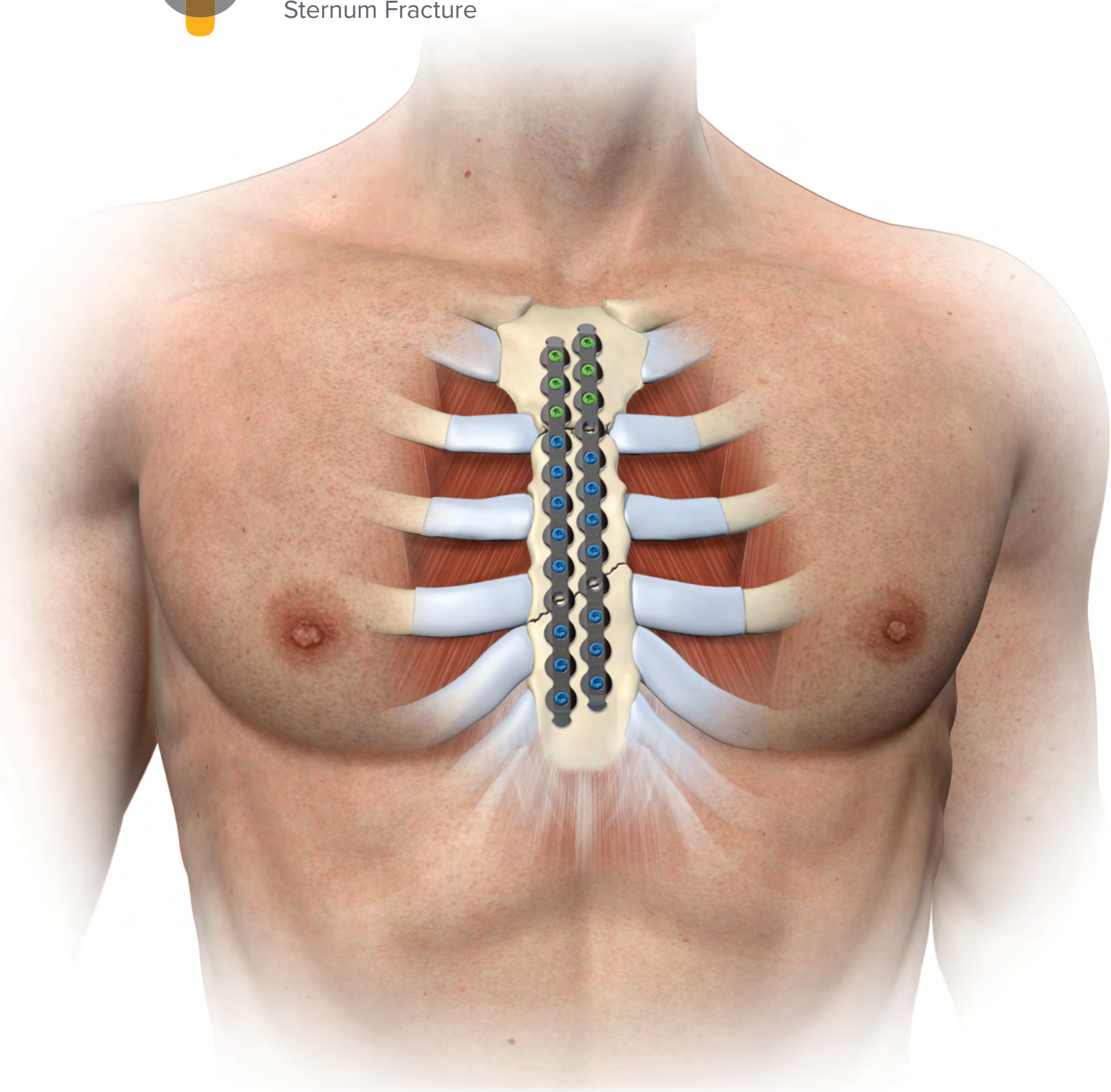
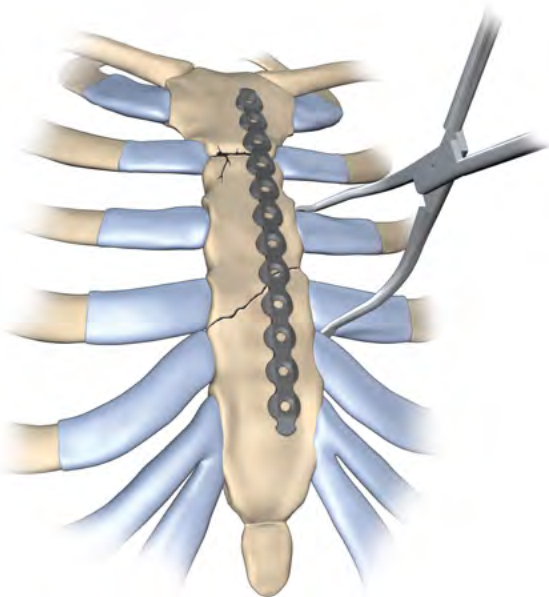


RibLoc® U+
Chest Wall Plating System
Sternum Fracture

Surgical Technique



Sternum Fracture Surgical Technique



1 Plate Placement

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

Note: Ensure that a minimum of three screw holes are on either side of the fracture.

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

Note: The 115 mm, 155 mm, and 215 mm U-plates may also be used after removing the U-clips.

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.

2 Contour Plate

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: The plate will bend in the direction of the handles.

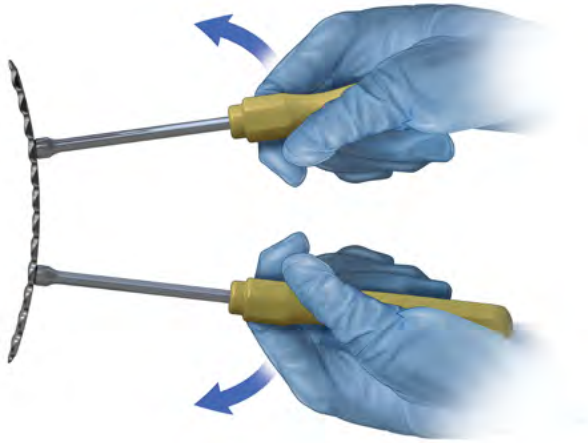


in-plane



out-of-plane

Sternum Fracture Surgical Technique [continued]

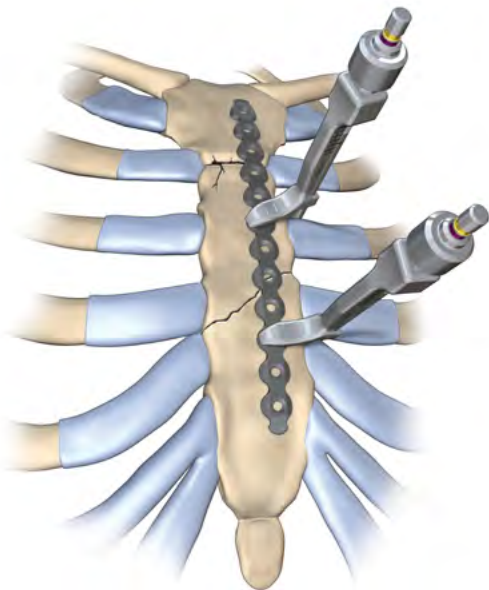


b. Joystick Benders

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.

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.



3 Secure Plate

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.

Sternum Fracture Surgical Technique [continued]

Recommended Screw Size		
Measured	Unicortical	Bicortical
6 mm	N/A	6 mm (Brown)
8 mm	N/A	8 mm (Blue)
10 mm	6 mm (Brown)	10 mm (Green)
12 mm	8 mm (Blue)	12 mm (Fuchsia)
14 mm	10 mm (Green)	14 mm (Gold)
>14 mm	12 mm (Fuchsia)	N/A

Size Indicator Example: Read the size indication as 12 mm or fuchsia

- Gold – 14 mm
- Fuchsia – 12 mm
- Green – 10 mm
- Blue – 8 mm
- Brown – 6 mm



4 Determine Screw Size

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 3. Follow the table at left to evaluate the correct screw size:

- ▶ As described at left, 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.

Tip: If the manual measurement result is in between sizes, select the smaller of the two sizes to achieve unicortical purchase.

Measurement via CT Scan

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

CT Measurement	Recommended Screw Size Unicortical
8.0 mm	N/A
8.1–10.2 mm	6 mm (Brown)
10.3–12.2 mm	8 mm (Blue)
12.3–14.2 mm	10 mm (Green)
14.3–16.2 mm	12 mm (Fuchsia)
16.3 mm	14 mm (Gold)

CT Measurement	Recommended Screw Size Bicortical
8.3 mm	8 mm (Blue)
8.4–10.3 mm	10 mm (Green)
10.4–12.3 mm	12 mm (Fuchsia)
12.4–14.3 mm	14 mm (Gold)
14.4 mm	N/A

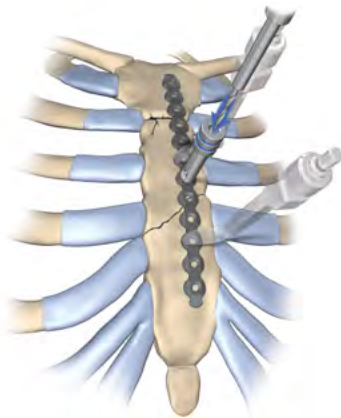
Sternum Fracture Surgical Technique [continued]



5 Place Screws

Place the Intermediate Drill Guide:

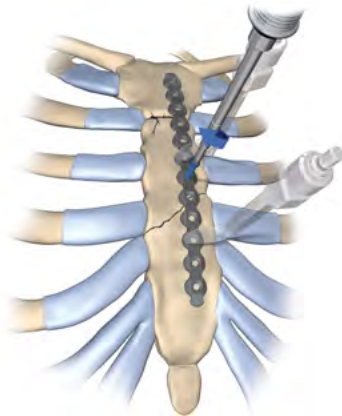
- Select the appropriately sized Intermediate Drill Guide matching the size of the screw as determined in STEP 4.
- Thread the Intermediate Drill Guide into the plate hole until firmly seated.



5A Drill Hole

Drill through the Intermediate Drill Guide until the drill stops.

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



5B Place Screw

Place screw in the drilled hole:

- First remove the Intermediate Drill Guide from the plate.
- Insert a screw of corresponding size until fully seated.
- Repeat STEP 4 through STEP 5B for additional screws as needed on this side of the fracture.

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



5C Assess Reduction

Visually ensure the 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 Surgical Technique

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

1 Plate Placement

After exposing the fracture, select the desired plate and prepare it for placement.

Note: Select a plate that allows a minimum distance of 5 mm between the fracture and the nearest screw hole.

Note: Ensure that a minimum of three screw holes are on either side of the fracture.

2 Shorten Plate

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 the 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.

3 Contour Plate

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 twist or straighten the plate.

Note: Further details about these bending options can be found on pages 2 and 3.

4 Secure Plate

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 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.

Straight Plate for Rib Fracture Repair Surgical Technique [continued]

5 Determine Screw Size

Determine the screw size by reading the size on the Intermediate Gauge in two places:

- a. The numerical size (6 mm, 8 mm, 10 mm, 12 mm, 14 mm) as marked on either side.
- b. The color marking on the end of the gauge.

Note: Ensure that the Intermediate Gauge is tightened next to the desired drill hole and that the plate is secured on the rib bone.

Note: The determined screw size ensures bicortical purchase.

Note: Move the Intermediate Gauge after placing the first screw for additional screw size selection.

6 Place Drill Guide

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.

7 Drill Hole

Drill through the Intermediate Drill Guide until the drill stops.

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

8 Drill Screw

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.

9 Assess Reduction

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



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