

A FUNCTIONAL SPACE MAINTAINER FOR POSTERIOR TEETH USING FLEXIBLE DENTURE: A RARE CASE REPORT**Dr. Lekha K.*, Naik Saraswathi V., Nadig Basappa, Shagale Amitha M., T.H. Meghana**

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ABSTRACT

The primary teeth are highly susceptible to dental caries with prevalence being 73%. Despite the attempt in prevention, premature loss of primary teeth remains to be a frequent problem in pediatric dentistry, resulting in disturbance of arch integrity and unfavorably affecting the alignment of permanent successors. Loss of primary molars at an early age can cause several issues. It becomes a challenge for a pediatric dentist to provide a prosthesis to the child which would be functional, and act as a space maintainer till permanent tooth erupts in to the oral cavity. This case report describes the unique use of flexible denture for space maintenance upon early loss of primary molars.

KEYWORDS: Functional space maintainer, Flexible denture, primary molars, Removable functional space maintainer.

INTRODUCTION

The word space maintainer was coined by JC Brauer in 1941. According to Boucher, space maintainer as a fixed or removable appliance designed to preserve the space created by the premature loss of a primary tooth or a group of teeth. Space maintainer halts more complex treatment in future. The purpose of space maintainer is to preserve the primate space, maintaining the integrity of the dental arches, guiding the normal occlusion and should fulfill functional and aesthetic requirements.^[1]

An ideal space maintainer (SM) should maintain the mesiodistal space, easily fabricated, withstand functional forces and at the same time should be comfortable to the patient. SM can be fixed or removable, unilateral or bilateral, functional or non functional. Fixed unilateral SM includes band and loop, crown and loop, distal shoe, direct bonded and glass fiber reinforced composite resin. Fixed bilateral SM includes nance, trans palatal arch and lingual arch.^[2] Removable SM include removable partial dentures which is built of acrylic. They are indicated when there is several loss of teeth in the mandibular or maxillary arch, when aesthetic is of importance, in case abutment teeth cannot support a fixed appliance, if the permanent teeth are not fully erupted as it compromise the band adaptation and oral hygiene is of prime importance. But removable SM are difficult in uncooperative pediatric patients as they are unable to maintain the prosthesis adequately leading to poor oral hygiene, if not worn regularly leads to shrinkage and ill fitting of denture.^[3] Added to it the acrylic is more rigid

and also the wire components which causes irritation to the child and hence poor compliance.

However, lately, flexible partial dentures have gained popularity because they offer superior strength, comfort, aesthetic and durability than acrylic RPDs. The flexible nature of the material used in flexible partial dentures is well-suited to the different natural conditions in the mouth. This simplifies the design process and enables the flexible nylon resin to act as a built-in stress breaker, providing superior function and stress distribution in a removable partial denture. They are well tolerated by children since they cause soothing effect in oral cavity.

Flexible dentures have been used as prosthesis for rehabilitation of partial edentulous patients, the same has been well documented in the literature. However, the use of flexible denture as a functional space maintainer has not been explored in the field of pediatric dentistry. This case report, emphasizes the application of flexible denture as a functional space maintainer.^[4]

CASE REPORT

A 6-year-old girl reported to the Department of Paedodontics and Preventive Dentistry, with a chief complaint of pain in the lower right and left back tooth region. On clinical examination, deep carious lesion with sinus opening and pus discharge in relation to 74, 75 and 84, 85 was noted. Radiographs showed radiolucency involving enamel, dentin, pulp and involving furcation area in relation to 74,75, 84, and 85. Due to poor

prognosis of involved teeth, extraction was planned. Since first permanent molars were not fully erupted to seat the band for fixed space maintainer, and to restore the function, a removable functional space maintainer was mapped out (Figure-1). Informed consent was taken from parents and extraction was carried out.

Flexible dentures have exceptional biocompatibility and distinctive physical properties to make it more adaptable in challenging cases involving pediatric patients.^[5] Hence, removable functional space maintainer using flexible denture was opted in this case.

Post extraction, patient was recalled after one week for impression (Figure-2). To obtain precise and detailed impression, a single mix technique using elastomeric

impression material (Aquasil soft putty, Dentsply Sirona) was used and dental cast was poured using dental stone (Figure-3). Shade selection was done using vita classical shade guide and A2 shade was selected (Acryrock). Undercuts were blocked in the cast followed by fabrication of flexible denture (Flexirich) using injection molding technique (Figure-4). After insertion, the occlusion was checked for high points and margins were inspected for overhanging and were adjusted accordingly (Figure-5). Post-insertion instructions were given to the patient and parent regarding maintenance and care of the denture. In the subsequent visits, patient reported with a positive experience, improved mastication and good oral hygiene. Patient was recalled after one month for follow-up and reported with a similar positive outcome (Figure-6).

Clinical photographs



Figure-1



Figure-2



Figure-3



Figure-4



Figure-5



Figure-6

DISCUSSION

Space maintainers can either be removable or fixed, functional or non functional and unilateral or bilateral. The selection of the appliance is tailored depending upon the need of the situation. The present case scenario proclaims about functional removable space maintainer which employed the use of elastomeric impression material for impression making. Basically impression technique to fabricate space maintainers are of hydrocolloid and elastomeric type. Hydrocolloid include agar, which is reversible. Alginate, which is irreversible. Elastomeric materials include polysulfide, polyether, condensation silicone, and addition silicone. Most commonly used hydrocolloid is alginate which is easily available and cost effective. But manipulation of it is untidy added to it less accuracy in reproduction of details, poor dimensional stability, shorter working and setting time. Leftovers of alginate must be completely removed from the oral cavity because it can go against an inflammatory reaction and also the risk of aspiration in pediatric patients.^[6] Whereas elastomeric impression materials are dimensionally stable, produce accurate impression, long working time, easy to manipulate, good reproduction of surface details. Due to the supremacy, elastomeric impression material (Aquasil soft putty, Dentsply Sirona) was used in the current case.

Fixed space maintainers, if properly designed, are not harmful to the oral tissues, require less patient compliance than removable space maintainers, and are more suitable for longer periods of space maintenance.^[7] Band and loop space maintainer and lingual arch space maintainer are two of the most commonly used space maintainers owing to their vast application in different clinical scenarios, ease of fabrication, less chair side time and patient acceptance.^[8] However, both these space maintainers lack in providing masticatory function and do not prevent supra-eruption.

On the other hand, functional removable space maintainers prevents supra-eruption of opposing teeth, aiding in masticatory function, prevention of abnormal tongue habits. Nonetheless they need extra care in maintenance of appliance. Hence, patient selection plays a vital role in determining the success of the appliance and must be avoided in children with low compliance, may be broken or lost easily if not handled properly. Also, the eruption of permanent tooth cannot be visualized directly due the denture component. Therefore, long-term and frequent follow-ups using radiographs should be done.^[9]

However, acrylic dentures are very rigid, sometimes irritate the oral tissues furthermore presence of metal clasps which are brought to bear retention can compromise their acceptance among pediatric population.^[10] To address this issue, the use of thermoplastic materials like Flexirock has increased in recent years.

Flexirock is a type of flexible denture base resin that is particularly suitable for creating partial dentures and unilateral restorations. It is made from a biocompatible nylon thermoplastic that possesses unique physical and aesthetic properties. Unlike traditional acrylic-based materials, it eliminates concerns about acrylic allergies. The flexibility of Flexirock allows it to adapt to the constant movement and flexibility in the mouth, providing greater comfort.

While it may be more expensive than a traditional acrylic removable SM with metal clasps, the superior comfort and aesthetics make it a popular choice among pediatric patients. Besides it is lightweight, with a thickness ranging from 0.6-1.8 mm, making it more comfortable to wear than traditional dental prosthesis. One of the key benefits is that it is virtually invisible since it lacks metal clasps and blends well with the surrounding tissue in the mouth. The clasps of flexible dentures are also made from thermoplastic material thereby reducing the risk of allergic reactions and sore spots. Hence, more comfortable in pediatric patients. The translucency of the material allows it to blend with the surrounding tissue, making it more aesthetically pleasing. Additionally, the nylon base makes the SM unbreakable in the event of an accidental fall. Furthermore, it does not contain bisphenol, making it the most biocompatible material for fabrication.

In the present case, patient was pleased and readily accepted the overall procedure and appliance as it was well sheltered post insertion. In the follow up visit, patient reported with a positive experience, improved mastication and good oral hygiene.

However, flexible dentures also have some drawbacks, such as they tend to absorb water content and tend to discolor very often, high cost, does not conduct heat and cold like metal, very hard to repair if fractured and no additions can be made onto it. Also difficulty in polishing and requires more chair-side time for adjustment.^[5]

CONCLUSION

Functional removable space maintainers enhance the functional, phonetics and esthetic requirements which are needed for maintaining the space and guiding the erupting permanent tooth buds. However, added to these functions, the flexible denture, gives additional benefit in terms of their biocompatibility, flexibility, resiliency and comfort in pediatric patients. Based on the positive results observed in this case, flexible dentures could be considered as an alternative to conventional options for space maintenance.

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