Molar intrusion with skeletal anchorage; from single tooth intrusion to canting correction and skeletal open bite

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Inter-radicular mini-implants

Buccal view

Palatal view

1.6x6mm
1.6x8mm

Option 1

This is the simplest method to intrude the molars. Two forces from the buccal & palatal sides and two forces from the mesial and distal sides on one tooth will exert an intruding force without tipping.
Advantages

• Easy to control the bucco-lingual and mesio-distal inclination
• Very efficient to intrude the posterior segments

Disadvantages

• Hard to find the good indications, because buccal interradicular spaces between 6 and 7 are usually too narrow and the bone distal to the 7 is not wide enough to place the implant.

Disadvantages

The buccal screws between the first molar and the second molar fail very frequently.

Disadvantages

Because as the posterior teeth being intruded, the screw becomes closer to the alveolar crest and the periodontal membrane.
One patient was referred to my department. She showed mobility and radiolucency of maxillary left second molar.

That tooth was extracted due to the endo-perio involvement. We can see the fracture line.

Disadvantages

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

Possibility of root trauma is high, for in most of cases the inter-radicular space between 6 and 7 is narrow.

Shingo Kuroda, Kazuyo Yamada, Toru Deguchi, Takashi Hashimoto, 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
Advantages

- Easy to control the bucco-lingual and mesio-distal inclination
- Very efficient to intrude the posterior segments
- Can avoid the narrow buccal inter-radicular space between 6 and 7, which may reduce the failure rate.

Disadvantages

- Needs four inter-radicular mini-implants
Midpalatal mini-implant + TPA

With this mechanism, unilateral intrusion of the left first molar was intended.

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In this case, the mid-palatal mini-implant was moved a little to the side of unilateral intrusion.

To intrude the left side only, right hook was soldered near the U loop of TPA and it was ligated tightly to the mid-palatal screw with a wire.

For unilateral intrusion of left posterior teeth.
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 0.019x0.025" ss archwire.
4. Apply a power chain tightly.

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 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.
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In the left case, open-bite was closed efficiently.
In the right case, intrusion of total dentition was obtained.
To intrude posterior teeth only, place the mini-implant distally!

Then, poster wedge will be removed more efficiently.

To intrude total maxillary teeth intrusion, place the mini-implant mesially!

Then, total upper teeth will be intruded.
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Facial asymmetry and occlusal canting

Upper incisors had normal angulation. Left posterior teeth showed extrusion.

Open bite with occlusal canting

Severe condylar resorption
Unilateral severe condylar resorption

Open bite with occlusal canting

Severe condylar resorption
Unilateral severe condylar resorption

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Four steps for swallowing without tongue thrusting
1) Touch the rugae area with tongue tip.
2) Bite with your back teeth slightly.
3) Close lips together.
4) Keep the position of tongue tip on the rugae area and swallow.

How to make tongue posture high touching the palate;
1) Before you ‘click’ a tongue against the roof of mouth, posterior part of tongue touches the palate first.
2) Press further the posterior part of tongue to roof of mouth and try to remove the air between tongue and roof of mouth. The negative pressure is made between the roof of mouth and tongue.
3) Keep the position of tongue on that area.

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Fixed retainer + Labial buttons + U/D elastics

How to retain the result after debonding?
1. Monitor the causes: TMJ pains, tongue thrust & mouth breathing.
2. Use Fixed retainers(4-4).
3. When a relapse tendency found, apply labial buttons (22/33) with u/d elastics 3/16” 6 oz.
4. Instruct patients to chew many times during eating meals (to increase muscle tonicity).
5. Train swallowing without thrusting tongue.

How to make labial button?
1) Etching
2) Wash and dry
3) Primer application
4) Curing
5) Place a Separator ring on cervical area
6) Inject Flowable resin in the ring.
7) Curing

8) Remove a Separator

9) Polish and check the undercut.

Fixed retainer (4-to-4)
3M Unitek 0.8mm Twist wire, REF 260-0321

2014.1.15
1 year after debonding
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Second molar extraction for open bite treatment

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It should be emphasized that our goal is not to encourage or discourage a particular approach.
As responsible clinicians, we need to discern between what is thought to happen and what actually happens with any treatment procedure. In this manner we can determine its advantages and disadvantages as well as its indications and contraindications.

- Samir E. Bishara, and Paul S. Burkey
- Second molar extractions: A review
- AM J ORTHOD 89: 415-424, 1986
Contents

• Guidelines for second molar extraction
  • Why four 2nd molars are extracted?
  • Timing for 2nd molar extraction
  • Changes in the 3rd molar position after the extraction of 2nd molars
  • Adequate angulation of third molars
  • Size of 3rd molars
• Case presentation
  • Good
  • Failure

Why four 2nd molars are extracted?

1. To eliminate the wedge effect
2. To solve the posterior crowding
3. To facilitate first molar distal movement

Young H. Kim, Anterior Openbite and its Treatment with Multiloop Edgewise Archwire, Angle Orthod 1987;57(4):290-321

Extraction options in Class II open-bite cases
By extracting third molars, bite closing is facilitated. The wedge is removed by intruding the maxillary first and second molars.

Effects of second molar extraction are as follows:
1. Wedge (second molars) is removed.
2. Center of rotation moves forward. Lever arm becomes longer than third molar extraction.
3. Number of teeth to be intruded are reduced.
4. Extraction of second molars brought spaces for first molars to be intruded and tipped back.
5. RAP can be utilized, if second molars are extracted just before starting the intrusion.
6. By intruding maxillary first molars, wedge is removed further.

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

2. Extraction of second molars brought spaces for first molars to be intruded and tipped back.
Why four 2nd molars are extracted?

1. To eliminate the wedge effect
2. To solve the posterior crowding
3. To facilitate first molar distal movement

Sometimes, by replacing the maxillary second molars with smaller third molars, posterior crowding can be resolved. Most of my open bite cases are Class II. First molar distal movement to correct Class II molar key is facilitated by extraction of maxillary second molars.

Timing for 2nd molar extraction

- In summary, the consensus of opinion in both anecdotal and quantitative reports is that the optimal time of second molar extraction is as soon as it erupts if the third molar crown is complete, but before radiographic evidence of root formation.

Changes in the 3rd molar position after the extraction of 2nd molars

Changes in the 3rd molar position after the extraction of 2nd molars
Changes in the 3rd molar position after the extraction of 2nd molars

Average angles of lower 8 were 55 at start of active treatment, 61 at end of active treatment and 74 at final occlusion.

Adequate angulation of 3rd molars

- According to Lehman, a favorable inclination of the third molars should be present with a $15^\circ$ to $30^\circ$ angle to the long axis of the first molar.


Adequate angulation of 3rd molars

- The final angulation of third molars showed no correlation with angulations at the start of treatment.

- There was a wide range of mesiodistal angulations in this study at SAT. The range was $29^\circ$ to $94^\circ$ for the long axis of the third molar crown to the occlusal plane.

- Interestingly, the 3 worst-positioned third molars at SAT all ended with good positions at In8.

Make a prediction, possible?

*angulations*

- The original angulation of the third molar is not a reliable *predictor* of outcome for third molar position.


**Size of 3rd molars**

- The size of the replacement third molar in this study was found to be *highly satisfactory*.
- The mandibular third molars were *larger* than the second molars by, on average, 0.55 mm, which was statistically significant (P ≤ .001).
- The maxillary third molars tend to be a little *smaller* than the second molars, a mean difference of 0.7 mm.
- Certainly good radiographic assessment of size before treatment is important to avoid microdont third molars.


**Open-bite**

**MEAW**

- 77/77
- 77/88
- 77/88
- 77/77 failure

**Mini-implant**

- 77/77
- 77/88
- 88/88
- Second vs. Third molar extraction

Summary of second molar extraction

- When second molars are extracted, upper posterior teeth are intruded efficiently especially if the second molars are extracted just before starting intrusion.
- Selection of good cases is required to obtain successful results.
- Extra treatment may be required after third molars erupt.
- Impaction of third molars may happen and it should be noticed to patients before extraction of second molars.
E-handouts of Open bite lectures are available at

1) 2013 A Combination of Mini-Implant and MEAW to Correct a Skeletal Class II Open Bite  [https://www.aaoinfo.org/node/625](https://www.aaoinfo.org/node/625)
2) 2014 Open bite treated by intruding posterior teeth; Methods, outcomes, stability and guidelines  [https://www.aaoinfo.org/node/2382](https://www.aaoinfo.org/node/2382)
3) 2015 Orthodontic Treatment of Skeletal Class II Open Bite; 1) Closing the open bite and 2) Solving the A-P discrepancy  [https://www.aaoinfo.org/node/4792](https://www.aaoinfo.org/node/4792)
4) 2016 Ankylosis of Anterior Teeth  [https://www.aaoinfo.org/meetings/2016-annual-session#extra_tab_4](https://www.aaoinfo.org/meetings/2016-annual-session#extra_tab_4)
5) 2017 Second molar extraction for open bite treatment  [https://annual-session.aaoinfo.org/meetings/2018-annual-session/](https://annual-session.aaoinfo.org/meetings/2018-annual-session/)
6) 2018 Molar intrusion with skeletal anchorage, from single tooth intrusion to canting correction and skeletal open bite  [https://annual-session.aaoinfo.org/meetings/2018-annual-session/](https://annual-session.aaoinfo.org/meetings/2018-annual-session/)