CASE REPORT

Modified Esthetic Multifunctional Orthodontic Appliance

Srilatha KT*, Deshmukh S**, Murthy PS**, Nandlal B***, George RM****, Ashwini K****

Abstract

Background: Tooth size arch length discrepancy is one of the major reasons for interceptive orthodontic appliance therapy. However, if there is requirement of both passive space maintenance along with space deficiency in different segments of the same arch, appliance therapy dynamics becomes complicated and, multi appliance therapies may be required. This case report explains a modified sling shot space regainer, which functions to regain the space in the left half of the mandibular arch at the same time serving as an aesthetic and functional space maintainer in the right half of the arch at the same time.

Conclusion: The modified design provides the management of multiple problems in the same arch with a single and simple appliance therapy thereby performing multiple functions at the same time.

Key words: Interceptive Orthodontics, Sling Shot space regainer, Multifunctional appliance therapy.


Introduction

The transition from primary dentition to permanent dentition is seldom accurate, the hurdles being tooth size arch length discrepancy, early exfoliation of primary teeth, premature eruption or delayed eruption of permanent teeth and premature extraction of primary teeth resulting in space loss. When the disruption from the usual pattern of eruption occurs, interceptive orthodontics plays a major role to bring in the lost harmony at an early stage. Among the various aspects of interceptive orthodontics, the clinician has to choose wisely what is ideal and apt for the patient. Most of the times the clinician comes across complicating situations wherein he has to restore form and function, regain lost space and prevent further deterioration, all at the same time. Treatment in such cases may have to be done in different phases to obtain the harmonious relationship\(^1\).
This paper aims to highlight new and modified design of removable appliance for space management which served dual function of functional space maintainer as well as space regainer in the same arch\(^1\).

**Case report**

A 9-year-old girl child reported to Department of Pedodontics and Preventive Dentistry with the chief complaint of decayed teeth in lower right quadrant. Clinical examination revealed presence of grossly decayed 84, 85 and clinically missing 75 with history of extraction of the same tooth 3 months back (Fig 1). This had resulted in mesial migration of first permanent molar limiting the space for second premolar to just 3.5 mm.

![Fig. 1: Clinical Appearance indicating extensively decayed 84, 85 and clinically missing 75](image)

Radiographic examination in the region of 84, 85 revealed that developing 44, 45 were in Nolla’s stage 7 with a bony barrier of 2 mm over the developing teeth, indicating that extraction of 84, 85 should be followed by space maintainer (Fig 2). Mixed dentition space analysis done on study models indicated space deficiency of 3.5 mm on the left side of the mandibular arch. Based on the Rickett’s Analysis cephalometric tracing was done to confirm the mesial migration of the mandibular first permanent molar. The measurement was made with reference to the Pterygoid vertical or PTV line (Vertical dropped from the most posterior border of the Pterygomaxillary fissure). A perpendicular was drawn from the PTV extending towards the distal surface of the first permanent molar. This distance was found to be 15.3 mm indicating that the space discrepancy observed in the space analysis was due to the mesial migration of the left mandibular first permanent molar. This analysis not only assists in conforming the mesial migration of permanent molar but also suggests the amount of distalization required.

![Fig. 2: Radiographic examination revealing space loss in the region of 75 and 84, 85 indicate for extraction](image)

Clinical situation required a space maintainer on the right side and a space regainer on the left side. There was also a need to restore the functional capacity as teeth were missing bilaterally. Hence a modified space maintainer was planned which also had a sling shot space regainer on the left side (Fig 3 & 4).

![Fig. 3: Pre op and Post Op image with the appliance in position](image)

Elastics were engaged in the hook of the sling shot on the left side which brought about the distalization of the permanent molar. Patient was kept on periodic recall and review. Trimming of appliance was done sequentially in the follow-up visits, to accommodate erupting permanent left second premolar.

**Discussion**

The premature loss of multiple deciduous teeth can destroy the integrity of normal occlusion. This can lead to mesial migration of the erupting first
permanent molars with very minimum resultant space for accommodation of permanent teeth. It also causes loss of form and function and may also result in development of parafunctional habits. The mesial migration not only causes space loss but also causes folding of the tissue in the same region resulting in plaque accumulation and pocket formation and ultimately leading to periodontal problems. However precaution should be taken before selecting a case for molar distalization as any amount of distalization can cause extrusion of the molar and increase in lower vertical height of the patient. Hence distalization should be done with caution in the vertical growth pattern patients. In the present case the growth pattern was favorable hence this risk was minimized.

In the present case there was a bilateral loss of primary molars. Although a conventional fixed appliance could have been planned in this case a removable appliance was preferred as it not only maintained the space but also restored the function. The various advantages of removable appliance over the fixed are as follows:

- Maintains the mesio-distal dimension during transition of dentition
- Prevents derangement of occlusal plane by preventing supra eruption of the opposing teeth.
- Restores the masticatory function thereby ensuring optimal nutritional status for the growing child
- Improves esthetics of the patient
- Helps in development and maintenance of normal vertical dimension of the lower face
- Prevents development of speech defect.
- Prevents development of abnormal parafunctional habits.
- Allows the patient to maintain the normal oral hygiene.

Only a removable space maintainer would not have served the purpose in this case, hence a modification was planned which had a sling shot space regainer on the left side. The appliance served dual purpose of space maintainer and space regainer. For most children, the age range between 7 to 10 yrs proves to be best for the tipping/ bodily movement of permanent first molar distally to recover the lost space as the second permanent molar is will be not be erupted during this age and its crown will at the mid root level of the permanent first molar.

**What the paper adds?**

The paper emphasizes on the early diagnosis and intervention which helps in eliminating the severity of the problems.

Provides a new and modified yet a simple design for the correction of multiple problems in the same arch and also maintain the oral hygiene at the same time.

**References**