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Case Report

Adjunctive adult orthodontics – A case report of space regaining for dental implant and novel approach for orthodontic retention

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Abstract

Adult orthodontics ensures healthy smile and boosts the confidence of older patients. Adjunctive orthodontics is one such treatment strategy which accomplishes functional and aesthetic corrections without obligating a lengthy treatment. Interdisciplinary treatment approach corroborates successful treatment of adult patients. This case report describes space regaining for a crown to be placed on dental implant with an adjacent tipped molar and an innovative method of retention in such cases.

Keywords: Adult Orthodontics, Adjunctive Orthodontics, Molar uprighting, Orthodontic retention.

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1. Introduction

Orthodontics, as a speciality is heavily influenced by the patient perspective and newer technology. For a long time, orthodontics has been the treatment provided to children. With the increased awareness, adults also understand the benefits of orthodontic treatment. Adult patients seek orthodontic treatment for reasons including aesthetic concerns, psychological concerns, interdisciplinary treatment, functional issues, and temporomandibular disorders.[1,2] Adult orthodontics has provided the patients with several possible treatments while satisfying their need for aesthetic consideration. Adjunctive Orthodontic treatment for adults is the tooth movement carried out to enhance other dental procedures and restore the alignment of the teeth.[3,4,5] Unlike comprehensive orthodontic treatment, specific tooth movement can only be achieved through adjunctive therapy.

This case report describes the adjunctive orthodontic treatment strategy used to regain space for dental implant due to mesially tipped adjacent teeth and a new method of retention in such cases.

2. Case Report

2.1. Case history, patient evaluation, clinical and radiographic examination

A 25-year-old male patient was referred with the requirement of space gaining in the third quadrant and intrusion of 26 so as to relieve the overhanging palatal cusp. The patient had a missing 36, for which he had undergone an implant placement for prosthetic rehabilitation. There was a delay in the delivery of the crown due to the COVID-19 pandemic lockdown of non-essential clinical practices. This delay led to the mesial drifting of 37 into the missing 36 space blocking out the dental implant.

Clinical examination revealed missing 36 with an implant in its place. The distal surface of the implant was in contact with 37. The patient presented with fairly aligned arches with adequate overjet and overbite. A cross-bite was observed with the 33 and mesio palatal cusp over-hanging of 26 (**Figure 1**). On radiographic examination, a mesioangular impacted 38 impinging on the cervical junction of 37 was noticed, which could be the reason for the collapse of 37 into

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the extraction space. The vertical extrusion of 26 into the extraction space can be appreciated in **Figure 2**.

2.2. Case progress

The patient was not willing to undergo a comprehensive orthodontic therapy due to longer treatment duration. The patient also requested correction of the crossbite of 33. Segmental orthodontic treatment was chosen to facilitate the prosthodontic rehabilitation and cater to the patient's needs. The objectives of the treatment were: 1) to upright 36 and regain the space; 2) To relieve the overhanging palatal cusp of 26; 3) To correct the crossbite of 33; 4) to correct the rotations of 22, 23, 24, and 33.

Extraction of 38 was carried out before the start of orthodontic treatment. A standard prescription of 0.022" X 0.028" MBT* brackets were bonded on second and third quadrant. The wire sequencing followed was 0.014" NiTi, 0.018" NiTi, 0.016"×0.022" NiTi, and 0.017" ×0.025" SS. Lingual buttons were attached to the lingual surface of 32, 34, and 35. The elastic chain was engaged from the lingual aspects of the 32, 34, and 35 and passing from labial surface of 33 bracket (**Figure 3**A). A molar uprighting spring was employed to upright and distalize the 37 (**Figure 3**B). The tooth- 26 demonstrated buccal root torque and no true intrusion was observed. The torque expression on 26 was because of -14º inbuilt torque of molar tube which relieved the palatal overhang and the interference was thus removed. A bite block was given in the pre-molar region for minimal vertical opening to facilitate the correction of the crossbite. The bite block was removed immediately after the crossbite correction to prevent any adverse tooth movements. Settling was initiated to correct the vertical discrepancies in the pre-molar region. However, before the completion of the settling phase, the patient requested an earlier finish of the treatment. The patient was debonded and referred for impression-making to the prosthodontist (**Figure 4**). To improve the finishing in the premolar region till the prosthesis was delivered, lingual buttons were bonded on labial aspect of 23, 24, 25, 33, and 34. Triangular elastics were engaged to correct the tip of 33 and simultaneously allow vertical correction of 23 and 24 (**Figure 5**). An innovative removable space maintainer was fabricated with 0.9mm stainless steel wire and was engaged adjacent to the implant. It facilitated easier impression-making and yet maintained the orthodontic corrections made (**Figure 6**). This lingual button supported retainer was maintained till the placement of the prosthetic crown. Clinical and radiographic evaluation of pre-treatment, post-treatment and One-year follow-up of patient shows stability of treatment (**Figure 7Figure 8**). Radiographic interpretation of pre and post treatment demonstrates molar uprighting and space regaining (**Figure 9**).

Figure 1: Pre-treatment intraoral left lateral and lower occlusal view

Figure 2: Pre-treatment Orthopantomogram (OPG) of the patient

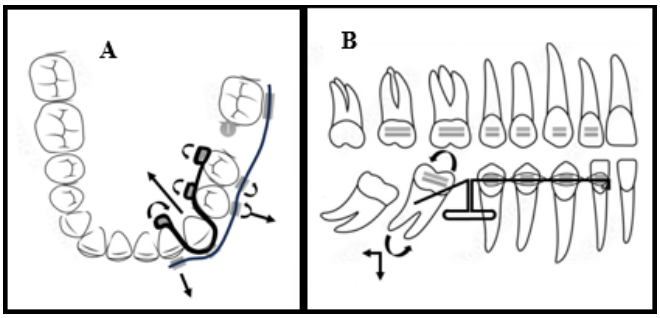

Figure 3: A: Derotation of teeth; **B:** Uprighting of 36 using molar uprighting spring

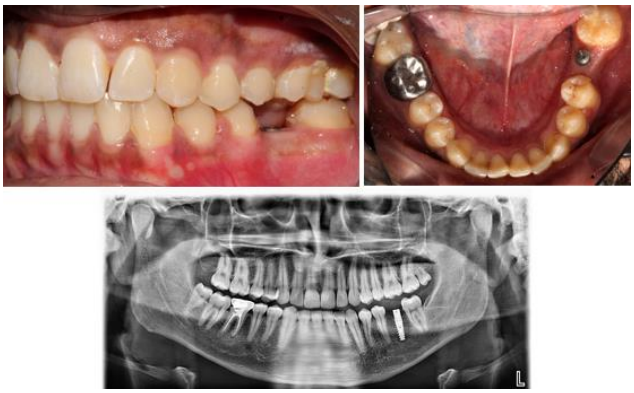

Figure 4: Post treatment intraoral lateral and occlusal view and OPG

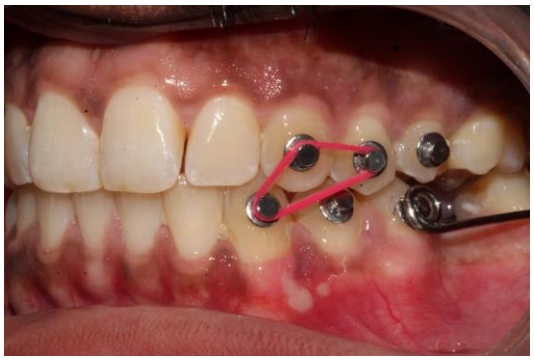

Figure 5: Settling of premolar region along with retainer in place

Figure 6: Lingual button supported retainer functioning as space maintainer

Figure 7: Post retention intraoral clinical picture

Figure 8: Intraoral Perapical radiograph (IOPA) of Pre-treatment, during uprighting, post treatment and 1 year post retention with crown

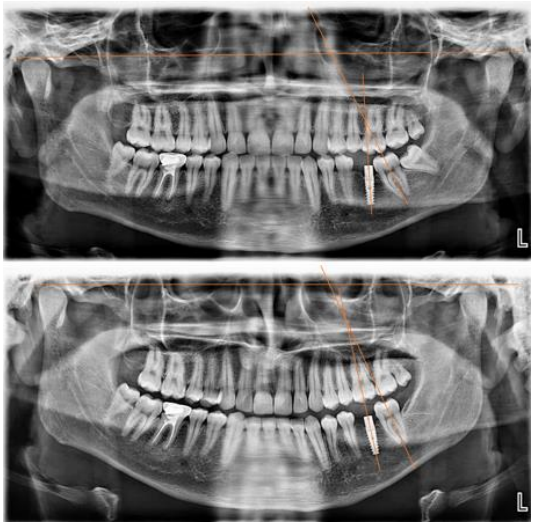

Figure 9: Radiographic interpretation of pre and post treatment OPG demonstrating uprighting of 37 and space regaining (Apparent change in implant inclination could be attributed to the combination of angular distortions in horizontal and vertical dimension in OPG)

3. Discussion

This case report illustrates an orthodontic assisted successful rehabilitation of a prosthetic crown on dental implant. There are instances where prosthetic rehabilitation can be compromised due to space encroachment by adjacent teeth especially in cases with long standing extraction space. Adjunctive Orthodontics plays an important role in such situations. The patient in this case report could not get the prosthesis in time due to COVID-19 pandemic lockdown. But, timely placement of a space maintainer could have helped in preventing the mesial tipping of adjacent tooth.

Numerous methods of molar uprighting are discussed in the literature. Depending on the demands of the case, appropriate mechanics should be used.[6] The uprighting spring helped in uprighting and slightly distalized the 37.[7] The correction of palatal overhang of opposing tooth harmonized the occlusion.

General dentists should be acquainted with the benefits of adjunctive adult orthodontic therapy and should motivate adult patient for the treatment by creating awareness, so that their timely referral might reduce the extent of treatment.[8] Precise diagnosis and framing the treatment plan which is compatible with patient's expectations results in satisfactory rehabilitation.[9]

Depending on the type of therapy, retention planning is classified into three categories: semi-permanent or permanent retention, limited retention in terms of type and time, and no retention. The level of the marginal periodontium and the state of the teeth are significant determinants of the kind of retention.[10,11,12,13] The removable space maintainer fabricated in this case retained the space regained and the advantage of this design is that it does not hinder the prosthodontic

impression-making, as can be removed and placed back easily. This retainer has the benefit of delivering retention from buccal and lingual sides. With this type of retainer, settling of the arches could be continued even after debonding till the prosthesis is delivered. This removable space maintainer does not require extensive fabrication skills and can be fabricated chair side.

4. Conclusion

For treating adult orthodontic patients, primary evaluation for systemic diseases, periodontal health and other oral conditions should be done after which effective interdisciplinary treatment strategy has to be designed.[14,15] Orthodontic and prosthodontic therapies must coordinate to build an efficient balance that will satisfy patient expectations. Adjunctive orthodontics paves the path to creating the best treatment modality to facilitate a successful outcome for adults. The novel approach for hassle free retention, exhibited promising alternative to the existing retention techniques used in adjunctive orthodontics.

5. Source of Funding

None.

6. Conflict of Interest

None.

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