RibLoc® U+ Chest Wall Plating System

Innovative Solutions for Challenging Thoracic Procedures

Sternum Fracture Technique
**Plate Placement**

**Step 1**
After exposing and reducing the fracture, evaluate the length and contour of the 126mm straight plate, by placing it onto the sternum.

**Notes:**
- Ensure that a minimum of three screw holes are on either side of the fracture.
- Allow a minimum distance of 5mm between the fracture and the nearest screw hole.
- The 115mm, 155mm, and 215mm U-plates may also be used after removing the U-clips.

**Step 2**
If needed, shorten the plate using either a standard OR cutter or the Joystick Benders:
- a) Thread the Joystick Benders into adjacent holes on either side of desired cutting location.
- b) Bend the plate back and forth until it breaks.

**Tip:**
- To ensure that the cut edge of the plate bends toward the sternum, thread the Joystick Benders onto the anterior surface of the plate.

**Contour Plate**

**Step 3**
If needed, contour the plate to match the geometry of the sternum using the following bending tools:
- a) Hand Bender
  1) For in-plane bending, place the plate within the teardrop features. In-plane contour can be added in situ or prior to plate placement.
  2) For out-of-plane bending, place the plate between the rollers.

**Tip:**
- Plate will bend in the direction of the handles.
Secure Plate

## Step 4

Secure the plate in place using the Intermediate Gauges:

a) Insert the Intermediate Gauge into the retrosternal position through the intercostal space on one side of the fracture and tighten it until the plate is secured to the sternum.

b) Repeat with the second Intermediate Gauge on the other side of the fracture, ensuring proper fracture reduction.

### Tip:

- The U Plus Bending Template can be used to assist in contouring the plate.

⚠️ **CAUTION:** Repetitive bending of the plate at the same location may fatigue and weaken it.

b) Joystick Benders

1) Thread the two benders into plate holes on either side of the desired contour location.
2) Use the handles to bend, twist or straighten the plate. This can be done prior to plate placement or in situ.
Determine Screw Size

Step 5
Determine appropriate screw size via manual measurement or by using a CT scan.

Manual Measurement
For manual measurement use the Intermediate Gauge and place it as previously described in STEP 4. Follow table below to evaluate correct screw size:
• As described in table below, use the determined screw size for bicortical purchase or count two sizes down if unicortical purchase is desired.
• Ensure the plate is securely in contact with the bone prior to reading the size indication. If a gap between the sternum and plate is unavoidable, a larger size may be needed to ensure adequate bone purchase.

<table>
<thead>
<tr>
<th>Measured</th>
<th>Recommended Screw Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unicortical</td>
</tr>
<tr>
<td>≤ 6mm</td>
<td>N/A</td>
</tr>
<tr>
<td>8mm</td>
<td>N/A</td>
</tr>
<tr>
<td>10mm</td>
<td>6mm (Brown)</td>
</tr>
<tr>
<td>12mm</td>
<td>8mm (Blue)</td>
</tr>
<tr>
<td>14mm</td>
<td>10mm (Green)</td>
</tr>
<tr>
<td>&gt; 14mm</td>
<td>12mm (Fuchsia)</td>
</tr>
</tbody>
</table>

Tip:
• If the manual measurement result is in between sizes, select the smaller of the two sizes to achieve unicortical and the larger one for bicortical purchase.

Measurement via CT Scan
Please follow below tables to determine the appropriate screw size for unicortical or bicortical purchase.

<table>
<thead>
<tr>
<th>CT Measurement</th>
<th>Recommended Screw Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unicortical</td>
</tr>
<tr>
<td>≤ 8.0mm</td>
<td>N/A</td>
</tr>
<tr>
<td>8.1 – 10.2mm</td>
<td>6mm (Brown)</td>
</tr>
<tr>
<td>10.3 – 12.2mm</td>
<td>8mm (Blue)</td>
</tr>
<tr>
<td>12.3 – 14.2mm</td>
<td>10mm (Green)</td>
</tr>
<tr>
<td>14.3 – 16.2mm</td>
<td>12mm (Fuchsia)</td>
</tr>
<tr>
<td>≥ 16.3mm</td>
<td>14mm (Gold)</td>
</tr>
</tbody>
</table>
**Place Screws**

**STEP 6**
Place the Intermediate Drill Guide:
- a) Select the appropriately sized Intermediate Drill Guide matching the size of the screw as determined in STEP 5.
- b) Thread the Intermediate Drill Guide into the plate hole until firmly seated.

**STEP 7**
Drill through the Intermediate Drill Guide until the drill stops.

**Note:**
- • Allow a minimum distance of 5mm between the fracture and the nearest screw hole.

**STEP 8**
Place screw in the drilled hole:
- a) First remove the Intermediate Drill Guide from the plate.
- b) Insert a screw of corresponding size until fully seated.
- c) Repeat STEP 5 through STEP 8 for additional screws as needed on this side of the fracture.

**Note:**
- • Place a minimum of three screws on either side of the fracture.

**STEP 9**
Visually ensure fracture reduction is still adequate and then repeat drilling and screwing, as previously described, on the other side of the fracture line.

**Note:**
- • Repeat for additional plates, as needed.
STRAIGHT PLATE FOR RIB FRACTURE REPAIR

The Straight Plate is also indicated to be used on the rib for anterior rib fixation. The 115mm, 155mm, and 215mm U-plates may also be used for anterior rib fixation after removing the U-clips on one or both ends.

**Step 1**
After exposing the fracture, select the desired plate and prepare for placement.

**Notes:**
- Select a plate that allows a minimum distance of 5mm between the fracture and the nearest screw hole.
- Ensure that a minimum of three screw holes are on either side of the fracture.

**Step 2**
If needed, shorten the plate using either a standard OR cutter or the Joystick Benders:
- a) Thread the Joystick Benders into adjacent holes on either side of desired cutting location.
- b) Bend the plate back and forth until it breaks.

**Tip:**
- To ensure that the cut edge of the plate bends toward the rib, thread the Joystick Benders onto the anterior surface of the plate.

**Step 3**
If needed, contour the plate to match the rib’s geometry using the bending tools provided. Place the plate over the rib throughout the bending process to assess fit.

Plate contouring options:
- a) Hand Bender for in-plane and out-of-plane bending.
- b) Joystick Benders for out-of-plane bending and to apply twist or straighten the plate.

**Note:**
- Further details about these bending options can be found on pages 1 and 2.

**Step 4**
Secure the plate onto the rib and maintain fracture reduction:
- a) Place the Intermediate Gauge superiorly over the rib on one side of the fracture and tighten it until the plate is secured to the rib.
- b) If needed reduce the fracture and approximate any displaced rib segment using the Rib Forceps.
- c) Secure the plate onto the rib on the other side of the fracture with the second Intermediate Gauge, ensuring fracture reduction is maintained.
**STEP 5**
Determine the screw size by reading the size on the Intermediate Gauge in two places:
- a) The numerical size (6mm, 8mm, 10mm, 12mm, 14mm) as marked on either side.
- b) The color marking on the end of the gauge.

**Notes:**
- Ensure that the Intermediate Gauge is tightened next to the desired drill hole and that the plate is secured between bone and Intermediate Gauge (see image on page 3).
- The determined screw size ensures bicortical purchase.
- Move the Intermediate Gauge after placing the first screw for additional screw size selection.

**STEP 6**
Place the Intermediate Drill Guide:
- a) Select the appropriately sized Intermediate Drill Guide matching the size of the screw as previously determined.
- b) Thread the Intermediate Drill Guide into the plate hole until firmly seated.

**STEP 7**
Drill through the Intermediate Drill Guide until the drill stops.

**Note:**
- Allow a minimum distance of 5mm between the fracture and the nearest screw hole.

**STEP 8**
Place screw in the drilled hole:
- a) First remove the Intermediate Drill Guide from the plate.
- b) Insert a screw of corresponding size until fully seated.
- c) Repeat for additional screws as needed on this side of the fracture.

**Note:**
- Place a minimum of three screws on either side of the fracture.

**STEP 9**
Visually ensure fracture reduction is still adequate. Correct reduction if needed. Then repeat drilling and screwing, as previously described on the other side of the fracture.