

Intrusion of Teeth using TADs – Two Case Reports with Two Different Clinical Approaches

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Abstract

Intrusion is one of the tooth movements which are routinely needed in the clinical orthodontics to treat variety of malocclusion. Intrusion is considered to be a very difficult tooth movement due to lack of anchorage. The use of miniscrew implant in case of intrusion obviates the need of extraoral anchorage and patient compliance. Here, we discuss two cases of intrusion using temporary anchorage devices in two different clinical scenarios in two different areas of oral cavity.

Keywords: Incisor, Intrusion, Molar, Temporary anchorage device.

INTRODUCTION

Intrusion is one of the tooth movements which are routinely needed in the clinical orthodontics to treat variety of malocclusion. It is considered to be a very difficult tooth movement due to lack of anchorage. Extraoral anchorage can be used to supplement tooth borne anchorage and to deliver forces in directions not possible with intraoral forces. However, it requires excellent patient co-operation. The introduction of temporary anchorage devices (TADs) has resulted in a paradigm shift in the overall perspective toward patient compliance, preservation of anchorage, and facilitation of treatment in various malocclusions.^[1] TADS, in the form of miniscrews made of stainless steel or titanium, ranging from 6 to 12 millimeters in length and 1.2–2 mm in diameter, placed on the buccal and/or palatal alveolar bone can be effectively used to intrude teeth with minimal side effects.^[2] Ryuzo Kanomi introduced the mini-implant in 1997.^[3] The mini-implant is only 1.2 mm in diameter and 6 mm long making it much more useful in orthodontic applications. Mini-implants are small enough to be used between the roots, placed in palate for molar distalization, molar intrusion, and other tooth movements.^[4]

Loss of the mandibular first molar often results in supraeruption of the opposing maxillary first molar, resulting in occlusal

interference and functional disturbances, compromised periodontal health, and increased complexity of restoring the edentulous space (loss of vertical height). Here, in the first case report, a minimally invasive, non-compliant clinical procedure for maxillary molar intrusion using two orthodontic miniscrews is discussed.

The second one deals with the correction of deep bite (due to supra eruption of maxillary incisors) by intrusion of the maxillary incisors using the TADs.

CASE REPORT-1

A 29-year-old female patient was referred from the department of prosthodontics for intrusion of the maxillary right first molar to make space for the endosseous implant prosthesis to replace the missing mandibular right first molar. Dental history included extraction of 26, 36, 37, and 46 due to

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caries. The patient had no significant medical history. The patient presented with a Class I skeletal relationship with generalized spacing.

Treatment objectives

The patient was first presented with an orthodontic treatment plan that included comprehensive upper and lower fixed appliances. The objectives included:

1. Intrusion of 16
2. To close the generalized spacing.

After the completion of orthodontic treatment, the patient would be referred back to the department of prosthodontics for the prosthesis of missing teeth.

Progress of molar intrusion

The maxillary right permanent first molar was banded; a molar tube and lingual sheath were welded to prevent the slippage of power chain. Two orthodontic miniscrews (SK Surgicals, Pune, India), 1.4×8 mm in length, were placed in the maxillary buccal and palatal slope. The buccal miniscrew was inserted between the first molar and second premolar. The palatal miniscrew was inserted between the first molar and second molar. The miniscrews were immediately loaded with 100 g of intrusive force using a closed elastic power chain (American Orthodontics, Washington Ave, Sheboygan). After 3 months, the patient presented with the molar with 2 mm intrusion above the maxillary occlusal plane. Fixed brackets were placed on the remaining arch to close the generalized spacing (Figures 1 and 2).

CASE REPORT-2

A 23-year-old male patient reported to the department of orthodontics and dentofacial orthopedics for intrusion of the maxillary central incisors for correction deep bite. The patient had no significant medical and dental history. The patient presented with a Class I skeletal relationship with deep bite and 13 crossbite.

Treatment objectives

The patient was first presented with an orthodontic treatment plan that included comprehensive upper and lower fixed appliances. The objectives included:

1. Intrusion of 11 and 21
2. To correct 13 crossbite.

Progress of incisor intrusion

First 11 and 21 were bonded, leveled, and aligned so that a segment of 19×25 SS archwire could pass through. One orthodontic miniscrew (SK Surgicals, Pune, India), 1.4×6 mm in length, was placed in the interraderic area at maxillary midline. The miniscrews were immediately loaded with 100 g of intrusive force using a closed elastic power chain (American Orthodontics, Washington Ave, Sheboygan). After 3 months, the patient presented with desired incisor intrusion for deep bite correction. Thereafter, rest of the treatment continued with full arch bonding (Figures 3-5).



Figure 1: Pre-operative view of molar intrusion



Figure 2: Intraoral view after molar intrusion



Figure 3: Pre-operative view of incisor intrusion

DISCUSSION

To intrude the supraerupted maxillary molar, one miniscrew was placed in the buccal dentoalveolus between the second premolar and first molar and the second was placed in the palatal slope between the first and second molar. The largest amount of maxillary interraderic bone in the mesiodistal direction, buccally and palatally, is between the second premolar and first molar.^[5] The ideal location for placement of a palatal miniscrew is in the midline suture or the paramedian region. The palatal midline is typically



Figure 4: View immediately after TAD placement



Figure 5: View after incisor intrusion

composed of thick cortical D1 bone covered with 1-mm thin-attached gingiva.^[6]

For optimum results, intrusion should be performed with light forces, and the line of action of the force should pass close to the center of resistance.^[7] Whether intrusion of supraerupted maxillary first molar is associated with intrusion within the maxillary sinus floor or with apical root resorption is controversial topic.^[8] Ari-Dermirkaya *et al.* reported that the amount of resorption after molar intrusion with skeletal anchorage was not clinically different from control groups treated without intrusion mechanics.^[9] In case-1, cephalometric superimposition showed that the maxillary first molars were intruded by 2 mm, which resulted in enough interocclusal space

for the replacement of the teeth in the mandibular arch. The gingival levels of the premolars and molars were also matched.

For deep bite correction, intrusion of incisor is one of the methods of treatment. Different methods have been advocated in the literature, for example, intrusion arch, intrusion spring, bite turbo, and TAD. TAD-supported intrusion has least effect on posterior molar extrusion effect. In case-2, the line of force is passing anterior to the center of resistance of the incisor resulting proclination of the incisors. However, it remains beneficial to the patient to get sufficient incisal guidance.

CONCLUSION

Intrusion can be achieved easily in day to day orthodontic practice. Among the various methods, we have to choose the technique which fulfills most of the objectives. Using TADs become an integral part of the orthodontics and it can overcome many difficult situations easily. TAD-supported intrusion can be applied in clinics with some added benefits.

CONFLICTS OF INTEREST

Nil.

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