

VEPTR II™ System

Vertical Expandable Prosthetic Titanium Rib

Surgical Technique

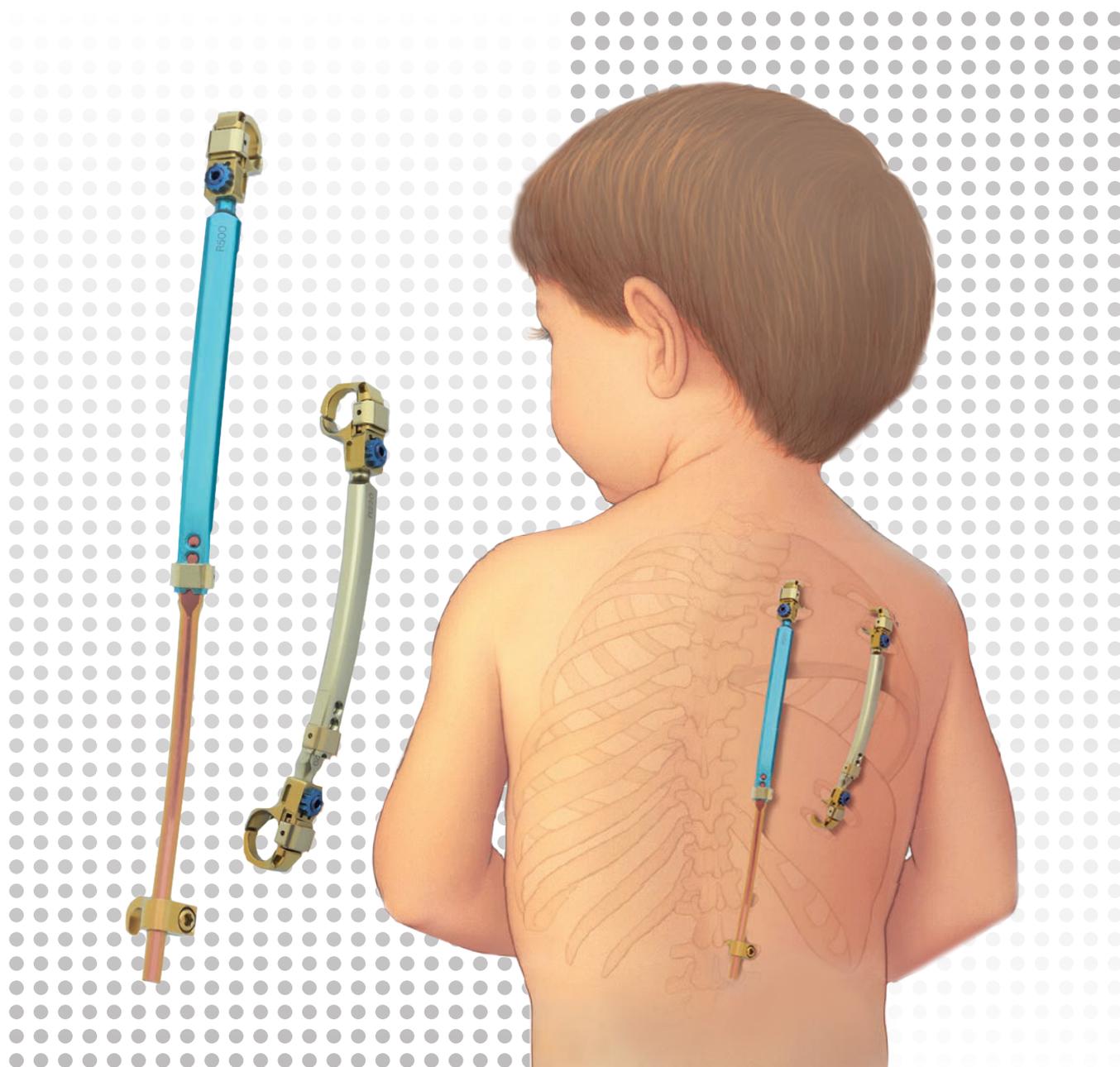


 Image intensifier control

 Warnings and Precautions

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

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VEPTR II™

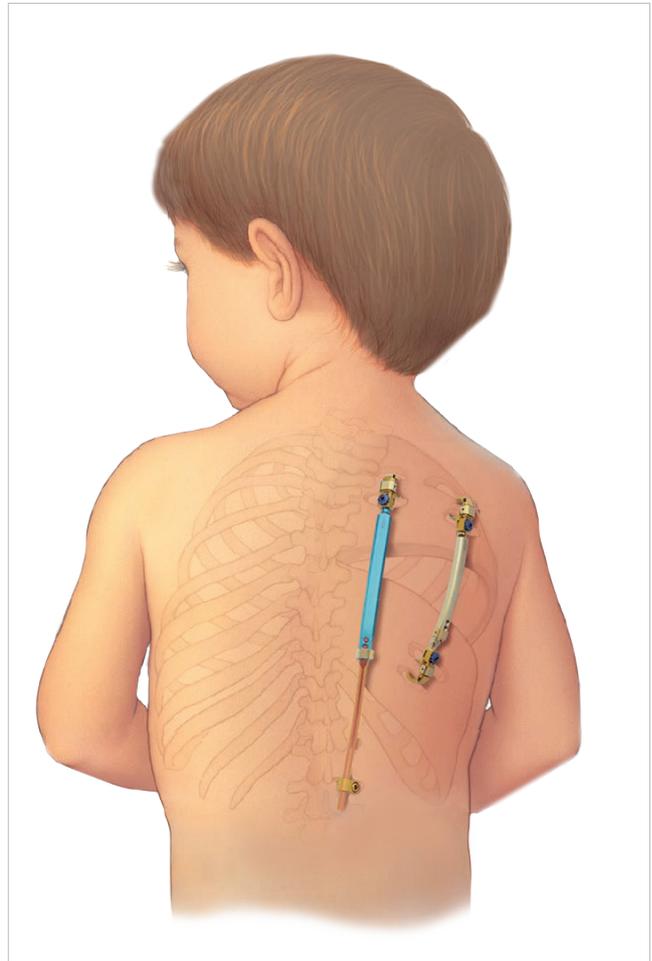
Introduction

VEPTR is based on a three-dimensional posterior thoracic approach to treat patients with complex chest wall and/or spinal deformities where the thorax is unable to support normal respiration or lung growth (Thoracic Insufficiency Syndrome).

VEPTR is intended to mechanically stabilize and distract the thorax in infantile and juvenile patients.

Devices are attached perpendicular to the patient's natural ribs (superior attachment point) and more caudal ribs, a lumbar vertebra or to the ilium (inferior attachment point). Once the VEPTR device is in place, its design facilitates expansion, anatomic distraction, and replacement of components.

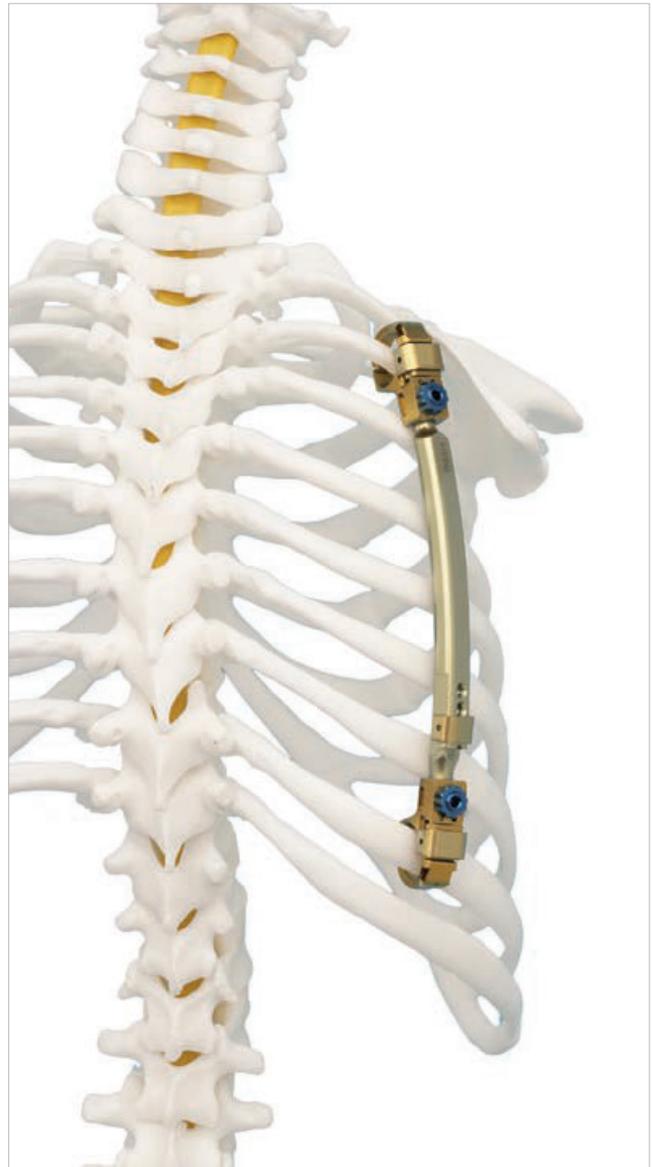
All components of the VEPTR II system are manufactured from a titanium alloy (Ti-6Al-7Nb) with the exception of the Ala Hook and S-Rod, which are manufactured from commercially pure titanium.



Construct Options

Rib-to-Rib

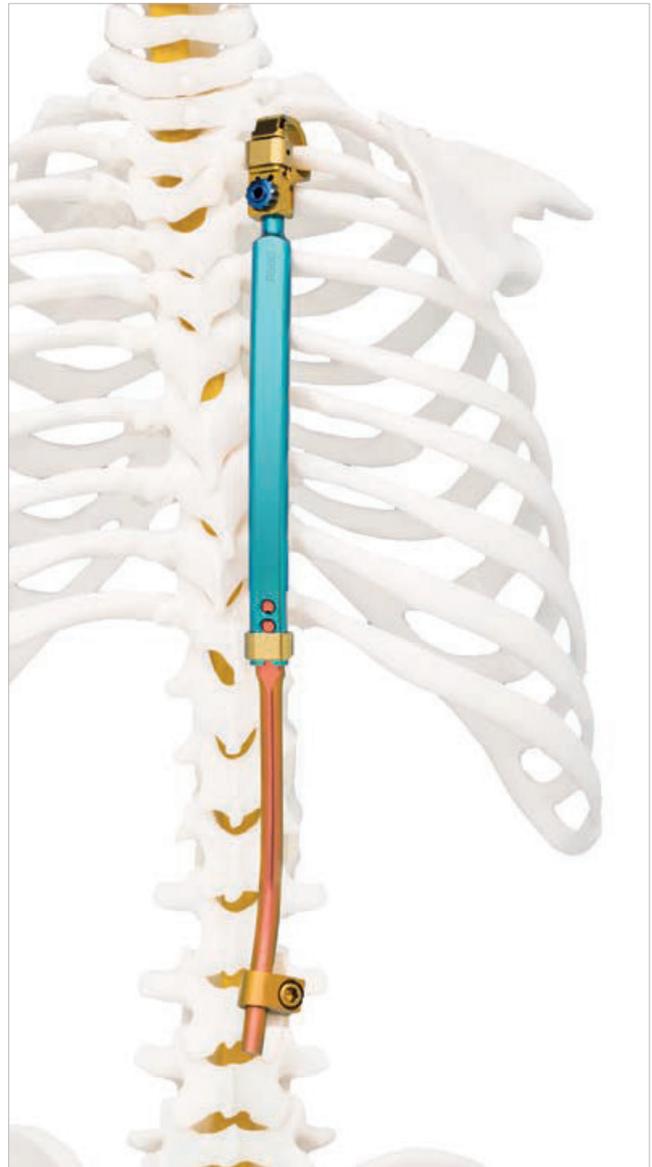
- Attaches to the superior rib and to the inferior rib
- Components available in 220 mm or 500 mm radius



- 1 Rib Hook Cap
- 2 Closure for Extension Bar
- 3 Rib Hook
- 4 Proximal Extension (220 mm Radius)
- 5 Distal Extension (220 mm Radius)

Rib-to-Lumbar Lamina

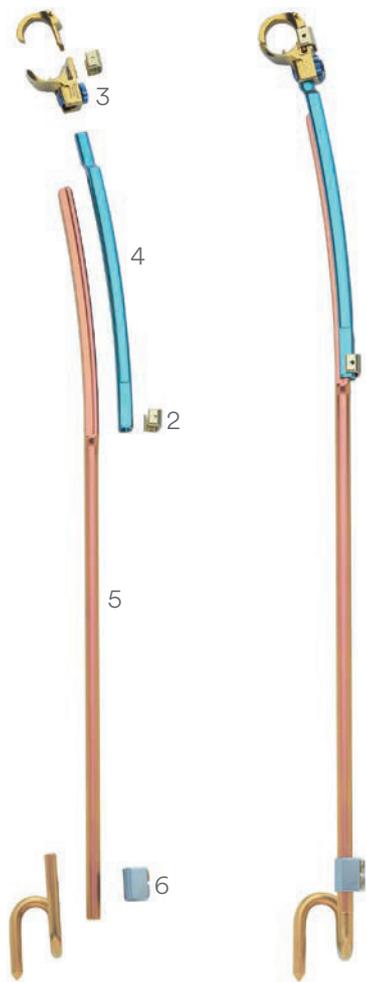
- Attaches to rib and to lumbar spine
- Components available in 220 mm or 500 mm radius



- 1 Rib Hook Cap
- 2 Closure for Extension Bar
- 3 Rib Hook
- 4 Proximal Extension (500 mm Radius)
- 5 Distal Extension (500 mm Radius)
- 6 Lamina Hook

Rib-to-Ilium

- Attaches to rib and to ilium
- Components available in 220 mm or 500 mm radius



- 1 Rib Hook Cap
- 2 Closure for Extension Bar
- 3 Rib Hook
- 4 Proximal Extension (500 mm Radius)
- 5 Distal Extension (500 mm Radius)
- 6 Parallel Connector
- 7 Ala Hook

AO Spine Principles

The four principles to be considered as the foundation for proper spine patient management underpin the design and delivery of the Curriculum: Stability, Alignment, Biology, Function.^{1,2}

AO Principles^{1,2}

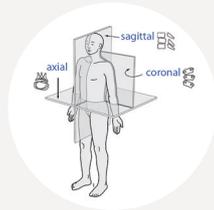
1.



Stability

Stabilization to achieve a specific therapeutic outcome.

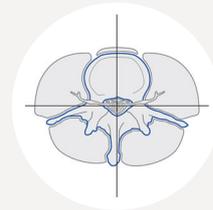
2.



Alignment

Balancing the spine in three dimensions.

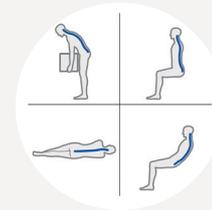
3.



Biology

Etiology, pathogenesis, neural protection, and tissue healing.

4.



Function

Preservations and restoration of function to prevent disability.

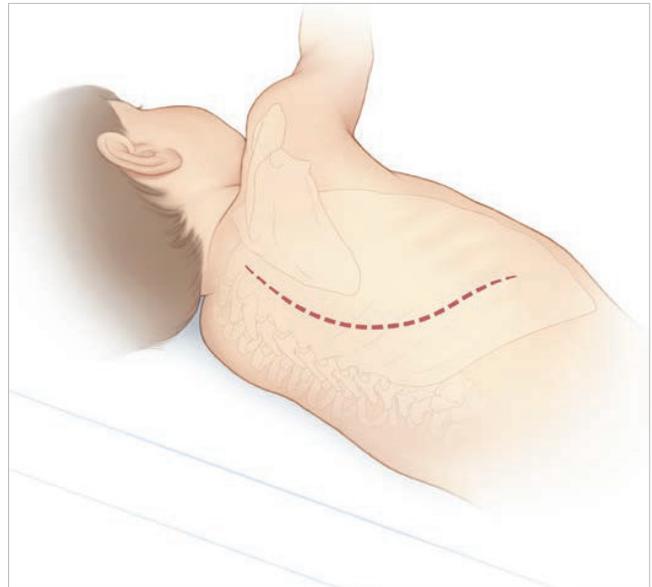
Primary Procedure

1. Patient positioning

Place the patient in a lateral decubitus position similar to that required for a standard thoracotomy. Patient positioning and superior exposure remain the same, regardless of the construct being implanted.

▲ Precaution:

- To protect against brachial plexus injury, do not extend the shoulder more than 90°.



2. Perform superior exposure

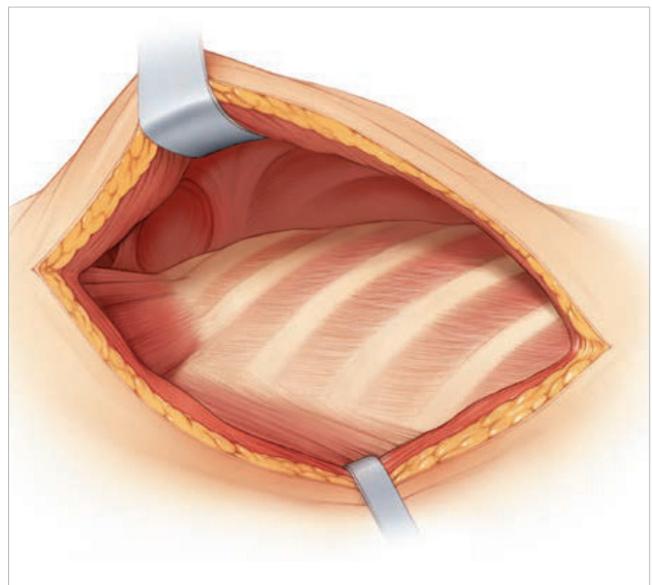
Make a J-shaped thoracotomy incision and retract the skin flaps.

▲ Precaution:

- Avoid disrupting the periosteum overlying the ribs.

Continue the incision and elevate the paraspinal muscles medially only to the tips of the transverse processes.

Gently elevate the scapula to expose the middle and posterior scalene muscle.



3. Insert superior implants

A. Identify superior rib

- 1 Identify the superior rib to be used as the superior point of attachment. Mark this point and confirm location using radiographic imaging.

▲ Warning:

- Due to the risk of brachial plexus impingement, do not choose the first rib as the superior point of attachment.

B. Prepare rib for implants

Instruments

03.641.001	Trial Rib Hook, small
03.641.012	Trial Rib Hook
U44-48320	Periosteal Elevator, curved, 20 cm

Make a 1 cm incision into the intercostal muscles above and below the rib where the Cranial Rib Support will attach. Insert a Periosteal Elevator to elevate the periosteum adjacent to the lung.

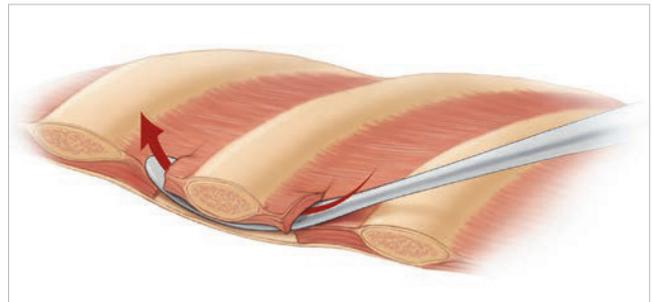
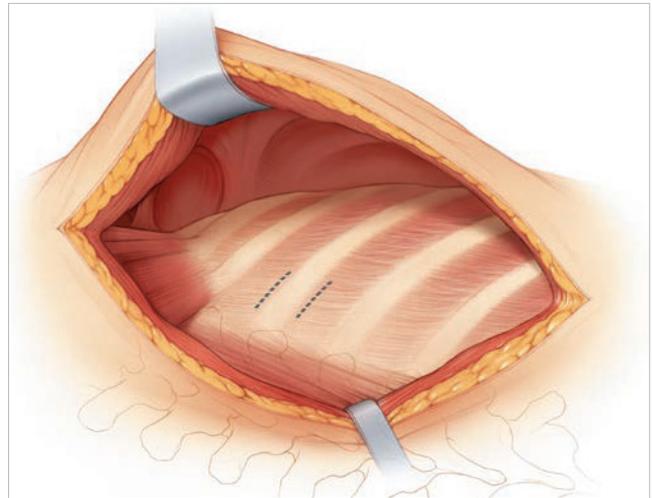
▲ Precaution:

- Take care to preserve the soft tissue surrounding the rib to protect rib vascularity and the neurovascular bundle.

Use the Trial Rib Hook to prepare the rib for the Rib Hook and Rib Hook Cap.

For a smaller patient where the small Rib Hook may be used, use the small Trial Rib Hook to prepare the rib.

The Trial Rib Hook and Trial Rib Hook, Small, may also be used to determine the appropriate Rib Hook size.



C. Select the suitable Rib Hook size

Select the appropriate Rib Hook size after using the Trial Rib Hook.



Standard



Small



D. Seat the Rib Hook

Instrument

03.641.005 Rib Hook Holder

Using the Rib Hook holder (1), seat the underside of the Rib Hook into the space between the periosteum and the rib (2). Rotate it into the correct position (3). For the medial construct, seat as medial as possible to the transverse process.

- For ease of grasping the Rib Hook with the Rib Hook Holder, seat one tip of the Rib Hook Holder first rather than simultaneously.



E. Select proper Rib Hook Cap size

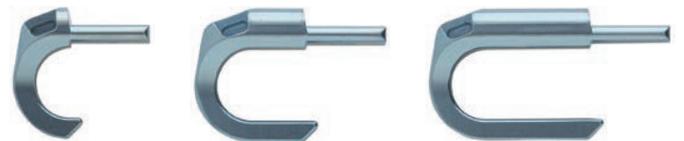
Based on the patient's anatomy, select the appropriate Rib Hook Cap (standard, extended, or extra long). The larger sizes can be used to encircle large areas of ribs, or multiple ribs.

▲ Precaution:

- If using the small Rib Hook, it is necessary to use one of the small Rib Hook Caps (light blue).



Standard



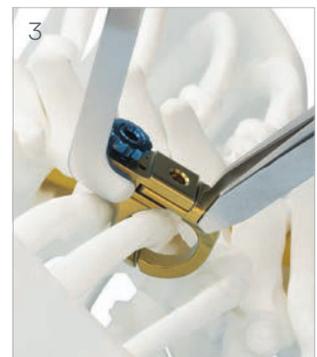
Small

F. Insert Rib Hook Cap

Instrument

03.641.006 Holding Forceps for Rib Hook Cap

Using the Holding Forceps (1), insert the Rib Hook Cap into the intercostal space superior to the rib (2). Rotate the Rib Hook Cap distally to mate with the rib support until the Rib Hook and the Rib Hook Cap are aligned (3).



G. Insert Closure for Extension Bar

Instruments

03.641.009	Lock Impactor with Offset
388.474	Lock Crimper, for VEPTR

Load a Closure for Extension Bar into the Lock Impactor. To lock the Rib Hook/Rib Hook Cap assembly, align the holes of the Rib Hook and Rib Hook Cap and insert the Closure for Extension Bar. Using a hammer, firmly tap the Impactor to seat the Closure for Extension Bar.

▲ Precaution:

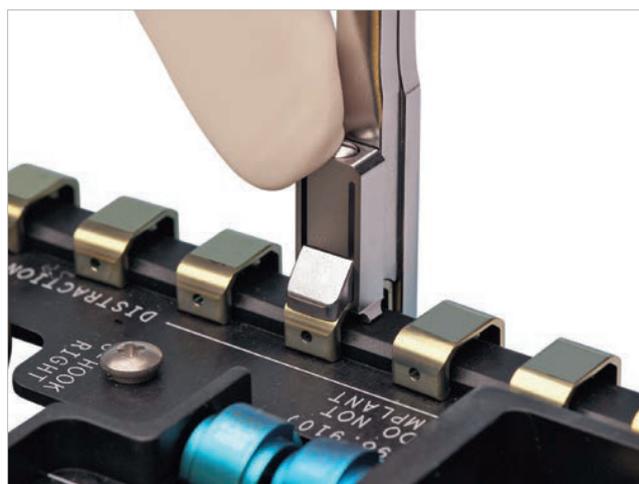
- The Lock Crimper should always be used to ensure the Closure for Extension Bar is fully seated.

Alternative instrument

03.641.010	SureLock
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Alternatively, the SureLock can be used to place the Closure for Extension Bar and ensure it is fully seated.

To facilitate loading a Closure for Extension Bar onto the SureLock, press the SureLock onto the Closure while it remains in the graphic case. Pushing on the top of the SureLock tip will facilitate grasping the Closure.



In case of fused ribs and scoliosis:

After superior and inferior points of attachment have been chosen, perform an opening wedge thoracostomy through the fused ribs at the apex of the thoracic deformity from the tip of the transverse process to the costochondral junction. Cut a transverse osteotomy from the transverse process to the sternum, in line of the normal rib.

Separate the fusion mass into multiple longitudinal sections of the approximate width of normal ribs in the patient. Ensure the continuity between the anterior and posterior attachments of the newly separated ribs.

4. Distract chest wall (if necessary)

Instruments

388.486	Foot for Rib Distractor, for No. U22-64010
U22-64010	Retractor, cervical, longitudinal
399.130	Bone Spreader, speed lock, width 12 mm, length 270 mm

Assemble the two feet for Rib Distractor to the longitudinal retractor. Distract the ribs using the rib retractor assembly as needed. A Bone Spreader may also be used to gently distract the chest wall at the site of the opening wedge thoracostomy.

Additional resection of medial fused ribs may be required if distraction is difficult.

▲ Precaution:

- Only resect visible bone adjacent to the spine. Be aware of anomalous segmental arteries due to abnormal anatomy.



5. Select length of Proximal Extension

A. Measure expandable portion

Instrument

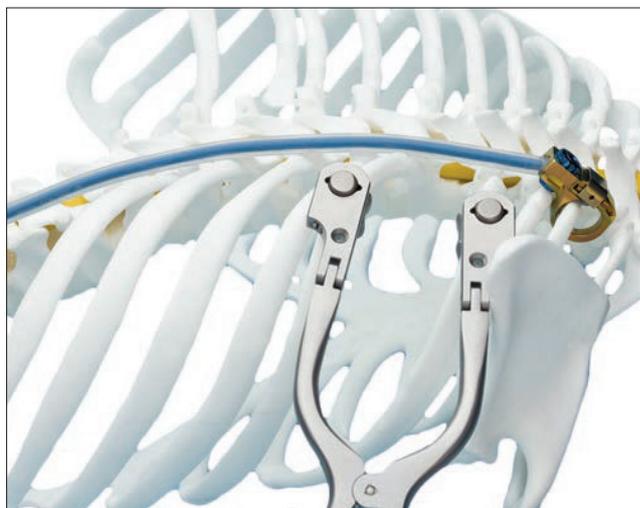
388.880	Trial Rod \varnothing 6.0 mm, length 400 mm
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Depending on the patients anatomy/pathology choose either the Extension with radius 220 mm (more curved) or with radius 550 mm (less curved).

Measure the distance for the expandable portion of the construct to determine the appropriate Proximal Extension size.

Measure the distance over the spread thorax, from the cranial rib and either to the thoraco-lumbar junction (rib-to-spine/ilium) or the chosen caudal rib (rib-to-rib).

The measurement in centimeters will correspond to the correct Proximal Extension size. For example, if the distance is determined to be 7 cm, use a Proximal Extension marked with a 7. Implant sizes are identified from 3 to 15 in 1-cm increments for the 500 mm radius implants, and from 3 to 13 in 1-cm increments for the 220 mm radius implants.



B. Cut and contour Proximal Extension, if necessary

Instruments

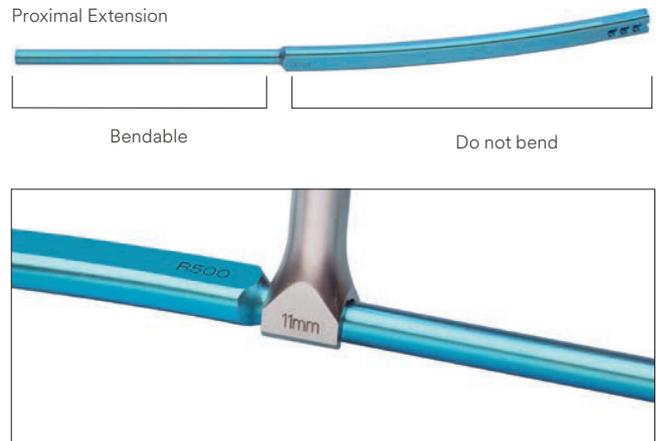
03.641.014	Extension Measuring Device
03.620.020	Rod Bender for Rods Ø 6.0 mm, with Radius Adjustment
388.750	USS Rod Cutting and Bending Device
388.720	Bolt Cutter

Excess rod on the Extension needs to be cut before implantation. As a minimum, 11mm of straight rod must remain on the Proximal Extension to facilitate the rod to fully seat within the Rib Hook. The Extension Measuring Device can be placed on the Proximal Extension to ensure enough rod is left on the Extension to fully seat in the Rib Hook. Any remaining rod can be cut and/or contoured to match patient anatomy.

Optional instruments

03.622.061	Bending Iron for Rods Ø 6.0 mm, left, for Coronal Plane
03.622.062	Bending Iron for Rods Ø 6.0 mm, right, for Coronal Plane
388.910	USS Bending Iron, left
388.920	USS Bending Iron, right

Using the Rod Bender, contour only the rod portion of the Proximal Extension. As an alternative, the Bending Irons can be used to contour the rod. The rod portion of the Extension can be cut using the handheld rod cutter.



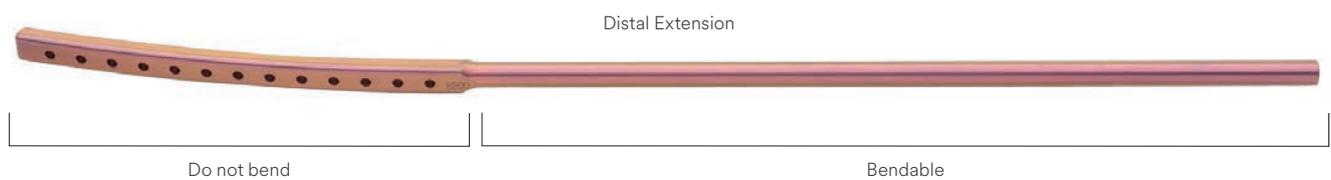
6. Assemble distal portion of construct

A. Select the appropriate Distal Extension

Distal Extension sizes correspond to the Proximal Extension sizes. For example, if the selected Proximal Extension is a size 7, the correct Distal Extension will also be a size 7. The radius of the Distal Extension must match the radius of the Proximal Extension.

(The green Proximal Extension matches the pink Distal Extension)

(The golden Proximal Extension matches the golden Distal Extension)



B. Determine contour and cut to length, if necessary

Instruments

03.620.020 Rod Bender for Rods Ø 6.0 mm, with Radius Adjustment

388.880 Trial Rod Ø 6.0 mm, length 400 mm

Optional instruments

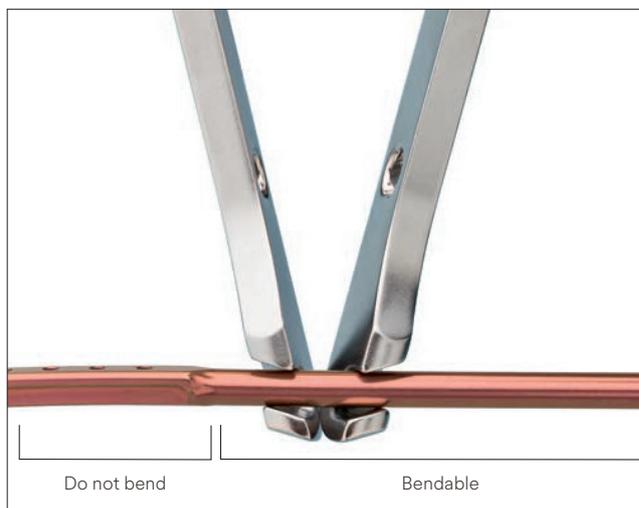
03.622.061 Bending Iron for Rods Ø 6.0 mm, left, for Coronal Plane

03.622.062 Bending Iron for Rods Ø 6.0 mm, right, for Coronal Plane

03.641.014 Extension Measuring Device

388.910 USS Bending Iron, left

388.920 USS Bending Iron, right



Use the Trial Rod to determine the contour of the rod portion of the lumbar extension.

▲ Precaution:

- **Do not bend the T-section of the lumbar extension which mates with the Extension Bar.**

Using the Rod Bender, contour only the rod portion of the Distal Extension. As an alternative, the Bending Irons and Coronal Rod Benders can be used to contour the rod. The rod portion of the Extension can be cut using the handheld rod cutter.

If implanting a rib-to-rib construct, approximately 11 mm of rod must remain on the Proximal and Distal Extensions to allow the rod to fully seat within the Rib Hook. The Extension Measuring Device can be placed on the Extensions to ensure enough rod is left on the Extensions to fully seat in the corresponding Rib Hooks. Any remaining rod can be cut and/or contoured to match patient anatomy.

- **When using a Lamina Hook or Ala Hook with Parallel Connector, an additional length of 1.5 cm should be left on the rod portion of the Distal Extension to facilitate distraction.**

C. Insert Closure for Extension Bar

Instruments

03.641.009 Lock Impactor with Offset

388.474 Lock Crimper, for VEPTR

Prior to insertion, slide the Distal Extension into the Proximal Extension. Align the most inferior hole in the Proximal Extension with the most inferior hole in the Distal Extension. The implants should overlap completely to maximize expansion over time.

Place a Closure for Extension Bar in this position using the Offset Lock Impactor. Gently tap the impactor with a hammer to seat the lock.

▲ Precaution:

- The Lock Crimper should always be used to ensure the Closure for Extension Bar is fully seated.

Alternative instrument

03.641.010 SureLock

Alternatively, the SureLock can be used to place the Closure for Extension Bar and ensure it is fully seated.



D. Insert inferior implant

1. Lamina Hook (for rib-to-lumbar lamina construct)

Make a 4 cm, longitudinal, paraspinal skin incision on the concave side of the curve at the lumbar interspace that was selected preoperatively. Retract the paraspinal muscles laterally.

▲ Precaution:

- Do not disturb the facet joints.

Use the lamina feeler to separate the ligamentum flavum unilaterally from the underside of the lamina to ensure bony contact with the Lamina Hook and to leave the interspinous ligament intact. Resect the ligamentum flavum for the hook to pass.

Choose the appropriate Lamina Hook (Right or Left). The hook will be placed downward-facing with the setscrew most lateral.

Place the hook in the desired location on the lumbar vertebra.



2. Ala Hook or S-Rod (for rib-to-iliac construct)

Instruments

03.641.013	Rod Holder
03.641.015	Screwdriver, hexagonal, small

Make a 4 cm, longitudinal incision just lateral to the posterior superior iliac spine. Identify the posterior third and middle third of the iliac crest. Make a 1 cm transverse incision in the mid substance of the apophysis with equal layers of cartilage above and below the incision. Insert the Periosteal Elevator through the apophyseal incision to widen it into a tunnel and thread it along the medial cortical surface of the iliac crest. The tip of the Periosteal Elevator should be just lateral to the Sacroiliac joint.

Choose the appropriate Ala Hook or S-Rod. If using the S-Rod, cut it to the appropriate length and contour as necessary.

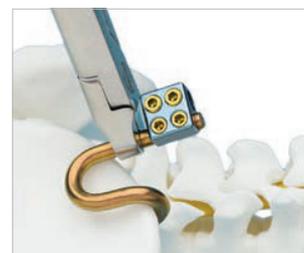
Attach an Extension Connector or Parallel Connector to the Ala Hook or S-Rod using the Small Hexagonal Screwdriver (2).

The 5.0 mm/6.0 mm Extension Connector or 5.0 mm/6.0 mm Parallel Connector should be used with the Ala Hooks.

The 6.0 mm/6.0 mm extension connector or 6.0 mm/6.0 mm Parallel Connector should be used with S-Rods. Insert the Ala Hook or S-Rod, using the Rod Holder, over the top of the iliac crest and medial to the inner table of the iliac wing.

3. Rib Hook (for rib-to-rib construct)

Use the same procedure and instrumentation as described earlier for placement of the Rib Hook and Rib Hook Cap.



E. Align the Distal Extension to the inferior implant

1. Placement using the Lamina Hook (for rib-to-spine) or Ala Hook or S-Rod (for rib-to-iliac)

Instruments

03.641.013	Rod Holder
03.641.015	Screwdriver, hexagonal, small

Create a tunnel through the paraspinal muscles from the proximal incision to just above the inferior attachment point. Place the Distal Extension into the tip of a no. 20 chest tube and thread proximal-to-distal, to the inferior attachment point.

If attaching to a Lamina Hook (for rib-to-spine construct), guide the Distal Extension into the Lamina Hook.

If using an Ala Hook or S-Rod (for rib-to-iliac construct), guide the Distal Extension into the opposing side of the extension or Parallel Connector. Tighten the setscrews in the connector using the Screwdriver, hexagonal, small.



**2. Placement using the Rib Hook
(for rib-to-rib construct)**

Instruments

03.641.002	Handle with Torque Limiter, 5 Nm, for Hexagonal Coupling, 6 mm
03.641.003	VEPTR Nut Driver Shaft, for Hexagonal Coupling, 6 mm
03.641.007	Sleeve Holder

Guide the Distal Extension into the Rib Hook using the Sleeve Holder. Ensure that the rod portion of the Distal Extension is visible through the view holes. Insert the VEPTR Nut Driver Shaft, for Hexagonal Coupling, 6 mm, into the Handle with Torque Limiter, 5 Nm, for Hexagonal Coupling, 6 mm. Use the Handle with Torque Limiter and VEPTR Nut Driver Shaft to tighten the nut onto the Rib Hook, connecting the Distal Extension.



7. Final assembly

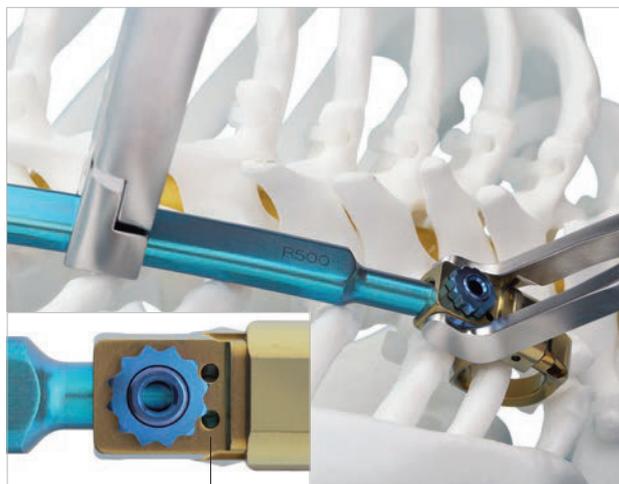
A. Assemble the Proximal Extension to the Rib Hook

Instruments

03.641.005 Rib Hook Holder

03.641.007 Sleeve Holder

Use the Sleeve Holder and the Rib Hook Holder to slide the rod end of the Proximal Extension into the Rib Hook. Ensure that the rod portion of the Proximal Extension is visible through the view holes.



view holes

B. Tighten the nut on the Rib Hook

Instruments

03.641.002 Handle with Torque Limiter, 5 Nm, for Hexagonal Coupling, 6 mm

03.641.003 VEPTR Nut Driver Shaft, for Hexagonal Coupling, 6 mm

03.641.005 Rib Hook Holder

Insert the Nut Driver Shaft into the Handle with Torque Limiter. Use the Handle with Torque Limiter and VEPTR Nut Driver Shaft to tighten the nut onto the Rib Hook, connecting the Proximal Extension.



Optional instrument

03.641.004 Socket Wrench for VEPTR Nut

The Socket Wrench for VEPTR Nut can be used when there is limited access to the Rib Hook nut. For example, in a rib-to-rib construct for placement of the Rib Hook under the scapula.



C. If using a Lamina Hook, distract if necessary and tighten

Instruments

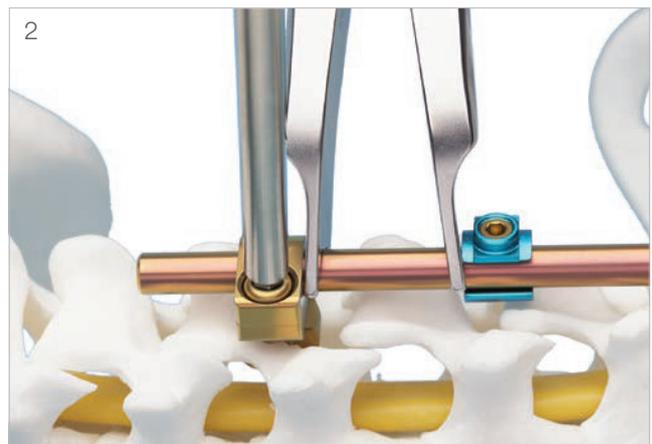
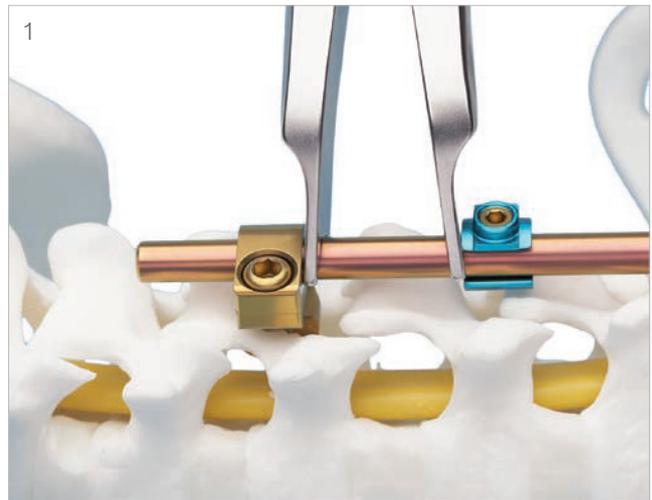
03.641.015	Screwdriver, hexagonal, small
03.641.016	Screwdriver, hexagonal, large
388.472	Distractor, curved, for Extension Bar
498.910	Fixation Ring for Rods Ø 6.0 mm, Titanium Alloy (TAN)

Using the Screwdriver, hexagonal, small, place a Fixation Ring superior to the Lamina Hook onto the rod portion of the Distal Extension.

Using the Distractor against the Fixation Ring, gently distract to further seat the hook (1). Use the Screwdriver, hexagonal, large to tighten the setscrew in the hook (2).

Remove the Fixation Ring following distraction, using the Screwdriver, hexagonal, small.

- If the patient is older than 6 months and of adequate body size, a second device (rib-to-rib construct) may be added posterolaterally in the midaxillary line to further expand the constricted hemithorax.



8. Alternative implant usage

A. Using the Rib Hook Extensions (series attachment)

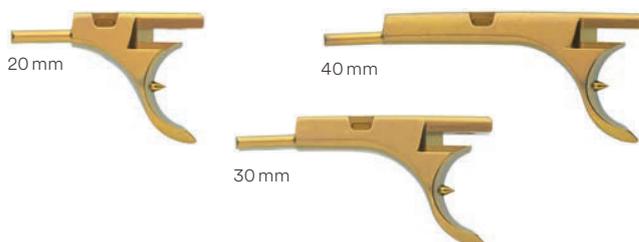
Instrument

03.641.006 Holding Forceps for Rib Hook Cap

The Rib Hook Extensions can be used when multiple rib attachment is desired. Based on the patient's anatomy, select the appropriate length Rib Hook Extension (20 mm, 30 mm, or 40 mm). Rib Hook Extensions are connected to a Rib Hook Cap (proximally) and a Rib Hook (distally) with a Closure for Extension Bar (497.125).

▲ Precaution:

- If using the Rib Hook Extensions, the most inferiorly placed Rib Hook should be the Long Rib Hook (red).



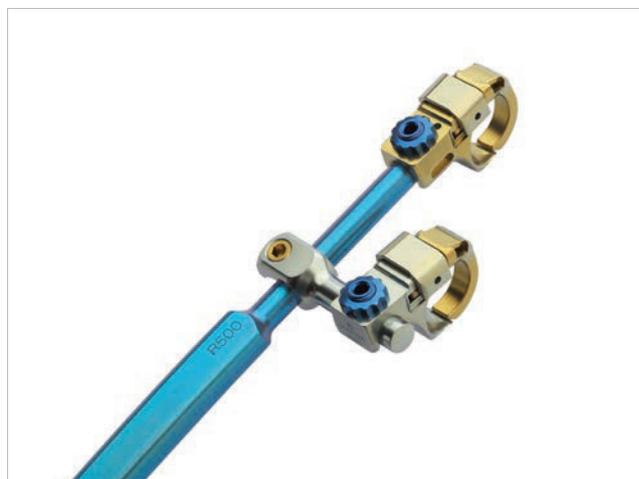
B. Using the Transverse Rib Hooks and Rod Connectors (parallel attachment)

Instrument

03.641.015 Screwdriver, hexagonal, small

The Transverse Rib Hooks and the Rod Connectors can be used when multiple rib attachment is desired. Insert the Transverse Rib Hook and appropriately sized Rib Hook Cap onto the selected rib. Based on the patient's anatomy, select the appropriate length Rod Connector (15 mm, 20 mm, 25 mm, or 30 mm) to connect the Transverse Rib Hook to the rod portion of the Proximal Extension on the medial construct. Guide the Rod of the Rod Connector into the Transverse Rib Hook. Attach the Rod Connector to the rod portion of the Proximal Extension using the Screwdriver, hexagonal, small.

Refer to detailed instructions within this technique guide to install specific components.



Expansion Procedure

▲ Warning:

- When performing an expansion procedure on patients implanted with a VEPTR II device, the decision to distract the implanted VEPTR II device should consider the risk/benefit of lengthening the device further versus alternative options including replacement of cranial and/or caudal construct components to longer ones. Remaining vigilant and closely monitoring patients for any device breakage with careful interpretation of this area on post-op imaging is recommended.

1. Patient positioning

Place the patient in a lateral decubitus or prone position.

2. Exposure

Identify the approximate location of the Closure for Extension Bar, locating the Proximal and Distal

- ① Extension through palpation and/or X-ray to localize the position of the Closure for Extension Bar. Make a transverse or longitudinal incision over the Closure for Extension Bar.

3. Remove the Closure for Extension Bar

Instruments

388.452	Lock Removal Pliers, for VEPTR
388.462	Lock Removal Device, for VEPTR

Remove the Closure for Extension Bar using the Lock Removal Pliers or the Lock Removal Device.



4. Distraction

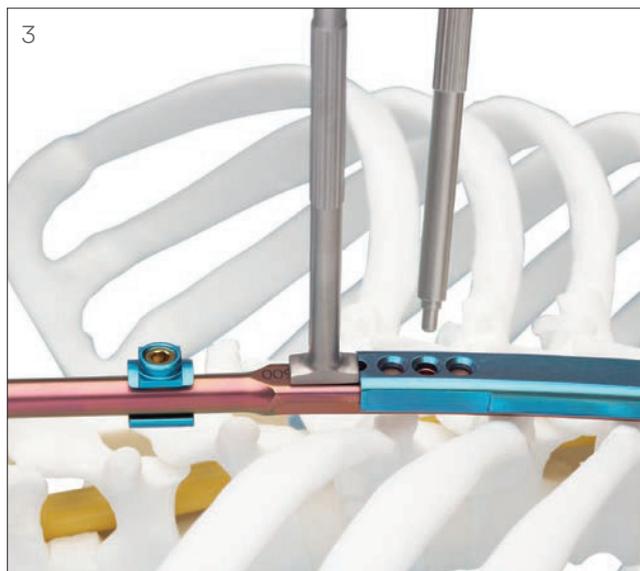
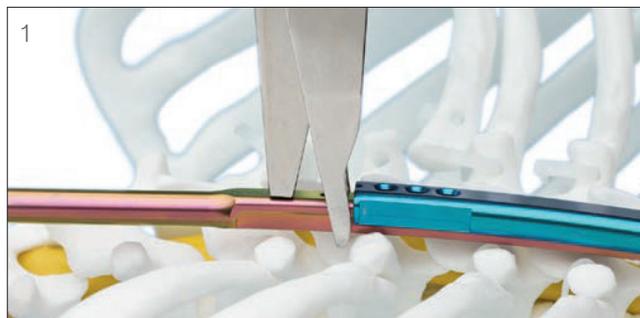
Instruments

03.641.011	Temporary Distraction Pin
388.471	Rib Distraction Pliers
388.472	Distractor, curved, for Extension Bar
498.910	Fixation Ring for Rods Ø 6.0 mm, Titanium Alloy (TAN)

Use the Rib Distraction Pliers (1), or the Distractor in conjunction with a Fixation Ring, to gently distract the implanted device until the device is adequately lengthened. Use the Temporary Distraction Pins as placeholders to assist distraction (2).

For the initial expansion (when the Rib Distraction Pliers cannot be used), the Temporary Distraction Pins can be used to assist distraction (3). Use the Distractor with the Fixation Ring to distract the Proximal Extension. When the desired hole location is reached, place the round tip of the first Temporary Distraction Pin in the desired hole of the Proximal Extension. Remove the Distractor and place the rectangular end of the second Temporary Distraction Pin in the Distal Extension to prevent the Proximal Extension from slipping (the “foot” on the pin may need to be rotated 90° depending on the desired hole location). Remove the first Temporary Distraction Pin to allow final locking.

- The hole spacing in the VEPTR II device will allow for incremental lengthening of 2.5 mm (minimum).



5. Final locking

Instruments

03.641.009	Lock Impactor with Offset
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388.474	Lock Crimper, for VEPTR
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Insert a new Closure for Extension Bar using the Offset Lock Impactor to fix the Proximal Extension in its distracted position. Using a hammer, firmly tap the Impactor to seat the closure.

▲ **Precaution:**

- Check to ensure the Closure is fully seated using the Lock Crimper.

Alternative instrument

03.641.010	SureLock
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Alternatively, the SureLock can be used to both place the Closure for Extension Bar and ensure it is fully seated.

Replacement of Components

A. VEPTR II component replacement

For replacement of Proximal Extension and Distal Extension, make three transverse incisions, one at the midportion of the implanted construct and others along the distal and proximal portions. A portion of the previous thoracotomy incision may be used.

To disconnect the Proximal Extension, unlock the device by loosening the nut on the Rib Hook using the Handle with Torque Limiter and VEPTR Nut Driver Shaft. To disconnect the Distal Extension, loosen the nut on the Rib Hook (for rib-to-rib construct), loosen the setscrew on the Lamina Hook (for rib-to-spine construct) or loosen the setscrews on the Extension or Parallel Connector (for rib-to-iliac construct).

Remove the Proximal and Distal Extension and insert the new components through the fibrous canal surrounding the old devices.

▲ Precaution

- Make sure to lock the Extensions before insertion.

B. VEPTR component replacement

(conversion of existing VEPTR to VEPTR II)

For replacement of an original VEPTR construct (Extension Bar/Lumbar Extension Rod or Extension Bar/Caudal Rib Support) without removing the implanted VEPTR Cranial Rib Support, use the VEPTR Adapter. Detach and remove the original VEPTR Extension Bar/Lumbar Extension Rod or Extension Bar/Caudal Rib Support from the Cranial Rib Support(s). Attach the VEPTR adapter to the original VEPTR Cranial Rib Support using a closure for Extension Bar. Now a VEPTR II Proximal or Distal Extension can be used to replace the original VEPTR Extension Bar construct.

Refer to detailed instructions within this surgical technique to replace the specific components in need.



Implant Removal

Any decision to remove the device must be made by the surgeon and the patient taking into consideration the patient's general medical condition and the potential risk to the patient of an additional surgical procedure. If a VEPTTR II implant construct must be removed, the following technique is recommended:

Position patient

Place the patient in a lateral decubitus or prone position.

Exposure

Identify the approximate location of the cranial and caudal location of the Rib Support and the Closure for Extension Bar through palpation and/or an X-ray to localize the position of the Closure for Extension Bar. Make transverse or longitudinal incision over the cranial and caudal Rib Support and the Closure for Extension Bar as required. A portion of the previous thoracotomy incision may be used.

Remove locks

Required Instrument

388.452	Lock Removal Pliers, for VEPTTR
388.462	Lock Removal Device, for VEPTTR

Remove the Closure for Extension Bar using the Lock Removal Pliers or the Lock Removal Device. Remove the Closure for Extension Bar for the cranial and caudal Rib Supports.

Remove Extension Bar, Rib Support and Closing Half-Ring

Required Instrument

03.641.002	Handle with Torque Limiter, 5 Nm, for Hexagonal Coupling, 6 mm
03.641.003	VEPTTR Nut Driver Shaft, for Hexagonal Coupling, 6 mm
03.641.005	Rib Hook Holder

03.641.007	Sleeve Holder
03.641.006	Holding Forceps for Rib Hook Cap
03.641.016	Screwdriver, hexagonal, large

Optional instrument

03.641.004	Socket Wrench for VEPTTR Nut
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Remove the proximal Extension Bar - unlock the device by loosening the nut on the Rib Hook using the Torque Limiting Handle and nut driver shaft. Remove the closing Half Ring and the Rib Support with the Holding Forceps for Closing Half-Ring or Rib Support.

To disconnect the Distal Extension, loosen the nut on the Rib Hook (for rib- to-rib construct), loosen the setscrew on the Lamina Hook (for rib-to-spine construct) using the Screwdriver, hexagonal, large or loosen the setscrews on the extension or Parallel Connector (for rib-to-iliac construct). Remove the Proximal and Distal Extension.

Removal of the Lamina Hook

Required Instrument

03.641.016	Screwdriver, hexagonal, large
03.641.013	Rod Holder

Remove the Extension Connector from the Lamina Hook using the Screwdriver, hexagonal, large. Remove the Lamina Hook.

Removal of Ala Hook/S-Rod (rib-to-iliac construct)

Required Instrument

03.641.015	Screwdriver, hexagonal, small
03.641.013	Rod Holder

Remove the Extension / Parallel Connector from the Ala Hook / S-Rod using the Screwdriver, hexagonal, small. Remove the Ala Hook / S-Rod using the Rod Holder.

Indications and Contraindications

Please refer to the corresponding Instructions for Use for specific information on Intended use, Indications, Contraindications, Warnings and Precautions, Potential Adverse Events, Undesirable Side Effects and Residual Risks. Instructions for Use are available at www.e-ifu.com and/or www.depuysynthes.com/ifu.

Bibliography

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2. Aebi M, Arlet V, Webb JK (2007) AOSPINE Manual (2 vols), Stuttgart, New York: Thieme.

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