



FIBRE REINFORCED COMPOSITE RESIN (FRCR) SPACE MAINTAINERS: CHAIRSIDE ALTERNATIVES TO CONVENTIONAL SPACE MAINTAINERS

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<p>Article Info <i>Received 15/04/2015</i> <i>Revised 27/05/2015</i> <i>Accepted 02/06/2015</i></p> <p>Key words: Fiber Reinforced composite resin space maintainer, Conventional.</p>	<p>ABSTRACT A natural tooth is the best space maintainer. Sometimes, early space loss may occur due to premature loss of primary teeth due to caries or trauma. This may lead to the development of malocclusion during the mixed or permanent dentition. Space maintainers may eliminate or reduce the severity of a developing malocclusion, the complexity of orthodontic treatment, overall treatment time and cost. The appropriate use of a space maintainer is advocated to hold the space created by an extracted primary tooth until the eruption of the succedaneous permanent tooth. This case report describes a chairside, fiber reinforced space maintainer fabricated for a 5 year old boy.</p>
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INTRODUCTION

A child's growth and development is dependent upon a range of factors. One important component of this process is the stage of development of the primary dentition. The Primary dentition performs various roles like maintenance of speech, chewing, appearance and the prevention of unfavorable oral habits [1]. They also aid in guiding the eruption of permanent teeth. The exfoliation of primary teeth is a physiologic process which is followed by development of permanent dentition [2]. Premature loss of primary teeth due to trauma or caries may disrupt this process. This may lead to mesial migration of adjacent teeth, resulting in loss of arch length. This loss of arch length further manifests as malocclusion in the mixed or permanent dentition in the form of crowding, impaction of permanent teeth, supra-eruption of opposing teeth etc. Over time, different methods have been developed to avoid these problems and to maintain the integrity of the arch by preserving these primary teeth till their normal time of

exfoliation is attained since primary teeth serve as the best space maintainers [3,4].

Space maintainers that are fabricated to maintain space following unilateral tooth loss may be of removable or fixed type. Of the various fixed space maintainers, the Band and Loop type of space maintainers are one of the most frequently used appliances [5]. Bands and loop space maintainers have demonstrated high success rates in the past as demonstrated by Baroni et al [6], Rajab and Fathian et al [7]. However, band and loop space maintainers are associated many shortcomings such as increased construction time, disintegration of cement, solder failure and caries formation along the margins of the band.

The shortcomings of conventional band and loop space maintainers may be overcome through the use of directly bonded space maintainers such as fiber reinforced composite resins (Polydentia SA) as fixed space maintainers. The glass-fiber splint is a biocompatible esthetic material made from thin and flexible, high strength, multi-layer polyethylene fibers. Directly bonded



space maintainers made from these materials have many advantages such as ease of adhesion to the dental contours, chairside construction and high strength [8]. This case report describes construction of a fiber reinforced space maintainer using Polydentia SA in a 5 year old boy.

Case report

A 5 year old boy reported with his parents to the Department of Pedodontics and Preventive Dentistry, Subharti Dental College, Meerut with the chief complaint of clinically missing bilateral primary maxillary first molars #54 and #64 (Figure 1). Detailed history revealed that the child first reported with pain in the bilateral primary maxillary first molars (#54 and #64) about 1 month back. Following this, #54 and #64 were extracted by a local dentist due to presence of gross caries in these teeth. The parents were now concerned about the impact of these extractions on future development of the child's permanent teeth. Intraoral examination revealed well healed sockets of teeth numbers #54 and #64. Bilateral space maintainers were suggested to the parents. Radiographically, the extraction sites had good bone formation and the succedaneous premolars had adequate bone covering (>2mm). Informed consent was obtained from the parents and space maintainer construction begun. Oral prophylaxis and fluoride application were carried out prior to the procedure. Technique of construction of Fiber reinforced composite resin (FRCR) space maintainer:

The distance between the mesiobuccal line angle of primary canine and the distobuccal line angle of second primary molar was measured with a dental floss to determine the length of FRCR required (Figure 2) and an adequate amount of FRCR (Fiber splint, Polydentia SA, Switzerland) was cut. Isolation was carried out using rubber dam and suction. Both the abutment teeth (primary canine and second primary molar) were cleaned and air dried. Adhesive was applied and light cured for 20 seconds. A thin layer of composite was applied to the buccal surfaces of abutment tooth and required length of the fiber splint was placed on this composite, extending from the buccal aspect of the primary second molar to primary canine. The ends of the fiber splint were adapted to tooth surface with a plastic instrument. Preliminary light curing for 40 seconds was done individually at each end of the fiber framework. An additional layer of flowable composite was applied over the area where the fiber abutted the tooth surface and this was light cured for 40 seconds. Any uncovered fiber splint was further covered with flowable composite. The space maintainer was checked for gingival clearance and occlusal interference. Finishing was done using composite finishing burs. Finally, bonding agent was applied over the fiber frame and light cured at multiple points for the purpose of reactivation. The final FRCR Polydentia SA space maintainer in relation to primary maxillary right first molar (#54) may be seen in Figure 3.

Figure 1. Pre operative intraoral photograph showing missing teeth # 54 and #64



Figure 2. Pre operative intraoral photograph showing missing # 54. The distance between canine and second molar was measured.



Figure 3. Postoperative intraoral photograph showing FRCR space maintainer in place



DISCUSSION

Conventional band and loop has long been used for maintaining space in the primary dentition [4], but its limitations such as tendency for disintegration of cement, inability to prevent rotation or tipping of adjacent teeth, increased chair side and laboratory time make it a cumbersome procedure [9]. The introduction of prefabricated bands in a variety of sizes in November 1935 [10] overcomes these disadvantages. However, many limitations persist to date. This indicates the need for newer designs and materials of appliance. One such material is multi-layer fiber-reinforced composite resins (FRCRs) such as Polydentia SA splint, which may be used as an alternative to the conventional space maintainer [11]. The glass-fiber reinforced splint used in this case provides

an excellent esthetic choice as a space maintainer. It is well tolerated by the patient, esthetic and less time consuming. The shortcomings of FRCR space maintainer include relatively greater cost and technique sensitivity. Moreover, limited literature is available that describes this space maintainer in terms of efficacy and longevity.

CONCLUSION

The loss of maxillary incisors in childhood always poses a challenge to the pediatric dentist to restore esthetics and function. The fiber reinforced composite resin (FRCR) space maintainer technique described in this case may satisfactorily restore esthetics and function and hence may be suggested as an effective chairside alternative to conventional space maintainers.

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