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Section 1  CLAW FIXATION

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Various claws are available according to the spinal area implanted (thoracic or lumbar):

2 types of thoracic claw are available:
- Pediculo-transverse
- Pediculo laminar

2 types of thoracic claw are available:
- Small polyaxial pedicular hook for claw (B02241104)
- Large polyaxial pedicular hook for claw (B02241106)
- Short transverse counterhook (B02242308)
- Long transverse counterhook (B02245308)

Only 1 type of lumbar claw is available: lamino-laminar claw

- Small polyaxial lumbar laminar hook for claw (B02241207)
- Medium polyaxial lumbar laminar hook for claw (B02241209)
- Large polyaxial lumbar laminar hook for claw (B02241211)
- Short lumbar laminar counterhook (B02242209)
- Long lumbar laminar counterhook (B02245209)
1. **THORACIC FIXATION USING A PEDICULO-TRANSVERSE CLAW:**

A claw is a combination of a hook and a counter hook. Polyaxial pedicular hooks are available in 2 sizes – 4mm (B02241104) or 6mm (B02241106). Transverse counter hooks are available in 2 sizes – short stem (B02242308) or long stem (B02245308).

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**Preparation for placement of the pedicle hook using the pedicle hook starter (A02240010).**

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**Preparation for placement of the transverse counter-hook using the transverse process hook starter (A02240020) at the superior part of the transverse process.**

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**Placement of the transverse counter hook using the counter hook holder (A02240100).**
Setting of the hook on the HOOK INserter (A02240150):
Assembly of the hook onto the HOOK INserter can be done directly from the final hook caddy.

Position the tongs of the instrument onto the notches on both sides of the hook head. Firmly squeeze the handle to secure the tongs onto the hook head; next turn the knob (on handle) to lock in place.

Positioning of the pedicle hook
(without its threaded extension) using the hook inserter (A02240150).
Stabilize the counter hook with the counter hook holder while sliding/impacting the pedicle hook over the counter hook stem.
**Screwing of the threaded extension onto the hook** using the screwdriver for hook head (A02240200).

To maintain claw stability during this step, leave the hook inserter (A02240150) and counter hook holder (A02240100) in place.

**NOTE:** If insertion of the threaded extension into the hook is obstructed by the high position of the counter hook stem, slightly tilt the hook holder (pedicle hook still attached) to ease insertion.

**REMARK:** The hook may be implanted pre-assembled with its threaded extension. In this case, be sure to leave adequate space (between threaded extension and hook) for insertion of the counter hook stem.

**Compression of the claw** using the forceps for claw (A02240030).
Final tightening of hook head with the screwdriver for hook head (AD2240200).

Tightening of the threaded extension locks the counter-hook stem into the hook to ensure claw stability and a secure connection to the rod.

The claws have the same threaded extension as the pedicle screws; therefore connection to the rod is the same.

(Refer to PASS LP degenerative surgical technique chapter 2 paragraph 4).
2. **THORACIC FIXATION USING A PEDICULO-LAMINAR CLAW:**

A claw is a combination of a hook and a counter hook. Polyaxial pedicular hooks are available in 2 sizes – 4mm (B02241104) or 6mm (B02241106). Laminar counter-hooks are available in 2 sizes – short stem (B02242407) or long stem (B02245407).

**Preparation for placement of the pedicle hook:**
see chapter 1.1, page 5.

**Preparation for placement of the supralaminar counter-hook** using a Kerrisson punch. The creation of a large window is recommended to ease the insertion of the counter-hook.

**Placement of the laminar counter hook** using the counter hook holder (A02240100).

**Positioning of the pedicle hook:**
see chapter 1.1, page 6

**Screwing of the threaded extension onto the hook:**
see chapter 1.1, page 7

**Compression of the claw:**
see chapter 1.1, page 7

**Final tightening of hook head:**
see chapter 1.1, page 8
3. LUMBAR FIXATION USING LAMINO-LAMINAR CLAW:

A claw is a combination of a hook and a counter hook. Polyaxial lumbar hooks are available in 3 sizes – small (B02241207), medium (B02241209) or large (B02241211). Lumbar laminar counter-hooks are available in 2 sizes – short stem (B02242209) or long stem (B02245209). Usually, the hook is placed in an infralaminar position and the counter-hook in a supra-laminar position. It is however possible to reverse the claw according to the needs of the construct.

Preparation for placement of the laminar hook using the transverse process hook starter (A02240020).

Preparation for placement of the supra-laminar counter-hook: see chapter 1.2 page 9

Placement of the laminar counter hook: see chapter 1.2 page 9

Positioning of the laminar hook using the hook inserter (A02240150): see chapter 1.1. page 6

Screwing of the threaded extension onto the hook: see chapter 1.1. page 7

Compression of the claw: see chapter 1.1. page 7

Final tightening of hook head: see chapter 1.1. page 7
The concept of the PASS LP system is to achieve a reduction of a deformity by simultaneously performing translation on two rods.

Following the positioning of the anchorages (refer to PASS LP Degenerative surgical technique, chapter 1 screw Positioning and Scoliosis surgical technique – chapter 1 Claw fixation), the reduction of the scoliosis includes the following steps.

1. **ROD SELECTION AND COUNTOURING**

   Use the malleable rod (A02100004) to select rod length and determine rod contouring.

   Bend the rod using the French bender (A02120100).

2. **CONNECTOR PLACEMENT**

   The standard connectors are symmetrical and thus reversible.

   Slide the connectors onto the rod.

   In most cases, the rods are placed on the median line.

3. **ROD AND CONNECTOR INSERTION**

   Drop the assembly over the flexible guide (or directly onto the threaded post of the screw) down to the screw head.

   Convex or concave rod can be placed first.

   No specific orientation needed for the rod.
4. NUT SETTING

The nutholder (A02230010) is used to load each nut onto the threaded extension of the screw. Place the nut on the thread in order to leave the maximum freedom of movement for the rod maneuvers.

5. ROD ORIENTATION IN SAGITTAL PLANE

Orientate the rod in the sagittal plane using the rod gripper (MS511).

Block the rotation of the rods by tightening the 2 nuts located on the upper anchorages of the construct using the nutdriver shaft (A02130170).
6. REDUCTION OF THE DEFORMITY

The reduction is achieved through the progressive and alternative tightening of the nuts on both rods using the nutdriver shaft (A02130170) thus allowing to share the load on all anchorages.

7. NUT BREAKING

Once the reduction is fully achieved (connectors flush against the anchorage), torque and break-off the nuts using the nutdriver (A02130160).
While torquing the nut, exert a downward force to contain the broken part in the instrument.

8. THREADED EXTENSION BREAKING

Break the threaded extensions using the nut holder and threaded extension breaker (A022230010).

IMPORTANT: Counting the broken parts is recommended to be certain no broken parts are left in the incision.
Section 3 DE-ROTATION

1. THE CLEMENT DE-ROTATION CONNECTOR

The De-Rotation Connector (ref. B02236020) is composed of a connector and a set screw. 
Can be used with both: 
PASS LP - Ø6.0 mm Rods 
PASS LP - Ø5.5 mm Rods

2. IMPLANT PRESENTATION

This De-Rotation Connector links the rod to the anchorage (screw) in a 2 steps manoeuvre:

- Lock the polyaxiality of the anchorage (screw) by tightening the break away nut
- Lock the translation/rotation movement of the connector on the rod by tightening the set screw

This technique is used to create a vertebral rotation manoeuvre.

The De-Rotation Connectors are used on the vertebrae at the apex portion of the deformity on both concave and convex rods.
The concave De-Rotation Connector is locked on the spine in the coronal plane by tightening the set screw, preventing anterior movement of the connector.

The convex De-Rotation Connector is kept loose in order to allow the connector to freely rotate around the rod on the convex side of spine.

The progressive tightening of the self-breaking nut creates an anterior-posterior translation of the spine. This translation is more important on the concave side of the spine allowing for vertebral rotation.

T30 screwdriver (A02230020) with the T-handle (A02100002)
3. SCOLIOSIS REDUCTION USING DE-ROTATION CONNECTORS:

In the case you wish to use de-rotation connectors, the reduction of the scoliosis includes the following steps.

3.A SURGICAL TECHNIQUE FOR A THORACIC CURVE

a. Rod selection and countouring: see chapter 2 page 11

b. Connector placement
Use the derotation connectors for anchorage in the apex zone of the deformity and the standard connectors on all other anchorage points.

IMPORTANT: The De-Rotation connectors are asymmetrical and must be implanted with the connector set screw facing up.
The rods are placed in a median position in relation to the anchorage.
Slide the connectors onto the rod in the correct order and direction.

c. Rod and connector insertion: see chapter 2 page 11

d. Nut setting: see chapter 2 page 12

e. Rod orientation in sagittal plane: see chapter 2 page 12

f. Positioning of the concave De-Rotation Connectors
Lock the concave De-Rotation Connectors in the coronal plane by tightening the set screws with the T30 screwdriver (A02230020), avoiding anterior movement.
The convex De-Rotation Connector set screws are kept loose at this stage.
g. Reduction of the deformity by tightening the nuts on all anchorages: see section 2 page 13
The vertebral derotation is obtained at the end of tightening when the concave anchorage is flush to the De-Rotation Connector.

h. Locking the convex connector set screws
**IMPORTANT**: Now lock the convex connector set screws with the T30 screwdriver (A02230020) equipped with the T handle (A02100002).
**Note**: All set screws should now be tight

i. Torqueing and Breaking the nuts: see chapter 2 page 13

j. Breaking the threaded extensions see chapter 2 page 13

3.B. SURGICAL TECHNIQUE FOR THORACO-LUMBAR OR LUMBAR CURVES

To get the best results, reduction must be performed in a certain manner:
Translation followed by compression and derotation that cannot be performed simultaneously.
We recommend the use of de-rotation connectors at all levels on both rods.

**Translation move on convex rod**
After you orientate and set the rods, progressively tighten the breakaway nuts on convex rod, keeping set screws unlocked.

**Convex compression**
Perform the convex compression gradually on the convex anchorages.
Lock de-rotation connectors by tightening the set screws.

**Concave vertebral derotation**
Clear the apex zone which needs to be derotated by unlocking the intermediate convex set screws, BUT still keeping the anchorages of the extremities of the compressed convex zone locked, to maintain the compression previously applied.
Place the concave derotation connectors in the coronal plane and lock the set screws.
Progressively tighten the concave breakaway nuts to perform the derotation.
Retighten the convex derotation connector set screws.

Then finish the procedure repeating points i and j as previously described.