

## CASE REPORT

# An Innovative Space Regainer “Banded Helical Retractor” in Space Management: A Case Report

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### ABSTRACT

**Background:** The premature loss of the primary teeth after the eruption of first permanent molar can result in mesial shift of the first permanent molar. In such circumstances, we require space regainer. The “banded helical retractor” was designed to overcome some of the limitations of the conventional removable and fixed retainers.

**Aim and objectives:** This paper presents a case report with premature loss of second deciduous molar after the eruption of first permanent molar, and regaining the space loss by using innovative design “banded helical retractor”.

**Case description:** A 7-year-old patient with loss of space due to early exfoliation of 75 was given an innovative space regainer “banded helical retractor”.

**Results:** After 6-weeks followup, space was regained with uprighting of molars.

**Conclusion:** “Banded helical retractor” as a space regainer was effective in regaining the space in the short duration of time.

**Keywords:** Banded helical retractor, Premature loss, Space management.

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### INTRODUCTION

The goal of a pediatric dentist is to guide the developing occlusion, preventing any anticipated deviations and/or intercepting the developing malocclusion. Premature loss of any of the primary molars can lead to the development of occlusal discrepancies and malocclusion in the permanent dentition. The consequence of the early and untimely loss of second deciduous molar in the lower arch is the mesial shifting of the first permanent molar, leading to space loss and inadequate arch length.<sup>1</sup>

All removable appliances used for distalizing the molars are limited in effectiveness by the degree of cooperation of the child patient, adequate stability, and anchorage of the appliance.<sup>2</sup>

When fixed appliances with open coil springs are used to reposition the first permanent molars, there will be reciprocal force exerted to the teeth and the supporting tissue anterior to the space, resulting in undesirable flaring of the anterior teeth.<sup>3</sup>

Thus, in the innovative designing of the spring “banded helical retractor,” a fixed space regainer was considered to achieve the effects of spring design in mandibular arch to distalize the first permanent molars.

Planning the design and layout of a spring entails selecting a point of attachment so that the free-end sweeps along the intended line of movement of the tooth; further details are to ensure an optimum combination of length, number of coils, thickness, shape of the spring, and provision for guarding and guiding the spring over its range of activity. The length and thickness of a spring must be decided with regard to the space available.<sup>1</sup>

This case report explains the need of timely intervention to regain the space loss in the mandibular arch owing to premature loss of second primary molar.

### CASE DESCRIPTION

A female child patient aged 7 years was reported to the Department of Pedodontics and Preventive Dentistry with a complaint of missing

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tooth in the left back tooth region for 6 months. Clinical examination revealed prematurely missing 75 (Fig. 1). The history revealed that the tooth was extracted owing to gross decay.

Arch space analysis revealed a space discrepancy of 2.5 mm.

An Orthopantomogram (OPG) revealed 3 mm amount of bone covering, developing 35 and mesially inclined 36 (Fig. 2).

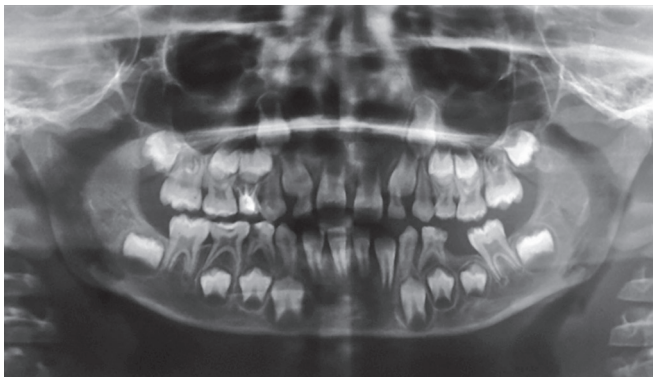


**Fig. 1:** Clinically missing 75 and mesially shifted permanent molars

The decision of fixed banded helical space regainer was made.

### Fabrication of the Innovative Appliance

- Banding of the first permanent molar and first deciduous molar was done.
- Molar tube was welded lingually to molar band.
- Wire component was fabricated using 19-gauge wire with helix 3 mm in diameter and active arm of 10 mm was placed across the mesial surface of the first molar and it was engaged into molar tube on the molar band (lingual). The 10 mm of active arm was measured by calculating the space from distal to helix to the end of the molar tube lingually. The measurements of helix, active arm, and the wire were considered to achieve an effective pressure of the appliance on the tooth. The retentive arm of the wire component was soldered lingually to the deciduous molar band (Fig. 3). The additional space of 2.5 mm was included for the aligning of the first molar and the retentive arm was given to avoid the discomfort to the patient by preventing soft tissue laceration.
- The finishing and polishing of the appliance was done and cemented after activation using GIC luting cements (Fig. 4). Activation was done by opening the coil in the spring to allow the force to be transmitted onto the first permanent molar.



**Fig. 2:** Orthopantomogram reveals the space discrepancy of 2.5 mm with mesial inclination



**A**



**B**

**Figs 3A and B:** (A) Retentive arm soldered to 74 band with the spring of helix 3 mm and active arm of 10 mm; (B) Innovative space regainer 'banded helical retractor'

### Follow-up

The patient was recalled weekly for the followup, within 4 weeks, the required space was regained (Figs 5 and 6). This was further confirmed with OPG (Fig. 7). The appliance was maintained for 2 weeks, after which the lingual arch holding space maintainer was given (Fig. 8).

### DISCUSSION

The eruptive forces of the permanent first molars tend to shift mesially, if the guiding planes of the distal surface of the mandibular second molar distal roots are prematurely missing.<sup>4,5</sup> Orthodontically to regain the lost space due to premature exfoliation of primary molars and to achieve stable intercuspation of the molars by flattening the excess curve of spee would be challenging.<sup>6</sup>

Space maintenance after premature extraction of primary teeth is a key to guide the growth of healthy occlusion. The space maintenance involves either passive occlusal guidance or active occlusal guidance. Passive occlusal guidance involves the use of space maintainers, while active occlusal guidance involves space regaining, that is when an abnormality in the dimensional changes in the arches are detected to implement treatment of regaining the space lost due to premature extraction.<sup>2</sup> Mandibular first permanent molar suffer mesial inclination more than maxillary first permanent molar.<sup>5</sup>

In the present case, an innovative space regainer “banded helical retractor” designed regained the space loss at the shortest possible duration of time and the same appliance served as a passive appliance after the desired position of the molars was obtained.

The factors that were considered in designing the appliance were: patient compliance, ease to fabricate, effectiveness (force of action), shorter duration of appliance wear, and also serve as passive appliance after the alignment of molars.

Patient compliance for the appliance was good. This appliance was easy to fabricate. The anchorage for the appliance was achieved by soldering retentive arm of the springs to the bands of deciduous molars.

The ratio of 1:3 was considered to achieve the effectiveness of the appliance explained by Adams, that the effectiveness can be achieved by the short range of action of the active arm in the available space.<sup>1</sup>





Fig. 4: Cementation of banded helical retractor



Fig. 5: Follow-up of appliance after 4 weeks



Fig. 6: Post removal of appliance



Fig. 7: Post-OPG reveals space achieved and uprighting of molars



Fig. 8: Follow-up with lingual arch holding space maintainer

This design also served as the passive/retentive appliance after the desired action from the spring was achieved.

## CONCLUSION

Innovative space regainer “banded helical retractor” was effective, easy to fabricate, and showed good patient compliance.

The limitation of the appliance was its activation before cementation and can be used in space loss less than 3 mm.

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