Case Report

Implant-Supported Maxillary Incisor Intrusion

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Abstract

Deep bite management and retention are cumbersome as the stability is questionable, especially when the correction is achieved by posterior extrusion in nongrowing patients. Hence, it is advisable to intrude the anteriors; however, as conventional methods of anterior intrusion tax the anchorage, choosing biomechanics which ensure stable anchorage is our goal. The use of mini-implants has revolutionized biomechanics in orthodontics with better results as far as anchorage is concerned. This case report supports the literature regarding the implant-supported anchorage for true intrusion.

Keywords: Deep bite, maxillary incisor intrusion, mini‑implants, nongrowing patient

INTRODUCTION

Anterior deep bite is a common problem which makes orthodontists focus on biomechanics to eliminate the problem by extrusion of posterior teeth or intrusion of the anteriors. Etiological factors for deep bite must be thoroughly evaluated to establish a correct diagnosis which will aid treatment planning. Some etiological factors for excessive gingival display include vertical maxillary excess, supraeruption of the maxillary incisors, and shortness or hypermobility of the upper lip.

The maxillary incisors can be predictably intruded about 2 mm with orthodontic appliances. Any further correction may generate esthetic problems, such as reverse smile architecture due to the discrepancy between the posterior occlusal planes and the anterior incisal plane.

Anchorage control is fundamental to successful orthodontic treatment. Although extraoral anchorage supplements tooth-borne anchorage, it requires excellent patient cooperation. Nowadays, skeletal anchorage systems such as miniplates, palatal plates, and mini-implants have revolutionized in providing a much more stable anchorage. Studies have shown that mini-implants are one of the best options for this purpose due to the multiple advantages they offer mainly easy management and placement in various anatomical areas as well as their low cost.

In this case report, we have discussed the treatment of deep bite with mini-implant‑aided intrusion.

DIAGNOSIS AND TREATMENT PLANNING

A 19-year-old female patient came with a chief complaint of forwardly placed upper front teeth. On extraoral examination, the patient had convex profile, incompetent lips, interlabial gap of 8 mm at rest, and gingival exposure of 4 mm during smile. Intraoral examination revealed Angle’s class I malocclusion, proclined upper anteriors with generalized spacing between upper anteriors, and severe deep bite (8 mm) [Figure 1].

Cephalometric examination revealed skeletal class II due to mild prognathic maxilla with proclined upper and lower anteriors and normodivergent growth pattern [Figure 2]. After evaluation of clinical aspects and cephalometric values [Table 1], as the patient has nearly 8 mm of spaces between upper anteriors, nonextraction line of treatment was planned. Initial alignment of the upper arch was followed by intrusion of upper anteriors with orthodontic mini-implants for the correction of deep bite and proclination.

TREATMENT PROGRESS

Banding and bonding of both the arches were done with 0.022” × 0.028” MBT prescription (Gemini series, 3M Unitek, USA). Mini-implants of 1.5 mm diameter and 10 mm length were placed on the right upper lateral incisor site with a torque of 35 Ncm in the palatal bone as it had sufficient bone support. The mesial roots were intruded using a Class II elastics and Class II force until it achieved the required occlusion.

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Monrovia, CA, USA). Initial alignment and leveling was done with wire sequence of 0.016” NiTi, 0.018” NiTi, 0.016” × 0.022” NiTi, and 0.019” × 0.025” NiTi archwires. By the time initial alignment and leveling was completed, 6.5 mm deep bite was present.

Mini-implants of 1.2 mm × 6 mm dimension were placed in interradicular space between lateral incisor and canine bilaterally in the upper arch. Sectional 0.019” × 0.025” stainless steel (SS) stabilizing wires were placed in both posterior and anterior segments [Figure 3]. A prestretched elastic chain which exerted a force of 50 g to the anterior segment from mini-implants was placed bilaterally for intruding maxillary incisors. After 4 months of active intrusion, 3.5 mm of overbite was corrected [Figures 4 and 5].

Space closure was done with 0.019” × 0.025” SS wire with step-up bend given distal to lateral incisor to maintain the intrusion achieved. Finishing and detailing was performed. After 20 months of total treatment time, debonding was done and lingual bonded retainer was given in the upper and lower anterior region.

**Treatment Results**

Posttreatment records [Figures 6 and 7] revealed that Angle’s class I molar and canine relationship was maintained. Ideal overjet and overbite were achieved. There was an improvement in profile, lip competency, interlabial gap at rest, and gingival exposure during smile. Superimposition of pretreatment and posttreatment lateral cephalogram [Figure 8] also confirmed the clinical findings along with improved esthetics.

| Measurement      | Pretreatment | Posttreatment |
|------------------|--------------|---------------|
| SNA              | 85°          | 83°           |
| SNB              | 81°          | 80°           |
| ANB              | 4°           | 3°            |
| Pn-A             | 2 mm         | 1 mm          |
| SN-Go-Gn         | 33°          | 32°           |
| FMA              | 28°          | 27°           |
| Max1-SN          | 115°         | 109°          |
| U1-NA            | 30°          | 25°           |
| IMPA             | 99°          | 98°           |
| LI-NB            | 34°          | 33°           |
| 1u-NF            | 31°          | 27°           |
| Nasolabial angle | 106°         | 111°          |

**Discussion**

Correction of deep bite by extrusion of posterior teeth is less stable, especially in nongrowing patients when compared to growing patients. Hence, it was decided to correct the deep bite and gummy smile by maxillary incisor intrusion. Various intrusion arches such as utility arch and Burstone intrusion arch are frequently used for incisor intrusion. They create a force to elongate the molars which compromises the posterior anchorage in turn reducing the ability to intrude incisors.

Mini-implants are routinely used for intrusion and retraction of anteriors for the correction of deep bite and correction of anterior open bite by intrusion of the posterior teeth. When sufficient interradicular space is not available for implant
Peddu, et al.: Implant-aided intrusion

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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CONCLUSION
Significant maxillary incisor intrusion with mini-implants was obtained without relying on patient cooperation and also with good control over the direction and amount of force. Cent percent anchorage was maintained during intrusion with no extrusion of the posterior teeth. This demonstrated that the mini-implant anchorage method was useful for achieving an excellent improvement of a dental deep bite and gummy smile in this patient.
Peddu, et al.: Implant-aided intrusion

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