

# MANAGEMENT OF CONGENITALLY MISSING BILATERAL LATERAL INCISOR : A CASE REPORT

Dr. Anirban Biswas\*, Dr. Sayani Adhikari\*, Dr. Mishal Md. Harris\*  
 Dr. Zarrin Rahnuma\*, Prof (Dr.) Prosanta Kumar Mondal\*\*  
 Prof (Dr.) Somen Roychowdhury\*\*

## ABSTRACT

Congenitally missing anterior teeth pose both functional and psychological problem in young children. Treatment of congenitally missing anterior teeth is difficult due to constant growth and change of the orofacial structures in young patients but it is necessary social and physiological development. If the missing spaces are complicated by drifting of the adjacent teeth the the treatment becomes more complicated. Different treatment modalities have been tried for treating such cases including both removable partial dentures and implants having both advantages and disadvantages. Here is a case report of a 9 year old boy complaining of a wide midline diastema developed due to distal migration of upper central incisors in the space of congenitally missing lateral incisors. The boy was having difficulty in speech and was feeling socially awkward due to the unaesthetic frontal appearance. 2×2 sectional fixed orthodontics was used to close the diastema and removable partial denture was used to replace the missing lateral incisors. Both functionality and aesthetic was restored.

## KEY WORDS

Missing laterals, 2×2 sectional fixed orthodontics, diastema, removable partial denture.

## ABOUT THE AUTHORS

\*Post Graduate Trainee, \*\*Professor  
 Department Of Pedodontics & Preventive Dentistry  
 Dr. R Ahmed Dental College And Hospital

## CORRESPONDING AUTHOR

**Dr. Sayani Adhikari**  
 Post Graduate Trainee  
 Department Of Pedodontics & Preventive Dentistry  
 Dr. R Ahmed Dental College And Hospital, Kolkata  
 e-mail Address : sayaniadhikari18658@gmail.com  
 Phone Number : 9476436557

## INTRODUCTION

Management of congenitally missing anterior teeth is of utmost aesthetic importance. Developmentally missing teeth pose deep psychological impact upon children and socially unaccepted aesthetics may lead to depression, low self-esteem, or anxiety. Early diagnosis and intervention of congenitally missing incisors and any developing anomalies followed by comprehensive treatment is essential for the patient.

The developmental absence of one or more teeth, with the exception of third molars, is referred to as hypodontia. Hypodontia is uncommon in the deciduous dentition with a prevalence of less than 1% & reported prevalence of 3% to 10% in permanent teeth. Maxillary lateral incisors are the second most frequently missing teeth after mandibular second premolar. It can either be syndromic such as cleft lip and palate, ectodermal dysplasia, Van Der Woude syndrome or Down's syndrome, or as a non-syndromic condition.<sup>1</sup> According to several studies, hypodontia is critically associated with several dental and craniofacial abnormalities such as class three skeletal pattern, bimaxillary retrognathism, microdontia with spacing and drifting of teeth, ectopic eruption etc. Additionally, these patients may have localised or generalised reduced alveolar bone development leading to old appearance, increased free way space may result in disturbed speech and mastication. Agenesis of lateral incisor is also linked with microdontia of lateral incisors (peg laterals).<sup>4</sup>

## GENETIC CONTROL:

Certain genes, such as PAX9, MSX1, and AXIN2, have been linked to tooth agenesis, according to research by Brook et al. The PAX9 gene, which controls dental development and mutations linked to missing teeth, is located on chromosome 14.<sup>2</sup>

Peck, Peck and Kataja believe signaling proteins such as bone morphogenic proteins (BMP) and fibroblast growth factor (FGF) may be responsible for agenesis early in embryonic development<sup>3</sup>. However local environment is also an important factor now.

For management of such cases two most common treatment protocols accepted are:

1. Orthodontic space opening followed by replacing the missing laterals (removable partial dentures, fixed partial dentures or implants)
2. Closing spaces and reshaping canines to simulate missing laterals. (canine substitution)

Indication for space opening	Indication for space closure
Protrusion of upright maxillary incisors is required	Severely protruded maxillary incisors
Anterior crossbite	Normal profile with minimal space
To gain upper lip support (even if minimal space is available in the maxilla)	Crowding or severe protrusion in mandibular incisors

Evidence from practice indicates that patients with canine substitution have improved periodontal health and reported higher levels of satisfaction with their appearance compared to those with dental prostheses.<sup>3</sup>

In the following case report, multidisciplinary approach for the management of a 9 year old boy with bilaterally missing lateral incisors is undertaken by sectional fixed orthodontics for space opening followed by rehabilitation with removable partial denture. Nevertheless, achieving outstanding esthetic and functional results that are as close as possible to natural teeth is challenging.

## CASE REPORT

### FINDINGS AND DIAGNOSIS:

A 9 year old boy reported with a chief complaint of unesthetic appearance due wide open space in his upper front teeth region. He did not reveal any medical history or drug allergies. Family history says patient's elder brother had similar presentation and undergone treatment for the same.

Extraoral findings reveals mesoprosopic face with convex profile, symmetrical and proportional face. Lips are competent with interlabial gap of 0 mm at rest. Smile evaluation showed more than 50% exposure of the upper incisors upon smiling with no gingival show and the upper centre line coincident with the facial midline.

Intraoral findings shows patient had mesial step molar relation, class 1 canine relation, however first molars show class 1 molar relation. He had an overjet of 3mm (Fig 2) and a normal 2mm overbite. Both the maxillary and the mandibular arches had well aligned teeth. Whereas there was a maxillary midline diastema of 12mm was present; since the upper lateral incisors were missing the central incisors have drifted distally into the lateral incisor spaces.(Fig 1) The panoramic radiograph confirmed the bilateral agenesis of the maxillary lateral incisors.(Fig 3)



Fig 1



Fig 2



Fig 3



Fig 4



Fig 5



Fig 6



Fig 7

## TREATMENT PLANNING

Pre treatment photographs were taken and maxillary and mandibular diagnostic impressions using irreversible hydrocolloid were made and poured with dental stone. After taking the patient's consent, a treatment plan was formulated. The treatment plan was as follows:

- Non extraction orthodontic therapy
- Closure of the midline diastema using E- chain
- Levelling and aligning the upper arch
- Maintaining overjet and overbite and the midline.
- Prosthetic rehabilitation of the missing lateral incisor space gained by a removable partial denture.

## ORTHODONTIC TREATMENT

- The patient was started with 2×2 fixed orthodontic therapy.
- The molar tubes were bonded in the upper molars.
- Two MBT brackets were bonded to the upper central incisors(Fig 4)
- Initial levelling and alignment was started using 0.014" NITI wire
- Sequential wire change was done from 0.014" to 0.016"x0.022" NITI wire; finally finished with 0.017"x0.025" SS wire.
- E chain was placed for closing the diastema. The diastema was closed over a period of 2.5 months using light E chain (Fig 5)

## RETENTION

Permanent lingual wire retainer was placed on the central incisor to prevent relapse.

## PROSTHETIC REHABILITATION:

A post treatment alginate impression were made



Post-Op Photograph

and poured with dental stone to obtain the casts with newly aligned and positioned central incisors. A removable partial denture was fabricated to rehabilitate the space created in place of the missing lateral incisors after closure of the midline diastema. (Fig 6,7)

## DISCUSSION

For patients with congenitally missing lateral incisors permanent canines may erupt or drift mesially into the edentulous space. If the space is to be opened orthodontically for ideal prosthesis, the canines will need to be moved distally, which may result in development of the alveolar ridge in the canine region. In cases where the occlusion and esthetics of the canine in the lateral position are acceptable, closure of the lateral space by the mesially positioned canine may be the simplest alternative treatment option.<sup>4</sup> However here the central incisors were found to drift distally creating a bizarre large unaesthetic midline distema, a rare situation. Since the midline diastema was created its closure was opted for by orthodontic closure of the space between the two central incisors followed by a removable partial denture.

Esthetics and occlusion must be considered in the final orthodontic positioning of the teeth. To satisfy the "golden proportion" principle of esthetics, the

space for the maxillary lateral incisor should be approximately two-thirds of the width of the central incisor.<sup>9</sup>

Earlier researches advised no treatment is necessary if there is absence of malocclusion associated with a missing incisor and the patient is happy with his/her aesthetics. Several treatment protocols could have been undertaken to manage the case scenario such as replacement of the missing lateral incisors with fixed partial denture, implant placement or auto transplantation.

However, The suitable time for a fixed prosthesis is after the growth of the alveolus, maxilla, and mandible is complete. If fixed prosthesis/implant are placed before growth is complete, the surrounding alveolar bone may continue to grow vertically and adjacent teeth may continue to erupt. Thus a discrepancy between the gingival margins of the prosthesis and the natural teeth develops and the prosthesis appears to become submerged. This creates a functional as well as an aesthetic problem that becomes difficult to correct.<sup>10-14</sup> Implants usually can't be placed until after the patient has finished growing their face and most of their teeth have erupted<sup>5,6,7,8</sup> since they are unable to erupt and keep up with dentoalveolar development in the absence of a periodontal ligament. Adult patients are most likely to benefit from single tooth implants. Patient selection should be carefully considered, taking into account the patient's socioeconomic status, oral cleanliness, and capacity to adhere to maintenance guidelines.

In this case, a removable partial denture was preferred for the following reasons:

1. Since the patient was growing the RPD acts as a interim restoration, a functional space maintainer that can be replaced by a fixed prosthesis anytime later in future after the growth of maxilla is complete.
2. Maintains the intercanine width for the patient.
3. The patient is able to maintain a good oral hygiene on his own.
4. Taking into account the socioeconomic status of the patient Rpd was an economical choice.

After the maxillary growth is completed a fixed prosthesis can be planned for the patient in future.

## CONCLUSION

The above mentioned case report describes that 2×2 sectional orthodontics is a suitable alternative for closure of midline diastema. The design of this appliance also helps in retraction of the protruded upper central incisors. Since the patient faced major psychological issues due to the unesthetic appearance rehabilitation reinforced his confidence. The treatment showed satisfactory results in terms of function and aesthetics.

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