

## **Mix and Fix: an approach towards Preventive Orthodontics**

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### **I. Introduction:**

The deciduous teeth play crucial role in the growth and development of a child. Premature loss of deciduous dentition results in the arch length discrepancies which ultimately leads to malocclusion. The concept of space loss resulting from premature loss of primary teeth was described by Davenport in 1887.<sup>1</sup>

The function of primary teeth is not only limited to speech, chewing and appearance but also they guide the permanent teeth to erupt.<sup>2</sup>

The premature loss of deciduous teeth due to dental caries or traumatic injuries requires the placement of space maintainers to prevent adverse effects of space loss. These effects may lead to crowding of the dental arch, ectopic eruption and impaction of the permanent tooth, tipping of the first permanent molar, centre line discrepancies and crossbite formation.<sup>3</sup>

Space maintainers lead the way for the eruption of the permanent teeth and hence eliminates the need for complex orthodontic treatment in later life of an individual.

Conventional space maintainers can be fixed or removable, active or passive, functional or non-functional. Fabrication of space maintainers requires specific clinical requisites that can vary according to the individual requirement. At times conventional space maintainers are not satisfactory or are unable to attain the desired consequence, hence their modifications are required.<sup>4</sup>

The pedodontist plays a pivotal role in selection of the appropriate space maintainer based on the clinical condition, oral hygiene maintenance, and the patient's cooperation.

### **II. Case Report:**

A 5-year old girl reported to the Department of Pediatric and Preventive Dentistry, Mahatma Gandhi Dental College and Hospital with chief complaint of decayed teeth in lower left and right back teeth region since 2 years. Patient gave history of swelling and pus discharge in lower left back teeth region, for which they have visited a dentist for drainage of pus 7 days back. On clinical examination, deep caries with respect to (tooth no.) 84, 85; proximal caries in relation to 74 and open access cavity in relation with 75 was observed. Also, partially erupted mesial cusps of left permanent first molar (tooth no.36) were observed. On radiographic examination, radiolucency approaching pulp was observed with respect to 74, 84 and 85 and periapical radiolucency with furcation involvement was seen with respect to 75 on intraoral periapical radiograph. Treatment plan was made in which pulp therapies followed by stainless steel crown in relation to 74, 84 and 85 to be done and extraction of 75 followed by space maintainer was planned. Since, indirect pulp capping followed by a ss crown was planned and partial eruption of 36 was observed; a modified space maintainer, 'Crown with Reverse band and loop' was the treatment of choice for the rehabilitation of lower left back teeth region.



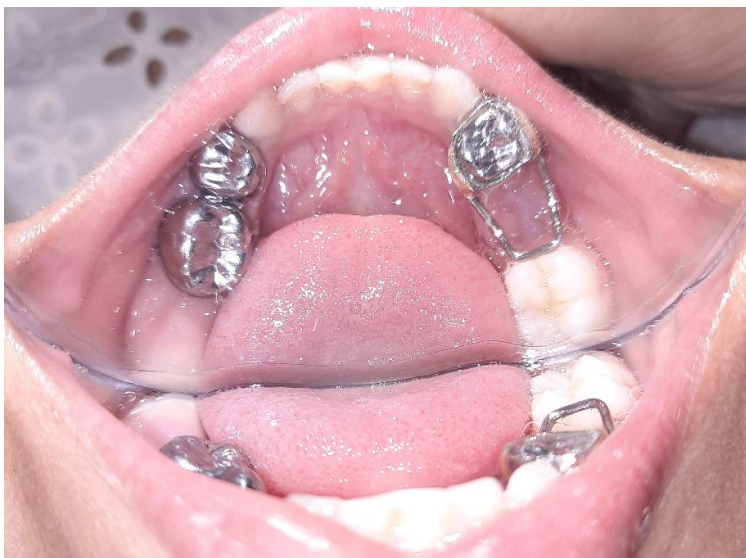
Pre-operative Photographs

### **III. Procedure:**

Indirect pulp capping by calcium hydroxide followed by restoration using Glass Ionomer Cement was carried out in relation to 74. After the restoration, cementation of stainless steel crown was done in order to provide strength to the tooth. As the mesial cusps of 36 were partially erupted the distal shoe was not considered for the treatment. A ring of band material was adapted on the ss crown and spot welded. An alginate impression of lower arch was made and band was transferred to impression and cast was poured. The loop was fabricated on the cast with 21-gauge stainless steel wire in which two perpendicular bends were given to contact the mesial surface of permanent first molar. The loop was extended mesially and soldered to the buccal and lingual surfaces of the band. Finally, finishing and polishing of the space maintainer was done. Extraction of 75 was done under local anesthesia in aseptic conditions. The post extraction instructions were given and patient was recalled the next day. The constructed Space maintainer was seated intraorally on the SS crown to check the fit and then luted with GIC luting cement. The excessive cement was removed with an explorer tip and patient was told to bite. The patient was recalled after a week for the follow-up. Indirect pulp capping followed by adjacent stainless steel crowns was done in relation to right primary second and first molars respectively for the rehabilitation of lower arch.



- Two adjacent S.S crowns placed wrt 84 and 85.
- S.S crown placed wrt 74
- Then 75 is present which would later be extracted.



After 1 week

#### IV. Discussion:

Each child is unique so as their oral cavity. If there is any premature loss of deciduous tooth space must be preserved for the eruption of the successor tooth. Primary teeth are considered to be the best natural space maintainer but if in case it is lost, the requirement for an artificial space maintainer emerges. Space maintenance in deciduous dentition is a crucial factor in preventive orthodontics. Each case is different, hence the decision about the choice of space maintainer depends on the presenting clinical situation and factors available from the literature.<sup>6</sup> If the conventional space maintainers are unable to satisfy the necessity of a specific case, modifications are intended.

Band and loop is the most common space maintainer frequently used to maintain space for the unilateral loss of primary first molar before or after the eruption of permanent first molar. They can also be utilized to preserve space for second primary molars but requires the first permanent molars to be erupted enough to fully seat a band. In such cases, a variation known as "Reverse Band and Loop" is used to preserve the space after the loss of primary second molar. Here, the band is seated on the primary first molar and loop extending distally to contact the mesial surface of permanent first molar.<sup>7</sup>

Various modifications are described by different authors based on the clinical situation and need for the treatment and cooperative nature of the child.

A study by Eshghi et al (2018) suggested Crown Pontic space maintainer as a suitable alternative to conventional band and loop.<sup>8</sup>

Croll and Jhonson (1980) indicated the use of stainless steel crown, sheath and wire loop for permanent tooth only in certain unusual cases in which crowning of permanent molar is essential and premature loss of primary second molar demands space maintenance.<sup>9</sup>

Srivastava et al (2016) presented an innovative design called “Tube and Loop” (Nikhil appliance) which is simple easy and quick.<sup>10</sup>

According to American Academy of Pediatric Dentistry(AAPD), fixed unilateral space maintainers can be of two types: Band and loop and Crown and loop.

On one hand, Beemer et al (1993) concluded that the crown and loop inherently has advantage of superior retention, but is strenuous to adapt intraorally if rotated or deformed.<sup>11</sup> If it breaks or solder joint fails or needs replacement, crown must be cut off and removed followed by the placement of a new crown with wire resoldered. It is more convenient to place stainless steel crown on the abutment and band is seated and loop is constructed that fits the crown properly. On other hand, a study by Qudeimal and Sasa (2015) assessed the survival rate of crown and loop space maintainer is higher as compared to band and loop.

Band and loop adjusts easily to accommodate the dynamic dentition.<sup>12</sup> Among all fixed space maintainer, Band and loop Space maintainer is considered as a gold standard which has been used and tested over a longer duration with good health.<sup>13</sup>

Christensen and Fields suggested that crown and loop is not a recommended technique. Fields stated that the use of crown and loop is no longer advisable as it precludes simple appliance removal and replacement. He suggested that teeth restored with stainless steel crown should be banded like a natural teeth.<sup>7</sup>

In this case report, by keeping in mind the different scenarios, modification of space maintainer is opted known as “Crown with Reverse Band and Loop” to achieve the goal that is prevention of the mesial movement of erupting permanent first molar and maintaining the space created by the premature loss of primary second molar.

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