

BILATERAL MODIFIED ERUPTION GUIDANCE APPLIANCE: A CASE REPORT

Abhijeet Patil¹ Harsimran Kaur² Rishika³ Ramakrishna Yeluri⁴

Former Post Graduate Student¹, Professor², Senior Lecturer³, Professor & Head⁴

1,4-Department of Pedodontics and Preventive Dentistry, Teerthanker Mahaveer Dental College & Research Centre, Moradabad

Abstract

Primary dentition is essential for space maintenance, chewing, proper phonation, and occlusion growth. Losing this dentition prematurely causes space loss, deep bite, crowding, tooth impactions, and midline change. Deciduous second molar directs the first permanent molar that rises in its location following the eruption route forward and upward. Preventing the space loss due to early primary second molar loss has always been a concern for pedodontists. Numerous designs are proposed which guide of secondary 1st molar eruption, the most popular design has always been the Willet appliance. However the traditional design usually varies with loss of deciduous 2nd molars on both sides. Therefore the traditional designs must be modified as per the patient's needs. This paper presents a unique case of bilateral modified eruption guidance appliance in a 5 year old child

Key words: Guiding appliance, Interceptive orthodontics, Space maintainer

Introduction

No other aspect in preventive and interceptive dentistry plays a more important role than the survival of milk teeth until its exfoliation. Early loss of primary tooth or more number of primary teeth may contribute to a broad range of consequences.¹ Deep tooth decay, injury, or congenital absence can both result in the loss of primary tooth, which can pose serious complications for a developing kid.² As stated by Stallard, Lyons, Willet, and many others in the early twentieth century, early loss of milk teeth causes space loss.³ Approximately 70 % of the prematurely lost 2nd deciduous molars in a particular quadrant lead to reduction of space with resultant malposition of secondary tooth.¹

When the primary 2nd molar is lost prior to first permanent molar eruption, it is suggested that the intra-alveolar form of space maintainer has certain contraindications, such as conditions like blood dyscrasia, immune system suppression, congenital heart disease (CHD), individuals with bad oral hygiene maintenance and many other.⁴ For situations where loss of second primary lower molars on both sides is there, the traditional model presents a number of problems. Changing the traditional designs for convenience, cooperation and performance for different pediatric patients is required.¹

This report puts a light on a case of space management on premature loss of deciduous second molars bilaterally using modified eruption guidance appliance type space maintainer.

Case

A five-year-old child walked to the Department of Pedodontics and Preventive Dentistry with a grievance of pain in the lower right and left back teeth region of jaw since 7-8 days. Clinical evaluation indicated a shallow

carious lesion and the involvement of pulp was noticed in IOPA radiograph in respect to the lower both sides deciduous 2nd molars. Preparation of the access cavity on lower 2nd deciduous molars was carried out, and temporary restorative cement was used for dressing. Sadly, the patient missed his next visit and returned to the department with swelling across his lower right and left back teeth. Clinical evaluation disclosed mobility of grade 3 with respect to lower right and grade 2 with respect to lower left primary 2nd molars associated with swelling of surrounding mucosa [Fig-1]. X-ray picture revealed enormous furcal radiolucency [Fig-2].



Figure 1: Pre-operative intraoral view



Figure 2: IOPA radiograph in relation to 85 and 75

It was then planned to extract both the second primary molars. In this scenario, space maintainer type of distal shoe appliance was suggested. Distal shoe space

maintainer alteration was suggested for space management of the bilateral loss of primary molars. The treatment plan was conveyed to members of the patient's family and written consent was received from the child's parents.



Figure 3: Adaptation of wire component

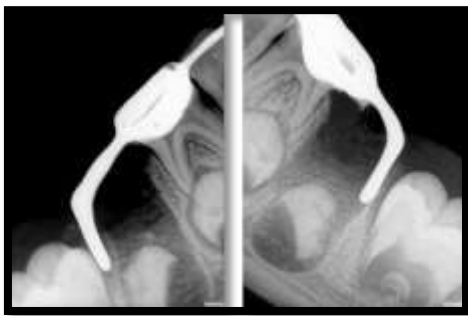


Figure 4: Periapical radiographs before cementation

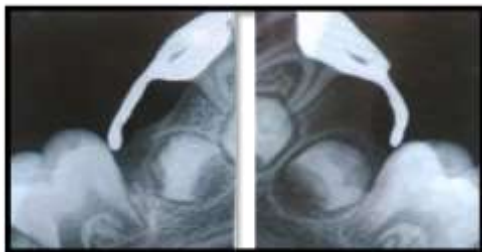


Figure 5: Radiograph after removal of intra-alveolar extension



Figure 6: Post-operative view

Corrective procedures performed were as follows:

- Two consecutive appointments were planned.
- In first appointment, extraction in relation to 75 was carried out under local anesthesia and post extraction instructions were given.
- In following next appointment band adaptations were made on lower right and left primary first molars.
- Alginate impression of lower jaw was recorded followed by extraction in relation to 85 under local anesthesia and antibiotic coverage.
- Adapted bands in relation to 74 and 84 along with extracted 85 were transferred on to recorded alginate impression and dental stone cast was poured.
- 85 was then extracted from dental stone cast, which provided vertical depth of intra-alveolar projection on right side of lower jaw. Whereas the perpendicular extent of the intra-bony part of appliance was measured with x-ray, and space was created in the cast and 19-gage wire was used to adapt the wire components [Fig-3]. The wire part was configured as a lingual arch in the front and a distal shoe in the back. The deciduous second molar represented as a guide for measuring the horizontal distal extension length on the working model.
- Both sides of the wire pieces were soldered to bands. To build a guiding plate on the both sides of the posterior wire, solder material was flowed in middle of the buccal and lingual wires.
- The modified appliance's intra-alveolar projection was positioned within the socket to contact and direct the unerupted permanent mandibular 1st molar vertical eruption route of both sides. The neutral contact between the secondary 1st molars' mesial ends on both sides and the appliance until cementation was verified through periapical radiographs [Fig-4]. Postoperative instructions were given to maintain oral hygiene, and after every three months the recall appointments were scheduled to examine the modified distal shoe appliance and supporting teeth for any distress.

On recall after 7 months, clinical examination showed partially erupting (mesial cusp tips) permanent mandibular first molars on both sides of lower jaw. It was then decided to remove the vertical intra-alveolar projection of modified appliance [Fig-5 and Fig-6]. The horizontal arm was planned to be maintained until the mesial marginal

ridge of both the first permanent molars was visible clinically.

Discussion

Pedodontists face the challenge of treating patients with premature loss of more than one primary molars. In the event of a loss of 2nd deciduous molar prior to the secondary 1st molar eruption, a space maintainer must be placed to direct the permanent molars into the right course. Eruption guidance appliance have always been frequently and effectively used in these cases.

However, this appliance can't be used in various cases, i.e. loss of multiple deciduous molars.⁵ Removable appliances are often related with a slew of downsides, i.e. the importance of complete patient support, as well as the possibility of breaking or failure of the design.⁶ As a result, an economical treatment that needs a decent amount of patient support and can direct the eruption of the first permanent molars into their right place in the jaw is ideal. To this end, it would be suggested to use altered intraalveolar design of space maintainer as the treatment modality. This design is thought to be a temporary device that will be changed by other equipment after the secondary 1st molars and incisors have erupted. Placing a wire on the posterior surface of anterior teeth such as a lingual arch might well meddle with the eruption of permanent teeth and necessitate more periodic recall with shorter time span. Various studies have however demonstrated that in the scenario of premature loss of deciduous molars, the permanent 1st molar erupts quickly than anticipated.^{7,8}

Gujjar et al.⁹, Dhindsa and Pandit¹, and Bhat et al.¹⁰ fabricated rigid bilateral appliances without chair side adjustability. Another design was made by Gegenheimer, in which the gingival extension could be removed after the 1st permanent molar eruption.¹¹ The limitations of the designs were their rigidity and technique sensitivity which were the advantages of the presented design. In the present case, eruption guidance path was clearly illustrated by this modified appliance.

Conclusions

The altered design of bilateral distal shoe is efficient in time management, much more secure, more appreciated by the kids and matches all the requirements needed to preserve adequate space. In the present situation, the above mentioned design demonstrated some benefits against the regular appliance, such as improved strength and durability, reduced time on the chairside and much less patient cooperation.

References

1. Dhindsa A, Pandit IK. Modified Willet's appliance for Bilateral loss of multiple deciduous molars: A case report. *J Indian Soc Pedod Prev Dent* 2008;26:132-5.
2. Chang J, Chen PH, Kuo SC. An appliance to replace prematurely lost maxillary anterior teeth using double stainless steel crowns onabutment teeth. *J Clin Pediatr Dent* 1999;23:285-8.
3. Graber TM. Preventive orthodontics. In: Graber TM, editor. *Orthodontics principles and practice*, 3rd ed. Philadelphia: WB Saunders Company; 2001. p. 627-67.
4. Huth KC, Sagner T, Hickel R. Interdisciplinary rehabilitation and prevention in a case with early and extensive loss of primary teeth. *J Clin Pediatr Dent* 2002;26:125-30.
5. Afshar H, Milani S. Modified distal shoe appliance for bilateral early loss of primary molars: Reports of four cases. *J Islam Dent Assoc Iran* 2017;29:79-85.
6. Foster TD. *A text book of orthodontics*. Oxford: Philadelphia: Blackwell; distributed by J. B. Lippincott, 1975.
7. Rönnerman A. The effect of early loss of primary molars on tooth eruption and space conditions A longitudinal study. *Acta Odontol Scand*. 1977;35(5):229-39.
8. Rönnerman A. Early extraction of deciduous molars. *Sven Tandlak Tidskr*. 1974;67(6):327-37.
9. Gujjar KR, Indushekar KR, Amith HV, Sharma SL. Modified distal shoe appliance – Fabrication and clinical performance. *J Dent Child (Chic)* 2012;79:185-8.
10. Bhat PK, Navin HK, Idris M, Christopher P, Rai N. Modified distal shoe appliance for premature loss of multiple deciduous molars: A case report. *J Clin Diagn Res* 2014;8:ZD43-5.
11. Anegundi RT, Banerjee S, Patil SB, Trasad V. A modification of distal shoe appliance for premature loss of primary second molar-comparison with Willet's appliance: Report of four cases. *Int J Pedod Rehabil* 2019;4:84-7

Corresponding Author

Dr. Rishika, Senior Lecturer

Department of Pedodontics and Preventive Dentistry,
Teerthanker Mahaveer Dental College and Research
Centre, Moradabad (U.P).

Email-rishika.choudharygill@gmail.com

How to cite this article: Abhijeet Patil, Harsimran Kaur, Rishika, Ramakrishna Yeluri. Bilateral modified eruption guidance appliance: a case report. *TMU J Dent* 2021;8(1) 14-16.