CASE REPORT

Management of Hypodontia Patient Using a Transitional Implant: A Case Report

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Abstract

Background: Children with missing anterior teeth have physiological and psychological problems. Out of the many treatment options available, dental implants have advantages in replacing teeth. But, conventional implants in growing individuals are contraindicated due to their osseointegration property. Newer literature suggests transitional implants in growing individuals, which may allow easy removal of requirements in the future.

Case description: A 12-year-old female patient visited the department with esthetic concerns. The orthodontic treatment was carried out to correct the malocclusion. An MS transitional implant was used to rehabilitate the missing maxillary left lateral incisor. After 24 months of follow-up, the transitional implant provided optimal esthetic and patient compliance.

Conclusion: Transitional implant is a possible mode of rehabilitation in children and adolescents with missing teeth. Systematic planning of treatment can lead to desired esthetic and functional results.

Keywords: Hypodontia, Implants in pediatric dentistry, Pediatric prosthesis, Transitional implants.

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Introduction

Children with congenitally missing maxillary lateral incisors pose issues concerning esthetics which impairs social acceptability.[1] Even though the prevalence of congenitally missing teeth is lower than absence due to trauma, its incidence is still 6.1–7.4%.[2,3] Management of these missing teeth often requires an interdisciplinary approach due to the patient's growth status, malocclusion, alveolar ridge deficiencies, and uneven gingival margins.

In pediatric patients, prosthodontic approaches have been considered until the cessation of growth. However, conventional options like removable prosthesis or semipermanent resin-bonded bridges are usually considered less owing to poor patient compliance, increased caries incidence, and increased residual alveolar ridge resorption. A fixed prosthesis is another treatment option, but it is contraindicated due to the restriction of the dentofacial growth complex.[4]

Implants have become a popular option for the replacement of missing teeth in adults. Factors like space requirements, bone condition, and site development need to be evaluated while placing the implant.[5] However, in growing individuals, conventional implants as interim rehabilitation therapy have faced certain controversies.

Transitional implants are one-piece narrow-diameter implants developed to support provisional fixed prosthesis till the osseointegration phase of definitive implants is completed. These are single-stage implants designed to be immediately loaded.[6]

Case Description

A 12-year-old female patient with poor esthetics visited the Pediatric Dental Outpatient Department having noncontributory medical and dental history. The intraoral examination revealed mixed dentition and molars to be in Angle's class I molar relationship. She also presented with the maxillary posterior right segment in buccal crossbite (tooth no. 12, 13, and 15) (Fig. 1A) and the absence of 22. The permanent maxillary right lateral incisor (tooth no. 12) was peg-shaped (Fig. 1B and C). The cephalometric analysis highlighted a skeletal class I relationship. These clinical aspects created pronounced malocclusion with esthetics deficiencies. Thus, the patient required a multidisciplinary treatment approach to restore both esthetics and function. The treatment commenced with the initiation of the orthodontic phase once patient and parent consent was obtained.

Phase I: Orthodontic Phase

The treatment plan included the correction of anterior and posterior crossbite followed by space regained for the missing maxillary left

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lateral incisor for implant placement. A quad helix appliance was fabricated and cemented (Fig. 2A). The appliance was activated to achieve the correction of unilateral posterior crossbite. Placement of a fixed orthodontic treatment was done to correct the anterior crossbite and to align, level, and manage the spacing of the upper arch (Fig. 2B).

MBT bracket prescription (3M, St Paul, Minnesota, United States of America) with NiTi archwires ("0.014" and "0.016") with bite platforms was bonded to achieve the alignment of the maxillary dental arch. Recurring esthetics dental proportion was used to calculate the space required. To gain the required space for the permanent maxillary right lateral incisor (tooth no. 12), the operator incorporated an open coil spring between teeth permanent maxillary left central incisor and canine (teeth no. 21–23) and permanent maxillary right central incisor and canine (teeth no. 11–13) to gain the required space (Fig. 2B).

Phase II: Surgical Phase

After anesthetizing the operating site with 2% lidocaine containing 1:80,000 adrenaline, a crestal incision was given. With internal bevel and proximal releasing incisions, a full-thickness flap was elevated using a periosteal elevator. The site was assessed and prepared with 1.8 mm drills of MS Kit for the transitional implant of size 2.5 mm diameter and 10 mm in length from the MS kit (Osstem), and primary stability was achieved (Figs 4A and B).

Phase III: Restorative Phase

The operator used the direct freehand composite method to restore the maxillary right lateral incisor (Fig. 3A). An impression was recorded of the implant site and poured with a transfer abutment in position. The crown prosthesis was fabricated with HIPC (Bredent, Germany) and cemented with zinc phosphate-luting cement (Fig. 3B).

Phase IV: Follow-up Phase

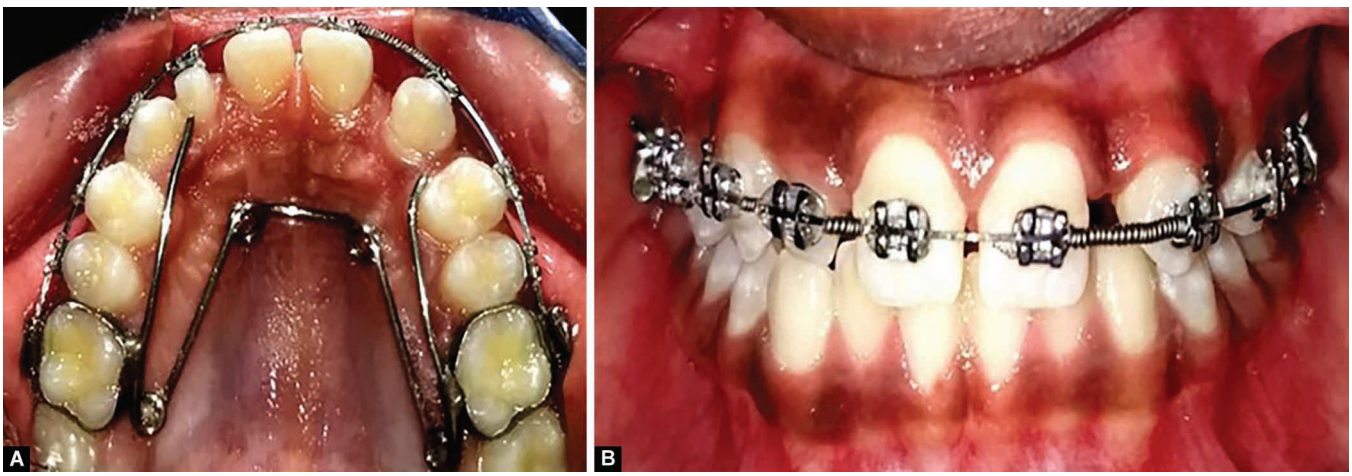
The patient was asymptomatic on 6, 12, and 24 months follow-up and had no appreciable marginal bone loss and bleeding on probing in any visits (Figs 4C and D).

Discussion

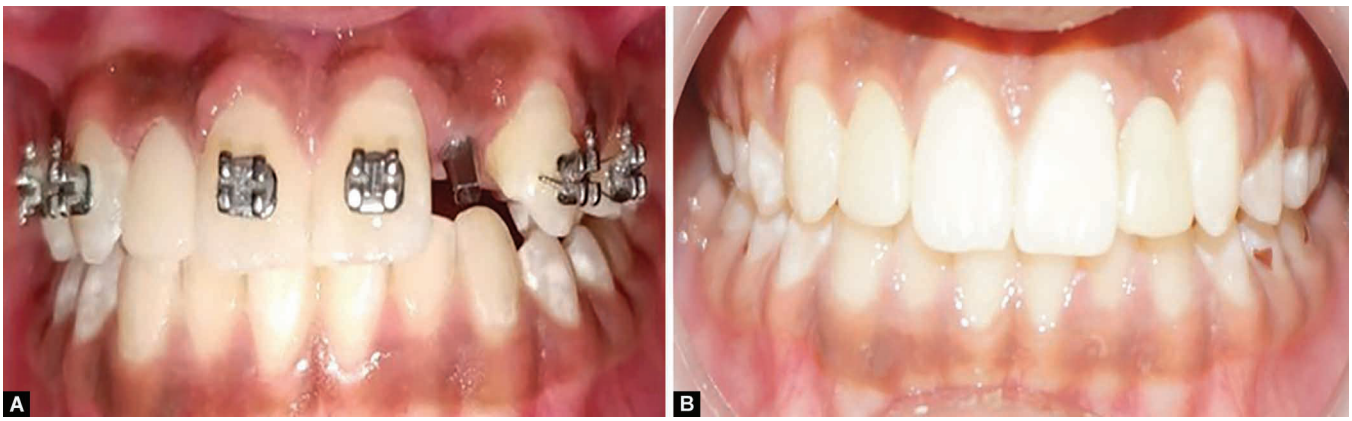
Implants provide a functional stimulus to maintain the alveolar bone height and it also preserves soft and hard tissue architecture in adults.[7–10] But, when placed in growing individuals, it may affect its success. The complications arising are mainly due to jaw growth that can change the implant position. Infraocclusion is the most common drawback with respect to implants in growing children.[11] But literature suggests similar findings even in adults,[12] and thus, implants are not an absolute contraindication in growing children.

Infraocclusion raises functional and esthetic concerns in patients with surface-treated conventional implants.[13,14] New implant-borne prosthetic restoration, orthodontic pretreatment with adjacent teeth intrusion and extrusion of opposing teeth, and distraction osteogenesis have been considered for managing infraocclusion.[15–17] If infraocclusion occurs, replacing the implants can be a better option, but the feasibility of retrieving osseointegrated implant is poor. Transitional implants were seen to have fibro-osseous integration, which facilitated easy removal. Thus, transitional implants can be replaced without any major deleterious effects due to its altered bone implant contact.[18]

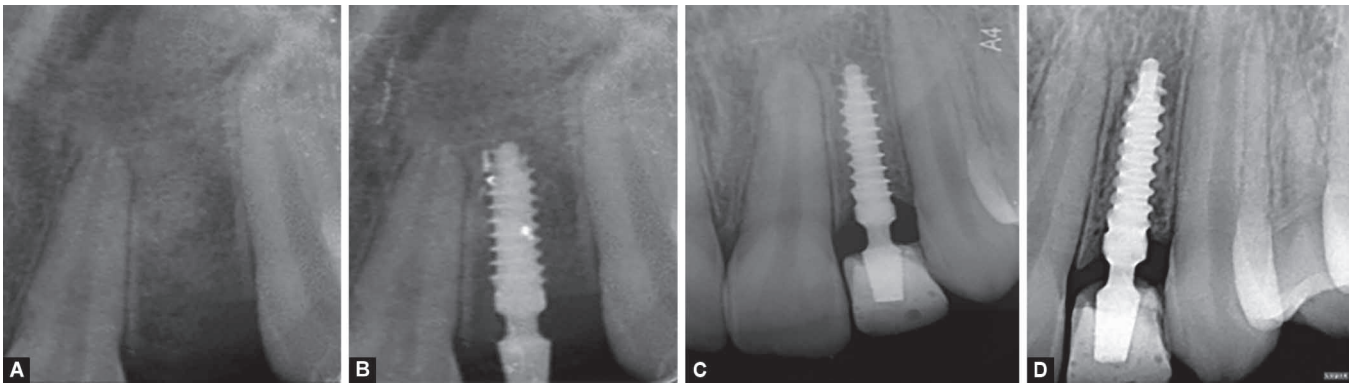
Figs 1A to C: (A) View of occlusion from right side; (B) Frontal view of occlusion; (C) View of occlusion from left side



Figs 2A and B: (A) MBT prescription bracket bonded with quad helix for expansion of the maxillary arch; (B) Space regained between 21 and 23 with open coil NiTi spring



Figs 3A and B: (A) Postoperative image of transitional implant placement; (B) Placement of crown prosthesis over the implant



Figs 4A to D: (A) Preoperative radiograph before implant placement; (B) Postoperative radiograph; (C) Implant placement radiograph, 6 months follow-up; (D) 24 months follow-up

According to Linkow, bone-implant contact is of two types, that is, fibro-osseous integration and osseointegration.[19] American Academy of Implants Dentistry considered the presence of healthy, dense collagenous tissue between the implant and bone as fibrous integration.[20] Histological studies stated the presence of 1–2 mm of connective tissue around machine-polished MS implants.[21] Thus, placement of machine polished nonsurface active MS implant was carried out in the above patient.

The retrieval of transitional implants is essential and depends on the rate and type of osseointegration.[1] A lower torque values were seen during retrieval of immediately loaded transitional implants, that is, 24 ± 7.3 Ncm for the mandible and 16.1 ± 4.8 Ncm in the maxilla.[22] On retrieving an implant present in the oral cavity after 6 years, a force of 50 Ncm was needed.[23]

The prosthesis in the current patient was immediately loaded and a high-impact polymer composite crown was given. This material will allow easy attrition of prosthesis in developing occlusion without compromising the esthetics. Thus, one can expect a fibro-osseous integration in this immediately loaded implant. And if infraocclusion occurs can be replaced in the future with a definitive implant.

Conclusion

The dynamics of growth should be considered and addressed for planning implants in children and adolescents. The transitional implants will look toward the required esthetic concerns and preserve the bone that can be used for a permanent replacement in the future.

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