Case Report

Mini Implants – A New Prospect in Malocclusion Correction: Case Report

Ashok P, Patel K, Gupta G, Gupta S

Abstract: Orthodontics is a branch that conglomerates efficiency and esthetics in treatment planning and its outcome. These subjective needs should be taken into consideration when a patient is being treated with the fixed appliance therapy. To enhance the treatment process the technology gives light to many methods, one such is the use of Mini Implants. They are one of the effective methods to obtain critical anchorage with no impact on the posteriors during leveling and retraction phase of extraction space closure or segmental intrusion of the arches. The following article sheds light on the above mentioned segmental intrusion of anteriors in upper and lowers to reduce the incisor display and also the gummy smile. The Mini Implants helped in delivering the required criteria with many advantages and reduced complications that arise in relation to anchorage considerations in the fixed appliance labial orthodontics.

Key words: Intrusion, Implants, Anchorage.

INTRODUCTION

Dentistry in recent times has evolved into a more complex and sophisticated area. Being a part of dentistry, Orthodontics bloomed into an innovative branch with the inflow of much technological advancement into it which made the treatment delivery effective and efficient, one of such many advancements are use of Mini Implants in Orthodontics. In any malocclusion that an orthodontist tries to correct an important area that matters is the anchorage considerations and the risk of anchorage loss. The anchorage loss is common during the initial leveling and aligning and retraction phase in the pre-adjusted appliance therapy. But now a day with the help of Mini Implants we can achieve absolute anchorage that turns out to be very beneficial in orthodontic treatment.

CASE REPORT

A 15 year old female patient came to the department of orthodontics and dentofacial orthopedics with a chief complaint of irregular teeth in the upper and lower front teeth region. On extraoral examination patient showed, convex facial profile with potentially incompetent lips and with excessive incisor display and gummy smile (Fig 1).

Intraorally patient showed crowding in the upper & lower anteriors with proclination of upper anteriors and Angle's class II molar relation on right side and class I on left side, Rickett's class II canine relation on right side and class I on left side and patient showed overjet of 6mm and overbite of 5mm (Fig 2). Radiographically (Fig 3) patient had proclined upper and lower anteriors, vertical growth pattern, skeletal class II with ANB of 7^0.

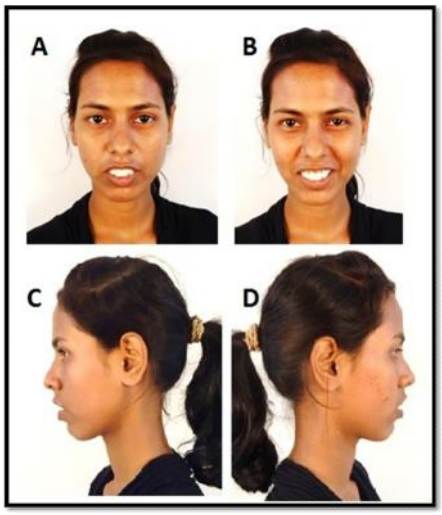

Figure 1: Pre-treatment extra oral photographs (A: Frontal view, B:Frontal Smile, C: Profile View left, D: Profile view right).

The diagnosis of the case was skeletal class II jaw base relationship, vertical growth pattern, Angle's class II subdivision with bimaxillary dentoalveolar protrusion, crowding in upper & lower anteriors, increased overjet and overbite. The patient had gummy smile due to short upper lip and also vertical maxillary excess with a hyper-divergent growth pattern, problem in vertical direction with increased lower facial height, the ideal treatment for this is case was

surgical intervention[1] but the patient was reluctant for any surgical treatment modality so fixed mechano-therapy for camouflage by extraction of all first premolars as it was a high anchorage case and mini implants assisted intrusion for excessive incisor display was recommended.

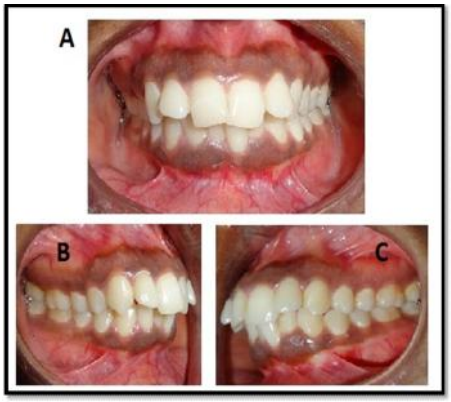

Figure 2: Pre-treatment intra oral photographs (A: Frontal view, B: Lateral view right, C: Lateral view left).

After bonding with standard MBT metal brackets, initial leveling and aligning was done using NiTi archwires till 17x 25 stainless steel wire was placed in upper and lower, then 3 mini- implants are placed with 2 in upper arch near 1 premolar area and one in lower left side near premolar region and were attached to rectangular wire with the help of soldered hooks. An elastic force was created using module that was tied to the ligature and attached to implant for intrusion of the anterior arch (Fig 4).

Figure 3: Pre-treatment lateral cephalogram.

Figure 4: Mini implant for intrusion.

After the intrusion the mid treatment records taken which showed improved profile with reduction in the lip procumbency and good aligned upper and lower arches (Fig 5).

Figure 5: Mid treatment extra oral photographs (A: Frontal view, B: Frontal Smile, C: Profile View left, D: Profile view right).

After 20 months of orthodontic treatment patient showed excellent profile with class I molar relation and canine relation with good overjet and overbite. The Mini Implants showed good anchorage and this helped in preventing the anchorage loss of molars (Fig 6). Post treatment profile showed improvement in relation to upper incisor show and implants helped in intrusion of the maxillary anterior segment and gave well aligned arches and class I molar and canine relation with good overjet and overbite.

Though the lip competency couldn't be achieved due to short upper lip, patient was reluctant for lip lengthening surgery and patient was satisfied with her profile (Fig 7).

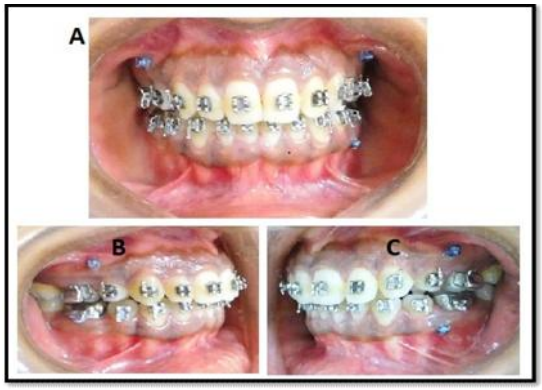

Figure 6: Mid treatment intraoral photographs (A: Frontal view, B: Lateral view right, C: Lateral view left).

Figure 7: Post treatment intra and extraoral photographs (A: Frontal view, B: Frontal Smile, C: Frontal view, D: Lateral view right, E: Lateral view left).

Figure 8: Post-treatment lateral cephalogram.

Radiographically patient showed improved axial inclination of upper and lower incisors and lip competency is improved and interincisal angle was within range suggesting normal incisor position (Fig 8).

DISCUSSION

In every orthodontic treatment anchorage is an important part to which the entire treatment inclines. Since there is always a chance of anchorage loss during treatment there comes a time where we need to take necessary precautions reduce it. Before the introduction of implants an absolute anchorage is always an extraoral one by the help of headgear, the extra-oral forces cannot be used on a 24x7 basis to resist the continuous tooth moving forces and are also taxing on the patient's compliance. On the other hand, strict reliance on intra-oral areas - usually dental units does not offer any significant advantages, except the fact that the patient's co-operation is less critical. Due to these constraints therefore, at times, either the treatment options start getting limited or the end result compromised.

The advent of osseo-integrated implants, due to the pioneering studies of Prof. Branemark has changed this scenario. Implants made of titanium are widely used by many orthodontists because they offer Absolute Anchorage. Ryuzo Kanomi[2] introduced the Mini-implant in 1997; he reported that the intrusion of lower incisors in a patient with deep overbite was achieved by means of a screw measuring 6 mm in length and 1.2 mm in diameter.

Placement method: Method of placement is after reflection of mucoperiosteal flap and denuding of bone, 2mm round bur used to make 1.5mm pit. Pilot drill used to enter bone same distance as length of mini-implant. Mini-implant inserted with accompanying screwdriver. Implant site sutured over. Gingival tissue exposed over head of mini-implant. Mucosal punch used to remove soft tissue surrounding head of mini-implant. Two-hole titanium bone plate attached to head of mini-implant and tied to bracket with ligature wire. Conventional dental implants are 3.5-5.5mm in diameter and 11-21mm long. The mini-implant is only 1.2mm in diameter and 8mm long,

making it much more useful in orthodontic applications. It is used for horizontal traction if placed on the alveolar ridge. The screw is inserted between the mesial and distal roots of a molar for molar intrusion it is placed in the palate, to provide anchorage for molar distalization. It is used distraction osteogenesis, with the implant placed intraorally instead of extraorally.

Uses of mini implant: Carrillo et al[3], TADs have several advantages over mini-plates and dental implants: immediately loaded, suitability to be inserted in different and difficult sites in dentaoalveolar process, easiness of placement and removal and less expensive for patients. By the use of mini implants this burden is lifted from the treatment perspective and opened a multitude of advantages that optimized the treatment outcome. Which include biocompatibility, there are small in dimension, easy clinical application, favorable primary stability and retention, immediate loading, sufficient stability for typical orthodontic forces, and there are applicable with the contemporary orthodontic mechanics, easy removable and cost effective.[4]

Miniscrews are indicated for tooth intrusion as they allow practitioners to apply light and continuous forces, which can reduce apical resorption, often associated with intrusive movement.[5] Park et al (2001)[6], Xun et al (2004)[7] and Kaku et al (2012)[8] suggested that TADs are reasonable alternative for correction of gummy smile when surgery is unfeasible, such as when patient denies to be subjected to surgery.

Implants for intrusion of teeth such as the above mentioned case: Creekmore[9] in 1983 published a case report of usage of a vitallium implant for anchorage, while intruding the upper anterior teeth. The vitallium screw was inserted just below the anterior nasal spine. An elastic thread was tied from head of the screw to the arch wire. Within one year, 6mm intrusion was demonstrated along with 25 lingual torque.

Ohnishi et al (2005)[10] also showed a clinical case with deep overbite treated using mini-implants for intrusion of the upper incisors. Intrusion also improved the patient's gingival smile. Kim et al (2006)[11] have been reported from 4 to 6mm of incisal intrusion using TADs, without esthetic complication.

Another study by Southard[12] in 1995 compared the intrusion potential of implants with that of teeth (dental anchors). Titanium implants were placed in extracted 4th premolar area in dogs, followed by an unloading period of three months. Then, an intrusive force of 50-60 gm via 'V' bend was delivered. This was compared with intrusive potential of teeth on the other side using the same mechanics. No movement of implant was seen. Therefore, implants are definitely superior to the teeth acting as anchor units.

CONCLUSION: Mini-screws are effective mean for an absolute anchorage in treatment of deep over bite and increased overjet. When upper anterior teeth are retracted and intruded at the same time, accurate mount, and precise point of application of intrusive and retrusive orthodontic forces are crucial factors for pure intrusion and bodily translation of upper anterior teeth, without proclination and without the problem of patient compliance. The following case show cases the above mentioned advantages of the mini implants and the use the treatment planning.

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