

# Predictable Maxillary Molar Distalization with Micro-implant Anchorage in the correction of class II Malocclusion

**Dr. Ramesh Sabhlok**

BDS, MDS, Cert. Ortho. (USA), FDS RCS (Edinburgh), FDS RCPS (Glasgow),  
M. Orth RCS (Edinburgh), FACD, FICD

**Consultant Orthodontist**

Dubai, United Arab Emirates

**E-mail: [sabhlok@emirates.net.ae](mailto:sabhlok@emirates.net.ae)**



## 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:**

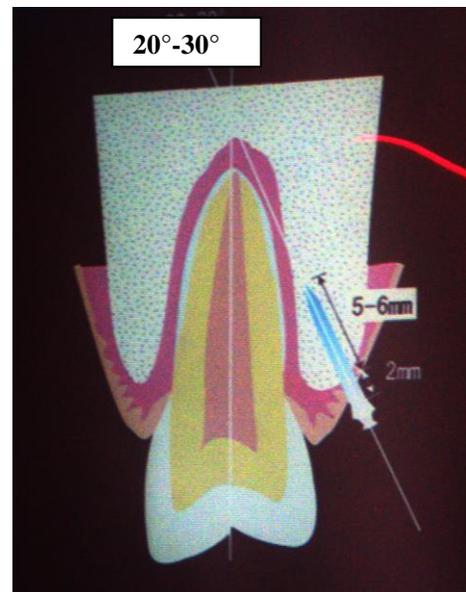
- With Mini-screw fixation there is a way to prevent or eliminate anterior anchorage loss during molar distalization, as it provides absolute anchorage. **The Mini-screw can be placed either buccally or palatally to distalize the first molars.**
- The **Mini-screw in combination with Distal jet appliance**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

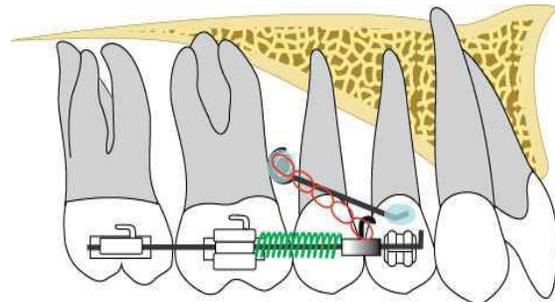
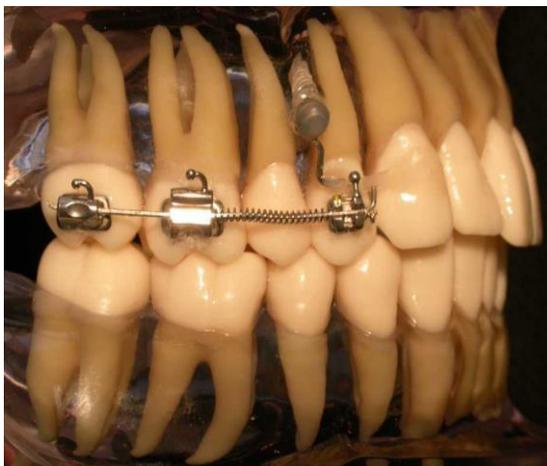
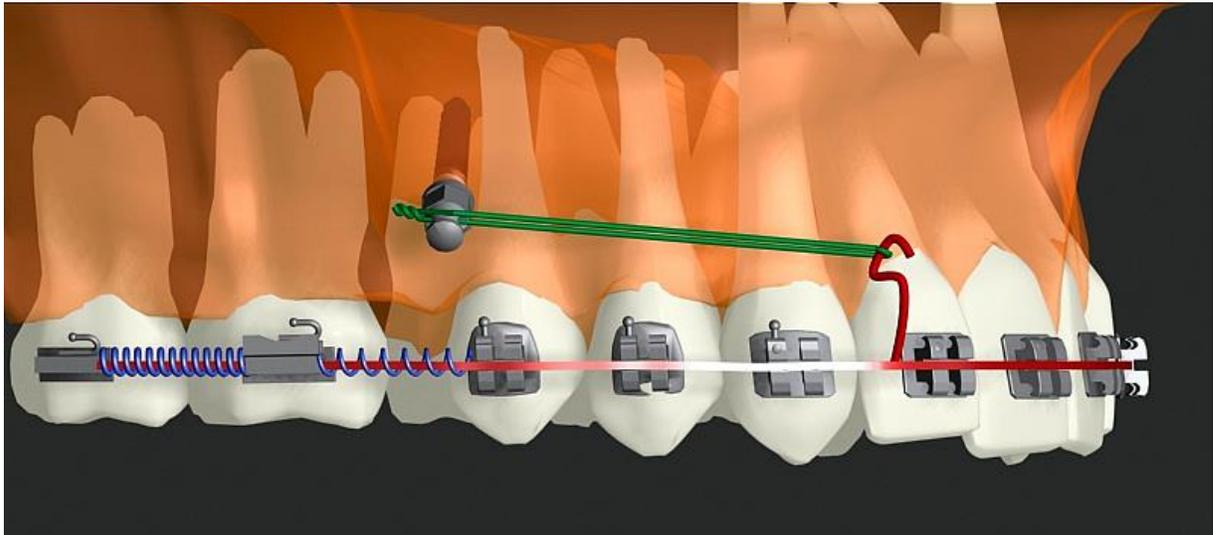
## Guidelines for safe placement with MIA:

- 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



Guidelines for placement of mini-screw

## 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*

*Okayama, Japan (Am J Orthod. Dentofacial Orthop. 2006; 129:721.e7-721.e12)*

- 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 buccally**



**Implant supported molar distalization**

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

Distalization of maxillary molars is a viable option for the correction of class II malocclusion. However, Anchorage loss and patient compliance are the major problems when using conventional molar-distalizing appliances like pendulum and distal jet, where the main source of anchorage is tooth and tissue-borne or when extra-oral appliances are used to distalize the maxillary molars. Many anchorage systems have been introduced in the last decade to reduce or eliminate the anchorage loss. The advent of temporary anchorage devices has revitalized orthodontic biomechanics and made it possible to achieve predictable results without any side effects.

This presentation will include temporary anchorage devices using buccal and palatal micro-implants as well as micro-implant supported conventional appliances like Distal Jet and pendulum for the distalization of molars using the concept of absolute anchorage. The focus will be on biomechanical and diagnostic considerations and countering strategies to combat the unwanted side effects. The effect on second and third molars, appropriate timings, force levels, anchorage requirements and post-distalization mechanics will be also addressed.

### **Learning Objectives:**

#### **Attendees will learn:**

- Non-compliance maxillary molar distalization techniques including buccal and palatal micro-implants, using the concept of absolute anchorage.
- Insertion sites, placement technique and anchorage/force application of micro-implants for upper molar distalization, retraction of pre-molars, canines and incisors.
- Strategies to combat side effects, post-distalization mechanics and finishing the occlusion after molar distalization.