Effective and Predictable Maxillary Molar Distalization with micro-implant Anchorage in the correction of class II Malocclusion

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Maxillary Molar Distalization with micro-implants:

- Intra-radicular micro-implant supported- Buccal and Palatal
- Palatal Micro-implants
- Conventional appliances like Distal Jet and Pendulum appliances supported with micro-implants

Limitations with Conventional Molar distalization Appliances:

- Group distalization is almost impossible
- Undesirable counteraction
  - Anchorage Loss
    - Flare out of incisors
    - Overjet increase
    - Mesial movement of Pre-molars
    - Tipping of molars
  - Mandibular clockwise rotation
- Complicated devices are required
- Poor oral hygiene
- Discomfort for patients
- Need patients cooperation if removable appliances, headgear and or inter-maxillary elastics are combined
Implant supported Distalizing appliances:

- With Mini-screw fixation there is a way to prevent or eliminate anterior anchorage loss during molar distalization, as it provides absolute anchorage. The Mini-screw can be placed either buccally or palatally to distalize the first molars.

- The Mini-screw in combination with Distal jet appliance may provide a less invasive alternative to the anchorage loss. In this case the Mini-screw is placed in the Maxillary alveolar process, between the palatal roots of the first and second pre-molar. This mechanical system prevents mesial movement of the anterior teeth during molar distalization.

- Alternatively the Mini-screw can be placed buccally between the second pre-molar and first molar and the distalization is achieved by activation of the Nitinol springs, placed on a sectional arch wire between first pre-molar and first molar. The first pre-molars are stabilized indirectly with mini-screw and a palatal arch placed on first pre-molars to prevent anchorage loss.

Various molar distalization methods using MIA according to amount of molar movement

- < 3 mm
  - Using inter-radicular space

- > 3 mm
  - Using Non-alveolar bone area
    - indirect anchorage
    - combined with pendulum appliance or Distal Jet Appliance
    - combined with inter-maxillary elastics
Guidelines for safe placement with MIA:

- Ideal location to place the micro-implant is between first molar and second pre-molar.
- Use 20% Benzocaine Gel / surface spray-15% Lidocaine- this way the roots will remain sensitive in the event of the root contact.
- Use periodontal probe to mark the area and then use the marking pen to mark the exact spot for the insertion of mini-screw.
- The initial point for mini-implant placement should be near the mucogingival line in the attached gingiva (2-4 mm from the CEJ).
- Place mini-screw at 20°-30° to the long axis of the proximal tooth with a mini-screw 1.3mm in diameter and 6 to 7 mm. in length between second pre-molar and first molar buccally.
- Self drilling Method with continuous irrigation.
- Use Light continuous forces (Nitinol coil spring 100gms- 250gms.)
- Place micro-implant near occlusal level as possible.
- The direction of force application was backward and upward as parallel to the occlusal plane as possible.
- Orthodontist himself should place the mini-screw.
- Know the limitation of tooth movement on denture
Molar Distalization with micro-implant Using buccal inter-radicular space

Recommendations for treatment of Class II malocclusion with Maxillary Molar Distalization

- Recommend to use of inter-radicular mini-screw anchorage if required distalization is less than 3.5 mm, because of minimum invasion and simple mechanics.
- However if required molar movement is more than 3.5mm, it is recommended to use bone anchorage placed out of dentition or choose extraction treatment.
Quantitative evaluation of cortical bone thickness with computed tomographic scanning for orthodontic implants

Toru Deguchi, Miho Nasu, Kaoru Murakami, Toshinori Yabuuchi, Hiroshi Kamioka, and Teruko Takano-Yamamoto


- From the cortical bone thickness, the best available location for a mini-screw is mesial or distal to the first molar, and the best angulation is 30° from the long axis of the tooth.

- From findings of the distance from the inter-cortical bone surface to the root surface and the root proximity, the safest length is 6 mm with a diameter of 1.3 mm. In addition, for lingual orthodontics, the recommended location is mesial to the first molar at 30°, and 8 to 10 mm in length.

Distal movement of maxillary molars using miniscrew anchorage in buccal inter-radicular region

Kazuyo Yamada; Shingo Kuroda; Toru Deguchi, Teruko Takano-Yamamoto; Takashi Yamshiro

Angle Orthod 2009;79;78-84

- In non-extraction cases, mini-screws inserted into the buccal inter-radicular space between the second pre-molar and the first molar at an oblique angle were useful and more efficient for moving maxillary molar distally than traditional orthodontic methods.

- Molar distal movement was achieved without active patient compliance or with no undesirable side effects such as incisor proclination, clockwise mandibular rotation or root resorption.

- Orthodontic treatment with mini-screw anchorage is simpler and more useful than traditional anchorage mechanics for patients with skeletal Class II malocclusion.
Mini-screw positioned mesial to the activation lock

Mini-screw anchorage system (palatal implant) combined with Distal Jet

Bowman’s modification- TAD assisted Horseshoe Jet Distalizer

Mini-screw combined with Nitinol springs placed buccal

Implant supported molar distalization
References:


11. Shingo Kuroda, Kazuyo Yamada, Toru Deguchi, Takashi Hashimoto, Hee-Moon Kyung, and Teruko Takano-Yamamoto: Root proximity is a major factor for screw failure in orthodontic anchorage Okayama, Japan, and Daegu, South Korea: Am J Orthod Dentofacial Orthop 2007; 131:00.


