MatrixMANDIBLE Preformed Reconstruction Plates. Preshaped to the mandibular anatomy.
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MatrixMANDIBLE Preformed Reconstruction Plates are pre-shaped to the anatomy of the mandible. Their shape was obtained by statistical analysis of data derived from more than 2,000 CT scans originating from various adult populations. Plates are available in three sizes: small, medium, and large.

The general anatomic shape of the MatrixMANDIBLE Preformed Reconstruction Plates can save time in the OR by reducing the number of bends required to completely contour the plate when compared to a traditional (non-preformed) reconstruction plate.*

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<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anatomically preformed plates</td>
<td>- Reduces OR time</td>
</tr>
<tr>
<td>- Smooth continuous plate section through the body and angle</td>
<td>- Limits hole deformation that results from extensive bending</td>
</tr>
<tr>
<td>- Sizers cover 2/3 of the mandible perimeter, from ramus past the contralateral mental foramen</td>
<td>- Minimizes stress in the plate resulting in significantly increased fatigue life compared to traditional (non-preformed) reconstruction plates</td>
</tr>
<tr>
<td>- Anatomically preformed sizers</td>
<td>- Addresses the majority of tumor resections</td>
</tr>
<tr>
<td>- 2.5 mm thick plate available in three sizes: small, medium, large (right/left in each size)</td>
<td>- Ensures the correct plate size selection</td>
</tr>
<tr>
<td>- Light blue color follows the MatrixMANDIBLE color scheme</td>
<td>- Addresses the anatomy of the majority of mandibles**</td>
</tr>
<tr>
<td>- Threaded plate holes</td>
<td>- Facilitates identification of optimal screw diameter and instruments</td>
</tr>
<tr>
<td>- Designed for use with MatrixMANDIBLE screws and instruments</td>
<td>- Allows use of locking or nonlocking screws</td>
</tr>
<tr>
<td>- Compatible with Condylar Head Add-on System</td>
<td>- Integrates easily with the available systems</td>
</tr>
</tbody>
</table>

The combination of anatomic design and manufacturing processes limits stress in the plate compared to classic intraoperative bending of a traditional (non-preformed) plate. The minimal intraoperative bending that may be required preserves the optimal threaded hole shape, with no deformation of holes in the preformed sections. These features result in a plate which has a significantly increased fatigue life when compared to traditional (non-preformed) reconstruction plates.**

* Data on file at Synthes.
** Testing was done to compare 2.5 mm thick MatrixMANDIBLE Reconstruction Plates to 2.5 mm thick MatrixMANDIBLE Preformed Reconstruction Plates. The plates were fixtured in a cantilever manner with a cyclical load between 13.9 N and 139 N applied to the vertical aspect of each plate. The plates were cyclically loaded until either failure or runout at 1,000,000 cycles. The traditional (non-preformed) reconstruction plates failed on average at 28,880 cycles while the preformed plates achieved runout at 1,000,000 cycles. Mechanical testing is not indicative of clinical outcomes.
Sizers
- Used to determine the correct plate size
- Hemimandibular anatomical shape with shorter ramus than the corresponding plate
- One sizer for each plate (6 total)

Bending templates
- Three sizes: small, medium and large, correspond to the plate sizes
- One bending template for left and right plates in each size
- Flattened representation of corresponding plate

* In this figure, colors are used only for the illustration of the plate regions and their corresponding areas on the sizers and bending templates.
In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation. They are:

**Anatomic reduction**
Fracture reduction and fixation to restore anatomical relationships.

**Stable fixation**
Stability by fixation or splintage, as the personality of the fracture and the injury requires.

**Preservation of blood supply**
Preservation of the blood supply to soft tissue and bone by careful handling.

**Early, active mobilization**
Early, active mobilization of the part and patient.

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Indications

The Synthes MatrixMANDIBLE Preformed Reconstruction Plates are intended for use in oral and maxillofacial surgery, trauma, and reconstructive surgery. This includes primary mandibular reconstruction, comminuted fractures and temporary bridging pending delayed secondary reconstruction,* including fractures of edentulous and/or atrophic mandibles, as well as unstable fractures.

**Primary clinical use**
Primary mandibular reconstruction used with vascularized, or nonvascularized, bone graft

**Secondary clinical uses**
Comminuted fractures

Temporary bridging until delayed secondary reconstruction*

Fractures of atrophic or edentulous mandible

Unstable fractures

* Plate fracture is possible when any plate bears the entire functional load for extended periods. Therefore, the implantation of a bone graft immediately, or at a later date, is necessary to support the construct. Reference: J. Prein. *Manual of Internal Fixation in the Cranio-Facial Skeleton.* Berlin: Springer-Verlag. 1998.
Surgical Technique

Exposure and reduce mandible

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>398.985</td>
<td>Bone Reduction Forceps, large</td>
</tr>
<tr>
<td>398.986</td>
<td>Bone Reduction Forceps, small</td>
</tr>
</tbody>
</table>

After completing the preoperative plan, expose the fracture or osteotomy site. For trauma, reduce the fracture as required.
2

Determine size of preformed plate

Instruments

03.503.900 – Sizers for MatrixMANDIBLE Preformed
03.503.905  Reconstruction Plates

Place the sizer marked “MEDIUM” on the mandible as though placing a plate, beginning at the chin region (mental foramen) and continuing through the parasymphysis. The sizer should contact the mandible on both chin and body regions.

Note: Do not bend sizers.
2. Determine size of preformed plate.

One of three conditions may occur with respect to the relation between the ramus of the mandible and the corresponding region of the sizer. Use the following guideline for proper implant selection.

If the posterior border of the vertical mandibular ramus and the corresponding region of the sizer are correctly aligned (Figure 1), use the medium plate and bending template.

If the vertical ramus portion of the sizer is posterior to the posterior border of the mandible (Figure 2), use the small plate and bending template. Use the “SMALL” sizer to confirm the size.
If the vertical ramus portion of the sizer lies distal to the posterior border of the mandibular ramus (Figure 3), then use the large plate and bending template. Use the “LARGE” sizer to confirm the size.

**Technique tip**

**Instrument**

| 03.503.056 MatrixMANDIBLE Combination Bender |

The length of the plate can be slightly increased or decreased by widening or narrowing the curvature in the chin region. The first 2–4 holes following the nonadaptable section of the plate will have the most influence on the length with minimal bending.

**Note:** If none of the plates fit, and if adaption of the MatrixMANDIBLE preformed reconstruction plate is not suitable for the patient; then a MatrixMANDIBLE traditional (non-preformed) plate of 2.0 mm, 2.5 mm or 2.8 mm thickness, depending on the indication, should be used.
3
Select and form bending template

Instruments

<table>
<thead>
<tr>
<th>Instrument Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.910</td>
<td>Bending Templates for MatrixMANDIBLE</td>
</tr>
<tr>
<td>03.503.912</td>
<td>Preformed Reconstruction Plates</td>
</tr>
</tbody>
</table>

Select the bending template equivalent to the plate size determined in Step 2.

Preform the bending template inside the preformed plate by aligning the specific delimited regions (vertical ramus, body) with the corresponding areas of the plate and pressing it against the inner surface of the plate. Press along the length of the plate, starting from the vertical ramus.

Form the bending template by placing it on the mandible as when placing the plate, and press it against the bone surface.

Bending templates can be adjusted to the desired length, if necessary, by cutting the unwanted simulated hole sections with a cutter.

Notes: Stable fixation requires a minimum of three screws in both proximal and distal segments.

When using the MatrixMANDIBLE preformed reconstruction plates as a temporary bridging device with 2.4 mm or 2.9 mm locking screws, allow for four screws per segment. If limited bone length or poor bone quality exists, a minimum of three 2.9 mm locking screws should be used.
Cut plate

Instrument

03.503.057  MatrixMANDIBLE Short Cut Plate Cutter (2 required)

Plate holes can be cut using two short cut plate cutters. To avoid soft tissue damage, deburr the cut plate when appropriate, using the manual deburring feature on the handle of the cutter.

If necessary, cut the last holes of the posterior vertical portion of the plate to match the length of the ramus.

Reposition the plate on the mandible to determine the number of holes to be cut from the chin region, if any.

Cut the holes from the chin region, as determined.

**Note:** Plate cannot be cut in region indicated in red.
Contour the plate

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.056</td>
<td>MatrixMANDIBLE Combination Bender</td>
</tr>
<tr>
<td>03.503.077*</td>
<td>MatrixMANDIBLE Plate Bending Iron, left</td>
</tr>
<tr>
<td>03.503.078*</td>
<td>MatrixMANDIBLE Plate Bending Iron, right</td>
</tr>
</tbody>
</table>

Use the MatrixMANDIBLE Combination Bender to perform in-plane and out-of-plane bending. For torsional bends use the bending irons. The bending irons can also be used to perform in-plane and out-of-plane bending. If in-plane bending is required, complete the bend using the “IN-PLANE BEND” feature of the MatrixMANDIBLE Combination Bender or the bending irons.

To make out-of-plane bends in the ramus portion of the plate, starting with the hole adjacent to the non-bendable plate section. Bend each hole section in consecutive order, as necessary.

Bend the chin area, starting at the hole adjacent to the non-bendable plate section. Bend each hole in consecutive order, as necessary. Flip the plate if the desired region of the plate does not fit in the “OUT-OF-PLANE BEND” feature of the instrument.

Caution: Avoid reverse bends and sharp bends (sharp bends include a single out-of-plane bend between two adjacent holes of > 30º). Reverse or sharp bends may weaken the plate and lead to premature plate failure.

Technique tip: For out-of-plane bends > 30º, perform bend across multiple hole segments. This can be achieved by first using the “OUT-OF-PLANE BEND” features of the Combination Bender, then bending to the desired angle.

Notes:

If the Condylar Head Add-on System (01.449.002) will be used, the last three hole segments of the plate where the condylar head attaches should not be bent.

When using the MatrixMANDIBLE Combination Bender, follow the steps as shown on the instrument. The “LAST HOLE BEND” feature should only be used for bending the last hole of the plate.

*Also available
Prior to contouring the plate to the patient’s anatomy, bending inserts should be threaded into the plate holes in regions where more extensive bending is desired to prevent deformation of the holes. Use a MatrixMANDIBLE screwdriver blade to thread the inserts into the selected plate holes.

**Note:** Extensive bending would include bends that exceed the range typical for adapting to the mandible, e.g., >20° in torsion and in-plane bending, and >45° out-of-plane bending.

Bend the plate to the desired geometry using the combination bender or plate bending irons. Once the proper bend is achieved (and before fixing the plate to the bone) use the screwdriver to remove the bending inserts.
6

**Position plate**

**Instrument**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.062</td>
<td>MatrixMANDIBLE Plate Introducing Forceps</td>
</tr>
</tbody>
</table>

Place the plate over the planned resection or fracture zone.

7

**Select screw size**

Determine the appropriate locking screw size (2.4 mm or 2.9 mm).

**Caution:** 2.0 mm diameter screws should only be used with the MatrixMANDIBLE preformed reconstruction plates if inserted into a bone graft, or if bone volume does not permit the placement of a larger screw.

In accordance with AO technique, it is important not to insert screws into infected bone.
8

Drill first hole

Three drill guide options are available to meet surgeon preference: short threaded drill guide, universal drill guide or transbuccal instruments.

Regardless of the option chosen, first drill the hole closest to the fracture or osteotomy site in the proximal (posterior) segment (1).

Then drill the hole closest to the fracture or osteotomy site in the distal (anterior) segment (2).

Caution: Drilling speed should never exceed 1,800 rpm. Higher speeds can result in thermal necrosis of the bone. Always irrigate during drilling.

Option 1—Threaded drill guides, short

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.044</td>
<td>MatrixMANDIBLE 1.8 mm Threaded Drill Guide, Short</td>
</tr>
<tr>
<td>03.503.046</td>
<td>MatrixMANDIBLE 2.4 mm Threaded Drill Guide, short</td>
</tr>
<tr>
<td>03.503.461</td>
<td>MatrixMANDIBLE 1.8 mm Drill Bit, J-latch, 90 mm, for 03.503.044</td>
</tr>
<tr>
<td>03.503.471</td>
<td>MatrixMANDIBLE 2.4 mm Drill Bit, J-latch, 90 mm, for 03.503.046</td>
</tr>
</tbody>
</table>

If wide exposure is available, use the appropriate diameter short threaded drill guide. Rotate the drill guide clockwise to engage the threads into the plate.

Note: Drill guides are color-coded to match the relevant screw size.
8. Drill first hole.

**Option 2—Universal drill guide**

**Instruments**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.461</td>
<td>MatrixMANDIBLE 1.8 mm Drill Bit, J-latch, 90 mm, for 03.503.044</td>
</tr>
<tr>
<td>03.503.471</td>
<td>MatrixMANDIBLE 2.4 mm Drill Bit, J-latch, 90 mm, for 03.503.046</td>
</tr>
<tr>
<td>323.204</td>
<td>2.0 mm/2.4 mm Universal Drill Guide</td>
</tr>
</tbody>
</table>

The universal drill guide may be used when good visualization is available.

If using a locking screw, align the drill guide perpendicular to the plate.

**Note:** Drill bits with mini quick coupling are also available.

**Option 3—Cannula and obturator**

**Instruments**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.045</td>
<td>MatrixMANDIBLE Trocar Drill Guide, for 397.213</td>
</tr>
<tr>
<td>03.503.047</td>
<td>MatrixMANDIBLE Threaded Trocar Drill Guide, for 397.213</td>
</tr>
<tr>
<td>03.503.477</td>
<td>MatrixMANDIBLE 1.8 mm Calibrated Drill Bit, J-latch, for 03.503.045/03.503.047</td>
</tr>
<tr>
<td>03.503.478</td>
<td>MatrixMANDIBLE 2.4 mm Calibrated Drill Bit, J-latch, for 03.503.045/03.503.047</td>
</tr>
<tr>
<td>397.211</td>
<td>Universal Trocar Handle</td>
</tr>
<tr>
<td>397.213</td>
<td>2.0 mm Cannula and Obturator</td>
</tr>
</tbody>
</table>
After creating a stab incision, pass the cannula with obturator carefully through the soft tissue, then remove the obturator.

Pass the drill guide through the cannula and snap it in place. Position the tip of the cannula on the plate, at the hole intended for the screw. If the threaded drill guide is used, rotate the drill guide clockwise to engage the threads in the plate.

With the correct diameter calibrated drill bit, drill directly through the drill guide. The depth of drilling can be determined by observing where the colored rings on the drill match the fixed surface on the drill guide, and correlating these to the chart in the transbuccal module.

**Note:** To achieve optimal angular stability with locking screws, the hole must be drilled coaxial with the plate hole, or at a right angle to the plate. However, a certain amount of variation can be tolerated.

Three different cheek retractor options are available for use with the cannula and obturator.

**Optional instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>397.232</td>
<td>Malleable C-Retractor</td>
</tr>
<tr>
<td>397.42</td>
<td>2.0 mm Cheek Retractor Blade</td>
</tr>
<tr>
<td>397.43</td>
<td>2.0 mm Cheek Retractor Ring</td>
</tr>
</tbody>
</table>

**Notes:** Drill bits with mini quick coupling also available.

The MatrixMANDIBLE trocar drill guide and threaded trocar drill guide can be used with the drill bits from the transbuccal module as longer alternatives for the short drill guides described in Option 1.
9

Measure screw length

Instrument

03.503.036 MatrixMANDIBLE Depth Gauge

Determine the appropriate screw length using the depth gauge.
10

Insert screws

Instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.503.070</td>
<td>MatrixMANDIBLE/MatrixRIB Self-Retaining Screwdriver Blade, short</td>
</tr>
<tr>
<td>03.503.071</td>
<td>MatrixMANDIBLE/MatrixRIB Self-Retaining Screwdriver Blade, medium</td>
</tr>
<tr>
<td>03.503.072</td>
<td>MatrixMANDIBLE/MatrixRIB Self-Retaining Screwdriver Blade, long</td>
</tr>
<tr>
<td>311.004*</td>
<td>Fixed-Swivel Screwdriver Handle</td>
</tr>
<tr>
<td>311.007</td>
<td>Screwdriver Handle with hex coupling, large</td>
</tr>
<tr>
<td>311.023</td>
<td>Ratcheting Screwdriver Handle</td>
</tr>
</tbody>
</table>

Insert the proper length locking or nonlocking screw through the plate and into the hole closest to the fracture or osteotomy site in the proximal segment. Tighten the screw until secured.

Notes: For maximum stability, locking screws are recommended. Use nonlocking screws if a bone fragment must be repositioned by pulling it against the plate, or if a very high screw angulation is needed.

If using the 2.0 mm cannula, remove the drill guide, then insert the self-retaining screwdriver with the screw engaged on the blade.

Technique tip: To engage the screw on the blade, align the blade over the cruciform recess and slowly rotate it counterclockwise until the blade drops into the recess. Firmly press the blade to fully seat it into the screw.

Gently rocking the engaged screwdriver facilitates the removal of the screwdriver blade.
Drill and place remaining screws

Insert the second screw on the opposite side of the planned resection gap or fracture zone, following the previously described procedure.

Insert all remaining screws, alternating to each side of the mandible. Securely tighten all screws unless resection is to follow. Apply additional fixation as desired.
Steps for Bone Resection

1
Resect mandible

Instruments

<table>
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<tbody>
<tr>
<td>03.503.070</td>
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<td>MatrixMANDIBLE/MatrixRIB Self-Retaining Screwdriver Blade, medium</td>
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<td>MatrixMANDIBLE/MatrixRIB Self-Retaining Screwdriver Blade, long</td>
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<td>Fixed-Swivel Screwdriver Handle</td>
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</tr>
<tr>
<td>311.023</td>
<td>Ratcheting Screwdriver Handle</td>
</tr>
</tbody>
</table>

*Also available

Once the plate is in place, remove the plate and screws, taking note of each screw’s placement. The screw caddy provided in the instrument tray can be used for this purpose.

Resect the mandible.
2  
**Replace implants**

Place the plate back onto the mandible in its original position.

Reinsert each predetermined screw. Check all screws to ensure a secure fit in the plate.

3  
**Apply bone graft**

A vascularized or nonvascularized bone graft may be applied for a primary reconstruction.

The MatrixMANDIBLE preformed reconstruction plate may bridge continuity defects without bone graft temporarily, prior to a secondary reconstruction.*

* Plate fracture is possible when any plate bears the entire functional load for extended periods. Therefore, the implantation of a bone graft immediately, or at a later date, is necessary to support the construct.

MatrixMANDIBLE Preformed Reconstruction Plates

2.5 mm thick (light blue)

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium MatrixMANDIBLE Preformed Reconstruction Plates, right</td>
<td>04.503.900</td>
<td>Small (shown)</td>
</tr>
<tr>
<td></td>
<td>04.503.902</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>04.503.904</td>
<td>Large</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>Titanium MatrixMANDIBLE Preformed Reconstruction Plates, left</td>
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<td>Small (shown)</td>
</tr>
<tr>
<td></td>
<td>04.503.903</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>04.503.905</td>
<td>Large</td>
</tr>
</tbody>
</table>
**Instruments**

**Sizers, for use with 2.5 mm thick MatrixMANDIBLE Reconstruction Plates, right**
- 03.503.900 Small (shown)
- 03.503.902 Medium
- 03.503.904 Large

**Sizers, for use with 2.5 mm thick MatrixMANDIBLE Reconstruction Plates, left**
- 03.503.901 Small (shown)
- 03.503.903 Medium
- 03.503.905 Large

**Bending Templates for MatrixMANDIBLE Preformed Reconstruction Plates**
- 03.503.910 Small (shown)
- 03.503.911 Medium
- 03.503.912 Large
MatrixMANDIBLE Preformed Reconstruction Plate Set (01.503.900)

**Graphic Cases and Modules**
- 60.503.900  Module for MatrixMANDIBLE Preformed Reconstruction Plates and Instruments, with lid

**Instruments**
- Sizers, for use with 2.5 mm thick MatrixMANDIBLE Reconstruction Plates
  - 03.503.900  Small, right
  - 03.503.901  Small, left
  - 03.503.902  Medium, right
  - 03.503.903  Medium, left
  - 03.503.904  Large, right
  - 03.503.905  Large, left
- Bending Templates for MatrixMANDIBLE Preformed Reconstruction Plates
  - 03.503.910  Small
  - 03.503.911  Medium
  - 03.503.912  Large

**Implants**
- Titanium MatrixMANDIBLE Preformed Reconstruction Plates, 2.5 mm thick, 2 ea.
  - 04.503.900  Small, right
  - 04.503.901  Small, left
  - 04.503.902  Medium, right
  - 04.503.903  Medium, left
  - 04.503.904  Large, right
  - 04.503.905  Large, left

**Required Set**
- 01.503.150  MatrixMANDIBLE Implant and Instrument Set

**Also Available**
- 01.449.002  Condylar Head Add-on System Set
- 03.503.077  MatrixMANDIBLE Plate Bending Iron, left
- 03.503.078  MatrixMANDIBLE Plate Bending Iron, right
- 311.004  Fixed-Swivel Screwdriver Handle
- 60.503.901  Lid for MatrixMANDIBLE Preformed Reconstruction Module

For detailed cleaning and sterilization instructions, please refer to: www.synthes.com/cleaning-sterilization
In Canada, the cleaning and sterilization instructions will be provided with the Loaner shipments.