Case Report

Fixed functional space maintainer: A weight gainer: A case report

K. P. Aswanth, Sharath Asokan, Baby John J

Department of Pedodontics and Preventive Dentistry, K. S. Rangasamy Institute of Dental Science and Research, Tiruchengode, Tamil Nadu, India

ABSTRACT

Restoration of primary maxillary incisors severely damaged by caries or trauma is a clinical challenge for pedodontist. In the past, the only treatment option would have been to extract the affected teeth and replace them with prosthetic substitutes. Various therapeutic modalities from removable partial dentures to fixed space maintainer can be used for replacement of such lost teeth. The purpose of this paper was to describe the rehabilitation of primary anterior and posterior teeth in a 5-year-old child using fixed functional space maintainer. It constituted a design, whereby the maxillary primary second molars were used to support the appliance through bands and a wire that contained an acrylic flange bearing trimmed acrylic teeth, both anteriorly and posteriorly. The appliance was both functional and aesthetical.

Key words: Early childhood caries, fixed space maintainer, functional space maintainer

INTRODUCTION

Early childhood caries (ECC) and dental trauma are the main reasons for premature loss of both anterior and posterior teeth during the infancy and toddler period. Early loss of maxillary incisors due to caries is very common in young children.[1] Premature tooth loss in anterior incisal segment usually causes minimum space loss and a linguodistal inclination of the teeth, resulting a collapse of the anterior lingually. Apart from this collapse, closure of the space and shift of midline can also occur (Barber).[2] It can also lead to parafunctional habits as well as altered behavior pattern including depression and increased shyness of a child, which leads to less friendly and non-acceptable daily lifestyle.[3] These negative effects of anterior tooth loss affects the patient's quality of life and reduces level of confidence.[3] The lingual sides of anterior teeth, which are required by the tongue for certain phonations, may result in improper speech. The pronunciations of tongue-tip consonants ("t," "d," "s," "sh," and "ch") and labial sounds ("f " and "v") are affected. The development of abnormal tongue habits and hence subsequent malocclusion is also possible. So, the space should be maintained functionally as well as aesthetically by a suitable space maintainer depending on the dental age of the patient.[4] The space maintainer may be of removable, fixed or semi-fixed, and functional or nonfunctional type. Fixed space maintainers are always acceptable in children as they have less desire to wear removable ones. The removable space maintainers cover large area of oral tissue causing irritation to ulceration.

Reasons for replacement with a prosthetic device are often based on concerns about space maintenance, esthetics, and speech development. Poor dietary habits develop due to child's inability to chew and eat well, following dental extractions.[3]

In recent times, however, parental pressure for esthetics has become the most common reason for fabrication of partial dentures in children. Parents who express concerns about their child's appearance may request prostheses to improve

Address for correspondence:
Dr. Sharath Asokan, Department of Pedodontics and Preventive Dentistry, K. S. Rangasamy Institute of Dental Science and Research, Tiruchengode - 637 215, Tamil Nadu, India.
E-mail: asokansharath@yahoo.com

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self-esteem and enhance socialization with other children, particularly as they prepare for kindergarten.[1]

CASE REPORT

A four and half years old boy reported to Department of Pedodontics and Preventive Dentistry, KSR Institute of Dental College and Research, with complaint of pain, unpleasant look, undernourishment, and alteration in speech. On examination it was found the upper anterior teeth 52, 51, 61, 62 and posteriors 54, 64 were grossly decayed (infected root stumps) [Figures 1 and 2]. Child's mother gave history of night bottle feeding upto 3 years of age. History also revealed improper diet and oral hygiene practices with no previous dental visit. Patient appeared undernourished (weight = 11 kg) and was uncooperative during diagnosis. Overall school performance of the child was only satisfactory and he was less friendly with his fellow classmates.

On completion of thorough case evaluation, we planned to extract the root stumps in the maxillary arch and place fixed functional space maintainer subsequently. After obtaining written parental consent, preoperative occlusal analysis was performed, following that the root stumps were extracted. Extraction was done as two visit procedure where each quadrant was done in each visit. Orthodontic bands (0.005-inch thickness and 0.180-inch width) were adapted on teeth 55 and 65 followed by alginate impression to make the working cast. 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. The anterior segment of the wire was soldered with spikes to reinforce the acrylic segment with teeth. The free ends of the wire were then soldered to the corresponding molar bands. In the anterior region of the upper cast, a trial wax up was done with trimmed acrylic teeth (B1 shade). The acrylic teeth were originally of adult size, which had to be trimmed to the primary tooth sizes of 51, 52, 54 and 61, 62, 64. After cold mould seal application and cold cure acrylic resin insertion, the appliance was then removed from the cast. After trimming, finishing, and polishing, the appliance was cemented on 55 and 65 with luting glass ionomer cement (Fuji I) and occlusion was checked for any premature contact [Figures 3 and 4]. The patient was advised to maintain proper oral hygiene. First recall of patient was done after 24 h followed by checkup every 3 months. The child and parent were satisfied with the replacement of his lost teeth. The parent was informed that the appliance will be removed around the age of 6-8 years, to prevent interference

Figure 1. Preoperative maxillary view

Figure 2. Preoperative occlusion

Figure 3. Postoperative after insertion

Figure 4. Postoperative occlusion

of erupting permanent successors. The child was also advised to return immediately in case there was any problem with the space maintainer, including distortion or breakage.

On the third review visit, it was noticed that the boy appeared nourished (weight = 13.5 kg) and cheerful. Child's mother informed that the overall performance of boy in school had improved with better friends circle. Oral hygiene of the patient was satisfactory and was informed to maintain it the same way.

DISCUSSION

The aesthetic rehabilitation of primary anterior teeth has a vital psychological impact on recovery of patient's self-esteem (Slack and Jones).[5] The progress of children in school and their psychological well being can be adversely influenced by the condition of their anterior teeth. Space created by the early loss of tooth in the dental arch also has a desire to close by the adjacent teeth. After premature loss of deciduous maxillary anterior teeth, the permanent successors may be proclined and thus arch length or perimeter is increased. Northway (1984) stated that more space was lost in the first year of extraction than in successive years.[6] Kumari (2006) found that the greatest space closure occurs during the first 4 months of the extraction.[7]

The premature loss of primary incisors is usually given little clinical attention unless severe closure of the space is noticed or there is evidence of an aberrant speech pattern and oral habits developing as a result.[3] Careful consideration should be taken during treatment planning or decision making for placement of any space maintainer in incisor segment. One of the important functions of the primary tooth is to occupy the physiological space and guide the eruption of its permanent successor.[8] Fixed space maintainers are always acceptable in children as they have less desire to wear removable ones. The removable space maintainers cover large area of oral tissue causing irritation to ulceration. To improve patient acceptance, aesthetic functional fixed appliance is reliable.[3]

In the present case, minimum amount of palatal coverage is done causing no or less irritation. Banding of molars is done for improved strength instead of bonding. A similar appliance was mentioned 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.[9] Although their appliance would be superior in hygiene, it may pose the risk of space developing between the teeth and the alveolus, due to an improper anterior fit or reduction of ridge height. The appliance that we used has acrylic flange design (modified ridge lap) and would not pose the above risk; lack of hygiene under the inaccessible acrylic flange may result in mucosal inflammatory disease. This is the most commonly used pontic design; the contact of the pontic with the underlying ridge is maintained only on the buccal aspect of the ridge. This limited contact in only one plane allows proper sanitation.[10] This type of pontic fulfills most of the needs of the restorative dentist in cases involving ideal edentulous ridges. However, if it happens, the appliance can be temporarily debanded until the tissue heals.

Aesthetic space maintainer has been found to have a much wider acceptability and compliance of wearing the appliance by the pediatric dental patients. This is indeed a solution to pediatric anterior edentulous arches with compromised speech, aesthetic, and behavior of the child including poor social acceptance. In the present case, a successful placement of fixed functional space maintainer was performed. Limitations like long-term follow-up, improper oral hygiene maintenance, and frequent breakage can be decreased by proper education and motivation of the child and the parents.

CONCLUSION

Early intervention can prevent the psychosocial problems because of early loss of primary teeth. Restoration of anterior aesthetics and function with this appliance gave a huge psychological boost for the child. Oral hygiene instructions were given to the child and his parents. The child had been asked to visit the department at 3-month interval in order to monitor issues with regards to hygiene and eruption of the permanent first molars.

REFERENCES

1. Adewumi AO, Horton C, Guelmann M, Dixon-Wood V, McGorray SP. Parental perception vs professional assessment of speech changes following premature loss of maxillary primary incisors. *Pediatr Dent* 2012;34:295-9.
2. Tandon S. Text Book of Pedodontics. 2nd ed. Paras Medical Publisher; 2008. p. 446-65.
3. Khare V, Nayak PA, Khandelwal V, Nayak UA. Fixed functional space maintainer: Novel aesthetic approach for missing maxillary primary anterior teeth. *BMJ Case Rep* 2013;2013.
4. Metha D, Gulati A, Basappa N, Raju OS. Esthetic rehabilitation of severely decayed primary incisors using glass fiber reinforced composite: A case report. *J Dent Child (Chic)* 2012;79:22-5.
5. Slack GL, Jones JM. Psychological effect of fractured incisors. *Br Dent J* 1955;99:386-8.
6. Northway WM, Wainright RL, Demirjian A. Effects of premature loss of deciduous molars. *Angle Orthod* 1984;54:295-329.
7. Padma Kumari B, Retnakumari N. Loss of space and changes in the dental arch after premature loss of the lower primary molar: A longitudinal study. *J Indian Soc Pedod Prev Dent* 2006;24:90-6.
8. Singh BD, Ranadheer E. Aesthetic space maintainer — a cosmetic alternative for pediatric patients — A case report. *J Indian Dent Assoc* 2010;4:12.
9. Jasmin JR, Groper JN. Fabrication of a more durable fixed anterior esthetic appliance. *ASDC J Dent Child* 1984;51:124-7.
10. Garber DA, Rosenberg ES. The edentulous ridge in fixed Prosthodontics. *Compend Contin Educ Dent* 1981;2:212-23.

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