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RESEARCH ARTICLE

MODIFIED CANINE RETRACTOR: A NEW SPACE REGAINER.

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Abstract

The premature loss of primary teeth due to caries, trauma, ectopic eruption, or other causes may lead to undesirable tooth movements of primary and/or permanent teeth resulting in loss of arch length and space closure for the eruption of permanent teeth. Recently, space discrepancies are being dealt with non-extraction treatment approaches using non-compliance mechanics successfully. The Paediatric Dentist recommends insertion of space regainers in these situations to guide the eruption of impacted tooth. The following case report describes an innovative space regainer, which is particularly suitable for unilateral space gaining with minimum side effects.

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Introduction:-

Guidance of the eruption and development of the primary and permanent dentitions is an integral part of the speciality of paediatric dentistry. Early diagnosis and successful treatment of developing malocclusions can have both short-term and long-term benefits while achieving the goal of occlusal harmony, function, and dental facial aesthetics^[1]. In 1998, Hoffding J and Kisling E reported that premature loss of primary teeth caused space loss^{[2],[3]}. Some of the more common causes of space loss within an arch are (1) primary teeth with inter-proximal caries; (2) ectopically erupting teeth; (3) alteration in the sequence of eruption; (4) ankylosis of a primary molar; (5) dental impaction; (6) transposition of teeth; (7) loss of primary molars without proper space management; (8) congenitally missing teeth; (9) abnormal resorption of primary molar roots; (10) premature and delayed eruption of permanent teeth; and (11) abnormal dental morphology. Therefore, loss of space in the dental arch interferes with the desired eruption of the permanent teeth^[4].

When the disruption from the usual pattern of eruption occurs, interceptive orthodontics plays a major role to bring in the lost harmony at an early stage^[5]. Interceptive orthodontics is defined as a phase of science and art of orthodontics employed to recognize and eliminate the potential irregularities and mal-positions in the developing dento-facial complex^[6].

Space regainers are the devices used to move the desired tooth in mesial or distal direction to regain the lost space^[7]. The goal of space regaining intervention is the recovery of lost arch width and perimeter and/or improved eruptive position of succedaneous teeth^[4]. According to William Profitt, mandibular space cannot be regained easily by removable appliances^[8]. Therefore, a new fixed type of space regainer was planned in this particular case. Space regained should be maintained until adjacent permanent teeth have erupted completely and/or until a subsequent comprehensive orthodontic treatment plan is initiated^[4]. Thus, this new appliance is a simple and effective space regainer which also serves the purpose of a space maintainer at the same time.

Fabrication of the Appliance:-

A suitable pre-formed stainless steel band was selected or constructed for an abutment tooth with stock band material of 0.180x0.005 inch diameter. A thicker band material of 0.006 inch can be used for fully erupted permanent molar in older children, as it is harder, so gives better stability of the appliance. After the banding of abutment tooth was done, alginate impressions of the both arches were taken keeping the band in place and models were prepared with conventional dental stone. The wire component for the space regainer comprised of a canine retractor (22 or 23 gauge of wire) or a 'U' loop (21 gauges of wire). The 'U' loop or the canine retractor should be positioned a little away from the band to avoid heating while soldering procedure. One added advantage of this appliance is that the placement of 'U' loop or reverse canine retractor can be done on either side (buccal or lingual) depending on the space available and other factors.

Case Report:-

A 12 years old girl child reported to the Department of Pedodontics and Preventive Dentistry with the chief complaint of decayed tooth in the lower left back region of jaw. Medical history was non contributory. Clinical examination revealed grossly decayed 75 resulting in distal migration of 34 and spacing on the distal aspect of 34 and clinically missing 35 (Figure 1).

Radiographic examination confirmed the clinical finding revealing impaction of 35 due to space loss (Figures 2 & 3). Mixed dentition space analysis done on study models indicated space deficiency of 5.0 mm on the left side of the mandibular arch.

Clinical situation required a space regainer which can mesialize the first premolar (34) and guides the eruption of 35. Hence a modified space regainer was planned following extraction of 75 which will provide good control of the tooth movement as well as force applied to the tooth.

A Modified Canine Retractor soldered to a molar band is inserted into the oral cavity (figures 4 & 5). The activation of the appliance was done periodically by opening the 'U' loop or the coil spring of the canine retractor. By approximately 6 months 34 was completely mesialized leaving sufficient space for the eruption of 35 (Figure 6). Once the space was regained, the appliance then served as a space maintainer, maintaining the space till the eruption of second premolar and it was left as such without further activation (Figures 7 to 10).



Figure 1:- Distal migration of 34.



Figure 2:- IOPA showing impacted 35 because of loss of space resulting from distal tipping of 34.



Figure 3:- Panoramic Radiograph showing loss of space for 35 to erupt.



Figure 4:- Modified Canine Retractor soldered on Molar band.



Figure 5:- Appliance inserted into buccal cavity



Figure 6:- Clinical view after 6 months showing space regained.



Figure 7:- Appliance maintained in the mouth till the eruption of 35.



Figure 8:- Mid Treatment IOPA with appliance in place.



Figure 9:- Clinical view after 9 months.



Figure 10:- Postoperative view showing tooth (35) into occlusion.

Conclusion:-

Advantages of new space regainer include:-

1. Simple and easy to fabricate
2. Cost effective
3. Fixed so, minimal requirement of patient cooperation.
4. Serves the dual purpose of space regainer as well as space maintainer

Limitations include:-

1. Multiple impactions or un-erupted teeth resulting from severe space loss require comprehensive analysis and fixed orthodontic treatment.
2. If a permanent first molar is to be distalised, extra-oral force with headgear may be considered.

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