Orthognathic Correction of Class II Open Bite. Using the Piezoelectric System and MatrixORTHOGNATHIC Plating System.

Case Report
Orthognathic Correction of Class II Open Bite.
Using the Piezoelectric System and MatrixORTHOGNATHIC Plating System.

Patient Profile
Patient is a female with a Class II open bite secondary to idiopathic condylar degeneration.

She was treated orthodontically for a Class I malocclusion with a good outcome a few years earlier. However, after treatment, her bite began to change with development of an anterior open bite.

She had no symptoms in any joint. Her TMJ exam was negative for pain. She was sent for a rheumatoid workup which was negative. She had no other significant medical history.

The bite stabilized over the past year so it was felt that orthognathic surgery would be safe to perform. She underwent a very short orthodontic treatment to prepare her teeth for surgery.

Preoperatively, her clinical examination showed excessive maxillary tooth show, a long lower third of the face, lip incompetence, and a retrusive appearance to her chin. There were no asymmetries noted.

Her models showed that she had a slight transverse maxillary deficiency. In this case, Dr. Ellis planned a three-piece Le Fort I osteotomy to establish proper occlusion.
Treatment Plan

Radiographic evaluation indicated that her anterior open bite was likely secondary to symmetric bilateral condylar degeneration.

Cephalometric evaluation revealed high occlusal and mandibular plane angles and retrusion of the mandible. In addition, she had vertical maxillary excess in the anterior region.

Her treatment plan was for a three-piece maxillary osteotomy with anterior intrusion to decrease the tooth show and level the maxillary occlusal plane. This would increase the anterior open bite. Therefore, mandibular advancement and open bite closure would be accomplished using a sagittal split ramus osteotomy. This would also shorten her anterior facial height, decrease her lip incompetence, and bring the chin into a better position. However, an advancement genioplasty was required to bring her chin into a better position.

At the pogonion, the advancement amounted to 17 mm from the combination of mandibular and chin advancements.
Intraoperative Procedure Details

A three-piece LeFort I, sagittal split ramus osteotomy, (Figures 6–8) and genioplasty cuts were made using the Synthes Piezoelectric System. (Figures 6–8) This system consists of a console, foot pedal and handpieces with associated tips for osteotomies of bone and bone substitutes. Osteotomies are made using modulated ultrasonic vibrations at a low frequency (28-36 kHz) such that only mineralized bone is cut with minimal risk to neurovascular structures and soft tissue lesions. Constant irrigation is supplied through the cutting tip to prevent heat generation and necrosis.

Saw tips were used for osteotomies by applying a brush stroke technique with minimum pressure. The smooth and narrow kerf allows for minimal risk of trauma to bone and provides for faster healing.

The Synthes Piezoelectric System offers a safe method of cutting bone that minimizes the risk to the palatal soft tissues and inferior alveolar nerves.

To segment the maxilla, the Synthes Piezoelectric surgical system was used to make a sagittal cut from the posterior maxilla to the anterior region, where cuts between the lateral incisors and canines bilaterally joined it (Figures 9–10).

Results from case reports are not necessarily predictive of results in other cases. Results in other cases may vary.
Plating

Rigid, low-profile fixation was achieved in the maxilla by using Titanium Matrix 90° L-Plates, 2 x 2, reversible, 0.5 mm thick on the lateral buttresses, and Titanium Matrix Oblique L-Plates, 3 x 3, reversible, 0.5 mm thick on the medial buttresses (Figure 11–12).

Etched lines in 1 mm increments on the plates help facilitate bending at the location of the osteotomy.

Note that the anterior plate spans both segments of the maxilla.

Rigid fixation was achieved in the mandible by using Titanium Matrix Sagittal Split Plates, Straight, 8 mm bar, 1.0 mm thick bilaterally (Figure 13–14).

Etched lines in 1 mm increments on the plates helped facilitate bending at the location of the osteotomy.

For extra stability, one position screw was used on the superior border in the proximal segment, bilaterally.

Rigid fixation of the genioplasty was achieved by using a Titanium Matrix Chin Plate with Double Bend, 6 mm offset, 0.7 mm thick (Figure 15).
Results
Postoperative cephalometric and panoramic radiographs show the surgical outcome. The planned movements were accomplished (Figures 16–17).

The maxillary splint was removed at seven weeks and the occlusion was as predicted.

Patient continues to undergo postsurgical orthodontic treatment.

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Surgeon profile
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**Implants Used**

<table>
<thead>
<tr>
<th>Titanium MatrixORTHOGNATHIC Plates</th>
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<tr>
<td><strong>04.511.301</strong> 90° L-Plate, 2 x 2 holes, reversible, short, 0.5 mm thick x 2</td>
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<tr>
<td><strong>04.511.321</strong> Oblique L-Plate, 3 x 3 holes, reversible, short, 0.5 mm thick x 2</td>
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<tr>
<td><strong>04.511.422</strong> Straight Sagittal Split Plate, 4 holes, 1.0 mm thick, 8 mm bar x 2</td>
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<tr>
<td><strong>04.511.462</strong> Chin Plate with Double Bend, 5 holes, 0.7 mm thick, 6 mm offset x 1</td>
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<tr>
<th>Titanium MatrixORTHOGNATHIC Screws</th>
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<tr>
<td><strong>04.511.204.05</strong>– 1.85 mm Screws, self-tapping, 4 mm – 8 mm lengths</td>
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<td><strong>04.511.208.05</strong> Used for all plates in the mandible</td>
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<tr>
<td><strong>04.511.210.05</strong>– 1.85 mm Screws, self-tapping, course pitch, 10 mm–18 mm lengths.</td>
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<td><strong>04.511.218.05</strong> Used for position screws in the mandible.</td>
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<tr>
<td><strong>04.511.224.05</strong>– 1.85 mm Screws, self-drilling 4 mm–8 mm lengths</td>
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<td><strong>04.511.228.05</strong> Used for all plates in the maxilla</td>
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Piezoelectric System

03.000.401.98S   Saw Cutting Tip, 20.9 mm x 14.1 mm x 4.0 mm x 0.6 mm, sterile

03.000.400.01S   Irrigation Tubing, Single Pack, for Piezoelectric System, sterile (Not shown)

05.001.400.98   Console, for Piezoelectric System

05.001.401.98   Handpiece, for Piezoelectric System

05.001.402.98   Foot Pedal, for Piezoelectric System

05.001.403.98   Torque Wrench, for Piezoelectric System