Application of TADs as anchorage in lingual orthodontics

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When lingual orthodontic treatment needs absolute anchorage?

1. Retraction of anterior segment
2. Distalize posterior teeth
1. Retraction of anterior segment

- sliding mechanics
- loop mechanics
- segmented mechanics
- en masse retraction—esthetic; remove cuspid offset
Micro-implant anchorage for lingual treatment

- Lee et al., 2001 JCO
- Bialveolar protrusion
- 1.2mm in diameter, 10mm in length
- Retraction for 7 months
Class II, open bite, large OJ
upper first bicuspids,
lower second bicuspids
extractions

Active treatment: 16 months
Cephalometric tracing

- FH-UA 124.5° (pretreatment) → 107°
Torque control of the maxillary incisors during retraction

- apply a moment to bracket

Lever-Arm Mechanics in Lingual Orthodontics. Park et al., 2000 JCO
Comparison between buccal and lingual brackets

Sagittal

Vertical

Rafi Romano, 2006, Semin Orthod

Hong et al., Angle Orthod. 2005
Vertical bowing effect

microimplant above incisors
Finite element model study

Wei Liang et al., 2009

AJODO
Center of resistance of the anterior segment

- laser reflection technique
- 7.0 mm apical to the interproximal bone level between central incisors

Vanden Bulcke MM;
Burstone CJ et al., 1987.
Lever-arm mechanics

- Change point of force application
Line of action of the retraction force

Translation

Hong et al., Angle Orthod. 2005
Lever-Arm Mechanics in Lingual Orthodontics

Park et al., 2000 JCO

- sliding mechanics
- loop mechanics
- segmented mechanics

- .016” × .022” stainless steel wire
Absolute anchorage

- A 0.9 mm stainless steel wire soldered to the main wire

Hong et al., Angle Orthod. 2005
- Class I, upper and lower first bicuspids extractions
Cephalometric tracing
• Class I, bialveolar protrusion,
• upper first and lower second bicuspid extractions
Cephalometric tracing
Think again...
2. Distalize posterior teeth

3 months

14 months

Kyung et al., 2003, JCO
Superimposition

- 5mm molar distalization
Guidelines for microimplant placement in lingual orthodontic treatment

- Hee-Moon Kyung, 2006, Semin Orthod
• measure the mucosal thickness first
• palatal mucosa thickness 6 mm, use 12-mm screw
• midpalatal thinner mucosa, use 6- to 7-mm screw
• buccal alveolar region, attached gingivae, use 7- to 8-mm screw
• adult with thick dense cortical bone, use 7-mm screw
• young patients, less dense cortical bone, use 8-mm screw
• Diameter: 1.2 to 2.0 mm
• maxillary buccal regions, 1.3- to 1.5-mm
• palatal interdental regions, 1.4- to 1.6-mm
• midpalatal regions, 1.6- to 2.0-mm depending on bone density

Safe zone--palatal buccal
Wehrbein et al., 1999, AJODO

diameter: 3.3mm
length: 6mm
unload for 12 weeks
- Compact peri-implant bone
- Nasal crest
- 2mm thicker in computed tomogram than in lateral cephalogram

Kyung et al., 2003, JCO
Mandibular microimplants

- irritate the tongue if placed lingually
- technically difficult
- can be placed below the lower incisors
- at least 5 mm in bone
- can apply force immediately.
- can resist up to 300g force.
Other potential developments---**Onplant**

- young patient-- para-midline placement.
Osseointegration after 12 weeks.

Crismani et al., 2008. AJODO
Biodegradable implants

- Use poly-L-lactic acid with poly-L-glycolic acid (PLLA-PLGA)

Chacon et al., 2004
Conclusions

TADs can be applied in lingual orthodontics with:

• 1. lever-arm mechanics.
• 2. variable implant placement locations.
• 3. different TAD devices.
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Thanks.
Indications of lingual orthodontics
Mandible