, ICDAS 4 on 63, 65, 84 and ICDAS 2 on 74 with the presence of root stumps on 53, 64 and missing 62 (Figure1,2). Radiographic findings on OPG demonstrated radiolucency involving enamel on 63,74; enamel and dentin on 65, 75 and 84; enamel, dentin and pulp along with peri-radicular involvement on 55, 53 and 85 (Figure 3). Teeth 54 and 64 presented with periapical radiolucency along with root resorption. Similarly, root resorption was present on 52, 51, 61 while 62 was missing due to caries (Figure 3).

Due to the need for the comprehensive management including Groper's appliance for esthetic rehabilitation, extraction of 52, 51 and 61 was performed initially. Restorations with glass ionomer cement followed on the subsequent visits on 65, 63, 74 and 84 along with additional calcium hydroxide base for 75 **(**Figure 4). Pulpectomy was performed on 55 and 85 followed by cementation of stainless-steel crowns (Figure 4,5,6). Pulpectomy followed by omega post and composite build up was done on 53. (Figure 4,5,6). With the aim of designing Groper's appliance, bands were fabricated on 55 and 65 followed by making of alginate impressions. After obtaining the cast, 19 gauge round wire was passively adapted on the anterior palate and soldered onto the bands. Self-cure acrylic was fabricated over the anterior alveolar ridge on which acrylic teeth were placed. After finishing and polishing of the appliance, it was cemented on 55 and 65 following extractions of the root stumps of 54 and 64 **(**Figure 4-6).

DISCUSSION

Dental caries, the most prevalent oral disease results from interplay between the bacteria, mainly Streptococcus mutans and sugary diet on the hard tissue of any tooth. An extensive examination of caries prevalence on the maxillary anterior teeth in children, encompassing multiple studies across Europe, Africa, Asia, the Middle East, and North America revealed that Africa and South East Asia in the forefront.[2]

Severe Early Childhood Caries (S-ECC) displays a specific and symmetrical developmental pattern, initiating at the cervical third of vestibular surface of the maxillary anterior teeth. Subsequently, it extends to the occlusal surface of the maxillary and mandibular first molars, canines and second molars. In its most advanced stages, it may also affect the lower incisors.[3] In the present case, all deciduous teeth except the lower anterior presented caries with severe destruction of maxillary incisors and first molars (Type 2-ECC).

Restorative procedures including the esthetic rehabilitation of young children with multiple tooth loss subsequent to S-ECC can pose greatest challenge to any pediatric dentist. Although, there is no strong evidence suggesting that early loss of maxillary incisors to cause undesirable effects on the growth and development of child, factors requiring consideration are the preservation of esthetics, speech development and prevention of any tongue habits.[4]

Nevertheless, parental desire happens to be the most decisive factor for the placement of any esthetic appliance. Even though various types of appliances such as Grasce appliance can be fabricated for smile restoration in children, authors have had most success with Groper's appliance. A significant and valid motive for replacing missing anterior teeth is to reinstate an aesthetically pleasing appearance, thereby fostering normal psychological development in child.[5] Contraindication for this fixed appliance, however, are epileptic or immune compromised patients, children with mental retardation, poor oral hygiene, improper dietary habits and significant overjet, deep bite or anterior cross bite.[4] In the present case, Groper's appliance was chosen which not only served the purpose of smile rehabilitation but also contributed to the space maintenance for the missing 54 and 64. Here, the appliance constituted a design similar to Nance palatal arch, whereby the maxillary deciduous second molars were used to support the appliance through bands and a wire that contained an acrylic flange bearing acrylic teeth, anteriorly.

There are some limitations to this appliance, such as mucosal inflammation associated with the labial acrylic flange and the need for removal of whole unit when the maxillary permanent incisors start to erupt. Mucosal inflammation can be minimized through proper oral hygiene maintenance and periodic recall visits, as evident in the present case during a one-month follow-up visit. Additionally, impact on the self-esteem of children due to the removal of entire unit is less likely to be detrimental, as children at this stage of development undergo a regular process of incisor exfoliation. Thus, the limitations of the Gropers appliance are outweighed by its advantages.[6]

Figure 1: Pre-operative maxillary and mandibular occlusal view

Figure 2: Pre- operative frontal view

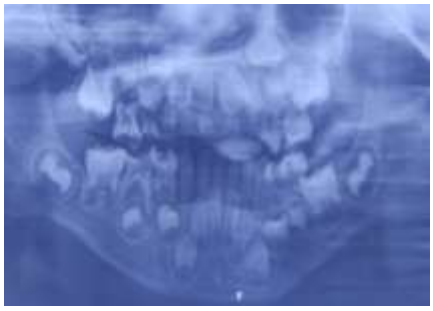

Figure 3: Pre-operative orthopantomogram

Figure 5: Post-operative frontal view: Groper's appliance replacing 52, 51, 61, 62.

Figure 4: Post-operative maxillary and mandibular occlusal view

Figure 6: Post-operative orthopantomogram

SUMMARY

Pediatric dentistry is fundamentally oriented towards the proactive prevention of caries with minimal intervention. Despite this primary focus, unavoidable circumstances such as Severe-Early Childhood Caries (S-ECC) may necessitate rehabilitative treatment modalities instead, as in here where Groper's appliance deemed suitable. Although, behavior of the patient and inadequate mouth opening were the challenges faced during the initial visits, subsequent behavior modification approaches helped for the redeem. Consequently, both the patient and parent expressed great satisfaction with the treatment outcomes. Hence, substituting the missing incisors with Groper's appliance offers a viable treatment choice for younger children due to its uncomplicated fabrication technique and convenience for daily wear.

Conflict of Interest: None.

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