Maxillary Skeletal Expander

MSE
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Guide Book Vol.1
Invented by Prof. Won Moon

The First Innovative Expander System in the world
Dr. Won Moon is the Founder of the Moon Principles Institute (“the MoonLab”) and a Co-founder of BioTech Innovation. He served as the Thomas R. Bales Endowed Chair in Orthodontics for the orthodontic residency program at UCLA School of Dentistry (2013–2020), and he currently holds two academic positions: Full-Professorship at Ajou University, and Adjunct Professorship at Forsyth Institute. 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 (FEM) Development and Simulation, Applications of 3D Printing in Orthodontics, Orthopedic Correction, Airway Changes with Orthopedic Corrections, Accelerated Tooth Movement, Micro-implant (MI) Design study, Digital Workflow, and Aligner System Development.

His work has been published in various journals, not necessarily limited to orthodontics because of his physical science background, and he is a co-author of six textbooks. He has presented these findings in 37 countries, totaling over 450 presentations. He received multiple research grants during his tenure at UCLA, including the Groundbreaking Research Project Grant Award in 2014. Besides the numerous research and presentation awards over the years, he has received the “Faculty of the Year Award” more times than anyone at UCLA Orthodontic Program, and he was the recipient of the “Lifetime Achievement and Faculty Dedication/Excellence Award” in 2019. His current focus has been establishing protocols for orthopedic corrections with MI, improving the airway for patients with nasal obstruction, creating virtual patients utilizing image analysis and FEM, and developing a novel Moon Aligner System.

His interest in mid-facial expansion began in 2004 as micro-implant became available in the 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.
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

1. The button on the Top: Locking direction
2. The button on the bottom: Releasing direction

Safety Leash + Activation Key

1. Activation Key & Safety Leashes
2. Pass through the key hole

Overview Process

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 + 0.8mm (1 revolution)
MSE I – 12 means to expand 12mm. Max. 90 turns
ANALYSIS

1. Deciding an expander size of MSE by the width of maxillary arch

2. To measure thickness of palatal bone and determine the proper length of M.I

*To be bi-cortical, the Inventor recommends a 11mm length M.I, but if the maxillary arch is narrow, a 13mm M.I can be used.

### MSE Mini Implant

<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>
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<td>OAS-T1513</td>
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<td>1.80</td>
<td>2.10</td>
<td>6.00</td>
<td>7.00</td>
</tr>
</tbody>
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*The expansion size does not mean the width of the MSE (Please see the dimension above)*
Lab Works

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
Lab Works

Fabrication 4

Place for suture line
1) MSE be placed as 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) If suture is not vertical line, MSE needed to be additional expansion should place with suture line.

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 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.
Placing M.I (Micro Implant)

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 a 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.

<table>
<thead>
<tr>
<th>MSE I</th>
<th>MSE II</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Tums = 0.8mm (1 revolution)</td>
<td>6 Tums = 0.8mm (1 revolution)</td>
</tr>
<tr>
<td>ex) MSE I = 8 means to expand 8mm, Max. 40 turns</td>
<td>ex) MSE II = 12 means to expand 12mm, Max. 90 turns</td>
</tr>
</tbody>
</table>

| Early teens | 3X / week (0.60mm / week) | Early teens | 6X / week (0.80mm / week) |
| Late teens | 1X / day (0.20mm / day) | Late teens | 2X / day (0.27mm / day) |
| Early to Mid-20's | 2-3X / day (0.40-0.60mm / day) | Early to Mid-20's | 4-6X / day (0.53-0.80mm / day) |
| Older | Min. 2-3X / day, assistance PRN | Older | Min. 4-6X / day |
| After Diastema | 1X / day (0.20mm / day) | After Diastema | 2X / day (0.27mm / day) |
Clinical Cases

Airway

MSE (20 Year-Old)