A combination of mini-implant and MEAW to correct a skeletal Class II open bite

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Before treatment
After treatment

CASE 1

Before treatment
After treatment

CASE 2

Before treatment
After treatment

CASE 3

Contents

- MEAW
- Intrusion methods of posterior teeth
- Extrusion or Intrusion Mechanics
- Combination of two mechanics
- Extraction options

There are two mechanics, extrusive and intrusive. Next, I would like to suggest guidelines, cases and indications for each of them.

Etiology of Open bite

In my clinic, I have many open bite cases with TMD, because they are referred from local clinics and other dentists. Seoul National University Dental Hospital is the final destination of problem cases.
Open-bite cases look very similar. All of open bites have different causes.

Open bite cases have causes, some of which are not uncontrollable or even unknown. This makes it very difficult to treat them and/or retain their fine results.

Methods were summarized into 6 categories.

Method 1

1. Place a mid-palatal mini-implant (1.6 mm x 6 mm), as far distally as possible.

Method 2

2. Use a TPA with hooks.

Method 3

3. Insert an 019x025” ss archwire.

Method 4

4. Apply a power chain tightly.

Method 5: Use a mid-palatal mini-implant

System of Method 5 is as follows:

1. Place a mid-palatal mini-implant (1.6 mm x 6 mm), as far distally as possible.
2. Use a TPA with hooks.
3. Insert an 019x025” ss archwire.
4. Apply a power chain tightly.

Structure
Method 1
Method 2
Method 5

Four methods use buccal mini-implants between 6 and 7. But Method 5 doesn’t use buccal mini-implants.

Disadvantages of Buccal Mini-implants in Open bites

• The stability is compromised when the implants are placed near the alveolar crest and/or into the periodontal membrane.

In open-bite cases, the buccal screws between the first molar and the second molar fail very frequently.

Disadvantages of Buccal Mini-implants in Open bites

1) The inter-radicular space between the first molar and the second molar is very small.

2) In open bite cases, as the posterior teeth being intruded, the screw becomes closer to the alveolar crest and the periodontal membrane.

Advantages of Method 5

1. A mid-palatal mini-implant is more stable than a buccal mini-implant between 6 and 7.

2. A mid-palatal mini-implant can be placed more distally than a buccal mini-implants between 5 & 6. The mid-palatal one is better in biomechanical aspects (longer lever arm) to intrude the posterior teeth.

3. Only one mini-implant is required.

In most of cases, the inter-radicular space between 6 and 7 is narrow. 1) Then, it is inevitable to place a mini-implant between 5 and 6. The mechanical efficiency to intrude the posterior teeth will be decreased. 2) Possibility of Root trauma is high.

Shingo Kuroda, Kazuyo Yamada, Tara Deguchi, Hee Moon Kyung, Teruko Takano Yamamoto, Root proximity is a major factor for screw failure in orthodontic anchorage, Volume AJODO 2007:131(4) :S68-S73
Some cases were treated by combining the MEAW technique and the mini-implant intrusion.

Extraction options in Class II open-bite cases

1. Extraction of third molars brought spaces for second molars to be intruded and tipped back.

By extracting third molars, bite closing is facilitated.

Effects of second molar extraction are as follows,
1. Center of rotation moves forward. Lever arm becomes longer than third molar extraction.
1. Number of teeth to be intruded are reduced.
2. Wedge (second molars) is removed.
3. Number of teeth to be intruded are reduced.
4. RAP can be utilized.

Extraction of bicuspids also helps bite closing, because
1. Number of teeth to be intruded are reduced.
2. Wedging molars are moved forward.
2. Wedging molars are moved forward.
2. Mesial movement of wedging molars are good to resolve the open bite.

**Extraction options in Class II open-bite cases**

**Indications**
1. Third molars are good in shape.
2. The angle between 7 & 8 is between 20–30 degrees.
3. Third molars have erupting potential. Adolescent patients are good.

**Clinical notes**
Third molars erupt faster than usual. But the secondary minor orthodontic treatment may be required to align the third molars especially, for lower ones.

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1. In adolescent or adult patients, third molars are not good in shape or impacted.

**Clinical notes**
1. Bite closing is slower than in 7-extraction cases.

1. **Clinical notes**
Bite closing is much slower than in 7-extraction cases.
2. This option is not recommended. Please, extract third molars before closing the bite.
Extraction options in Class II open-bite cases

Indications
1. Class II canine and molar relationship
2. Severe upper anterior protrusion and labial inclination,
3. Or upper anterior crowding.

Clinical notes
1. Bite closing is facilitated by extraction of 5s.
Insert the ligature wire into the holes of the power chain as the figure shows.

Put the center ring around the screw neck.

Pull the ligature wire with a hemostat.

Hook the ligature wire around the neck of screw.

Twist the ligature.
Cut the ligature and bend the remaining portion around the neck.

Stretch the power chain tight and hang it up to the hook of TPA.

Use a long shank wrench. Please, give a 6 mm space between the bottom of the handpiece and the incisial edge. If the bottom of the angle touches the incisial edge, it will be impossible to remove or insert the screw anymore.

Clinical Tip III for a mid-palatal mini-implant

In every patients, please measure a mid-palatal bone thickness. A mid-palatal mini-implant, 1.6x6mm, is used.

Award of the best poster at KAO 2004
Clinical Tip IV for a mid-palatal mini-implant

Place the mini-implant more distally + Extend the arch anteriorly!

Clinical Tip V for a mid-palatal mini-implant

Attach the hooks distally and gingivally.

Clinical Tip VI for a mid-palatal mini-implant

Extract the upper third molars or second molars to remove the wedging effect and to provide the space for intrusion.

Clinical Tip VII for a mid-palatal mini-implant

- If the insertion torque is higher than 30Ncm, use predrilling.

- Orthonia® (RMO)
  - Wireless rechargeable handpiece
  - Stops automatically when torque increases over 30 Ncm.
Problems experienced in mid-palatal mini-implants

I experienced mini-implant fracture in two cases. In these cases I felt that their bones were much harder than usual. My fault was that excessive torque was applied more than 50Ncm. (In most of cases, less than 30Ncm is enough to place mid-palatal mini-implants without drilling.) Orthonia is good because it stops automatically at 30Ncm. If it stops, remove and drill. Then we can avoid fracture of a screw.

How to remove the fractured tip

1) Expose the fractured tip after retracting a flap.
2) Reposition the flap and suture.

Clinical Tip VIII for a mid-palatal mini-implant

Method 5

A TPA with crown buccal torque and a midpalatal mini-implant was used to intrude the molars. The main arch wire is 019x025 ss with a slight crown buccal torque. This arch is expanded a little.

Clinical Tip IX for a mid-palatal mini-implant

How to control 2nd molars

Sometimes, upper 1st molars are intruded but 2nd molars don’t follow.
2) Add a L loop with an intrusion step between 6 and 7 to intrude 2nd molars **buccally**

Clinical Tip X for a mid-palatal mini-implant

1) Monitor the extrusion of lower molars

Clinical Tip XI for a mid-palatal mini-implant

Intruding force should be strong.

Clinical Tip XII for a mid-palatal mini-implant

; Retain the TPA and mid-palatal mini-implant during the finishing stage.

- 2011.5.4 After intrusion
- 2012.2.29 Debonding

Initial counterclockwise rotation of mandible relapsed during the detailing stage. Extrusion of upper molars was a cause of the changes. It is recommended to retain them as long as possible during the finishing stage.
Clinical Tip XIII for a mid-palatal mini-implant:
Fixed retainer + Labial buttons + U/D elastics

How will you solve the relapse after debonding?
1. Exercise not to thrust tongue during swallowing.
2. Check TMJ pains.
3. Chew thirty times for one bite.
4. Fixed retainers + labial buttons (22/33) + u/d elastics 3/16" 3½ oz

How to make labial button?

Adhesive application
Curing
Separator
Ring
Placement
Flowable Resin
Application

Curing
Separator
Removal
Labial Button
Multiloop Edgewise Arch Wire (MEAW)

- 018x022 stainless steel

MEAWs are made of 018x022 ss wire.

He invented MEAW technique

Nov. 25, 2002, After lecture at Department of Orthodontics, SNU

Class II correction
- U: MEAW
- L: Ideal arch wire

Class III correction
- U: Ideal arch wire
- L: MEAW

Closing anterior open bite
- U: MEAW
- L: MEAW

MEAWs can be used to correct Class II relation, Class III relation and open bite. To close the anterior open bite, MEAWs are used both in upper and lower arches.
• Class II correction
  U: MEAW, L: Ideal arch wire
  5/16" Class II elastics

To correct Class II relationship, MEAW is applied in the maxillary arch and Ideal arch wire is used in the mandibular arch. Class II 5/16” 6oz elastics are applied.

• Class III correction
  U: Ideal arch wire, L: MEAW
  5/16" Class III elastics

To correct Class III relationship, MEAW is applied in the mandibular arch and Ideal arch wire is used in the maxillary arch. Class III 5/16” 6oz elastics are applied.

• Openbite correction
  U: MEAW, L: MEAW
  3/16” up/down elastics

To close the anterior open bite, MEAWs are used both in maxillary and mandibular arches. 3/16” 6oz elastics are applied from the first upper loop to the first lower loop.

• 018 x 022 stainless steel

To make MEAWs, 4 to 5 L-shaped loops are made between teeth.

An 043-CK plier is used to make a MEAW.

First, anterior curvature is bent with a turret.
Between #2 and #3, the first L loop is made.

Between #2 and #3, the first L loop is being bent.

Sequentially, upper L loops are being made.

The final upper and lower MEAWs were made.

Size of L loops
Upper and lower MEAWs showed a good coordination.

To avoid gingival impingement or cheek mucosa irritation, L loops have a buccal tipping. The angle increases progressively distally.

But the upper and lower MEAWs don’t have torques.

Tip back bends
- Provides reverse curve of Spee

Tip back bends are applied to each loops, 3° to 5°. Finally, the upper arch has a compensating curve and the lower arch has a reverse curve of Spee.
1. Extrusion of anterior teeth is the main effect.
2. Very slight intrusion of posterior teeth is also secondary effect, “Rocking chair effect”.
3. Distal tipping contributes to the correction of molar relationship.
4. This effect is increased by Class II elastics (in Class III, by Class III elastics).
Reasons why I use MEAWs instead of curved TMA or NiTi wires?

“Handle of a car”

Distal tipping or intrusion of a molar can be controlled very accurately and effectively with a stiff stainless wire. And also the load-deflection rate is decreased well with the L loops.

Summary

1. If the handle is made of a flexible material, it would not be easy to control well (tip-back and intrusion) and
2. it would be hard to adjust the wires (vertical or in-and-out steps) for compensating the minute errors of bracket positioning.

1. Some of skeletal open-bite cases can be treated orthodontically,
   – by extrusive mechanics (MEAW) or
   – by intrusive mechanics (Mini-implant).

2. Three factors—incisal display, lip incompetency, and skeletal pattern—were suggested to select the mechanics differentially.

Summary

1. Combination of a MEAW with a mid-palatal mini-implant
   – produces intrusion of upper posterior teeth and extrusion of anterior teeth at the same time. And this may close open bite very rapidly just after extraction of 2nd molars.