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Case Report

Maintenance of space by innovative clinical application of flexible partial denture: a case report

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ABSTRACT

The permanent first molar is more susceptible to dental caries than other permanent tooth. Loss of permanent first molar 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 dental implant or fixed prosthesis can be planned for the same. This case report describes the unique use of flexible denture for space maintenance upon early loss of permanent first molar.

Keywords: Space maintainer, Flexible denture, Early loss, Prosthesis, Functional space maintainer

INTRODUCTION

The first permanent molar (FPM) erupts earlier than other permanent teeth, making it more susceptible to dental caries and possible premature extraction. Despite its early eruption, the FPM plays a crucial role in maintaining dentofacial harmony and masticatory efficiency. The loss of an FPM at an early age can result in several issues.

Early extraction of an FPM can result in a decrease in post-extraction space, accelerated development and eruption of the second permanent molar and third molar, lingual tipping and retrusion of incisors, and a counter-clockwise rotation of the occlusal plane.[1] In cases where extraction of the FPM is unavoidable, space maintenance should be performed before a fixed prosthesis can be given to the patient.

Maintaining the post-extraction space is crucial, as the loss of an FPM can result in shifting of adjacent teeth, leading to malocclusion. The eruption of the second permanent molar can also cause occlusal discrepancies and disrupt the balance of the occlusal forces.

Modern dentistry provides various options for restoring a partially edentulous mouth, including removable partial dentures (RPD), fixed bridges, and dental implants. RPDs became popular several decades ago with the introduction of acrylic polymers and chrome cobalt alloys in dentistry. Patients often choose RPDs due to factors such as cost and physiology. However, today, more dentists recommend flexible partial dentures because they offer superior strength, comfort, and durability than 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.

Flexible dentures are already 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, explores the application of flexible denture as a functional space maintainer.

CASE REPORT

A 13-year-old male presented to the department of pediatric and preventive dentistry, with a complaint of missing tooth in the lower left back region of his jaw. The patient reported that the tooth had been extracted ten days prior due to gross decay that could not be restored. Upon clinical examination, an edentulous space in relation to tooth number 36 and a deep carious lesion in tooth number 46 was observed (Figure 1 and 2) After radiographic examination, root canal treatment for 46 and flexible denture as a space maintaining prosthesis for edentulous space in relation to 36 was planned.

Single mix technique was employed to obtain putty wash impressions using condensation silicone putty and light body material (Speedex, Coltene Whaledent) followed by shade selection. Fabrication of flexible denture was done using Valplast. (Figure 3-6).

The occlusion and margins were evaluated and prior to insertion, the flexible partial denture was immersed in warm water to improve its flexibility and ease of insertion. (Figure 7 and 8). Post-insertion instructions were given to the patient and parent regarding maintenance and care of the denture. The patient was advised to visit for regular follow-up appointments.

Figure 1: Pre-treatment occlusion.

Figure 2: Pre-treatment mandibular arch.

Figure 3: Impression of mandibular arch.

Figure 4: Prosthesis on cast- occlusal view.

Figure 5: Prosthesis on cast - buccal view.

Figure 6: Prosthesis on cast-lingual view.

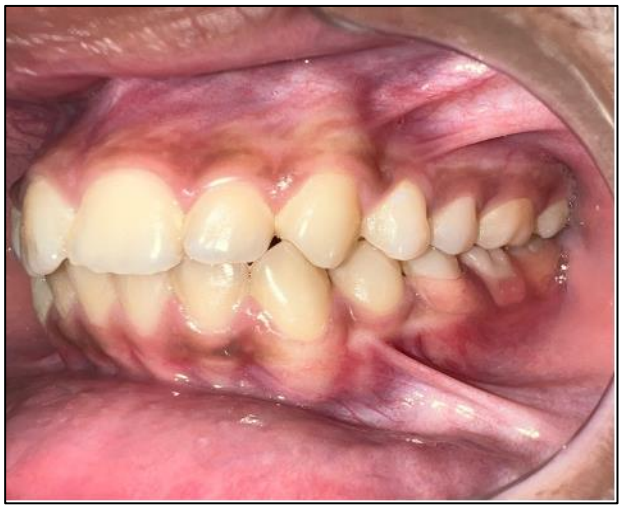

Figure 7: Post treatment-buccal.

Figure 8: Post treatment-intra oral.

DISCUSSION

Space maintenance through prosthesis following loss of FPM is important to restore masticatory efficiency, improve esthetics and self-esteem. The problems associated in attempting to restore function and appearance are greater in adolescents than others. Prosthetic rehabilitation should be performed at the earliest, to maintain the oral functions, provide normal development, and improving socialization skills.[2]

While dental implants are a common solution for replacing missing teeth, they are usually not recommended for patients under 18 years due to the higher risk of failure and potential negative effects on craniofacial growth. Fixed partial dentures (FPD) are also not advised in young patients because of short clinical crown length, large pulp chambers, high decay rates, growing age and inability to tolerate the processes of FPD. Instead, removable partial dentures (RPDs) can be a reversible and effective treatment option for young patients. However, the presence of metal clasps in RPDs can compromise their acceptance among young patients.[3] To address this issue, the use of thermoplastic materials like Valplast has increased in recent years.

Valplast 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, Valplast eliminates concerns about acrylic allergies.[4] The flexibility of Valplast allows it to adapt to the constant movement and flexibility in the mouth, providing greater comfort.

While it may be more expensive than a RPD with metal clasps, the superior comfort and aesthetics make it a popular choice for many patients. Valplast is also 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. The translucency of the material allows it to blend with the surrounding tissue, making it more aesthetically pleasing. Additionally, the nylon base makes the partial denture prosthesis unbreakable in the event of an accidental fall. Furthermore, Valplast does not contain bisphenol, making it the most biocompatible material for fabrication of partial dentures.[5]

However, flexible dentures also have some drawbacks, such as their inability to conduct heat and cold, limiting certain foods' appreciation. They also require the remaining teeth to be periodontally sound and are more expensive to fabricate.

In this particular case, the patient had a positive experience with the flexible partial denture. The patient also reported improved mastication and good oral hygiene at the three-month follow-up. Although dentures are not ideal, they are important for maintaining a normal

and satisfactory daily diet for patients, particularly during childhood when lifelong dietary patterns are established. Based on the positive results observed in this case, flexible dentures could be considered as an alternative to conventional options for space maintenance.

CONCLUSION

No product can solve all the problems associated with a partial prosthesis neither can it meet all the requirements but, they can prove to be the best alternative when their placement is done considering them as an intermediate restoration. The key is to solve and address as many problems and needs as possible in a simple way that is affordable for the patient. An effort has been made to focus on improvements over conventional partials in aesthetics, function, durability, and longevity of a partial denture made from a flexible denture material. With further improvisations in the working techniques, reduction in cost of making, adjustments and repair potential of the material, flexible partial denture may become a simpler answer to complex partially edentulous oral conditions.

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