

CASE REPORT

Use of Preformed Space Maintainer and Regainer in an 8-year-old Child: A Case Report

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ABSTRACT

Exfoliation of primary teeth and eruption of permanent teeth is a normal physiological process. However, when this normal process is disrupted due to factors like premature loss of primary teeth, proximal carious lesions, etc., it may lead to mesial migration of teeth resulting in loss of the arch length, which can manifest as malocclusion in permanent dentition in the form of crowding. To preserve the wastage of arch length and perimeter by maintaining the relative position of the existing dentition, a space maintainer is fabricated after a premature loss of the primary tooth. The fabrication requires patient cooperation and multiple visits. In this case report, a prefabricated space maintainer and regainer were used in eight-year-old uncooperative child successfully. Follow-up was taken after 6 months which showed successful compliance of patient as well as maintenance of good oral hygiene.

Keywords: Child oral health impact profile, Dental caries, Pediatric dentistry, Preventive dentistry, School children.

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INTRODUCTION

Exfoliation of primary teeth and eruption of permanent teeth is a normal physiological processes.

However, when this normal process is disrupted due to factors like premature loss of primary teeth, proximal carious lesions, etc., it may lead to mesial migration of teeth, resulting in loss of the arch length, which can manifest as malocclusion in permanent dentition in the form of crowding, impaction of permanent teeth, and supra-eruption of opposing teeth.¹ The best way to avoid these problems is to preserve the primary teeth in the arch till their normal time of exfoliation is attained. Primary teeth are thus considered as the best natural space maintainers for permanent dentition.² However, there are situations when the premature extraction or loss of tooth is unavoidable due to extensive caries or plethora of other reasons as mentioned above. The safest option to maintain arch space in these situations is by placing a space maintainer.

To preserve the wastage of arch length and perimeter by maintaining the relative position of the existing dentition, a space maintainer is employed after a premature loss of the primary tooth.³

The idea of giving an appliance to preserve space was first introduced by Edward Angle. He believed that a high percentage of malocclusions are caused by these early losses and proposed the concept of a space maintainer in 1907 that remained without many variations for prolonged residence time in the oral cavity. In the literature, there have been several initiatives to use maintainers since 1924. Quinteros, Fischer, Goberer, and Hogeboom, among others, were a few of the authors who proposed rigid-type space maintainers. In conventional methods, bands were adapted to molars, and a wire was welded to join the two extremes. Furthermore, Chapin, Strang, Bierman Lancett, Foster, Morgan, and Willet physiological maintainers are also a few of the first mentioned appliances, which allowed the normal movements of the teeth and had shape variations.

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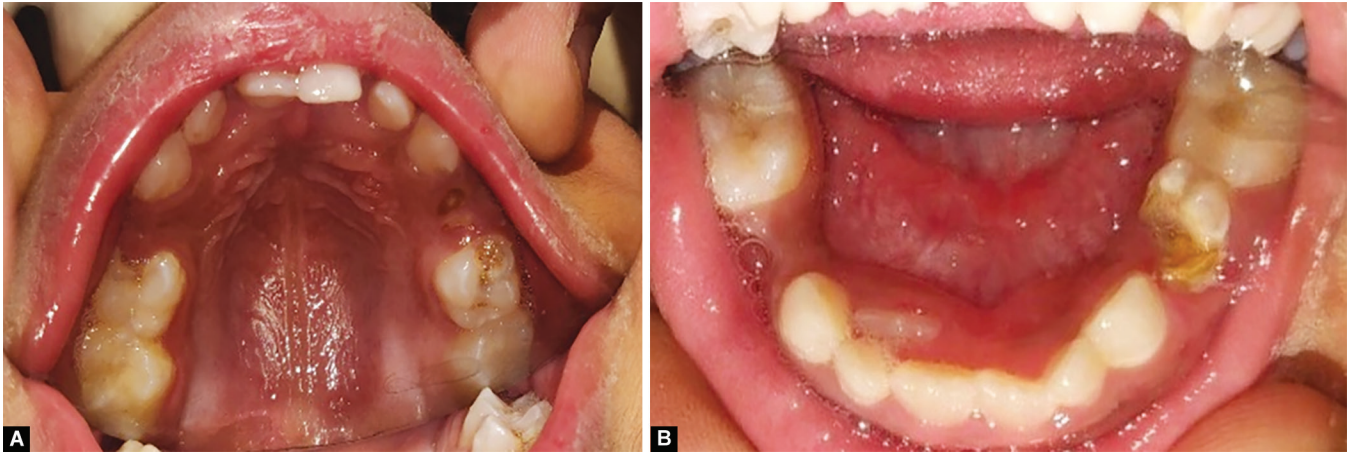
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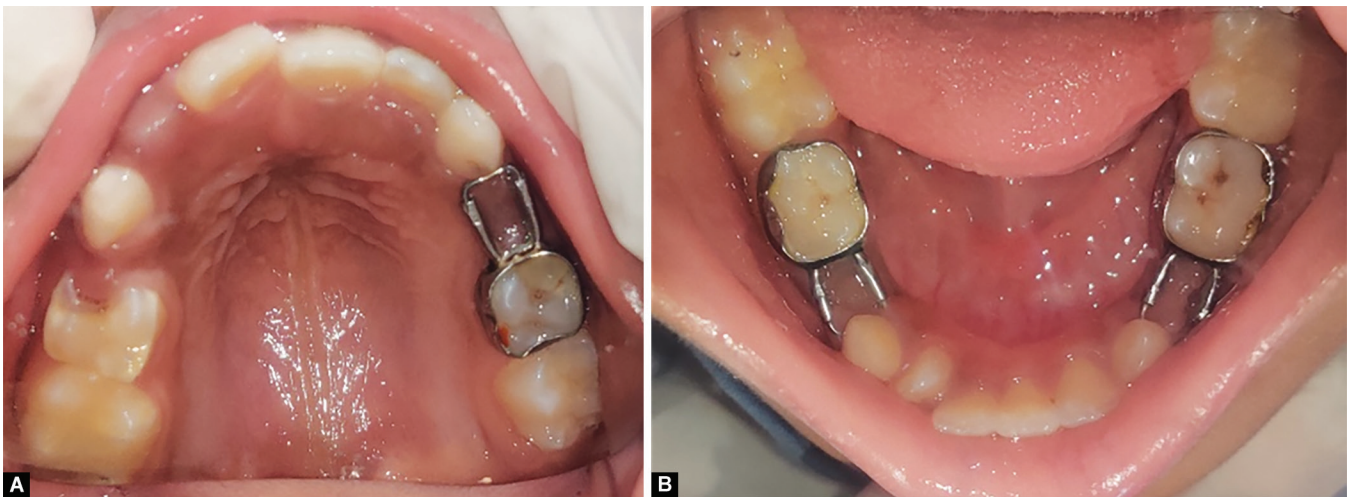
As dentistry is fast changing, the design of space maintainers has also been modified time to time. The space maintainers currently in use include fixed and removable appliances. Although removable space maintainer is easy to fabricate and restore functions and esthetic, they have seen to show less patient compliance.⁴ Fixed space maintainers such as band and loop have been shown to have a suitable success rate. However, the cement dissolution, solder failure, caries formation along the margins of the band, and long construction time are some of the disadvantages associated with them.⁵ Fiber-reinforced composite is an esthetic material recently used as a space maintainer. However, the material is flexible, resulting in enormous displacement for a certain amount of force when compared to band and loop.⁶ Acrylic-based, light-cured resins are frequently used in daily dental practice, as they can provide the essential properties and necessary characteristics to be used in diverse functions. The most common use of the materials includes custom trays, temporary crowns, and removable orthodontic appliances.⁷

While planning a case of space maintainers, it is important to take into consideration each of the above options before deciding the most suitable option for the specific case.⁸

This case report represents a novel, chair-side fabrication of a fixed space maintainer for prevention of space loss in maxillary and mandibular left primary first molar.



Figs 1A and B: Preoperative clinical picture



Figs 2A and B: Postoperative clinical picture

PATIENT DETAILS

Patient aged 8 years reported to the Department of Pediatric and Preventive Dentistry, ITS Dental College, Muradnagar, with a chief complaint of pain in the upper left and lower left back tooth region since 1 week. The child was extremely apprehensive and showed Frankel's definitely negative behavior (score 1). Past dental history revealed traumatic extraction of maxillary primary molar in a private dental clinic 2 months back, leading to the development of fear or apprehension of dental treatment or dentist.

Step-by-step behavior modification was done including desensitization, tell-show-do, and retraining with the child with help of audiovisual aids. Once the child was comfortable with the dentist and the dental operator, an oral examination was done.

Clinical examination revealed missing maxillary and mandibular left primary first molar, root stumps present with respect to right maxillary first molar (due to crown fracture at the time of previous extraction attempt), and grossly decayed mandibular right first primary molar as shown in clinical pictures here (Figs 1 and 2).

TECHNIQUE OF FABRICATION OF SPACE MAINTAINERS

Space analysis was done after taking impressions of maxillary and mandibular arch and it revealed space loss in the upper right maxillary first molar area. On the subsequent visits, extraction w.r.t 64, 84 were done under nitrous oxide inhalation sedation. Simultaneously performed band size was selected from the prefabricated space maintainer kit (e-space maintainer, kids-e-dental LLP). In this case, universal band with tubes was selected. The length of the loop was adjusted according to the mesiodistal space of tooth extracted. Excess wire of the loop was cut and the loop was engaged in the band tube just like the lock and key arrangement (Fig. 3). Once the assembly was properly fitted in the oral cavity, the space maintainers were cemented w.r.t. 64, 74, and 84, and the Gerber space regainer was fabricated and cemented w.r.t. 54. Follow-up was done after 1 week and 1 month.

DISCUSSION

One of the critical functions of the primary tooth is to occupy the physiological space and guide the eruption of permanent teeth.

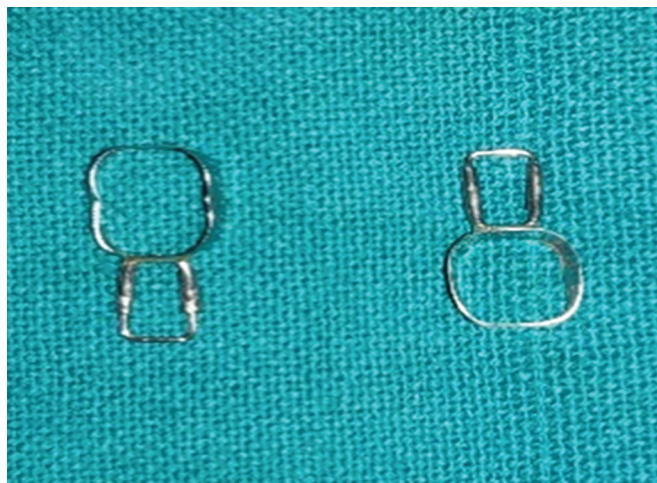


Fig. 3: Prefabricated space maintainer

Precocious loss of primary molars without adequate intervention may result in space loss for successors. Studies report that following extraction of the primary first molar, there is a space loss of 1.5 mm in the mandible and 1 mm in the maxilla.

Several types of space maintainers have been fabricated and tried till yet. The types range from functional, non-functional, fixed, and removable space maintainers. Examples of fixed space maintainers are band and loop (unilateral and bilateral), crown and loop, transpalatal arch, nance palatal arch, lingual arch, and their modifications. The fixed space maintainer is indicated to preserve dental arch integrity; however, the conventional band and loop space maintainer may have some shortcomings like esthetics, plaque retention, etc. The removable space maintainers are indicated in cases of bilateral tooth loss and multiple extractions. The advantage of this appliance is that it preserves the space and maintains the adjacent teeth in their positions, and does not deteriorate the periodontal health as it is easy to clean, but the biggest limitation of this kind of appliance is patient compliance. To save the chair side time, preformed space maintainers came into practice which can be used, assembled, and cemented chair side.

In this case, the patient was recalled after 1 month, and the clinical findings depicted that the appliance was retained in position, and the gingiva showed no signs of inflammation.

CONCLUSION

This case report showed that in order to reduce chair side time and number of appointments in apprehensive patients, preformed

space maintainers could be a new alternative to the conventional fixed space maintainers used in pediatric dentistry.

Why this Paper is Important for Pediatric Dentists?

This case report may solve the time issue for popular band and loop space maintainers.

It is a chair-side readily applicable space maintainer for children.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patient(s) understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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