MSE
Maxillary Skeletal Expander
Invented by Prof. Won Moon
UCLA School of Dentistry

BIOMATERIALS KOREA
Dr. Won Moon is the Thomas R. Bales Endowed Chair in Orthodontics and serving as the program director for an orthodontic residency program, UCLA School of Dentistry. He has been a Diplomate of the American Board of Orthodontics since 2002. He completed his dental education at Harvard and orthodontic education at UCLA. He studied mathematics prior to dentistry, and his research topics include 3D image analysis utilizing surface mapping functions and Elliptical Fourier’s Descriptors, Genomewide Association Study of Craniofacial Phenotypes, Finite Element Model Development and Simulation, Applications of 3D Printing in Orthodontics, Orthopedic Correction, Airway Changes with Orthopedic Corrections, Accelerated Tooth Movement, and Micro-implant (Mi) Design study. His work has been published in various journals, not necessarily limited to orthodontics because of his background, and he is a co-author of two textbooks. He is currently working on a textbook, “Midfacial Expansion”. He has presented these findings in 17 countries, totaling over 150 presentations. His current focus has been establishing protocols for orthopedic corrections with Mi, improving the airway for patients with nasal obstruction, and creating virtual patients utilizing image analysis.

His interest in mid-facial expansion began in 2005 as micro-implant became available in USA, and he is responsible for developing Maxillary Skeletal Expander (MSE), a unique micro-implant assisted rapid palatal expander (MARPE). He has been active in advocating non-surgical skeletal expansion in both children and adult patients, especially for those who may suffer from airway restrictions. His presentation in MSE has been widely accepted internationally, and numerous peer-reviewed publications are available.
Components

1. **MSE Expander** (Available expansion sizes: 8mm, 10mm & 12mm)
   Choose an expander size according to the width of patient’s palatal vault

2. **Micro Implant (M.I)** (Ø 1.8mm X 11mm & 13mm Lengths are available)
   Choose M.I length according to the thickness of patient’s palatal bone
   *For MSE type 1, M.I is Ø 1.5mm and for MSE type 2, M.I is Ø 1.8mm

3. **2 Activation Keys (1 Short & 1 Long)**

4. **Mini Hand Driver**
   Use with initial insertion of M.I placement
   The best way is to use Mini Hand Driver for initial

5. **Ratchet Wrench Driver**
   Inserting and Removing M.I

6. **Short Engine Blade (Shaft)**
   Attach to Mini Hand Driver

7. **Safety Leashes**
   With ③ activation key
HOW TO USE
COMPONENTS

Mini Hand Driver + Short Engine Blade

1. MHD and SEB
2. Insert a blade into the mini hand driver hole
3. Rotate the Blade until going through the MHD
4. Place M.I same as a picture
5. To separate the SEB and MHD, Press the blue button on the MHD

Ratchet Wrenches

Max. Insertion Torque : 80Ncm
The button on the Top : Locking direction
The button on the bottom : Releasing direction

Safety Leash + Activation Key

1. Activation Key & Safety Leashes
2. Pass through the key hole
1. **Take 1:1 Cephalo**
   To measure thickness of palatal bone and determine the proper length of M.I

2. **Lab work**
   - Posterior position
   - Weld to 6th teeth molar band

3. **Insertion M.I**
   - Bi-cortical Engagement
   - Vertical insertion
   - Use RW Driver and Mini driver

4. **Activation protocol**
   - 6 Turns $\approx 0.8$mm (1 revolution)
   - ex) MSE II - 12 means to expand 12mm, Max. 90 turns
1. Deciding an expander size of MSE by the width of maxillary arch

<table>
<thead>
<tr>
<th>MSE</th>
<th>8mm</th>
<th>10mm</th>
<th>12mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type1</td>
<td>13.4mm</td>
<td>15.4mm</td>
<td>17.4mm</td>
</tr>
<tr>
<td>Type2</td>
<td>14.1mm</td>
<td>16.1mm</td>
<td>18.1mm</td>
</tr>
</tbody>
</table>

*The expansion size does not mean the width of the MSE. (Please see the dimension above)
2. To measure thickness of palatal bone and determine the proper length of M.I

*To be bi-cortical, The Inventor recommends to 11mm Length M.I, but if a mid palatal is narrow, 13mm M.I can be used.

<table>
<thead>
<tr>
<th>Model</th>
<th>D(Diameter)</th>
<th>L1(Head part)</th>
<th>L2(Non-thread part)</th>
<th>L3(Thread part)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAS-T1511</td>
<td>1.50</td>
<td>2.10</td>
<td>4.00</td>
<td>7.00</td>
</tr>
<tr>
<td>OAS-T1513</td>
<td>1.50</td>
<td>2.10</td>
<td>6.00</td>
<td>7.00</td>
</tr>
<tr>
<td>OAS-T1811</td>
<td>1.80</td>
<td>2.10</td>
<td>4.00</td>
<td>7.00</td>
</tr>
<tr>
<td>OAS-T1813</td>
<td>1.80</td>
<td>2.10</td>
<td>6.00</td>
<td>7.00</td>
</tr>
</tbody>
</table>
Fabrication 1

Posterior Palatal Vault Between 6th and 7th teeth. In order to direct the expansion force against the buttress bones.
**Fabrication 2**

This process is one of the most important procedures to be success incorporate Bi- Cortical engagement & splitting of the suture

Proper MSE lab fabrication required : (Refer FAQ)

Less than 1mm space between palatal vault and the expander
Keep at least 3mm space between supporting arms and soft tissue in order to prevent tissue impingement

Soldered arms to the molar bands are intended as a guide for proper MSE placement

Even if the Mid-Palatal suture line is not in the middle, MSE must be placed vertically from the Mid-Line of the maxilla

**Fabrication 3**

Posterior position
Fabrication 4

Place for suture line

1) MSE be placed as suture line

2) If suture is not vertical line, MSE needed to be additional expansion should place with suture line.
1. Vertical Insertion

After an expander placement, Insert M.I. When inserting M.I., make sure they are placed vertically with proper insertion guidelines. (1-2-3-4)

2. Can I use a Motor Driver?

The inventor recommends to use the manual driver for placing M.I. Because you can feel insertion torque and Bi-Cortical engagement as well.

If you use a motor driver, you can’t feel insertion torque and bi-cortical engagement.

Increasing high TQ level

Please don’t insert the TAD too tightly because MSE body will be bent by strong pressures or forces.

* [Manual Driver] MHD + SEB

* [Manual Driver] RW

It is important to insert M.I. by applying force intermittently.
Bi cortical process

1. Initial penetration with force
2. Relatively easier insertion after the first layer of cortical bone
3. Tighter insertion when the second layer of cortical bone is being penetrated
4. Slight release of tightness and tickling sensation in the nose.
Activation Protocol

Caution: There could be situation when the hexagonal nut is not able to turn by the activation key. In this case, stop activation for max 3 weeks for bone regeneration.

MSE I

4 Turns = 0.8mm (1 revolution)
ex) MSE - 8 means to expand 8mm, Max. 40 turns

MSE II

6 Turns = 0.8mm (1 revolution)
ex) MSE II - 12 means to expand 12mm, Max. 90 turns

<table>
<thead>
<tr>
<th>Age Group</th>
<th>MSE I</th>
<th>MSE II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early teens</td>
<td>3X / week (0.60mm / week)</td>
<td>6X / week (0.80mm / week)</td>
</tr>
<tr>
<td>Late teens</td>
<td>1 X / day (0.20mm / day)</td>
<td>2 X / day (0.27mm / day)</td>
</tr>
<tr>
<td>Early to Mid-20's</td>
<td>2<del>3X / day (0.40</del>0.60mm / day)</td>
<td>4<del>6X / day (0.53</del>0.80mm / day)</td>
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<tr>
<td>Older</td>
<td>Min. 2~3X / day, assistance PRN</td>
<td>Min. 4~6X / day</td>
</tr>
<tr>
<td>After Diastema</td>
<td>1X / day (0.20mm / day)</td>
<td>2X / day (0.27mm / day)</td>
</tr>
<tr>
<td>DATE</td>
<td>TOPIC</td>
<td>VENUE</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------</td>
<td>--------------------------------------------</td>
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<tr>
<td>FEB.29 - MAR.1</td>
<td>The 47th Annual Moyers Symposium, The University of Michigan</td>
<td>Rackham Auditorium, Horace H. Rackham School of Graduate Studies, The University of Michigan</td>
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<tr>
<td>MAR.5</td>
<td>The 53rd International Congress of the Mexican Association of Orthodontics 2020</td>
<td>Cede Centro Expositor, Puebla, Puebla, Mexico</td>
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<tr>
<td>MAR.9</td>
<td>MSE Seminar in Puebla, Mexico</td>
<td>TBA (Puebla, Mexico)</td>
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<tr>
<td>MAR.13</td>
<td>MSE Seminar for the Partnership Study Club</td>
<td>1150 Civic Dr Suite 101, Walnut Creek CA 94596</td>
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<tr>
<td>APR.19</td>
<td>MSE Seminar for EODO (Excellence in Orthodontics and Dentofacial Orthopedics) in Australia</td>
<td>TBA (Sidney, Australia)</td>
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<tr>
<td>APR.29</td>
<td>Charles J. Burstone Lecture for University of Connecticut</td>
<td>TBA</td>
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<tr>
<td>MAY.1</td>
<td>Pre-AAO UCLA CE Course with Hands-on Workshop</td>
<td>TBA (Atlanta, Georgia near the AAO Convention)</td>
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<tr>
<td>MAY.5</td>
<td>Advanced Implant Orthodontics Course in Madrid/UCLA</td>
<td>UCLA School of Dental Medicine</td>
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<tr>
<td>MAY.27 - 30</td>
<td>The 66th Congress of the Spanish Society of Orthodontics (SEDO)</td>
<td>Grand Canary</td>
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<tr>
<td>JUN.12</td>
<td>The 35th Jarabak Lecture</td>
<td>University of Michigan</td>
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<tr>
<td>JUN.19</td>
<td>Annual Alumni Reunion Meeting, Louisiana State University (LSU) Health Sciences Center</td>
<td>Louisiana State University (LSU) Health Sciences Center</td>
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<tr>
<td>SEP.11</td>
<td>The 50th Anniversary Celebration for University of West Virginia</td>
<td>University of West Virginia</td>
</tr>
<tr>
<td>OCT. 4 - 7</td>
<td>The 9th International Orthodontic Congress (IOC), the 12th Asian Pacific Orthodontic Conference (APOC), and the 79th Annual Meeting of Japanese Orthodontic Society (JOS)</td>
<td>PACIFICO Yokohama in Yokohama, Japan</td>
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<tr>
<td>NOV. 6 - 7</td>
<td>Northeastern Society of Orthodontists (NSEO) 59th Annual Meeting</td>
<td>Bonaventure Hotel, Montreal, CANADA</td>
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Maxillary Skeletal Expander

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Orthodontics

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