

**Regaining lost space due to premature extraction of deciduous tooth for erupting mandibular premolar in mixed dentition: A simple approach**

Dr. Rajib Saha<sup>1</sup>, BDS (WBUHS), MDS (WBUHS), Senior Lecturer, Dept. of Pedodontics and Preventive Dentistry, Guru Nanak Institute Of Dental Sciences & Research , Kol-114

Dr. Amitava Bora<sup>2</sup>, BDS (WBUHS), MDS (WBUHS), Assistant Professor, Department. of Pedodontics and Preventive Dentistry, Burdwan Dental College and Hospital

Dr. Sudipta Kar<sup>3</sup>, BDS ( Cal ), MDS ( WBUHS ), Reader, Dept. Of Pedodontics and Preventive Dentistry Guru Nanak Institute of Dental Sciences & Research, Kol-114

Prof. Dr. Shabnam Zahir<sup>4</sup>, BDS ( Cal ), MDS ( Cal ), Professor, Dept. of Pedodontics and Preventive Dentistry, Guru Nanak Institute Of Dental Sciences & Research , Kol-114

Prof. Dr .Gautam Kumar Kundu<sup>5</sup>, BDS (Cal ), MDS ( Cal ), Professor and HOD, Dept. of Pedodontics and Preventive Dentistry, Guru Nanak Institute Of Dental Sciences & Research , Kol-114

**Corresponding Author:** Dr. Amitava Bora, BDS (WBUHS), MDS (WBUHS), Assistant Professor, Department. of Pedodontics and Preventive Dentistry, Burdwan Dental College and Hospital

**Type of Publication:** Case Report

**Conflicts of Interest:** Nil

**Abstract**

Pedodontists routinely observe the sign of space loss and space closure for premature loss of deciduous tooth. This space loss may aggravate malocclusion when kept untreated. Proper interception of such condition helps to reduce the chances of malocclusion as well as cost of treatment in near future.

**Keywords:** Space Regainer, tooth Impaction. interceptive orthodontics, Space Loss

**Introduction**

Pediatric dentistry is an age specific specialization which not only deals with children's dentition but also carefully observe the growth and development of oro facial region. The exfoliation of the deciduous dentition starts from at about six years of age and completed at 12 years. Premature loss of deciduous tooth can cause space loss and subsequent malocclusion [1]. *Hoffding J and Kisling*

E observed space loss following premature loss of primary teeth [2] [3]. As a result of this kind of unattended space loss may lead to delayed eruption or buccal or lingual eruption of subsequent permanent tooth leading to future malalignment of dentition. [4] [5].

Space maintenance is very important for proper eruption of permanent teeth into ideal occlusion and alignment following premature loss of deciduous teeth. Space maintainers are the devices used for preservation of the space created by the premature loss of the deciduous tooth whereas

Space regainers are active form of space maintainer which are used to move the permanent tooth in mesial or distal direction to regain the lost space following premature loss of deciduous teeth.[1]

## Case Report

A 10-years old girl patient reported to the department of pedodontics and preventive dentistry with a chief complaint of delayed eruption of tooth because of early loss of deciduous second molar due to carious involvement followed by extraction. Past medical history was insignificant. Past dental history shows the patient underwent extraction in mandibular right primary second molar (85) one year back.

Intraoral clinical examination reveals observable space loss in relation to extracted 85 (Figure 1). The patient was examined thoroughly clinically and after that an IOPA x-ray (Figure 2) was taken and both revealed insufficient space for the eruption of second premolar (45). A pre-operative model (Figure 3) was made and model analysis revealed a space loss of 2.1 mm in the lower right quadrant. Therefore, the treatment modality was designed by gaining the lost space.

The right mandibular permanent first molar (46) was banded with molar band (0.005 × 0.180 inch). Buccal tubes (0.7 mm diameter, 10 mm length) were welded to it buccally and lingually. NiTi open coil springs were cut 2-3mm longer than the distance between anterior stop (above the cervical contour of first premolar) and molar tubes in the posterior region. The wires were then properly bended like u loop according to the curvature of the alveolar bone. Two point shoulder were done at the end of the loop to prevent anterior movement of the open coil spring. Then the NiTi open coil springs are incorporated into the u loop wires. The assembly was cemented on to the teeth with the springs held in compression to ¾th of their lengths (1.25 times as long as the required space) (Figure 4). Patient was recalled in every month.

After one and half months, the space gained was 2.3 mm. This procedure enhances the proper eruption pattern of the underlying permanent teeth (Figure 5, 6). Patient

compliance was found excellent. No appliance breakage or occlusal interference was reported by the patient. After four months of treatment, the space was regained (Fig 7) and the tip of the premolar was seen clinically. After six month (Figure 8, 9) 45 was in occlusion with the upper teeth.

## Discussion

To treat a case of malocclusion it is very much important to observe the growth parameter, tooth size-jaw size discrepancy, the curve of spee, over line persistence of bone on the remaining deciduous tooth position, and morphology of adjacent tooth etc. Various factors like patient cooperation, chewing habit or oral hygiene maintenance are also responsible for the success of the treatment of malocclusion. These factors should be considered during the treatment planning and designing of an orthodontic appliance.[6] The design of orthodontics appliance should be such that it provides comfort to a patient. Moreover, in most of the cases the children may be uncooperative by nature. So they require compact and efficient treatment. Simple early diagnosis and interceptive management may prevent need of corrective orthodontic therapy.

Space analysis is an useful tool for diagnosis and space management. Nance, Moyers or Tanaka Jhonston space analysis, Cephalometric analysis, hand-wrist radiograph, growth analysis, cervical vertebral maturity indicators etc may be analysed properly to establish a correct diagnosis and effective treatment planning [7], [8]. literature shows 1mm of space is required in each side for correction of one mm of depth of curve of Spee, so deep curve of spee needs more space. lee way space preservation is another effective method of minor crowding correction[10].

According to Gianelly (1994), minor crowding in the mixed dentition period may be corrected by preserving the lee way space of nance [9]. *Arnold* observed that about 4.5

mm of crowding in the mandible can be corrected by holding the lee way space in 72% of cases [10]. *Brennman and Gianelly* (2000) also supported the similar observation.

Space regainer is indicated when available space is less than the available space. 7-10 years are the ideal age for regaining lost space. Space regainers may be broadly divided into fixed and removable type. The removable type space regainers often use springs or screws incorporated in a Hawley's appliance but disadvantage of this appliance is, it requires patient compliance. Hence, it was decided to go for a fixed space regainer in our case. Conventional Fixed type space regainer is active band and loop space maintainer with free NiTi open coil spring appliance (Gerber appliance).

Advantages of fixed space regainers (used in this case report) are

1. The appliance is easy to construct
2. Patients compliance is good
3. Cost effective
4. Simple design
5. After regaining the lost space, it can be kept passive as a space maintainer .
6. It may prevent further corrective orthodontic treatment.

NiTi open coil spring has two unique feature – shape memory and superelasticity with minimum load fluctuation. [11] These property actually helps to induce large tooth movements without replacement of the springs. Approximately 1 mm per month distal movement has been reported for permanent first molars, but individual variations are also observed .[8-10] In our case a space of 2.3mm had been regained within 4 months.

### Conclusion

Pedodontics are often facing lot of challenges during early age orthodontic treatment. Treatment cost and proper

diagnosis may be the factors for successful orthodontic management. Space regainer may be considered as a boon for our pediatric patients as well as their parents. Space regainers not only reduces treatment time but also it reduces treatment cost and need for future corrective orthodontics as a whole.

### References

1. Bell RA, Dean JA, McDonald RE, Avery DR. Managing the developing occlusion. In : Dean JA, Mcdonald RE, Avery DR editorss. Dentistry for the Child and Adolescent, 9th edition, Mosby, Missouri 63043. pp. 550-613
2. Hoffding J, Kisling E. Premature loss of primary teeth: Part 11, the specific effects on occlusion and space in the permanent dentition. J Dent Child 1978;45:284-7.
3. Hoffding J, Kisling E. Premature loss of primary teeth; Part 1, its overall effect on occlusion and space in the permanent dentition. J Dent Child 1978;45:279-83.
4. Kisling E, Hoffding J. Premature loss of primary teeth: Part 111, drifting patterns for different types of teeth after loss of adjoining teeth. J Dent Child 1979;46:34-8.
5. Kisling E, Hoffding J. Premature loss of primary teeth: Part V, treatment planning with due respect to the significance of drifting patterns. J Dent Child 1979;46:300-6.
6. Ali, Batoool et al. Factors affecting treatment decisions for Class I malocclusions. American Journal of Orthodontics and Dentofacial Orthopedics , Volume 154 , Issue 2 , 234 – 237
7. Nance HN. The limitation of orthodontic treatment. I. Mixed dentition diagnosis and treatment, Am J Orthodontics 1947;33:177-223.

8. Moyers RE. Hand book of orthodontics, ed 4, Chicago, 1988, Mosby.
9. Gianelly AA. Crowding: Timing of treatment. Angle Orthod 1994;64:415-8
10. Arnold S. Analysis of Leeway Space in the mixed dentition (thesis). Boston, Mass: Boston University;1991.
11. Peek S, Peek L, Katija M: The palatally displaced canine as a dental anomaly of genetic origin. Angle Orthod 1994; 64:249-256.

**Legends Figure**



Figure 3: Pre operative model



Figure 1: Pre operative clinical view



Figure 4: Appliance after cementation

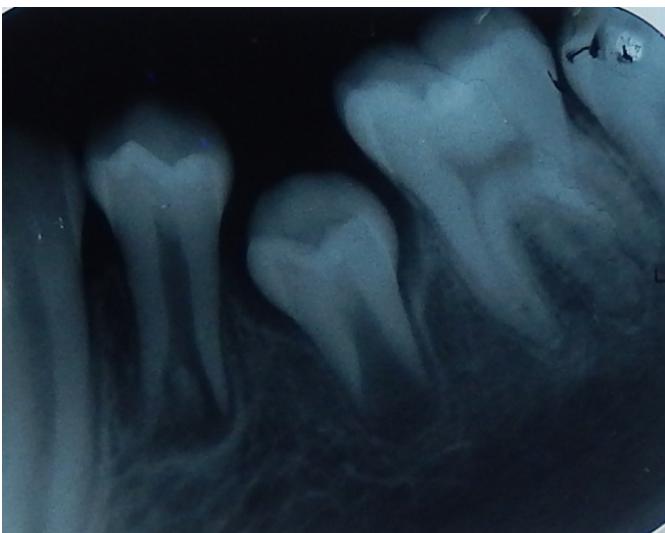


Figure 2: Pre operative radiological view



Figure 5: After 1.5 month radiological view



Figure 6: After 1.5 month clinical view



Figure 9: Postoperative model showing pre molar in occlusion



Figure 7: After 4 month radiological view



Figure 8: After 6 month clinical view