Mayne’s appliance-guidance of eruption: A case report

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Abstract

Premature loss of primary tooth results in space loss resulting in malocclusion. Maintenance of the space using various types of space maintainers may eliminate the need for prolonged orthodontic treatment in the future. Various designs of space maintainers and their modifications are used for this purpose that includes the Mayne’s appliance. This paper describes a case where space loss is prevented by the use of “Mayne’s” appliance - A modified crown and loop space maintainer, which permits minor adjustments for the space control while the tooth in question is erupting.

Keywords: Mayne's space maintainer, modified crown and loop, space maintainer

Introduction

Premature exfoliation or extraction of primary tooth may result in space loss, which in turn results in the impaction of the succedaneous tooth, midline shift and supra eruptions of the opposing tooth, with subsequent impairment of function. Maintenance of this space till the eruption of permanent tooth may eliminate or reduce all these consequences. Various types of space maintainers are available (removable or fixed appliances) and the pedodontist has to select the precise space maintainer depending on the child’s stage of dental development, the dental arch involved and the location of the missing primary teeth. A well-designed fixed one is more preferable than a removable appliance. The most commonly used for posterior teeth loss are those made of a band or a pedodontic stainless steel crown with a wire soldered to it.[1] However, these fixed appliances are not considered in cases where the permanent tooth in question is erupting. In the present case, since the buccal cusp of right permanent first premolar was erupting, Mayne’s appliance was selected.

Case Report

A 9-year-old female child accompanied by her mother reported to the Department of Pedodontics and Preventive Dentistry, Faculty of Dental Sciences, M.S.Ramaiah University of Applied Sciences, Bengaluru, with a chief complaint of decayed teeth. Her medical history was unremarkable. A thorough oral examination revealed mixed dentition stage with the following findings [Figure 1] and following treatment was planned.

• #63, 74: Dentinal caries – Light cure glass ionomer cement (GIC) restoration
• #55, 64, 65, 75, 85: Chronic irreversible pulpitis – pulpectomy followed by stainless steel crown
• #54: Grossly decayed – extraction followed by space management.

Figure 1: Pre-operative intra oral photograph showing grossly destructed 54
However, #14 was seen erupting buccally while the space analysis showed a space discrepancy of +1 mm. A conventional crown and loop space maintainer would prevent eruption of 14, hence to facilitate its eruption and also to maintain the space, “Mayne’s appliance” in which the buccal loop is eliminated and only the lingual extension was given.

**Construction of Mayne’s appliance**
- Tooth preparation and the crown selection for 55 was done; impression was made and cast was poured
- #54 was extracted under local anesthesia, complete aseptic and sterile conditions by applying the principles of extraction
- On the cast, modified loop was made with stainless steel 19 gauge wire. As the buccal cusp of the permanent tooth was erupting, buccal loop was eliminated, and only the lingual loop was given. This lingual loop spanned the edentulous area to contact mesial abutment just below the contact point and a solder ball was placed at the end to prevent injury from sharp edge of wire end, this prevents interference with permanent successor. A silver solder was used to solder the loop to the crown at the middle third
- The appliance was removed from the cast and finished. The appliance was then checked intra-orally for any occlusal or gingival interference prior to cementation
- The abutment tooth was isolated with cotton rolls and then the appliance was cemented on the abutment tooth using luting GIC [Figure 2]
- Patient was instructed to not to eat or drink for 30 min and not to bite on any hard food. The patient was recalled at regular intervals for check-up
- Removal of loop - At 3 months visit tooth eruption was more noticeable; hence the decision of removing the loop was made [Figures 3 and 4]
- 1 year follow-up check-up showed complete eruption of the teeth [Figure 5]

**Discussion**
Mayne’s appliance was first designed by Mayne. It is a type of non-functional space maintainer consisting of a bar or
crib arrangement that follows the contour of the tissue and permits minor adjustments for space control while the tooth in question is erupting. The basic band and loop design can be modified in such a way as to not interfere with the eruption of a permanent successor.\[2\] In this patient, the buccal cusp of 14 was erupting, but it was in Nolla’s Stage 5 of tooth formation,\[3\] hence it was decided to give Mayne’s appliance in which the crown and loop was modified in such a way that the buccal part of the loop was eliminated and only lingual extension was given. Only disadvantage of this space maintainer is that it is non-functional, but this is of no concern if occlusion prevents supra eruption of opposing the tooth as was found in the present case.

Since in this patient buccal cusp of 14 was erupting, functional space maintainer is contraindicated. The other options that could be considered in such a case are: Fiber reinforced composite resin (FRCR), bonded space maintainer and transpalatal arch (TPA).

A study done by Garg et al,\[4\] showed failure of FRCR due to the debonding of enamel-composite because of its placement on primary teeth, primary teeth show presence of prismless enamel areas which had negative influence on the resin retention. Similar results were found in a study by Subramaniam et al,\[1\]

Similar failure results were found for bonded space maintainers also. According to Rapp and Demiroz, primary canine should not be utilized for space maintenance following premature loss of first primary molars as it may inhibit the natural movement of the primary canine,\[5\]

TPA appliance is preferred in cases showing premature exfoliation of deciduous second molar,\[6\] and is bulkier compared to Mayne’s appliance; it may compromise patient’s oral hygiene. Considering the above facts, we ruled out FRCR, bonded space maintainers and TPA.

**Conclusion**

Mayne’s appliance though rarely used, and has been rarely found in the literature, can be a useful appliance in cases where the permanent tooth is erupting and the space has to be maintained till the tooth completely erupts. It is easier to fabricate, permits minor adjustments in the appliance and also easy to maintain for the patient. Hence, Mayne’s appliance can be considered as a space maintainer option in cases where tooth in question is erupting.

**References**