

Case Report

Mini-Implant Anchorage for En-Masse Retraction of Mandibular Anterior Teeth in a Mutilated Case: A Case Report

Stuti Raj, Kamlesh Singh and Aftab Azam

ABSTRACT

Aim: The case report presented aim to describe the treatment of anterior crowding in a mutilated case with asymmetrical extractions using a temporary anchorage device.

Summary: The use of miniscrews as an absolute anchorage has gained popularity over the past decade. The case report describes a 20 year female patient with irregularly placed upper anterior teeth with missing molars. Miniscrews were placed bilaterally in the extracted space of mandibular first permanent molars. The treatment plan consisted of extraction of both upper first premolars and lower left first premolar, retraction of upper and lower anteriors were performed and the extraction space was closed. The extraction space was closed in 11 months.

Keywords: Miniscrews, anchorage, en-masse, retraction

INTRODUCTION

Extraction treatment has gained popularity from 1930^[1] and was performed to achieve a more stable result.^[2] Over the years extraction has been the most common orthodontic procedure to minimize severe crowding and also to achieve maximum inter-arch inter-digitations.^[3] Closing of extraction space is generally achieved by two prevailing approaches sliding mechanics and frictionless mechanics. The sliding mechanics involves pushing and pulling of the tooth along the continuous arch wire with a force delivery system sufficient to produce and sustain tooth movement. In frictionless mechanics, closing loops are used in continuous and segmented arch wires which have an advantage to reduce the friction during movement.^[3] Pre adjusted orthodontic treatment frequently utilize sliding

mechanics with force delivery system such as elastomeric chain, nickel titanium coil springs, elastic module attached to wire ligatures or intraoral elastics.^[4]

En-masse retraction of six anterior teeth perhaps creates anchorage problems. These problems might be assisted by the use of a transpalatal bar and extraoral appliances.^[5-6] Absolute anchorage for tooth movement are provided by skeletal anchorage using dental implants,^[7-8] miniplates,^[9] miniscrews,^[10] and microscrews.^[11-13] Mini-implants have many benefits like easy to place and remove, less injury to the periodontium because of their small size, they can be placed in the intra-arch alveolar bone without conspicuous damage to tooth roots. In addition, orthodontic force applications can begin almost immediately after placement of mini-implants.^[12] In the present case report extraoral anchorage was not possible as the molars were missing and also the bone in the missing area was adequate, so the best option left with us was absolute anchorage. Miniscrews were used as an absolute anchorage in mandible for en-masse retraction of anteriors which further reduces the time taken to close the extraction space.

CASE REPORT

A 20 year female patient presented with the chief complains of irregularly placed upper anterior

Department of Orthodontics & Dentofacial Orthopaedics, Saraswati Dental College & Hospital, Lucknow (UP), India.

Address for Correspondence:

Dr. Stuti Raj, Department of Orthodontics & Dentofacial Orthopaedics,, Saraswati Dental College & Hospital, Tiwari Ganj, Faizabad Road, Lucknow (UP), India. dr.stuti.raj@gmail.com, +91 8601331885

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Figure 1:
Pre extraoral photographs (a) Frontal view, (b) Frontal smiling view and (c) Profile view

teeth. On clinical examination the patient had athletic built with mesomorphic body type, mesoprosopic head form, facial asymmetry, incompetent lips with lower lip everted, convex profile, anterior facial divergence with Prognathic maxilla and retrognathic mandible

[Fig.1 (a), (b), and (c)]

Intra-oral examination displayed U shaped arch form, 6 mm of tooth material excess in maxilla on Arch-perimeter analysis. In mandibular arch 36, 45 and 46 were missing, there were fixed prosthesis in relation to 36. Lower right canine was labially rotated. Katz Premolar relation Class II on right side Class I on left side. The canine relation was End on right and Class I on left side.

The Overbite was 5 mm (50%) and Overjet was 6 mm. Dental upper midline was shifted 2 mm towards patient left; lower midline is coinciding with skeletal midline [Fig. 2 (a), (b), (c), (d) and (e)]. On cephalometric analysis revealed Class II skeletal pattern, vertical growth pattern, proclined upper and lower anteriors. On panoramic examination 36, 45 and 46 were missing.

Treatment objective: To correct the proclination of teeth in upper and lower anteriors. To close the extraction space with the maintenance of edentulous space for mandibular first molar in lower right quadrant without hampering fixed prosthesis.

Treatment plan: Asymmetrical extraction approach was undertaken. MBT 0.022" x0.028" brackets were selected and transpalatal arch in maxilla and miniscrews in mandible were used as an anchorage system. Closure of space was done by active tiebacks type one and retraction utility arch in maxillary arch while elastomeric chain and NiTi coil springs in lower arch.

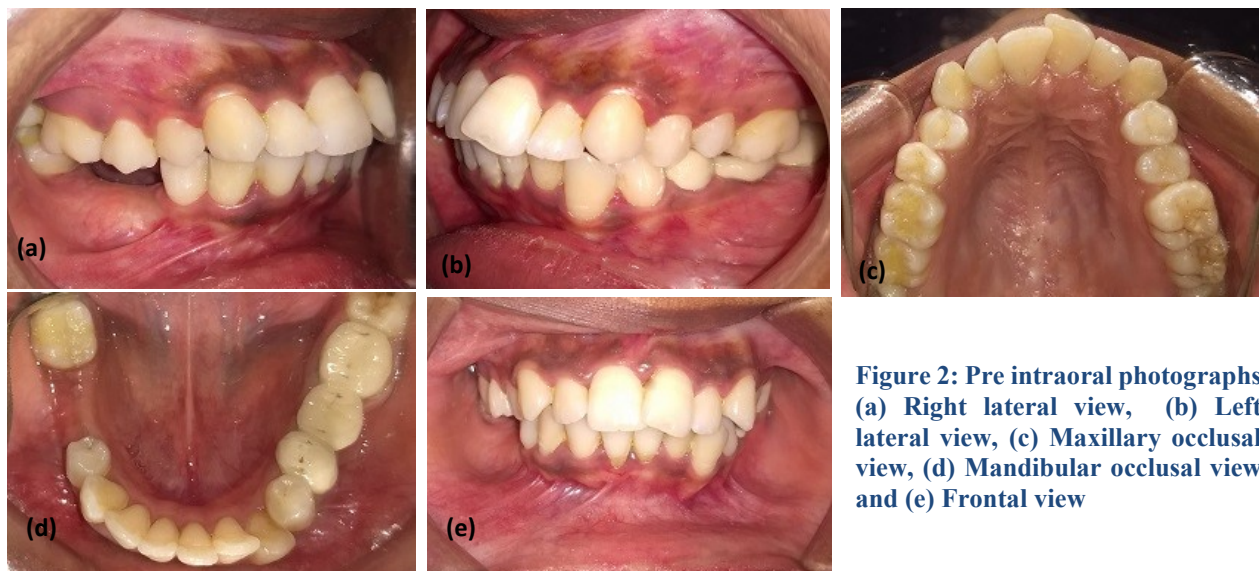


Figure 2: Pre intraoral photographs (a) Right lateral view, (b) Left lateral view, (c) Maxillary occlusal view, (d) Mandibular occlusal view and (e) Frontal view



Figure 3: Titanium screw kit and screws

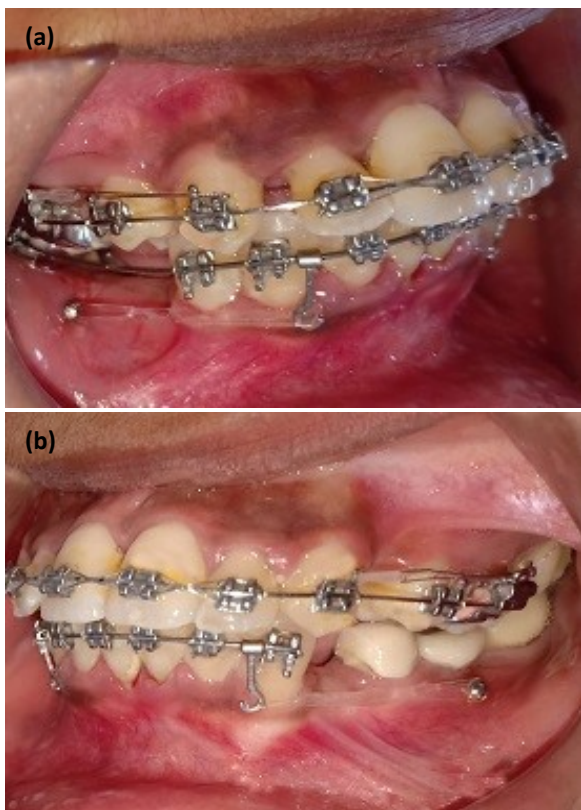


Figure 4 (a) and (b): Miniscrew placed with initial loading of force after 6 months

Treatment progress: After extractions of 14, 24 and 34, MBT 0.022" x 0.028" brackets were bonded in upper while in lower arch only anteriors along with right first premolar were bonded. Transpalatal arch was used as an anchorage system in maxillary arch. The loop of transpalatal arch was mesially fabricated so that it cause intrusive effect on molars. Normal sequence of wires were followed 0.012", 0.014", 0.016" NiTi to rectangular 0.016" x 0.022" NiTi

to achieve leveling and aligning for first 6 months; which was followed by 0.017" x 0.025" SS wire in both the arches. After this the placements of two mini-implants were performed. The armentarium used in placement is shown in the Fig. 3. The mini-implant used was of self-drilling type with dimension 1.5" x 8" mm. The insertion was performed under local infiltration in the molar edentulous area in right and left quadrant. Immediate loading was performed as shown in the [Fig. 4 (a) and (b)]. En-masse retraction was done on 0.017 x 0.025 SS wire with a 5 mm crimpable hook using elastomeric chain initially and later on NiTi coil springs for a period of five months. In maxillary arch, after banding the second molar, two stage retraction techniques were performed. Firstly both single canines were retracted and then with the aid of retraction utility arch, the four incisors were retracted and the extraction space was closed.



Figure 5: Extraoral photographs after 11 months of treatment (a) Frontal view, (b) Frontal smiling view and (c) Profile view.

Treatment results: After eleven months of treatment the crowding was relieved and the extraction space was closed in all the first three quadrants while in the fourth quadrant where 45

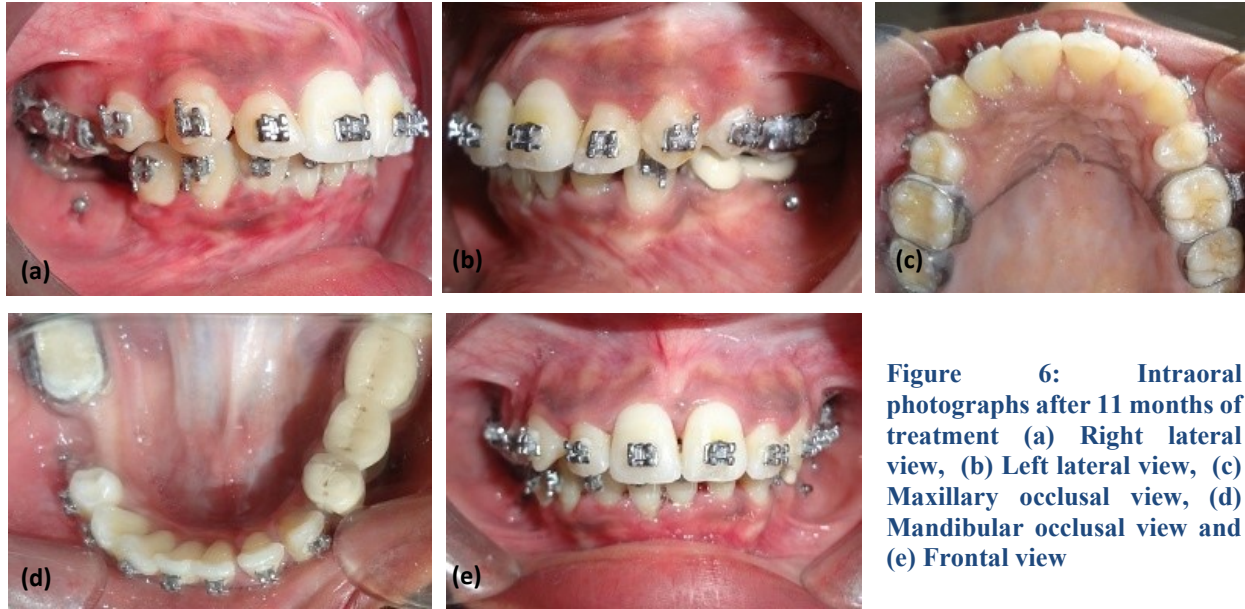


Figure 6: Intraoral photographs after 11 months of treatment (a) Right lateral view, (b) Left lateral view, (c) Maxillary occlusal view, (d) Mandibular occlusal view and (e) Frontal view

was already missing, the first premolar attains the space of missing second premolar as shown in the [Figure 5 (a), (b) and (c); Figure 6 (a), (b), (c), (d) and (e)].

DISCUSSION

The pattern of treating bimaxillary protrusion cases mostly involves extraction of all first premolars to allow maximum retraction of incisors.^[14] In this case the premolar extractions were necessary as there were tooth material excess in both the arches along with bimaxillary protrusion.

To allow more retraction of anterior segments, maxillary arch was anchored by the mesially looped transpalatal arch but due to absence of mandibular first molars, miniscrews acted as an absolute anchorage in mandibular arch.

The alveolar bone in the missing molar area was adequate to provide stability to the miniscrew and there was no risk of damaging adjacent roots. During the space closure, the oral hygiene status was maintained and there were no discomfort registered by the patient regarding miniscrews. The fixed prosthesis was also maintained. With the aid of temporary anchorage device the space closure was achieved in less time.

CONCLUSION

The use of miniscrews - in this case - has provided absolute anchorage for en-masse retraction of the anterior teeth in a mutilated case. The use of miniscrews accelerated the treatment and accomplished the space closure in less time.

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Conflict of interest : None reported

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