Comparison of the Clinical Efficacy of Three Orthodontic Techniques for Skeletal Class III Malocclusion

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1. Class III malocclusion
2. III° reverse overbite and overjet
3. Lower anterior lingual inclination

Bio Introduction
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President of Hubei Stomatological Doctor Association

AAO 2017 Annual Session
CC:
Mandibular Protrusion
Concave Profile

1. Orthopedic Treatment?
2. Orthognathic Surgery?
3. Fixed Orthodontic Treatment?
MEAW Tech
Transmission Straight-Wire Tech
Implant Tech
Anterior crossbite & Irregular dentition

Cephalometric analysis

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Mean value</th>
<th>Measured value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNA (°)</td>
<td>82.8</td>
<td>81.2</td>
</tr>
<tr>
<td>SNB (°)</td>
<td>80.1</td>
<td>81.2</td>
</tr>
<tr>
<td>ANB (°)</td>
<td>2.7</td>
<td>0</td>
</tr>
<tr>
<td>L-Na (°)</td>
<td>22.8</td>
<td>25.8</td>
</tr>
<tr>
<td>I-Nb (°)</td>
<td>30.3</td>
<td>28.6</td>
</tr>
<tr>
<td>L-Na (mm)</td>
<td>5.1</td>
<td>5.7</td>
</tr>
<tr>
<td>I-Nb (mm)</td>
<td>6.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Wits (mm)</td>
<td>-1.5</td>
<td>-2.0</td>
</tr>
<tr>
<td>UL-SnPg (mm)</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>LL-SnPg (mm)</td>
<td>6.3</td>
<td>6.9</td>
</tr>
<tr>
<td>UL-SnPg - LL-SnPg (mm)</td>
<td>0.9</td>
<td>0.3</td>
</tr>
<tr>
<td>FL-A (°)</td>
<td>7.3</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Treatment plan:
1. Non-extraction
2. Hass expansion
3. MEAW Technique

Class III elastics, Correct the crossbite

Asymmetric short class III elastics, Correct mid-line shift
Comparison of Pre-tx and Post-tx

PP Plane  MP Plane  SN Plane

CC:
- Mandibular Protrusion
- Mandibular Deviation

Treatment Plan:
1. Non-extraction treatment
2. MEAW technique

Asymmetric short class III elastics correct cross bite and mandibular deviation
Multiloop Torque correct Posterior cross bite
Asymmetric short class III elastics for final occlusion adjustment
### Features of MEAW Technique

<table>
<thead>
<tr>
<th>Controlling moving direction of every tooth</th>
<th>Providing sustained light force</th>
<th>Gaining space from uprighting posterior teeth by Tip back bend</th>
<th>24 hours intermaxillary elastics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The vertical component of loop can move the teeth independently</td>
<td>1. The arch wire is three times as long as normal wire, with good elasticity and gentle force</td>
<td>1. Upright and backward movement of posterior teeth</td>
<td>1. Take effect for 24 hours</td>
</tr>
<tr>
<td>2. The horizontal component of loop can control three-dimensional teeth movement exactly</td>
<td>2. Load deformation rate of arch wire is only 1/10 of normal wire</td>
<td>2. Provide 1.5-4.5mm space by 5-15° Tip back bend</td>
<td>2. Asymmetric elastics can adjust mandibular deviation easily</td>
</tr>
</tbody>
</table>

### Key Points of MEAW Technique

- **Bending and Adjustment of Multiloop**
  - Bending of anterior area
  - Dealing with compressed gums
  - Grasping of tip back bend degree

- **Correct using of short and long elastics and vertical elastics**
  - The bigger the tip back bend, the bigger anterior traction force
  - Long elastics should be used with caution in high-angle patients

- **Enforceability of 24 hours intermaxillary elastics**
  - The key to success

### Focus

- **Mechanism of Class III elastics**
  - The anterior slope of condyle exists tensile stress
  - The posterior slope is compression stress
  - Total displacement is posterosuperior
  - Condylar process rotates antilockwise
  - Mand moves backwards
  - For low-angle patients with crossbite, long elastics is good for mand backward movement and bite opening
  - Long elastics should be used with caution in high-angle Class III patients
  - Short elastics will be more gentle than long elastics when use same force
CC: Mandibular Protrusion Concave Profile

1. Class III malocclusion
2. III° reverse overbite and overjet
3. Lower anterior lingual inclination

Facial form and Teeth form

1. Orthopedic Treatment?
2. Orthognathic Surgery?
3. Fixed Orthodontic Treatment?

MEAW Tech
Transmission Straight-Wire Tech
Implant Tech

Transmission Straight-Wire Technique

3M
9M
12M
Transmission Straight-Wire Technique

19M

NOW

Force and Beauty

Eternal Theme

Fine wire + light force
**Application experience of Class III elastics**

1. Choose appropriate cases
   - Class III elastics is unsuitable for patients with open bite
   - Class III elastics is suitable when needed to open the bite or move the upper dental arch forward

2. Limit using time of intermaxillary elastics
   - Intermaxillary elastics can not be used for a very long time
   - During elastics, other treatment should be appropriately limited

3. Employ right methods to avoid side effects
   - Adding labial crown torque to thick rectangular wire with posterior wire being pre-expanded to avoid the side effect of arch contraction.
   - For high angle patients with open bite tendency, using TPA to avoid or alleviate side effect.

4. Use suitable force on appliance
   - The force of 50-60g on each side is suitable for intermaxillary elastics.

**Features of Transmission Straight-Wire Tech**

<table>
<thead>
<tr>
<th>Mystique and magic of transmission effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Particularity of the position of canine</td>
</tr>
<tr>
<td>2. Teeth tipping and backward movement</td>
</tr>
<tr>
<td>one by one only need 50-60g force</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exquisite designed brackets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Special design of single bracket</td>
</tr>
<tr>
<td>Edge-off structure, step, cross pipe</td>
</tr>
<tr>
<td>2. Particularity of Class III brackets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solving the overbite and overjet at first</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not bonding brackets in premolar area</td>
</tr>
<tr>
<td>at first</td>
</tr>
<tr>
<td>2. Using intermaxillary elastics and</td>
</tr>
<tr>
<td>improving profile from the beginning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24 hours thin wire with light force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Take effect for 24 hours</td>
</tr>
<tr>
<td>2. 50-60g force can modify mild to</td>
</tr>
<tr>
<td>moderate skeletal deformity</td>
</tr>
</tbody>
</table>

**Superiority Combination**

- **Cuspid bracket**
  - Edge-off Structure
  - Tip back bend
  - Tip back bend
  - Tip back bend

- **Other brackets**
  - No Edge-off
  - Step
  - Cross pipe
  - Horizontal pipe: NiTi wire
  - Vertical pipe: For hooks et al

- **Fast tipping movement of canine**
- The oblique ligation is similar to self-ligating bracket

- **Teeth can move accurately**
- The same as Cuspid bracket
- The same as Cuspid bracket

**Key points of Transmission Straight-Wire Tech**

- **Correct bending of arch wire**
- **The adjustment of the force of Class III elastics**
- **The theory of differential movement**

**Improving the overbite and overjet first**

- **Improving the overbite and overjet first**
  - Improving face profile quickly and obviously
  - Molars reach Class I relationship quickly
  - Incisors can go back to normal position quickly
  - The change of the soft and hard tissues is obvious

**Transmission Straight-Wire Technique**

**CC:**
- Mandibular Protrusion
- Concave Profile
1. Modify crossbite first
2. No brackets in premolar area
3. Oblique ligation decrease friction

Extract 36,47

Beginning 3 Months 8 Months End

Extract 36,47

Extract 36,47

Torquing auxiliary arch

Extract 36,47
35 years old
Mandibular Protrusion
Concave profile

Problems List:
1. Class III malocclusion
2. Anterior crossbite
3. 45 residual crown, 14 elongation

Treatment plan:
1. Extract 15, 25, 31, 45
2. Transmission Straight-Wire Tech
3. Mini-implant anchorage

Not bonding brackets in premolar area first
Class III elastics with light force

12M
Triangle spaces in posterior area
The patient asked to do some stripping
Adding the difficulties of keeping the inclination of teeth

Pre-treatment

Post-treatment

Pre-treatment

Post-treatment
Problem List:
1. Skeletal crossbite of anterior teeth, mandibular can't move backwards
2. 14, 24, 32 loss
3. Lower anterior bone is thin
4. Family heredity history

Treatment plan:
1. Non-extraction treatment
2. Transmission Straight-Wire Tech
3. Mini-implant anchorage

CC:
Mandibular Protrusion
Skeletal crossbite of anterior teeth
Concave profile

14, 24, 32 congenital missing
Pre-treatment 1.5 year later

CC:
Mandibular Protrusion
Open bite and cross bite of anterior teeth
Concave profile

Problems List:
1. Class III malocclusion
2. Cross bite and open bite of anterior teeth
**Treatment plan:**
1. Non-extraction treatment
2. Mini-implants in posterior area of Max and Mand
   - Max implants for molars intrusion
   - Mand implants for anterior teeth retraction

**Extracting the mandibular third molar**
1. If is already erupted normally, or eruption space is enough
2. If is impacted, and the distance from the distal crown of 7 to mand ascending ramus is longer than the space we need to distalize lower dentition

**Implant position**
1. Distal buccal side of 7
2. Between the root of 6 and 7, near to distal

**Distalizing the dental arch**
1. Tipping movement of anterior teeth, crown:root = 5:1
2. Whole movement of posterior teeth, crown:root = 5:3

**Vertical control the height of posterior teeth**
1. Preventing posterior extrusion
2. Preventing "Wedging effect"

**Features of using mini-implant**

<table>
<thead>
<tr>
<th>Feature</th>
<th>MEAW</th>
<th>Transmission</th>
<th>Mini-implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extracting the mandibular third molar</td>
<td>Profile change is slight, main change is teeth and occlusion plane</td>
<td>Adjusting occlusion accurately</td>
<td>Profile change is obvious, patient become more confident</td>
</tr>
<tr>
<td>Implant position</td>
<td></td>
<td>Light force system, don't need special anchorage devices</td>
<td>Vertical control can prevent “wedging effect”</td>
</tr>
<tr>
<td>Distalizing the dental arch</td>
<td></td>
<td>Transmission effect</td>
<td>Shorten course of treatment</td>
</tr>
<tr>
<td>Vertical control the height of posterior teeth</td>
<td>Adjusting midline shift and mandibular deviation simultaneously</td>
<td>Need to consider the distal space of the second molar and to extract mand 8</td>
<td></td>
</tr>
</tbody>
</table>
## Comparison of three methods

<table>
<thead>
<tr>
<th></th>
<th>ME.A.W</th>
<th>Transmission</th>
<th>Mini-implant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complexity</strong></td>
<td>Complex需带多个线圈</td>
<td>Simple</td>
<td>Medium需小型植牙手术</td>
</tr>
<tr>
<td><strong>Comfort</strong></td>
<td>Bad L-loop容易压迫牙龈</td>
<td>Medium需上下颌环</td>
<td>Medium需弹性链可能压迫牙龈</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td>High需24小时弹性</td>
<td>High需24小时弹性</td>
<td>Low需由医生安排</td>
</tr>
</tbody>
</table>

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