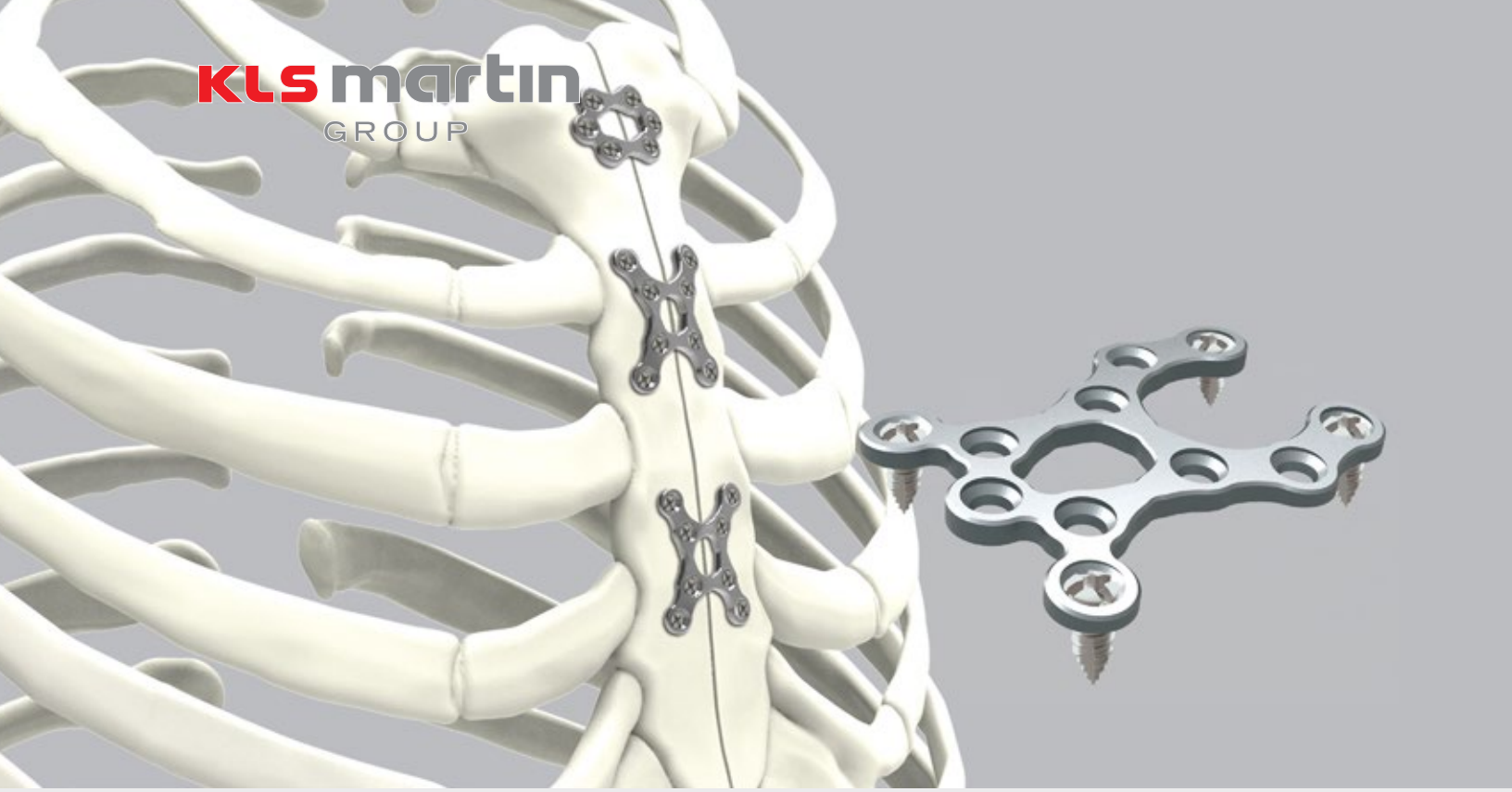
KLS martin GROUP



Sternal Plating

Continuing innovations in sternal closure

Technique Guide:

- midline
- mini-sternotomy
- mini-valve
- transverse fractures


Sternal
Plating
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LIFT

Sternal Plating – Innovation for thoracic surgery

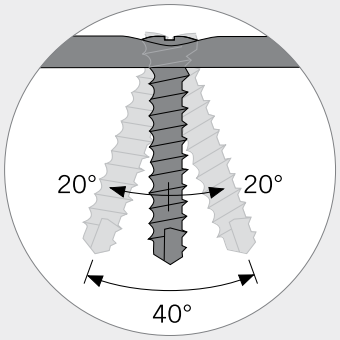
Indications

The KLS Martin Thoracic Plating System is indicated for use in the stabilization and fixation of fractures in the chest wall including sternal reconstructive surgical procedures, trauma, or planned osteotomies.

Contraindications

- Active infection.
- Not intended for screw attachment or fixation to the posterior elements (pedicles) of the cervical or lumbar spine.
- Patient conditions including: blood supply limitations, insufficient quantity or quality of bone or latent infections.
- Patients with mental or neurologic conditions who are unwilling or incapable of following postoperative care instructions.
- Foreign body sensitivity. Where material sensitivity is suspected, testing is to be completed prior to implantation.

Ti Screws are made from high-strength titanium alloy.
Plates accept 2.3 and 2.5 mm diameter screws.



ThreadLock TS (Taper Screw) design allows the user to feel the tactile engagement in the bone until the final turn.

Screws can be inserted and locked securely into the plate up to 20° in any direction, providing freedom to engage the bone at the ideal angle without bulky instrumentation.

Screws countersink for a smooth interaction between plate/screw on anterior plate surface.

Low-profile 1.8 and 2.0 mm titanium locking plates with cut point for emergency re-entry.

Rounded anterior surface for reduced palpability.

Ti Plates are manufactured from commercially pure titanium.

Midline sternotomy

A plate configuration with a minimum of six bars across the midline and nine fixation points on each side of the osteotomy must be placed to ensure proper closure of a midline sternotomy.

24-025-42-09 Ti 1
6-Hole football

24-025-59-09 Ti 1
4-Hole curved plate

24-025-63-09 Ti 1
2 x 2-Hole ladder

24-025-43-09 Ti 1
10-Hole body plate

24-025-57-09 Ti 1
26-Hole ladder

24-025-55-09 Ti 1
8-Hole ladder

24-025-60-09 Ti 1
18-Hole ladder

24-025-58-09 Ti 1
34-Hole ladder

24-025-61-09 Ti 1
14-Hole ladder

24-025-47-09 Ti 1
18-Hole ladder

24-025-62-09 Ti 1
30-Hole ladder

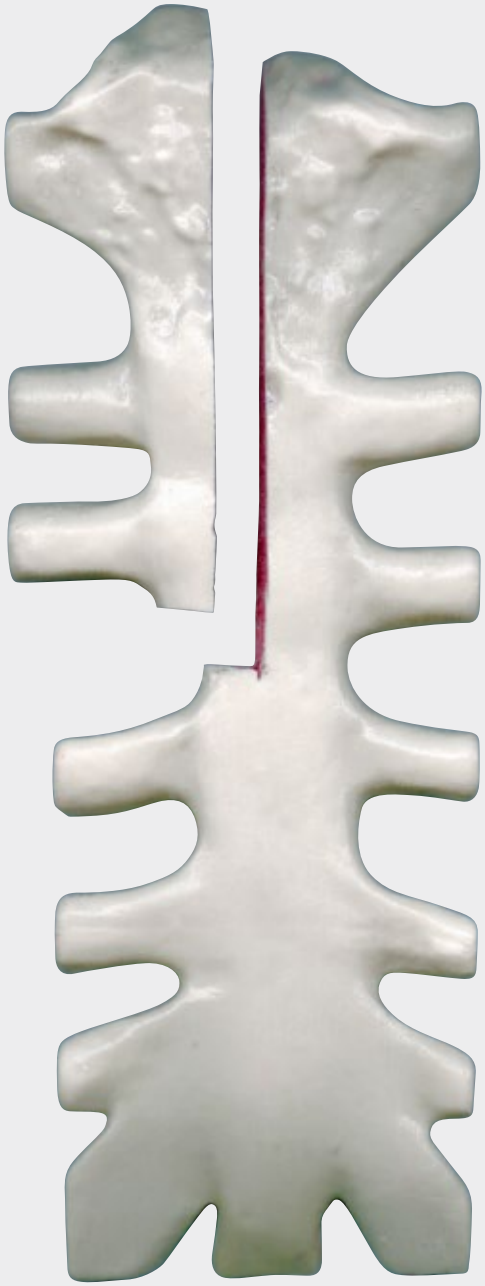
Warning: Straight plates are not designed for midline closures, rib-to-rib fixation, or the spanning of continuity defects.

Ti Titanium

1 Packaging unit

Mini-sternotomy (J, L, or T)

A mini-sternotomy with 3 ribs or less must have a minimum of 4 bars across the vertical osteotomy and 1 bar across the horizontal osteotomy. Mini-sternotomies with more than 3 ribs must have a minimum of 6 bars across the vertical osteotomy and 1 bar across the horizontal osteotomy.



24-025-44-09 Ti 1

8-Hole X plate

24-025-46-09 Ti 1

7-Hole JLT plate

24-025-56-09 Ti 1

11-Hole JLT plate

Right anterior thoracotomy - rib disarticulation

Adequate fixation must be placed on each side of the fracture.

24-025-52-09 Ti 1
9-Hole Y plate

24-025-54-09 Ti 1
14-Hole Y plate

24-025-48-09 Ti 1
4-Hole straight plate

24-025-49-09 Ti 1
6-Hole straight plate

24-025-50-09 Ti 1
8-Hole straight plate

24-025-51-09 Ti 1
10-Hole straight plate

Ti Titanium

1 Packaging unit

Transverse fractures

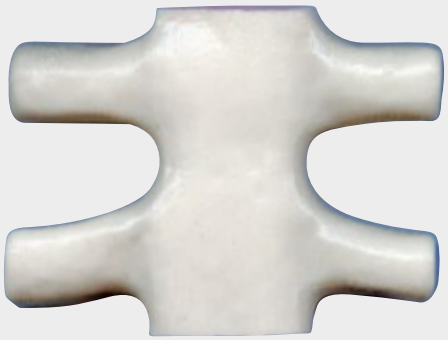
In case of total transverse fracture it is recommended to have a minimum of 2 bars over the fracture with 4 fixation points on each bar for both superior and inferior portions of the fracture.

24-025-48-09 Ti 1

4-Hole straight plate

24-025-49-09 Ti 1

6-Hole straight plate



24-025-50-09 Ti 1

8-Hole straight plate

24-025-51-09 Ti 1

10-Hole straight plate

Warning: Straight plates are not designed for midline closures, rib-to-rib fixation, or the spanning of continuity defects.

Step 1:
Expose

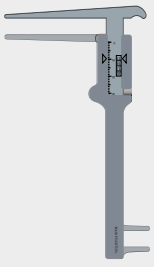
Dissect the soft tissue from the surface of the anterior sternum to allow for complete visualization of the bone. This step should also be performed in revision cases that require wire removal due to sternal nonunion or for re-operation.

Step 2:
Measure

Measure the depth of the sternum at the anticipated plate locations before bone reduction to insure the selection of appropriate screws. Use the sternal caliper (24-006-01-07) to determine sternum thickness.

Note: Screws should be no longer than necessary to penetrate the posterior cortex. The surgeon should use extreme care to ensure the screw does not extend past the posterior surface. Screws should be placed monocortically.

Do not use a screw that is longer than the measured thickness of the sternum. For example: If the sternum is 13 mm thick, use a 13 mm screw. If the sternum is 12 mm thick, use an 11 mm screw.



Sternal caliper

Step 3:
Reduce

Reduce the sternum using the sternal bone reduction forceps (24-001-02-07) by placing the instrument at the superior and inferior aspects of the sternum and slowly reduce the sternum.

During this process, be careful to observe the midline for protruding internal tissue and proper bony alignment. Care should be taken to avoid damaging vessels or grafts; e.g., internal mammary artery (IMA), coronary grafts, etc.

Avoid placing forceps in a transverse fracture line.

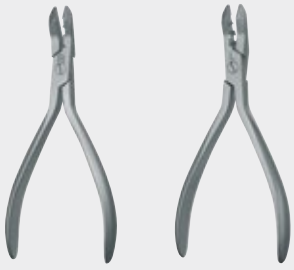
Alternative Method:
The approximation of the sternal halves can be achieved by placing sufficient sternal wires in the manubrium and xiphoid. Pull the wires tight to reduce the sternum. After placement of all sternal plates, check to ensure wires are tight and make any tension adjustments necessary.

Sternal bone reduction forceps

Step 4:
Selection

Once the sternum has been reduced, select the desired plate(s). Plate should be placed with the cut-point over the sternotomy and/or fracture line to ensure rapid reentry if necessary.

If any contouring and/or cutting of the plate is required, use the locking bending pliers (24-010-01-07 / 24-010-02-07) provided in the set.



Locking bending pliers

Step 5:

Secure

Select the appropriate length 2.3 mm maxDrive screw based on the recorded measurements. Place screw in desired screw hole by using the maxDriver or thumb-twist screwdriver and blade (25-486-97-07).

The screw should be inserted by turning in a clockwise direction. The screw will lock into the plate. Screw placement is complete once the screw is fully engaged in the plate.

Note: Avoid over-tightening the screw once it is completely engaged into the plate. Screws should be placed in all holes of the plate.

If screws are placed with the maxDriver, the surgeon should use the thumb-twist screwdriver and blade (25-486-97-07) after screw placement to ensure the screw is completely locked into the plate. The screw may require additional tightening.

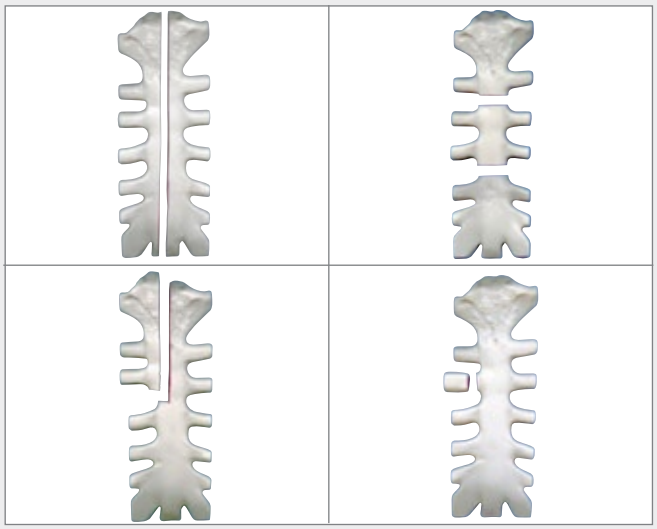
maxDriver

Screwdriver handle

Screwdriver blade

Step 6:

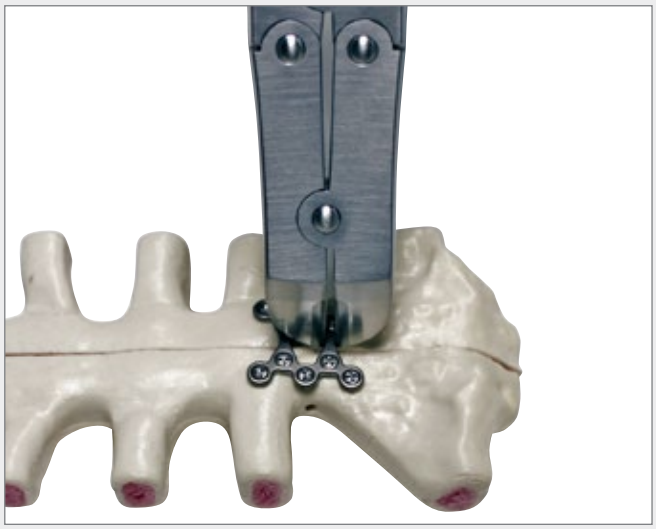
Repeat the steps above to place the remaining plates.



Step 7:

Plate options and locations should be chosen to best fit the anatomy of each patient. When plating transverse fractures, take care to avoid placing screws on or near the fracture line. Span the fracture with a plate that appropriately fits the anatomy.

Note: To facilitate emergent reentry, avoid placing non-cuttable portions of the sternal plate over the sternotomy line.



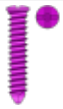
Emergent Reentry:

If emergent reentry is necessary, the plates feature a cut point to allow for rapid access to the chest cavity. The plate can be cut with most heavy wire cutters found in the operating room or crash cart.

Double action plate cutter

Drill-Free maxDrive Ti

Sternal Screws		self-retaining	
		5	1
	2.3 x 7 mm	24-023-07-09	24-023-07-91
	2.3 x 9 mm	24-023-09-09	24-023-09-91
	2.3 x 11 mm	24-023-11-09	24-023-11-91
	2.3 x 13 mm	24-023-13-09	24-023-13-91
	2.3 x 15 mm	24-023-15-09	24-023-15-91
	2.3 x 17 mm	24-023-17-09	24-023-17-91

Emergency Screws		self-retaining	
		5	1
	2.5 x 9 mm	24-024-09-09	24-024-09-91
	2.5 x 13 mm	24-024-13-09	24-024-13-91
	2.5 x 17 mm	24-024-17-09	24-024-17-91

25-650-04-04

Measuring clip for screw length, black

25-651-01-04

Measuring clip for screw diameter

Ti Titanium alloy

1 Packaging unit

STERILE R Sterile

Screwdrivers and Blades

maxDrive

Blades suitable for	25-407-01-07	KLS-SD-1000
50-817-20-07 2.0 / 2.3 mm		40 mm
25-486-97-07 2.0 / 2.3 mm	80 mm	
25-486-98-07 2.0 / 2.3 mm	94 mm	

*For storage in Level One modules

50-800-02-71 1

Battery pack

for 50-800-04-07

1/2

KLS-BP-001 1

Battery pack

for KLS-SD-1000

24-025-42-09 Ti 1
6-Hole football
= 1.8 mm

24-025-63-09 Ti 1
2 x 2-Hole ladder
= 1.8 mm

24-025-43-09 Ti 1
10-Hole body plate
= 1.8 mm

24-025-44-09 Ti 1
8-Hole X plate
= 1.8 mm

24-025-61-09 Ti 1
14-Hole ladder
= 1.8 mm

24-025-55-09 Ti 1
8-Hole ladder
= 1.8 mm

24-025-46-09 Ti 1
7-Hole JLT plate
= 1.8 mm

24-025-56-09 Ti 1
11-Hole JLT plate
= 1.8 mm

24-025-52-09 Ti 1
9-Hole Y plate
= 1.8 mm

24-025-54-09 Ti 1
14-Hole Y plate
= 1.8 mm

Ti Titanium

1 Packaging unit

Plate profile

24-025-47-09 Ti 1

18-Hole ladder

= 1.8 mm

24-025-57-09 Ti 1

26-Hole ladder

= 1.8 mm

24-025-58-09 Ti 1

34-Hole ladder

= 1.8 mm

24-025-60-09 Ti 1

18-Hole ladder

= 1.8 mm

24-025-62-09 Ti 1

30-Hole ladder

= 1.8 mm

24-025-59-09 Ti 1

4-Hole curved plate

= 1.8 mm

24-025-48-09 Ti 1

4-Hole straight plate

= 1.8 mm

24-025-49-09 Ti 1

6-Hole straight plate

= 1.8 mm

24-025-50-09 Ti 1

8-Hole straight plate

= 1.8 mm

24-025-51-09 Ti 1

10-Hole straight plate

= 1.8 mm

24-025-07-09 Ti 1

20-Hole straight plate

= 2.0 mm

Note: It is the surgeon's responsibility to ensure the sternum is closed with the appropriate level of fixation as required to complete the surgical procedure and ensure a stable construct for midline sternotomies, reconstruction procedures and fixation of lateral thoracotomy.

Warning: Straight plates are not designed for midline closures, rib-to-rib fixation, or the spanning of continuity defects.

½

22-523-22-07 St 1 TC GOLD
Double action plate cutter,
22 cm, 8 3/4”

½

24-004-01-07 St 1
Sternal tenaculum
23 cm

½

24-015-73-07 St 1
Sternal bone reduction forceps
18 cm

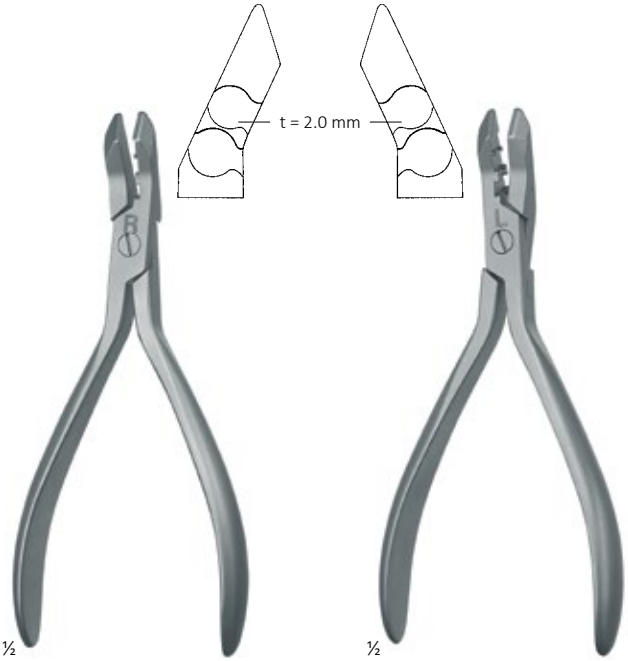
½

24-001-02-07 St 1
Sternal bone reduction forceps
20.5 cm, 8”

St Stainless steel

1 Packaging unit

TC GOLD Instruments with tungsten carbide inserts



½ ½

24-010-01-07 St 1
Locking bending pliers, right
15 cm, 6”

24-010-02-07 St 1
Locking bending pliers, left
15 cm, 6”

1/2

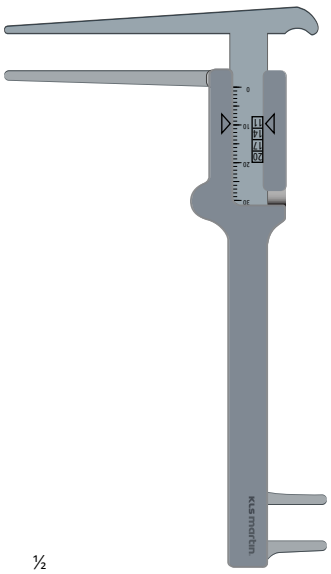
12-188-17-07 St 1
Cushing forceps, serrated
17 cm, 6 3/4”

1/2

24-010-06-07 St 1
36 mm wide
24-010-04-07 St 1
50 mm wide
Thoracic sizer

1/2

50-501-40-07 St 1
Depth gauge
17 cm, 6 1/2”



½

24-006-01-07 St 1
Sternal caliper

91-600-04-96 · REV 07 · 2021-12-13 · Sternal Plating Technique Guide · The information presented is intended to demonstrate a KLS-Martin L.P. product. Please refer to the IFU for the full list of indications, contraindications, warnings, precautions, and sterilization information. Always refer to the IFU before using any KLS-Martin L.P. product. Surgeons must always rely on their own clinical judgment when deciding which products and techniques to use with their patients.