

# REPLACEMENT OF CONGENITALLY MISSING BILATERAL INCISORS USING IMPLANTS: A CASE REPORT

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## ABSTRACT:

Congenitally missing teeth are frequently presented to the dentist. Interdisciplinary approach may be needed for the proper treatment plan. The available treatment modalities to replace congenitally missing teeth include prosthodontic fixed and removable prostheses, resin bonded retainers, orthodontic movement of maxillary canine to the lateral incisor site and single tooth implants. Implants are a viable option for replacement of congenitally missing lateral incisors and should be considered before the commencement of definitive treatment plan. Early diagnosis, and proper planning can achieve excellent aesthetics. This article aims to present a case report of replacement of bilaterally congenitally missing maxillary lateral incisors and right mandibular second premolar with dental implants.

**Key words:** Congenitally missing teeth, Orthodontics, Prosthesis, dental implants, interdisciplinary approach.



## INTRODUCTION:

Permanent lateral incisors are the third most common missing tooth in the mouth after upper and lower second premolars <sup>(1)</sup>. It is more common bilaterally and has a slightly higher female predilection. The prevalence of congenitally missing lateral incisors is between 1 and 2 percent <sup>(1, 2)</sup>. Congenitally missing maxillary permanent lateral incisors often lead to an unattractive appearance and difficulty in treatment planning. Many factors must be considered before a decision is made both

to close spaces and modify the canines, or to redistribute the spaces and replace the missing teeth with prosthesis. Good communication among patients, dental specialists, and general practitioners is necessary <sup>(1)</sup>.

When a maxillary lateral incisor is missing, often the treatment options can be clearly defined, that is, substitute an adjacent tooth for the missing one; open the space for an implant, a bonded bridge or fixed bridge. Three treatment options exist for the replacement of congenitally missing

lateral incisors. They include canine substitution, a tooth-supported restoration, and a single-tooth implant. Selecting the appropriate treatment option depends on the malocclusion, anterior relationship, specific space requirements, and condition of the adjacent teeth. The ideal treatment is the most conservative option that satisfies individual esthetics and functional requirements. Today, the single-tooth implant has become one of the most common treatment alternatives for the replacement of missing teeth <sup>(2)</sup>. There must be coordination among the restorative dentist, the oral surgeon or implantologist and the orthodontist to obtain the optimum result <sup>(3)</sup>.

The available treatment modalities to replace congenitally missing teeth include prosthodontic fixed and removable prostheses, resin bonded retainers, orthodontic movement of maxillary canine to the lateral incisor site and single tooth implants.

Implantology has become an established part of overall dental treatment strategies and is also increasingly being integrated into orthodontic treatment concepts.<sup>(4)</sup> Recent publications have reported upon the use of osseointegrated implants for orthodontic anchorage and to replace of missing teeth after creation of sufficient space by orthodontic means.<sup>(5)</sup> Implants provide the advantage of conservation of adjacent natural teeth upon the fixed partial restoration provided the available space is enough for implant placement. But if the provided

space is not adequate, it can be gained orthodontically. This article aims to present a case report of replacement of bilaterally congenitally missing maxillary lateral incisors and right mandibular second premolar with dental implants. This paper describes the therapeutic use of osseointegrated implants to replace congenitally missing upper lateral incisors. Highlighting the importance of the Orthodontic/Restorative interface.

### CASE DETAIL:

A 22-year-old female patient presented with congenitally missing maxillary bilateral incisors, Class I occlusion, and recent post-orthodontic treatment with an over-retained primary tooth present on the right side and missing primary tooth on the left.

No specific past dental, family and medical history was elicited. No relevant findings were observed on extra-oral examination. Intra-oral examination revealed retained primary maxillary right and left canines. Diastema was present between maxillary central incisors and between right central incisor and primary maxillary canine. Distally tilted right maxillary second molar was present. Gingival and periodontal examination revealed healthy periodontium. Radiographic examination was done to evaluate the proposed site for implant placement, which included intra-oral periapical radiograph . [Figure 1]

The case was discussed with the Department of Orthodontics and treatment to be done was planned.

Informed consent was obtained from the patient. Extraction of retained deciduous maxillary right and left canine was done. Simultaneous closure of midline diastema and bilateral distalization of maxillary canine was done to gain space between central incisor and canines bilaterally. [Figure 2] [Figure 3] [Figure 4]

When the sufficient interdental area between two teeth was gained [Figure 5], the implant placement surgery was planned. Under local anesthesia, the crestal incision was given and mucoperiosteal flap was elevated. The site was initially with 2 mm pilot drill. The site was then gradually enlarged with standard color coded drills to the desired lengths at the osteotomy sites. The implant was delivered at the prepared osteotomy sites [Figure 6]. Primary closure of the flap was obtained with interrupted type resorbable sutures. Radiographic examination was done post-operatively [Figure 7][Figure 8]. Patient was prescribed non-steroidal anti-inflammatory drug ibuprofen 600 mg thrice a day for 5 days. Chlorhexidine gluconate 0.2% was prescribed for 2 weeks, soft diet instructions were given. After 5 months under sterile conditions, 2<sup>nd</sup> stage surgery was done using crestal exposure of implant cover screw. A healing abutment was placed with hex screw driver on each implant. At 2 weeks later impressions were made with open tray technique with impression copings placed into the implants [Figure 9]. Shade selection was done. Healing abutments were replaced until prosthesis was

manufactured. After a week, the healing abutments were removed and replaced by final abutments onto which final prosthesis was given [Figure 10,11,12]. Patient was happy with her new smile.

Differences in bone loss have been found as compared with edentulous patients treated with osseointegrated implants<sup>(6,7)</sup> Excessive interfacial micromotion early after implantation interferes with local bone healing and predisposes to a fibrous tissue interface instead of osseointegration<sup>(8)</sup>.—The level of the interproximal papilla of the implant is independent of the proximal bone level next to the implant, but is related to the interproximal bone level next to the adjacent teeth<sup>(9)</sup>. Treatment using implants in missing lateral incisors cases are satisfactory for the patient's esthetic expectations<sup>(10)</sup>. Interdental papilla levels were increased gradually and improved natural appearance<sup>(11)</sup>. [Figure 13,14,15]

## DISCUSSION:

The term “team approach” has been used throughout the health care industry, and as technologies continue to advance, this term has evolved from simply referring a patient back and forth to detailed treatment planning and case selection. In this case report, the restorative dentist presence and participation at stage I surgery was a valuable asset to achieving the ideal esthetic and functional result for this patient. Patients with congenitally missing maxillary lateral incisors may seek orthodontic therapy as part of a restorative plan.

Maxillary lateral incisors are the most common congenitally missing teeth (11%) other than third molars. <sup>(6,7)</sup> Clinically, the absence of maxillary lateral incisors is reflected by the presence of anterior spacing, including a diastema between the central incisors and a mesial drifting of the cuspids. The correction of this aesthetic problem can be a diagnostic and clinical challenge in dental practice.

In this case report, the space between teeth measured 6.3 mm; thus, 3.3-mm-diameter implants were used. The facial gingival-most apical aspect of the guide for the designated implant site must be fabricated accurately to represent desired final gingival margin of the definitive restoration. The surgeon will use the guide to measure 3 mm apical to set the proper implant depth. With this particular patient displaying uneven gingival heights from right to left, the guide provided a critical reference for fixture placement. <sup>(12,13)</sup>

The restorative team member must determine whether the definitive restoration will be cement or screw retained. There is currently significant discussion about cement-retained restorations contributing to the causes of peri-implantitis. <sup>(14)</sup> For this reason, some clinicians have abandoned cement-retained implant restorations. Screw-retained implant prosthesis may require an implant placement in a more palatal position. This could have a negative effect on the final esthetic result. Although a screw-retained restoration avoids the complication of excess cement,

it adds an additional degree of difficulty because of the small margin of error for implant placement. Cement-retained restorations allow implant placement in an ideal position based on available bone, ability to augment ridge, proper depth to create ideal transitional profile, and proper mesial– distal spacing and not on prosthetic design. Wadhvani *et al.* reported the most effective method to avoid excess cement with cementable restorations was to avoid subgingival margins. The authors recommended supragingival abutment–implant crown margins <sup>(12)</sup>. In addition, it was recommended that the materials used on the abutment is the same shade of the prosthesis to avoid detection on recession on the facial aspect. Replacement of maxillary incisors with implants requires a thorough understanding of the periodontal anatomy, regenerative potential of bone and soft tissue, and the biomaterial principals of the restorative techniques used. In this case report, positioning of implant analogs in the ideal positions on a diagnostic cast before surgery was key in fabricating a surgical guide to aid the periodontist in implant positioning. <sup>(15)</sup>

In addition to the tooth width requirements for mesiodistal spacing, the alveolar width in a buccolingual direction must be adequate for implant placement. Often an additional surgical appointment is necessary to graft or augment the alveolar ridge before an implant can be placed. It has been suggested in the literature that by allowing or guiding the eruption of the canines into the lateral

position and orthodontically moving them to their natural position, the necessary amount of buccolingual alveolar thickness for implant placement can be achieved naturally, without the need to perform any ridge augmentation. <sup>(2,16)</sup> Although not completely understood, it has been shown that very little, if any, resorptive change in alveolar bone width is observed when space is opened orthodontically compared with the decrease in alveolar ridge width after extraction of maxillary anterior teeth.

However, a disadvantage of orthodontic canine distalization for implant site development is the potential for loss of arch length when the canines are allowed to erupt mesially. <sup>(17)</sup>

Another factor that plays an important role is completed skeletal growth or the age of the patient at the time of implant placement. If the implant is placed before the cessation of the peak growth periods, it can cause various esthetic and functional problems. Orthodontic treatment is required when the space available between the adjacent roots and the adjacent crowns is inadequate. In this case the space available for implant placement was inadequate after extraction of right and left primary maxillary canines. To gain the space for implant placement, simultaneous closure of midline diastema and distalization of canine was done. <sup>(18)</sup>

Clearly, the amount of bone required for integration and implant stability is less than that needed for ideal implant position and soft-tissue contours. This bony support of soft-tissue contour can be an advantage as well as a disadvantage, as demonstrated by this case. For example, because of the coronal position of the alveolar crest in site #7, periodontal surgical crown lengthening was required to reposition the implant more apically, dictated by the surgical guide. For site #10, although the implant was positioned

accurately to allow for a cementable definitive restoration, the facial contour of bone was depressed and thin. GBR was used in an effort to prevent facial bone loss and to expand the soft-tissue contour over the implant restoration. Full-thickness flaps without vertical incisions in this case report had the advantage of avoiding any soft-tissue scarring from vertical incisions, allowing for manipulation of soft tissue by repositioning and coronal advancement over the idealized provisional and, of course, facilitating the regenerative and crown-lengthening surgery. <sup>(14,17,18)</sup>

This would not have been possible if a flapless technique were used, and there would be a strong likelihood that the final restorative results would be compromised although integration would have been successful. In addition, this case demonstrates that highly accurate restorative and surgical procedures can be accomplished without the use of computer-generated guides. <sup>(15,18)</sup>

Congenitally missing lateral incisor presents challenging treatment planning for the dentist as they are usually associated with other malocclusions and abnormalities. Selecting the appropriate treatment option depends on the malocclusion, the anterior relationship, specific space requirements and the conditions of the adjacent teeth. In order to obtain the best aesthetic and functional result, a multidisciplinary team approach involving the orthodontist, implantologist and prosthodontist is required. <sup>(18)</sup>

## CONCLUSION:

For a successful outcome and patients satisfaction a coordinated orthodontic, prosthodontic, periodontic, and restorative treatments, with careful consideration of patient expectations and requests, are critical. For the replacement of congenitally missing upper lateral incisors implant-supported restorations should represent the treatment of choice.

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**FIGURES:**

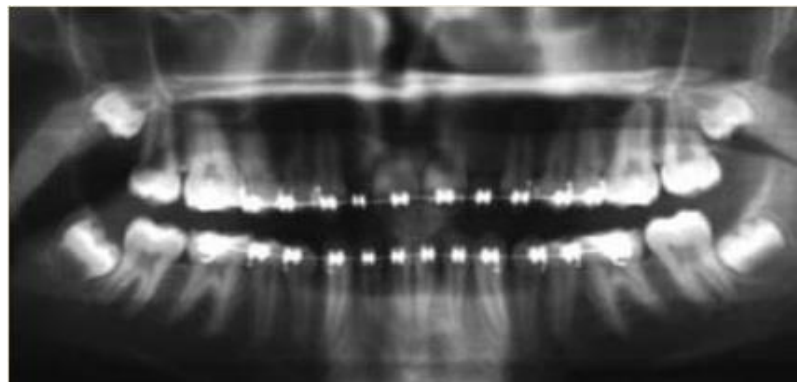


Fig.1 Panoramic radiograph of case before prosthetic treatment





Fig.2 Immediately post-orthodontic treatment.



Fig.3 Adequate keratinized tissue present. Bone sounding revealed adequate width.





Fig.4 The inadequate mesial to distal width. #12

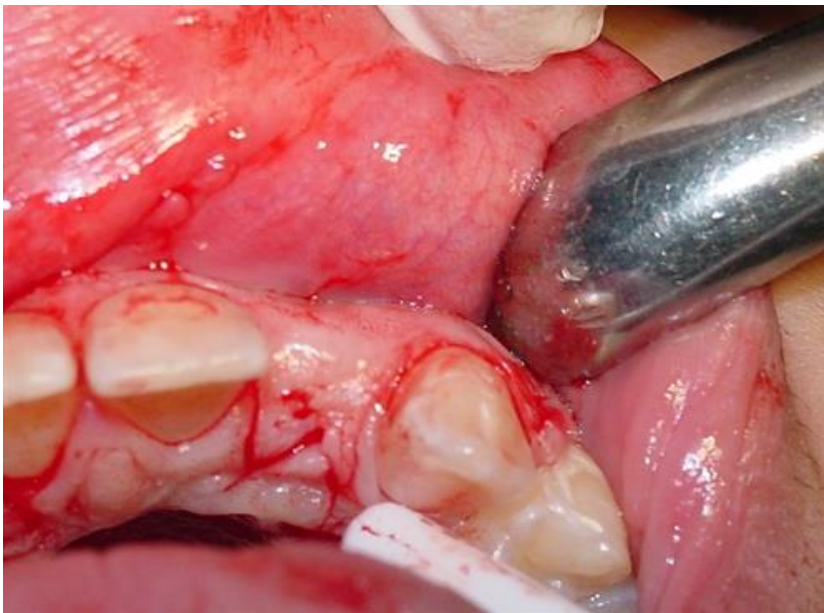


Fig.5 Instead of a midcrestal incision, a modified incision was used. Midcrestal incisions tend to produce an "envelope effect" when approximating tissue around an abutment.



Fig.6 The fingers are visible#22



Fig.7 3I 3.75 x 13 mm placed to level of crest#12. The platform has a bevel that rests on the cortical bone but is not countersunk. The fixtures were approximately at 50 Ncm as the motor indicated.

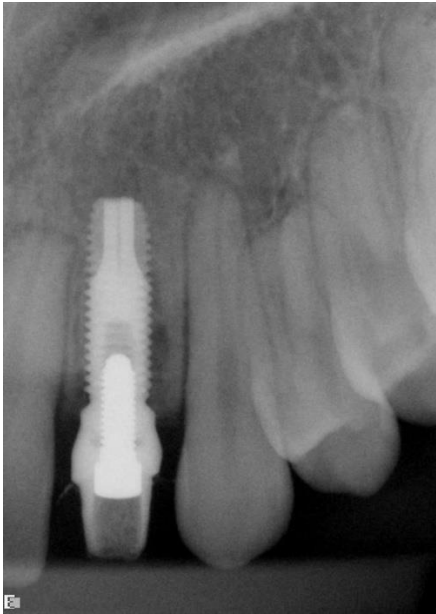


Fig.8 3I 3.75 x 13 mm placed to level of crest#22. The platform has a bevel that rests on the cortical bone but is not countersunk. The fixtures were approximately at 50 Ncm as the motor indicated.



Fig.9 Immediately post op



Fig.10 After a three month period, Impressions at the abutment level were taken and PFM restorations fabricated.



Fig.11 Immediately post insertion.



Fig.12 Lingual view.



Fig.13 One year follow up.





Fig.14 One year follow up #12



Fig.15. One year follow up #22