CASE REPORT

Management of Missing Maxillary Lateral Incisor: Canine substitution or Lateral Incisor Replacement

[1]Ashwin Mathew George [2]Department of Orthodontics [3]Remmiya Mary Varghese

[1]Professor, Department of Orthodontics, Saveetha Dental College, SIMATS, Chennai, India.

[2]Senior Lecturer, Department of Orthodontics, Saveetha Dental College, SIMATS, Chennai, India

[2]Rajas Dental College and Hospital, Kavalkinaru Junction, Tirunelveli, Tamil Nadu.

To cite: Ashwin Mathew George, Department of Orthodontics, Remmiya Mary Varghese

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J Contemp Orthod 2020;4(2): 1-4.

Received on: 20-04-2019

Accepted on: 23-05-2019

Source of Support: Nil

Conflict of Interest: None

ABSTRACT

To When one is at the Cross roads of managing a missing maxillary lateral incisor ,there are two options to finish with a good occlusion The two options are a) Reshaping the maxillary canine into a lateral incisor (Canine Substitution) and the maxillary premolar into a lateral incisor1 and b) Open space and replace the missing lateral incisor with a prosthesis. Which among the two options would be the right choice is the topic of discussion in this article. This article reviews a case of a missing maxillary right lateral incisor and how it was managed successfully taking into account both the esthetic and functional aspects. Factors that contribute to achieving functional occlusion and criteria to reshape teeth for substitution will be discussed.

Keywords: - Missing maxillary lateral incisor, Functional Occlusion, Canine Substitution, Ridge Development, Reshaping of teeth.

INTRODUCTION

Literature states that approximately 2% to 10% of the population exhibit missing teeth. Excluding the third molars the second most commonly missing teeth are the maxillary lateral incisor and the mandibular second premolars.

Patients with missing lateral incisors can also present with a contra lateral peg shaped lateral incisor or the one with smaller than normal mesio-distal width.[2]

Managing patients with congenitally missing maxillary lateral incisors raises several important issues involving the: -

a) Amount of space

b) Patient's age

c) Type of malocclusion, and

d) Condition of the adjacent teeth.

e) Ridge development. (Guidance of Eruption/Tooth Movement).

Among all the above factors mentioned, the most critical for the overall development of dentition or the guidance of eruption would probably be the need for ridge development in the area of the missing lateral incisor.

Basically the management of missing lateral incisor involves 3 protocols[3]

1. Canine substitution (Reshaping Canine into Lateral Incisor and Premolar into Upper Canine.)

2. Lateral Replacement (Creating space for Tooth –Supported Restorations.)

3. Lateral Replacement (Creating Space for Single Tooth-Implants)

1) Indications for Canine Substitution: -

a) Angle Class II Molar with no crowding in the mandibular arch.

b) Angle Class I Molar with crowding in the mandibular arch.

c) Balanced or straight profile.

d) Not much variation between the size, shape and color of the canine and premolar.

2) Indications for Lateral Replacement (Creating space for Tooth –Supported Restorations.)[4]

a) Angle Class I Malocclusion with normal intercuspation.

b) Pronounced Spacing of the maxillary dentition.

c) Patients Profile need not be taken into consideration.

d) Size, Shape and Color of the Canine and Premolar are irrelevant.

3) Indications for lateral replacement (Creating space for Tooth –Single Tooth Implant Restorations.)[5]

a) Adequate development of Alveolar Ridge for Implant placement in addition to the indications mentioned in (2).

CASE REPORT

A 17 yr. old female patient reported with a chief complaint of unaesthetic facial appearance with a convex profile (Fig 1) Intraoral clinical examination revealed that patient had a Class I molar relationship on both right and left side. A missing upper right lateral incisor causing shift in the midline towards the right side was one of the chief concerns of the patient.

The maxillary and the mandibular incisors were proclined with the presence of crowding in the lower arch. (Fig 2).

Fig 1: Pretreatment Extra Oral Photographs.

Fig 2: Pretreatment Intra Oral Photographs:-

In view of the dental and soft tissue imbalances, it was decided to reshape the maxillary right upper canine tooth to a lateral incisor and the upper right premolar into the canine. Extraction of 24, 34 and 44 were done to reduce the proclination of the upper and lower anterior teeth and also to correct the midline shift.

Reshaping of the upper canine and premolars were done before bonding brackets on the tooth. The upper right canine was reshaped to resemble a lateral incisor by flattening the labial surface, reducing the canine cusp tip and flattening the mesial and distal proximal contact points. The upper premolar was reshaped to mimic a canine by periodically reducing the palatal cusp. Reducing the palatal Cusp in bulk at the start of treatment would lead to sensitivity of the tooth. It is advised to polish the reshaped teeth periodically with a fluoride varnish to prevent decalcification and sensitivity.

Treatment was initiated with a 0.022inch MBT bracket prescription. An important criterion is the choice of brackets for the reshaped lateral incisor and canine teeth. For the reshaped canine tooth, a lateral bracket with a torque prescription of + 10° was bonded and for the reshaped premolar tooth, a canine bracket with a torque prescription of 0° was bonded. To maintain the correct gingival zenith of the substituted teeth, the lateral bracket was bonded gingivally to bring about extrusion and the canine bracket was bonded incisally to bring about intrusion. To achieve functional occlusion in lateral guidance, composite build up was done on the non functional buccal cusp of the reshaped premolar. (Fig 3) After initial leveling and aligning with round NiTi wires, steps were taken to correct the midline in the upper arch.

Fig 3: Composite build up of the reshaped premolar to achieve functional occlusion.

Extractions of 24, 34 and 44 facilitated corrections of the proclination and crowding of teeth. The correction of the midline was also achieved at this stage. Retraction was carried on 0.019x0.025-inch stainless steel arch wires and the 0.019x .025-inch stainless steel arch wires were maintained in a passive state for 3 months to express the ideal torque values. (Fig 4)

Fig 4: Post treatment intra oral photographs.

Debonding was done after 15 months of active treatment and upper and lower fixed bonded retainers were placed. In addition to fixed retainers an Upper Hawley's retainer was delivered as part of the retention protocol. The patient finished with a balanced esthetic profile (Fig 5)

Fig 5: Post treatment intra oral photographs.

DISCUSSION

There are many variables that need to be considered before deciding the treatment options for missing maxillary lateral incisor. The decision to replace a missing lateral incisor and do a canine substitution is based on many factors such as the type of malocclusion, profile and the shape, size, and color of the canine and premolar. An interdisciplinary method of treatment, involving an Orthodontist Periodontist and a Prosthodontist would be an ideal approach[6]. The current concepts favors Canine substitution based on many factors and literature states that space closure should be considered as the first option in growing patients and keeping in mind the esthetic, functional and periodontal considerations.[7]Patients with missing Lateral Incisor frequently present with contra lateral peg shaped or smaller than normal mesio-distal width lateral incisor [2] .Therefore taking into account the Bolton Discrepancy should be a vital part of the treatment planning. The use of a diagnostic set up would be useful in such situations.

In the present case, the missing right maxillary lateral incisor was substituted with the canine and the canine was substituted with the premolar, reshaping of the substituted teeth is the key to success and adequate precautions were taken to prevent decalcification by periodically polishing the reshaped surface. There are many advantages of doing space closure with canine substitution like producing a normal gingival topography around a mesially relocated cuspid which is of critical importance in patients with a high smile line.[8]Patients treated with Canine substitution should be recalled at periodic intervals to check the stability of the final results as most of the patients are children or adolescents and changes in the occlusion would occur along with facial growth. Another advantage of Canine substitution would be maintenance of the alveolar ridge by the early movement of the Canine into the missing lateral incisor space. In a retrospective study to compare Space closure with Space reopening, results showed that subjects treated with orthodontic space closure were more satisfied with the appearance of their teeth while patients with prosthetic replacement had impaired periodontal health with accumulation of plaque and gingivitis.[9] and probably the most significant importance would be that the adaptive changes that take place with growth would be natural in the case of Canine substitution.

CONCLUSION

Missing maxillary lateral Incisor poses a challenge not only in the decision to open or close spaces but also the difficulty in achieving esthetic and functional occlusion. This case report explains the management of missing lateral incisor with Canine substitution to achieve good esthetic and functional balance. Although recent literature tend to favor the decision of Space closing(Canine substitution) especially in growing children, the decision to open or close spaces is very subjective to individual cases and the clinician should make the decision

based on different factors discussed.

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