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RESEARCH ARTICLE

MODIFIED GROPER'S APPLIANCE FOR ENHANCED ESTHETICS : A CASE THEME.

Dr. Aaisha Aejaaz, Dr. Tabrez T. A, Dr. Mohsen AM and Dr. Tanveer A.

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Abstract

One of the dentist's greatest restorative challenges is the esthetic rehabilitation of a young toddler who has suffered multiple tooth loss subsequent to rampant early childhood caries or extensive dental trauma. An anterior esthetic appliance may be used to replace lost teeth. The most decisive factor for placing an anterior esthetic appliance is parental desire.

Aim: This paper has offered several considerations for the clinicians to make when considering the placement of a fixed prosthetic appliance to replace missing incisors in preschool children.

Objective: The main objective of any passive appliance in children include space maintenance, esthetics, mastication, speech development and controlled tongue habits. However, there is no strong evidence that early loss of maxillary incisors will have any significant, long lasting effect on the growth and development of the child, but definitely affects the esthetics and speech which in turn affect the confidence in their social life.

Conclusion: Early childhood caries of an anterior tooth at younger age may result in psychological trauma to the child. So, restoration of anterior aesthetics with this appliance gave an imperative psychological boost for the child and his parents. Besides enhancing the facial aesthetics it acts as a functional space maintainers and assist in the development of proper speech.

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Introduction:-

One of the dentist's greatest restorative challenges is the esthetic rehabilitation of a young toddler who has suffered multiple tooth loss subsequent to rampant early childhood caries (EEC) or extensive dental trauma. This paper discusses one type of fixed anterior esthetic appliance and considerations to be made when deciding when and why it should be placed. ECC, known previously as baby bottle caries, nursing bottle caries, baby bottle tooth decay, or nursing decay, is a relatively new term that describes rampant dental caries in infants and toddlers. The condition, when associated with the bottle habit, has been characterized as first affecting the primary maxillary anterior teeth, followed by involvement of the primary molars.¹

The extent of decay is almost always more severe in the maxillary incisors, and, frequently, by the time the child is brought to the dentist, much of the anterior clinical crowns are decayed or lost. ECC is found in epidemic most of the countries and especially in developing countries, which significantly affect the health and social development of the child. Children of all socioeconomic levels may present with ECC, including middle and upper class populations. When extraction of primary incisors is necessary, many parents will seek an esthetic solution for the

problem. For the clinician seeking to construct and place an esthetic appliance in a preschooler there is very little information in the dental literature which addresses the need or indications for these appliances. A few articles have been published which describe a particular appliance design, but there is a scarcity of information available to aid the clinician in appliance design, placement, and counseling of parents.⁵

Clinical Considerations And Parental Counseling

When considering the need for an anterior appliance to replace missing primary incisors, the following points should be discussed with the parents. First, the strongest factor for placing an anterior esthetic appliance is parental desire as the child is in the stage of emotional and psychologic development. While space maintenance, masticatory function, speech development, and tongue habits may be of some other consideration. There is no strong evidence that early loss of maxillary incisors will have any significant, long-lasting effect on the growth and development of the child.⁴

Space Maintenance

While space maintenance in the posterior region is an important consideration when there is early loss of primary molars, the anterior segment, from canine to canine, appears to be stable, even with the early loss of several incisors, with no net loss of space from canine to canine.⁵ Occasionally, especially in a crowded dentition, if one or more incisors are lost, there may be some rearrangement of space between the remaining incisors, but no space maintenance is usually required if the loss occurs after the eruption of the primary canines.⁷

Masticatory Function

Children who have had all four maxillary incisors extracted due to ECC seem to function well without them. Empirically, many seem to have an improved ability of function, likely because the badly decayed or infected incisors inflicted pain upon eating. Parents may express concern about their child's ability to eat without four incisors hence they must be reassured that feeding is generally not a problem. In a survey of parents whose children had all incisors extracted, parents reported that their child adapted to the lack of their anterior teeth and had no difficulty eating and chewing. In the unlikely event that any difficulties should arise, these may be overcome by altering a child's diet and substituting softer foods, but this measure is rarely necessary.⁸

Speech

Yet another consideration is the child's speech development following extraction of all four incisors. This issue remains somewhat controversial. Many sounds are made with the tongue touching the lingual side of the maxillary incisors and inappropriate speech compensations can develop if the teeth are missing.¹¹

Esthetic Appearance

One of the most important and valid reasons for replacing missing incisors is to restore a natural and pleasing appearance and thus provide an opportunity for normal psychological development. As children grow and develop, they continually formulate a mental image about their bodies. However, body image alterations bear little significance in the very young.¹³ Most children are highly adaptable and preponderantly positive in mood. Children under five are seldom affected socially to any great extent due to their limited exposure to peers, unlike school age children. However, it is possible that children who regularly attend daycare or preschool programs may become more aware of their image and lack of teeth and be affected by their appearance. As these children approach school age, they may have a lesser problem fitting into groups of children who are in the mixed dentition and actively exfoliating the primary incisors.²

To summarize, if parents do not indicate a desire to replace missing anterior teeth, no treatment is usually required. But, if the parents do wish to replace missing teeth, they should not be discouraged from their decision. The possibilities of caries and growth interference are two other topics that should be discussed with parents considering a maxillary esthetic appliance. Plaque and food debris accumulation is increased with the fixed anterior appliance. Many children who had all incisors extracted are highly susceptible to caries risk due to EEC. It is imperative that the parents understand the risks involved in treating their child. A comprehensive caries prevention program must be initiated with a frequent recall schedule. Adequate measures of oral hygiene and a modified less cariogenic diet should be achieved before placing any appliance in the mouth.

Appliance Design

There are many types of appliances that can be fabricated. However, the authors have had the most success with the design of the Groper appliance. This appliance is similar to a Nance holding arch, but with extensions of acrylic supporting plastic or acrylic teeth in the missing teeth region. The acrylic part replacing two lateral incisor was attached to wire which is extended up to second primary molars where it is soldered to orthodontic bands on either sides.

The round wire is 0.036 inch in diameter, so that the appliances is rigid enough during mastication, also the location of the wire was chosen to be as lateral as possible to avoid interference with the tongue positioning. The bands were custom made for better fit and stability.

The complete appliance was cemented onto the molars. The plastic teeth then veneered with composite to match the central strip crown restoration, which enabled us for perfect customized shade matching.

Note the modification done by missing labial flange extension of the appliance which gave the artificial teeth an emergence profile.

The whole appliance was finely polished and well cotoured to avoid any plaque accumulation or any kind of tissue damage.

Case theme:

A five year old girl reported to the pedodontic clinic with a complaint of badly decayed upper front teeth . There was no history of pain or swelling. On examination, she was having multiple decayed teeth allover. In the anterior region 52 and 62 were root sumps and 51 and 61 were deep dental carious both clinically and radiographically there was no sign of any periradicular infection.

Initially all the teeth were conventionally tereated with extractions, restorations pulpectomies and stainless steel crowns.

anteriorly we tried to do pulpectomy and strip crowns with the support of omega loops as posts, but crowns didn't last longer and both lateral teeth crowns were lost with in a week during eating. as the parents were very concerned about the appearance, the option of a groper appliance in a modified form was discussed and agreed.

The lateral incisors were retreated by pulpectomy with zincoxide eugenol and the access cavity which is the orifices of the root canals were sealed with a GIC restoration as plug by 2-3mm. Then the following appointment 55 and 65 were banded (band size: 0.005 x 0.180) and alginate impressions were made for the upper and lower arches. Casts were poured with dental stone. On the upper cast, a stainless steel wire (0.9 mm) framework was made, spanning from one band to the other, while making a zig-zag pattern in the anterior region . The anterior zig-zag wire pattern was made to reinforce the retention of acrylic segment. The ends of the wire were then soldered to the corresponding molar bands. The acrylic teeth were trimmed to the desired lateral sizes and retention holes were created with a no: 4 round bur on the base of the teeth, so that the acrylic material could flow into them and aid in retention. After all necessary trimming and polishing, the appliance was carefully cemented with glass ionomer luting cement. After cementation the appliance the lateral incisors were veneered by composite restoration material to match with strip crowns of central incisors. This gave the appliance an excellent aesthetic appearance with the much desired emergence profile totalling to a restoration of a beautiful smile.



Figure 1:-Preoperative teeth in occlusion.



Figure 2:-Application Of Omega Loop Wire In Lateral Incisors



Figure 3 And 4:-Indicates Application Of Strips Crowns In Central And Lateral Incisors Along With SSC In Deciduous Molars.



Figure 5, 6 ,7:-indicates application of groper's appliance .and Post-operative teeth in occlusion.

Discussion:-

The factors associated with anterior tooth include: tipping of adjacent teeth, over-eruption of antagonist teeth, midline deviation, masticatory impairment, speech problems and lingual dysfunction. The reasons for replacing the edentulous upper anterior span with an aesthetic appliance constitute parental desire, space maintenance, restoration of aesthetics and maintenance of function. Children who are under five years of age, with anterior dental caries of teeth, are seldom affected socially, because of limited exposure to peers unlike school aged children. However, children who attend daycare or preschool programs may become aware of their appearance.² As they enter school, they may be comfortable, fitting into groups of children who actively exfoliate primary incisors.. Speech problems are uncommon in children who are over four years of age and if they occur, they are usually compensated and reversible. Our patient had no complaints with mastication or speech, but she had complaints with aesthetics. Maintenance of space; prevention of over-eruption of antagonist teeth, restoration of function; allowance for maxillary growth; maintenance of hygiene; durability and low costs, were the requirements of a space maintainer¹

The appliance which has been discussed is of the fixed type and it bears none of the disadvantages of the removable type, such as need of the patients' cooperation and chances of breakage. A similar appliance was documented by Jasmine and Groper, in which, plastic teeth were attached to metal cleats that were soldered to the palatal wire bar instead of being attached to acrylic, as it was in our design. Although, their appliance would be superior in hygiene, it may pose the risk of a gap developing between the teeth and the alveolus, due to an improper anterior fit or reduction of ridge height. Although our acrylic flange design would not pose the above risk, where as lack of hygiene under the inaccessible acrylic flange may result in mucosal inflammatory disease. However, if it happens, the appliance can be temporarily debanded until the tissue heals.⁴

Unlike the posterior segment, the anterior segment from canine to canine appears to be stable, with no net loss of space between the canines. Moreover, intercanine growth between ages of two and four years is minimal (less than 0.5mm) and it is clinically insignificant. Changes in arch length with tooth migration generally occur after the eruption of the first permanent molar. At this time, the appliance can be removed, as it coincides with the eruption of the central incisors. In a crowded dentition, if one or more incisors are lost, there may be some rearrangement of

space between the remaining incisors, but no space maintenance is required if the loss occurs after the eruption of the primary maxillary canines.⁸

Conclusion:-

Early childhood caries of an anterior tooth at younger age may result in psychological trauma to the child. So, restoration of anterior aesthetics with this appliance gave an essential psychological boost for the child and his parents. Besides enhancing the facial aesthetics it acts as functional space maintainers, assist in development of proper speech; prevent development of any untoward oral habits thus aiding the sound development for the child during the foundation years.

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