Cable System

For Orthopaedic Trauma Surgery

Surgical Technique

AO approved by AO Technical Commission

DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

Image intensifier control

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 DePuy Synthes reusable devices, instrument trays and cases, as well as processing of DePuy 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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Cable System

For Orthopaedic Trauma Surgery

Description

The DePuy Synthes Cable System is a cerclage system that consists of two different-sized cerclage cables with crimp in three different materials [Stainless steel, Titanium Alloy (TAN), Cobalt Chromium Alloy], and instruments for applying the cable assembly. They are used with the Cerclage Positioning Pins (for LC-DCP and LCP) and Cerclage Eyes.

Application

Compatible with DePuy Synthes implants

The Cable system is compatible with the existing DePuy Synthes plates and screws, both in stainless steel and titanium.
The cable assemblies are available in stainless steel and titanium.

▲ Precaution:

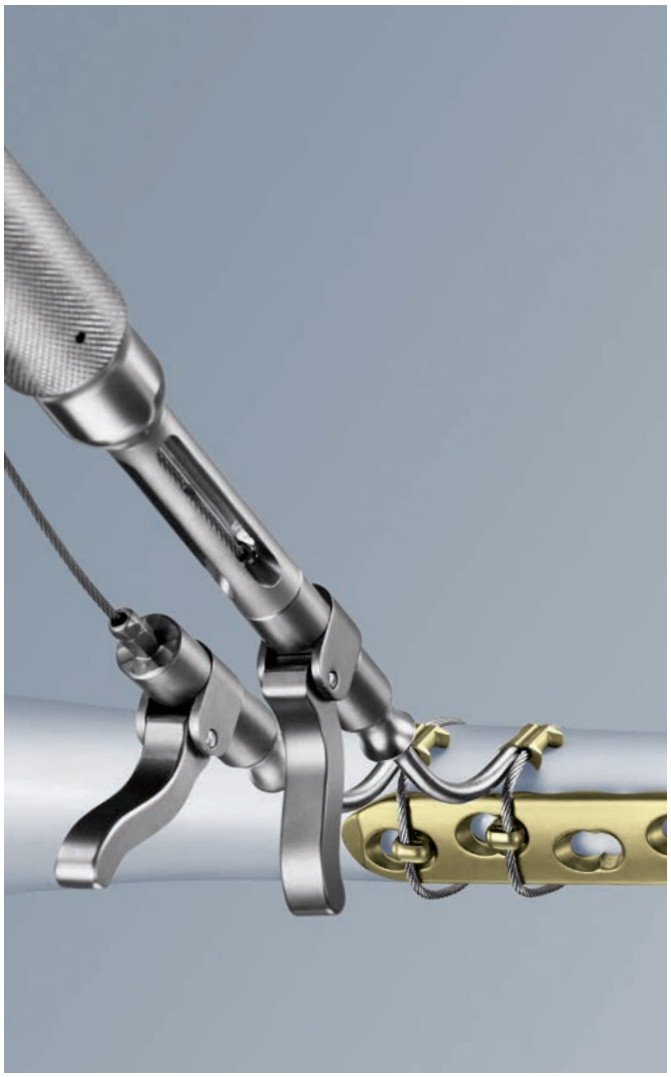
The correct material composition is important. Use a Stainless Steel cable only with Stainless Steel implants, and the CoCr and Titanium cable only with Titanium implants.

Tension Holder

The Tension Holder can be used to temporarily hold the tension of the cerclage cable while the cable tensioner can be removed.

Crimping

A ratchet mechanism controls the amount of crimp and deformation. The crimper automatically releases when the cable is crimped (no overcrimping or undercrimping possible).



The AO Principles of Fracture Management

Mission

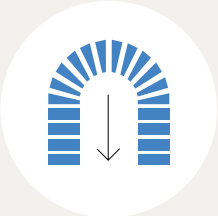
The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

AO Principles[1,2]

1.

Fracture reduction and fixation to restore anatomical relationships.

2.



Fracture fixation providing absolute or relative stability, as required by the "personality" of the fracture, the patient, and the injury.

3.

Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4.

Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

[1] Müller ME, Allgöwer M, Schneider R, Willenegger H. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg New York: Springer 1991.
[2] Buckley RE, Moran CG, Apivatthakakul T. AO Principles of Fracture Management: 3rd ed. Vol. 1: Principles, Vol. 2: Specific fractures. Thieme; 2017.

Standard Cerclage Technique

The following standard cerclage technique is explained using the example of a periprosthetic femoral fracture.

1. Position patient and reduce fracture

Position the patient for the respective surgical approach, and reduce the fracture.

2. Choose the appropriate cable passer

Instruments	
391.103	Cable Passer, medium, curved
391.104	Cable Passer, large, curved
391.105	Cable Passer, medium
391.106	Cable Passer, medium, 45° angle
391.107	Cable Passer, large
Optional	
391.108	Cable Passer, large, 45° angle

Select the appropriate cable passer. The size and shape of the cable passer depends upon the circumference of the bone and access to the site. Select a cable passer that will allow the instrument to pass around the bone without causing damage to soft tissues or stripping of the periosteum.

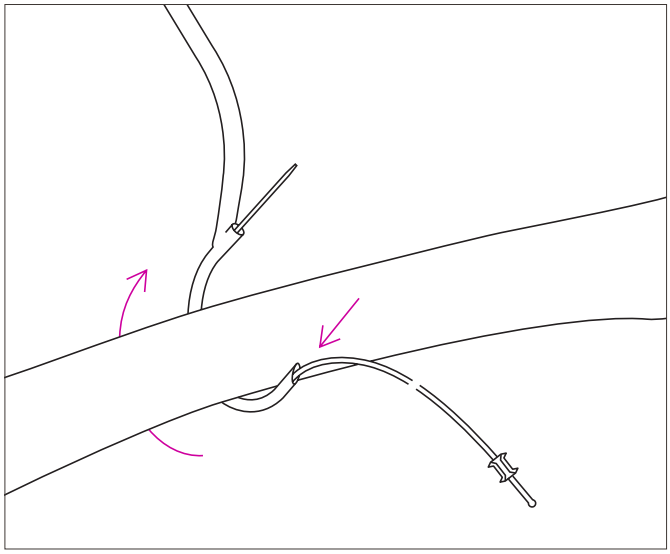
3. Pass the cable around the bone

Pass the cable passer around the bone. Thread the free end of the cable into the end-hole of the cable passer until the cable exits through the shaft hole. Remove the cable passer leaving the cable wrapped around the bone.

▲ Precaution:

Do not thread the cerclage cable through the shaft hole since the crimp will prevent removal of the cable passer.

If plates are employed, you may use cerclage positioning pins for LCP, DCP and LC-DCP (see step 4A, use of cerclage positioning pins for LCP, DCP and LC-DCP section), cerclage eyes (see step 4B, use of cerclage eyes for screws section) or threaded cerclage positioning pins for LCP 3.5/4.5 (see step 4C, use of threaded cerclage positioning pins for LCP section).



4a. Use of cerclage positioning pins for LCP, DCP and LC-DCP

Instruments	
X98.837/839	Cerclage Positioning Pin for LCP 3.5/4.5 and LC-DCP 3.5/4.5
310.310	Drill Bit ∅ 3.2 mm, length 145/120 mm, 2-flute, for Quick Coupling
323.460	Universal Drill Guide 4.5/3.2, for neutral and load position

Cerclage positioning pins are used for periprosthetic fracture fixation with plates when screws are not an option. The positioning pins maintain the stable positioning of the cable on the plate.

1 Position plate and drill pilot hole

Position the plate (LCP 3.5/4.5, LC-DCP and DCP 4.5 wide or narrow) on the bone. Choose the site of the positioning pin, and drill a pilot hole ∅ 3.2 mm in the cortical bone in the centre of the plate hole with aid of the universal drill guide.

2 Mount cerclage positioning pin

Mount a positioning pin on the cable and advance it up to the crimp. Thread the cable through the end-hole of the cable passer, and pass it around the bone.

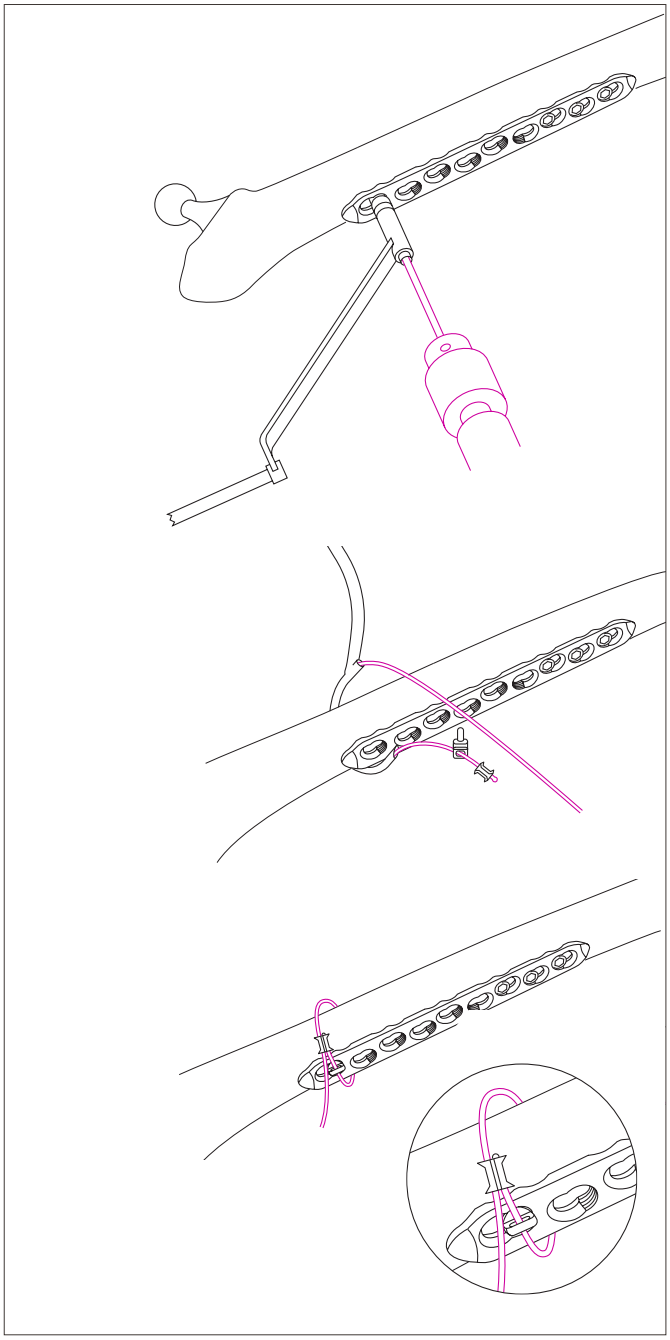
3 Insert cerclage positioning pin in plate hole

Instrument	
391.885	Holding Forceps for Cerclage Eyes and Positioning Pin

Insert the positioning pin into the pilot hole, either by hand or using the holding forceps.

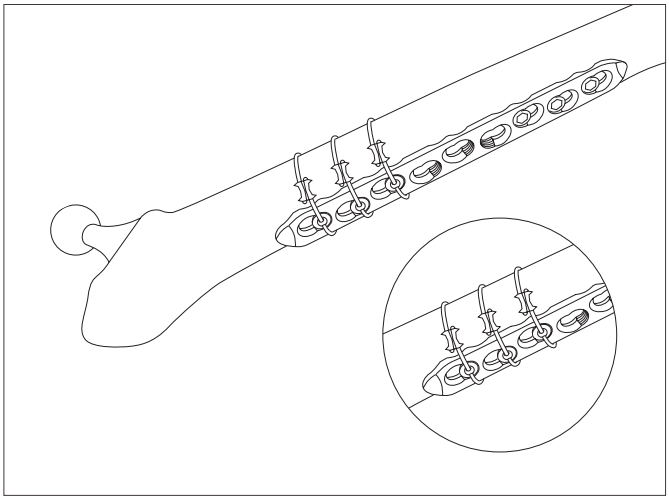
Alternative Implant	
281.001	CerclageFix Insert, Stainless Steel

A CerclageFix Insert may be used alternatively for DCP and LC-DCP plates. Make sure to insert the article into the hole before fixing the plate to the bone.



4b. Use of cerclage eyes for screws

Instruments	
0X.221.002.05	Cerclage Eyes for Screws ∅ 3.5 mm Stardrive and hexagonal socket, pack of 5 units
0X.221.003.05	Cerclage Eyes for Screws ∅ 4.5 mm Stardrive and hexagonal socket, pack of 5 units
0X.221.004.05	Cerclage Eye for Hexagonal Socket, ∅ 4.0 mm, cannulated, pack of 5 units



Cerclage eyes are used in cases where screws are unable to get a sufficient grip (e.g. in periprosthetic fractures) or where monocortical screws are used with prostheses.

1 Mount cerclage eye

Mount a cerclage eye on the cable and advance it up to the crimp. Thread the cerclage cable through the end-hole of the cable passer, and pass it around the bone.

2 Insert cerclage eye

Instrument	
391.885	Holding Forceps for Cerclage Eyes and Positioning Pin

Insert the cerclage eye into the recess of the screw using the holding forceps.

▲ Precaution:

The correct material composition is important. Use a Stainless Steel cable only with Stainless Steel implants, and the CoCr and Titanium cable only with Titanium implants.

4c. Use of threaded cerclage positioning pins for LCP

Instruments	
X98.838.01	Positioning Pin 3.5 with thread, for LCP
X98.803.01	Positioning Pin 4.5 with thread, for LCP

Threaded cerclage positioning pins for LCP are used for LCP plates 3.5 and 4.5/5.0, where the locking screws cannot sufficiently grip. The cerclage positioning eyes maintain the stable positioning of the cable on the plate.

1 Mount the threaded cerclage positioning pin for LCP

Fix the plate with LCP screws to secure the position of the plate. Define the position of the positioning pin on the plate, and manually screw in the positioning pin into the threaded part of the LCP combi-hole.

Alternative implant	
X81.002	CerclageFix for LCP 4.5/5.0

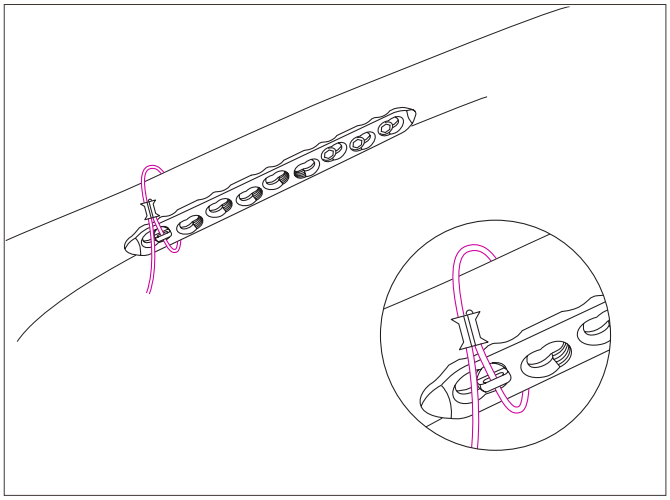
Alternatively CerclageFix can be used.

2 Mount the cable

Thread the cable through the end-hole of the cable passer, and pass it around the bone. Then pass the cable through the hole of the cerclage positioning pin.

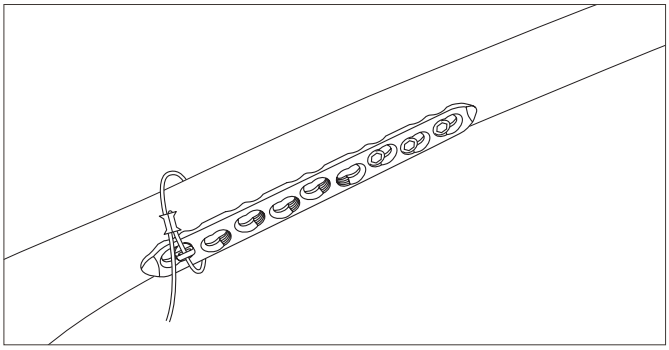
▲ Precaution:

The correct material composition is important. Use a Stainless Steel cable only with Stainless Steel implants, and the CoCr and Titanium cable only with Titanium implants.



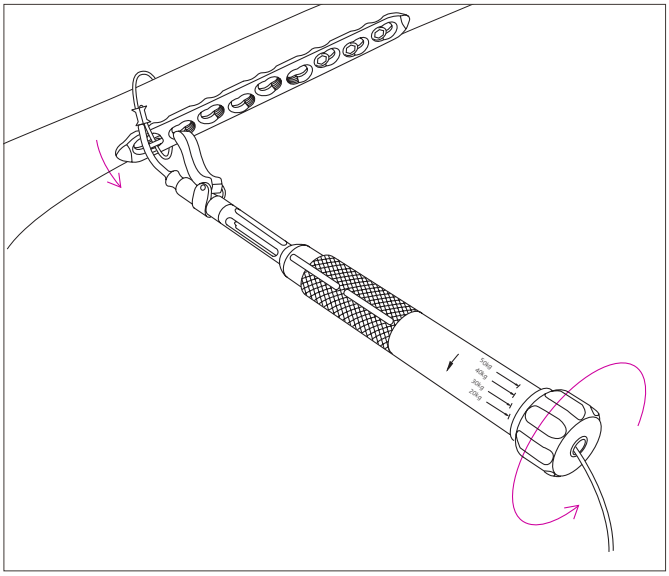
5. Position cable crimp

Insert the end of the cable through the free hole of the crimp, and place the crimp in the desired position on the bone. When placing the crimp, ensure that it is covered by soft tissue and securely anchored in the bone. The four points on the underside of the crimp must contact the bone, and the smooth side must face upwards.



6. Insert cerclage cable into the cable tensioner

Instruments	
391.884	Tension Holder, for temporary use
391.883	Attachment Bit for Tension Holder
391.201	Cable Tensioner
Alternative Instruments	
03.221.015	Cable Tensioner, one-hand operable*
and	
03.221.016	Cable Lock ∅ 1.0 mm, for Cable Tensioner, one-hand operable
or 03.221.017	Cable Lock ∅ 1.7 mm, for Cable Tensioner, one-hand operable



Mount the temporary tension holder and the attachment bit on the cable tensioner. To enable the cerclage cable to be inserted into the cable tensioner, turn the fluted knob at the end of the tensioner counterclockwise as far as possible. Insert the cerclage cable into the cable tensioner, and advance the attachment bit up to the crimp.

* Note: The surgical steps to be taken when using the one-hand operable Cable Tensioner are described in the One-hand operable Cable Tensioner Surgical Technique. For all other steps this surgical technique applies.

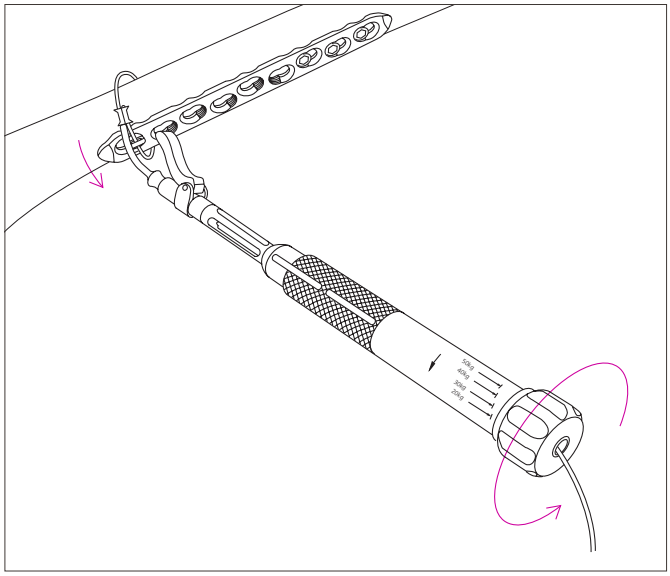
7. Tension cerclage cable

Turn the fluted knob on the cable tensioner until the desired tension is reached. The tension is shown by the markings on the tensioner (20–50 kg).

If the cerclage cable is tensioned above the specified level, it may tear out of the crimp or cut through or crush osteoporotic bone.

▲ WARNING:

The tension of the cerclage cable should not exceed 40 kg (for the cable ∅ 1.0 mm) and 50 kg (for the cable ∅ 1.7 mm).

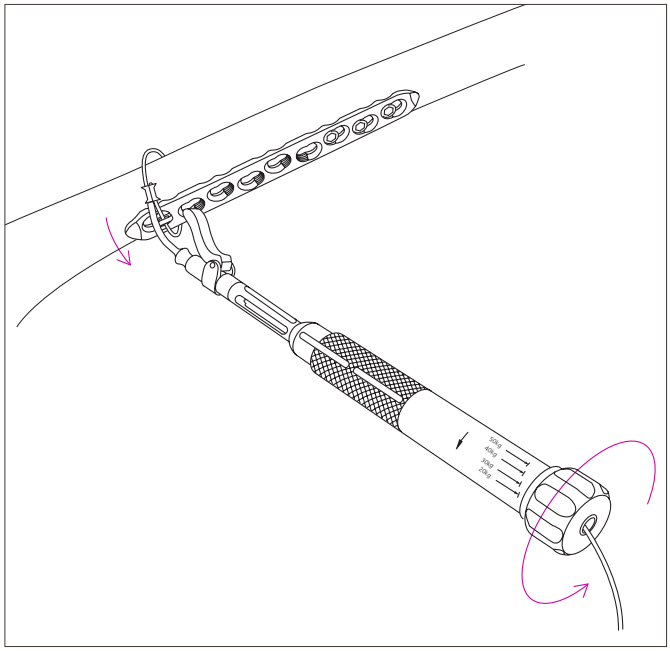


8. Temporary fixation (optional)

Instrument	
391.884	Tension Holder, for temporary use

The tension holder can be used to temporarily hold the tension of the cerclage cable so that the cable tensioner can be removed.

Pull back the lever of the cam lock on the temporary tension holder, and loosen and remove the cable tensioner (see step 10, Remove cable tensioner section). Using this procedure, any cerclage cable can be retensioned and/or repositioned before definitive fixation.



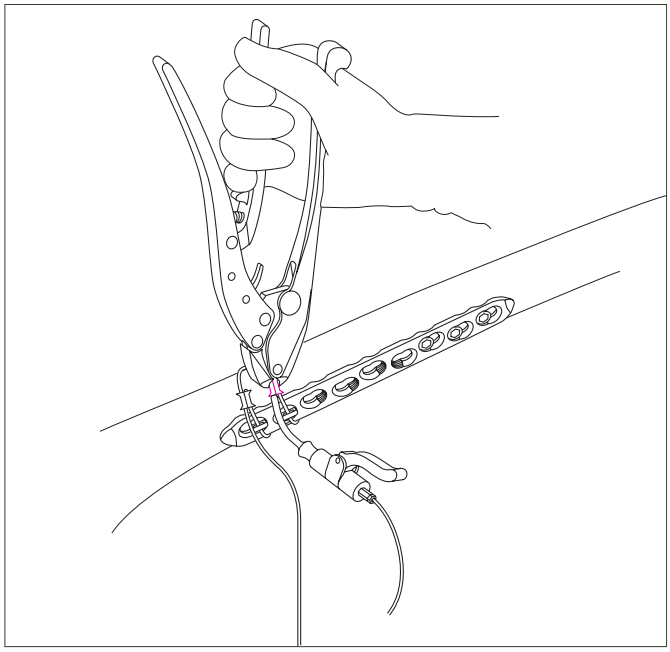
9. Secure cerclage cable with cable crimp

Instrument	
391.882	Cable Crimper

When the desired cable tension is reached, the cerclage cable can be secured with the crimp. Place the jaws of the cable crimper on the crimp, ensuring that the crimp is centred and is correctly held in the crimper jaws. Pull the inner start lever first, then squeeze the outer handles to complete crimping. The toothed mechanism of the cable crimper establishes the appropriate compression pressure for securing the crimp.

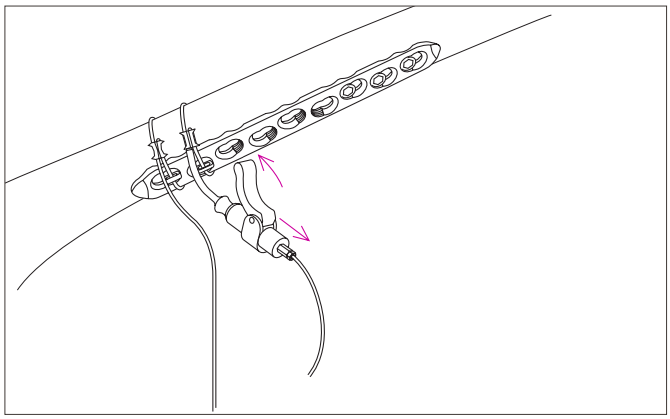
▲ Precaution:

Incorrectly placing the cable crimper can lead to crimp failure.



10. Remove cable tensioner

When the crimp – and thus the cerclage cable – is secured, turn the fluted knob on the cable tensioner as far as possible, and remove the tensioner. If the temporary tension holders are wed, push the lever of the cam lock forward, and pull the holder off the cable.



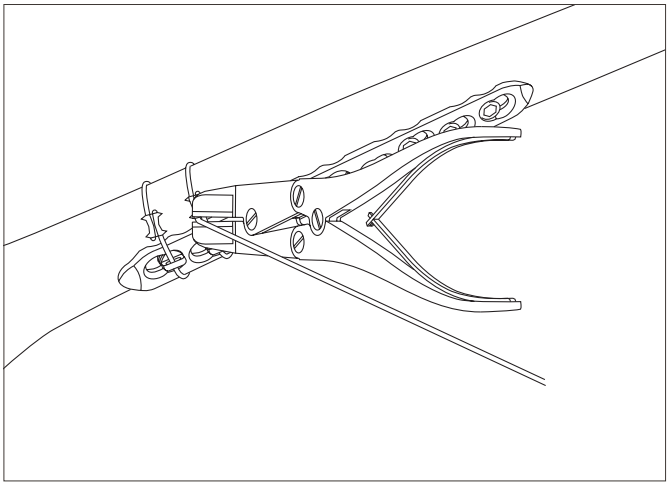
11. Cut cable

Instrument	
391.905	Cable Cutter, standard
or	
391.906	Cable Cutter, large

Cut the loose end of the cable using the cable cutter. Position the cutting jaws very close to the crimp, and make the cut in one action to produce a clean cut. Ensure that the adjacent cerclage cables do not get damaged.

▲ Precaution:

Make sure to cut the cable close to the crimp and in one action to avoid sharp edges.



Implant Removal

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments.

Tension-band Technique on the Olecranon

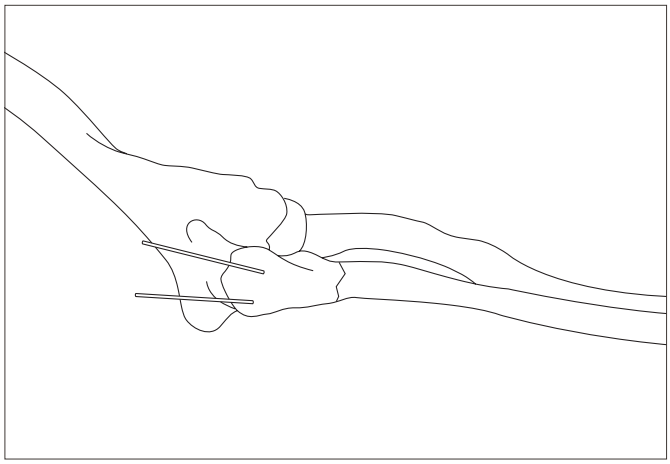
The principle of the tension-band technique is mainly employed in avulsion fractures (e.g. olecranon, patella). Fractures or osteotomies of the greater trochanter and avulsion fractures of the medial and lateral malleolus can also be treated with this technique.

1. Position patient and reduce fracture

Position the patient and reduce the fracture.

2. Insert Kirschner wires

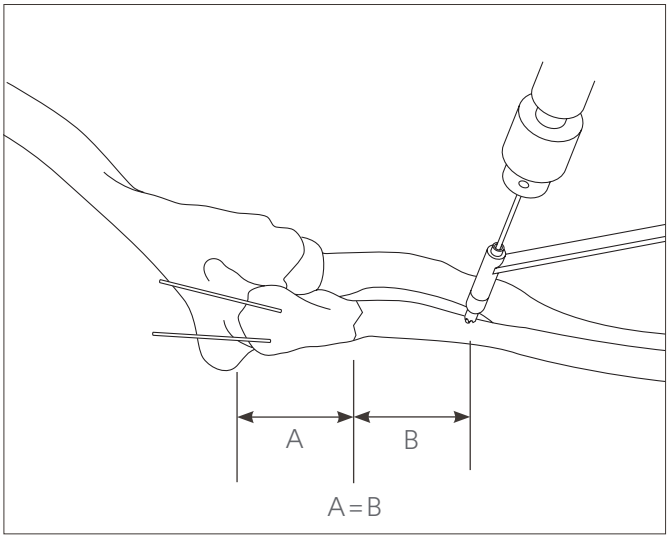
Using a drill guide, insert two parallel Kirschner wires in line with the longitudinal axis of the olecranon. The Kirschner wires can be drilled into the anterior cortical bone of the ulna, or down to the medullary cavity. Predrilling may be indicated for hard bone density.



3. Drill hole for cerclage cable

Instrument	
310.190	Drill Bit ∅ 2.0 mm, length 100/75 mm, 2-flute, for Quick Coupling

For the cable in the distal fragment, drill a ∅ 2.0 mm hole perpendicular to the longitudinal axis of the ulna and distal to the fracture site. The distance between the fracture site and the drill hole (B) should match the length of the proximal fracture fragment (A). The drill must only just penetrate the second layer of cortical bone.



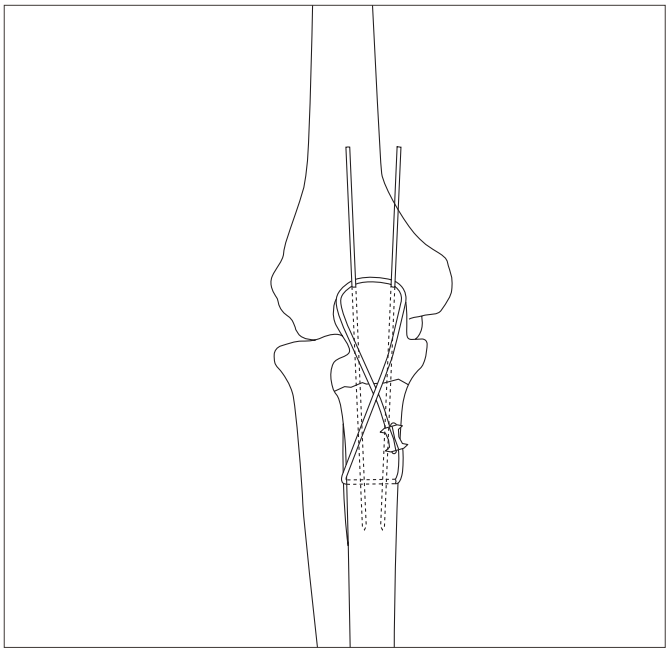
4. Create the tension band

Instrument	
X98.800.01	Cerclage Cable with Crimp ∅ 1.0 mm

Position the crimp of the cerclage cable ∅ 1.0 mm on the ulna parallel with its longitudinal axis. Guide the cerclage cable through the drill hole and around the Kirschner wires. Pass the free cable end across the positioned cerclage cable to produce a figure-eight loop, and insert it into the free hole of the crimp.

Alternatively, one or two screws (solid or cannulated) with cerclage eyes may be used instead of the Kirschner wires.

For tensioning, crimping and cutting of the cable, see steps 7–11 of the standard cerclage technique.

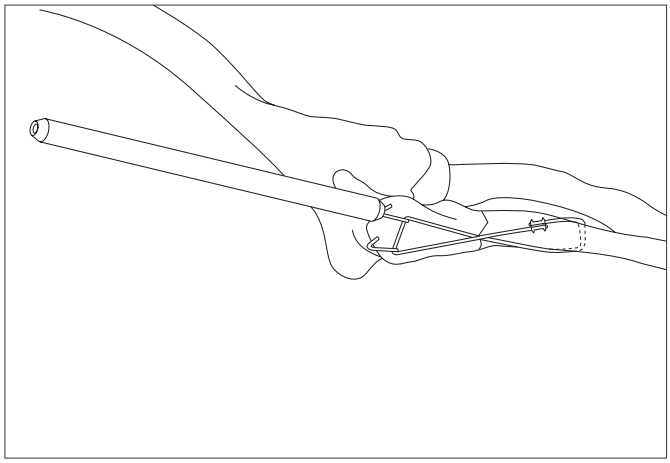


▲ Precaution:

The correct material composition is important. Use a Stainless Steel cable only with Stainless Steel implants, and the CoCr and Titanium cable only with Titanium implants.

5. Cut and anchor Kirschner wires

Instruments	
391.820	Wire Bending Pliers, length 155 mm, for Wires up to ∅ 1.25 mm
392.000	Bending Iron for Kirschner Wires, for Wires ∅ 1.25 mm to 2.5 mm



Slightly retract the Kirschner wires. Cut them at an oblique angle so that the sharp ends can be bent to form small hooks using the wire bending pliers. Using the bending iron for Kirschner wires and a hammer, tap the hooks into the bone. Ensure that the hooks secure the cerclage cable.

▲ Precaution:

Do not cut the Kirschner wires with the cable cutter since this can damage the cutting edges.

Implant Removal

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments.

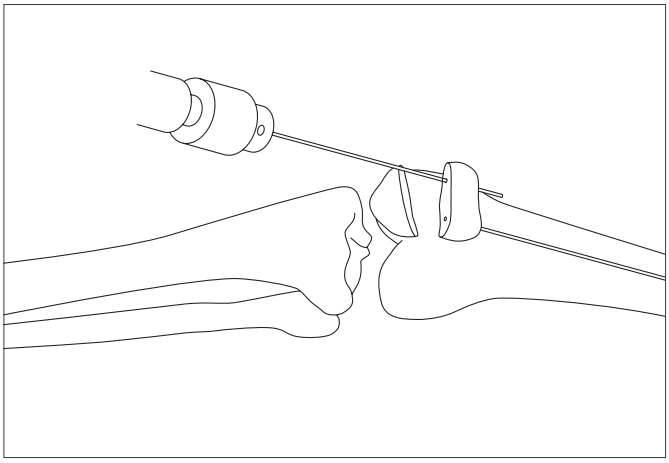
Tension-band Technique on the Patella

1. Reduce fracture

Instruments	
310.190	Drill Bit ∅ 2.0 mm, length 100/75 mm, 2-flute, for Quick Coupling
X92.160	Kirschner Wire ∅ 1.6 mm with trocar tip length 150 mm

Tilt the distal fracture fragment to expose the fracture surfaces of both fragments. Using the drill bit, drill two parallel holes in a retrograde direction through the proximal fragment. Insert the Kirschner wire into each hole with the blunt end to the fore, and advance it into the fracture surface until it emerges in front of the quadriceps. Ensure that the Kirschner wire tips remain completely in the proximal fragment.

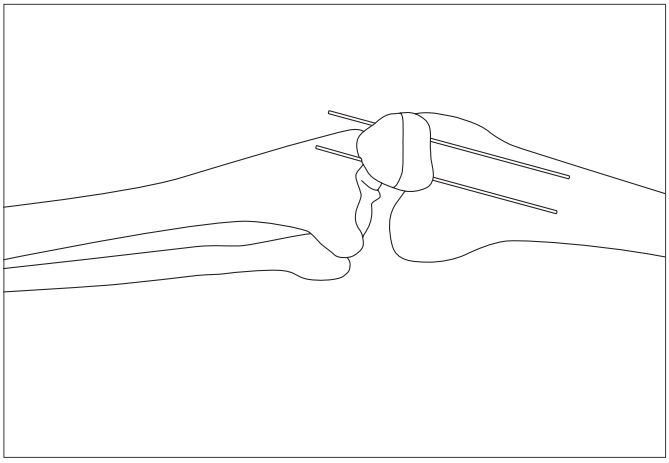
Reduce the fracture using a reduction forceps with points, and secure provisionally. Check the anterior cortical bone and the articular surface to ensure that the fracture is correctly reduced.



2. Insert Kirschner wires into the distal fragment

Instrument	
310.190	Drill Bit ∅ 2.0 mm, length 100/75 mm, 2-flute, for Quick Coupling

Gradually insert the Kirschner wires into the distal fragment and advance at least as far as 1 cm beyond the distal pole of the patella. Check the reduction and provisional fixation.



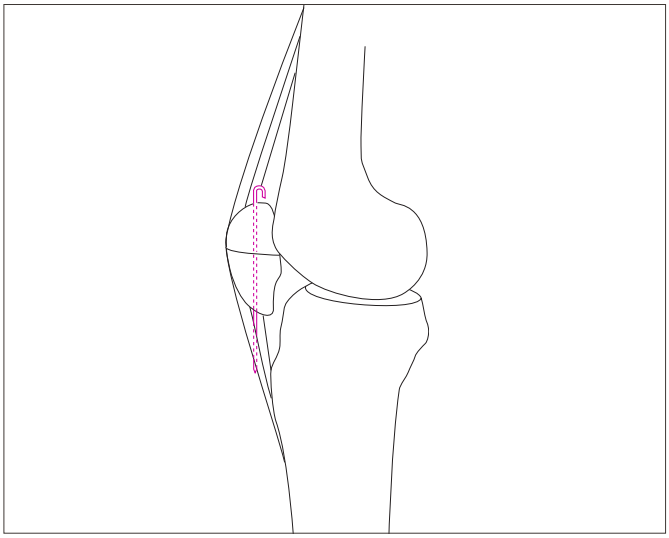
3. Cut the proximal ends of the Kirschner wires

Instrument	
391.820	Wire Bending Pliers, length 155 mm, for Wires up to ∅ 1.25 mm

Cut the proximal ends of the Kirschner wires at an oblique angle to produce sharp ends. Using the wire bending pliers, bend the proximal ends of the Kirschner wires to form hooks.

▲ Precaution:

Do not cut the Kirschner wires with the cable cutter since this can damage the cutting edges.

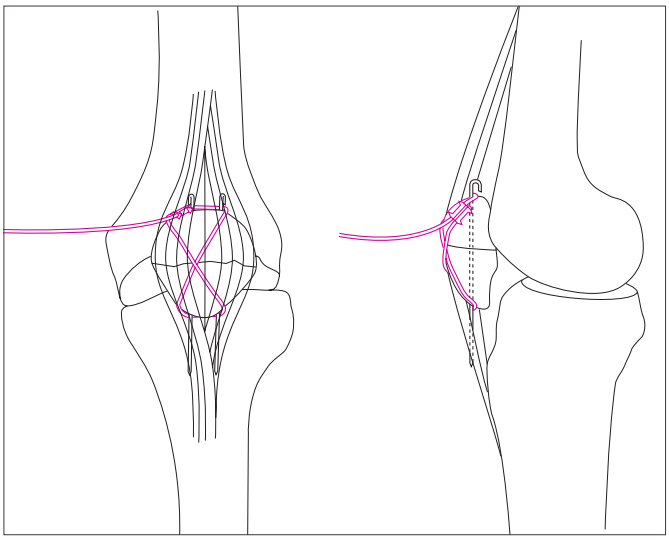


4. Create the tension band

Instrument	
X98.800.01	Cerclage Cable with Crimp ∅ 1.0 mm

Position the crimp of the cerclage cable on the lateral or medial side, proximal to the pole of the patella. Pass the cable deep to the quadriceps and patellar tendons around the Kirschner wires. Pull the free cable end beneath the positioned cable to produce a figure-eight loop, and insert it into the free hole of the crimp.

For tensioning, crimping and cutting of the cable, see steps 7–11 of the standard cerclage technique.



5. Cut and anchor Kirschner wires

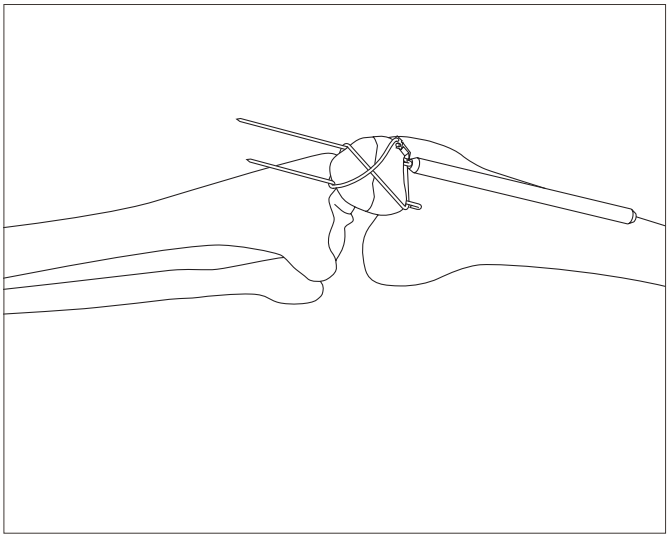
Instrument	
392.000	Bending Iron for Kirschner Wires, for Wires ∅ 1.25 to 2.5 mm

Using the Bending Iron for Kirschner Wires and a hammer, tap the hooks into the bone. Ensure that the hooks secure the cerclage cable.

Cut the projecting distal ends of the Kirschner wires approx. 1 mm from the bone.

▲ Precaution:

Do not cut the Kirschner wires with the cable cutter since this can damage the cutting edges.



Implant Removal

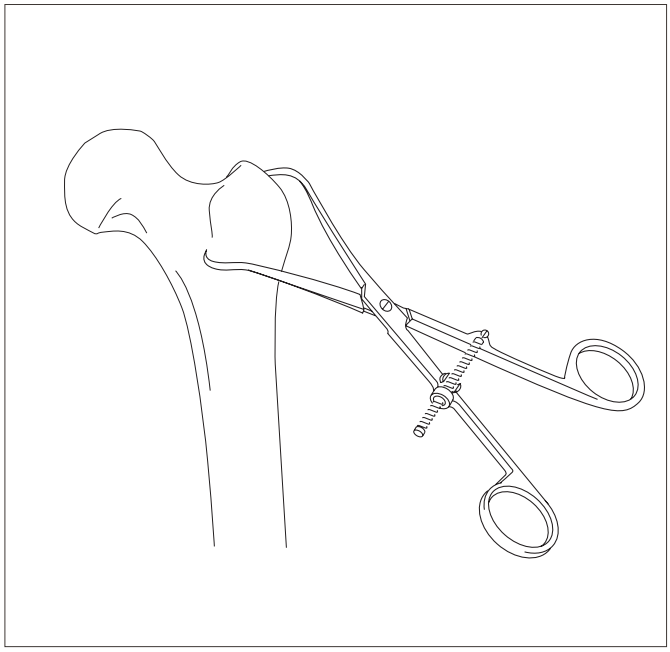
In case the physician decides to remove the implants, implants can be removed by using general surgical instruments.

Trochanteric Reattachment Device

1. Reduce the trochanteric fragment

Instruments	
498.806	TRD – Trochanter Reattachment Device, small, for Cable System, Titanium Alloy (TAN)
498.807	TRD – Trochanter Reattachment Device, large, for Cable System, Titanium Alloy (TAN)
391.919	Impactor for TRD, for Cable System

Hold the femur in a slightly flexed, internally rotated, and abducted position. Reduce the trochanteric fragment into the desired position using standard bone reduction forceps, a common bone hook, or trochanter forceps.
The Trochanteric Reattachment Device attached to the Impactor can also be used to reduce the trochanteric fragment.

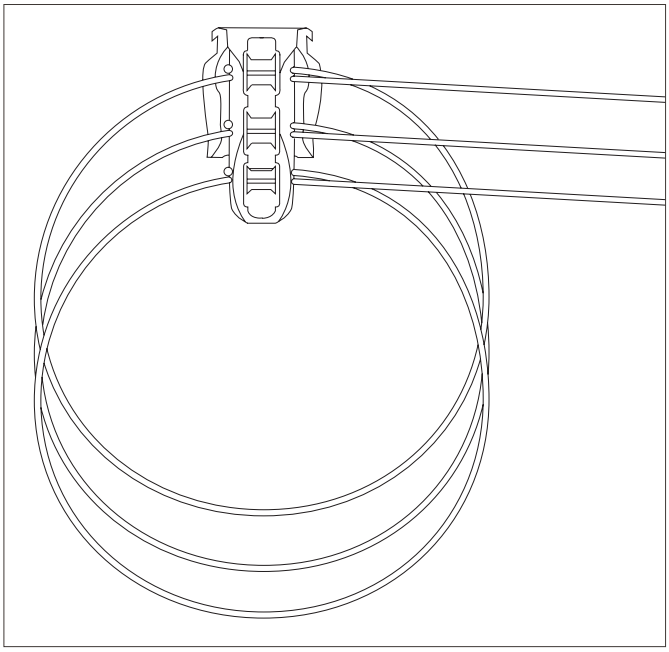


■ Note:

When reducing the greater trochanter, ensure that there is a good bed of bone upon which the trochanter will be fixed.

2. Prepare the Trochanteric Reattachment Device (TRD)

Remove the TRD from its package and pull the free end of each cable out of it.



■ Note:

It is very important to plan the direction from which the cables will be tensioned. If necessary, change the direction in which the cables pass through the TRD to facilitate access.

To change the direction of the cables:

1 Hold the TRD in the palm of one hand, ensuring that the free ends of the cables remain in the sterile field.

2 Place one finger lengthwise over the center of the TRD (directly over the crimps) to prevent the crimps from moving.

3 Remove one cable from the TRD.

4 Thread it through the TRD and crimp in the opposite direction.

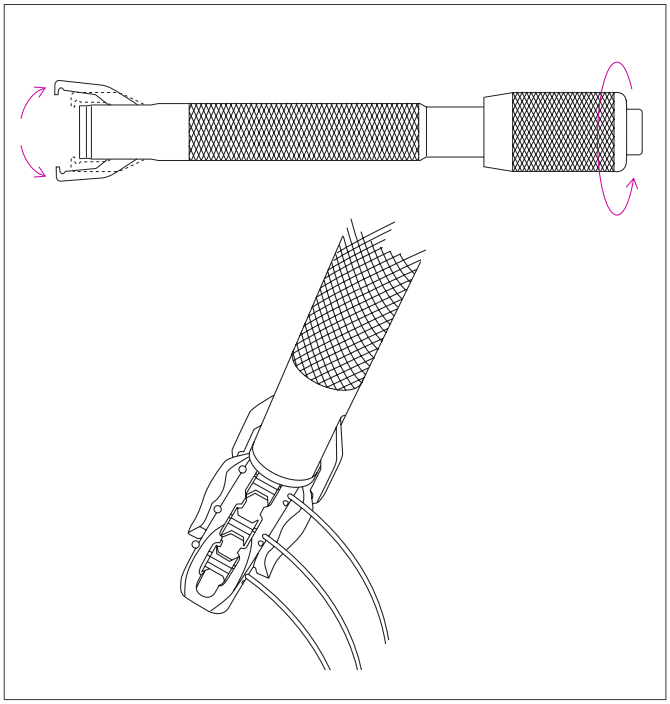
5 Repeat this process for the other cables.

3. Attach the impactor

Instrument	
391.919	Impactor for TRD, for Cable System

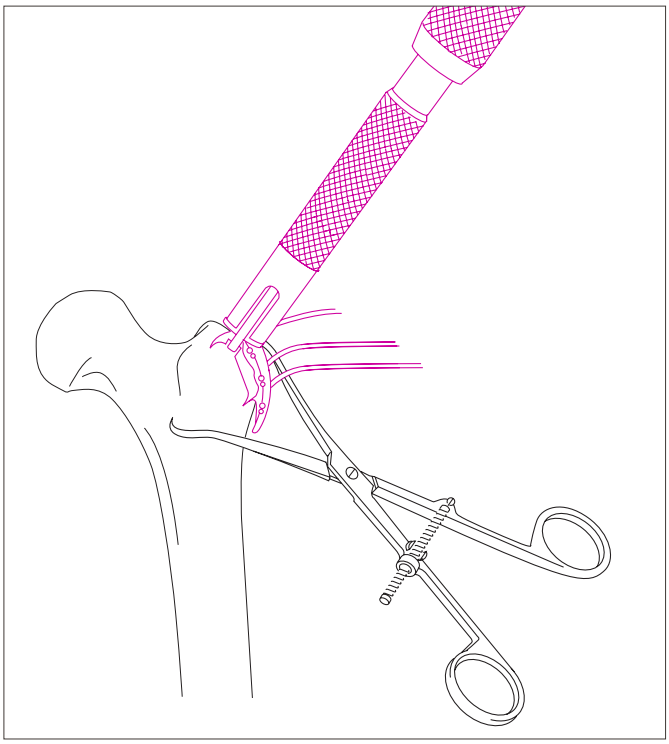
Turn the collar of the Impactor counterclockwise until the jaws are fully open.

Place the TRD on a flat surface and position the impactor over the flat area on the proximal end of the TRD, just above the most proximal crimp. When the jaws are closed, they should grip the TRD in the small notches on either side of the device. Turn the collar of the impactor clockwise until the jaws close and hold the TRD firmly.



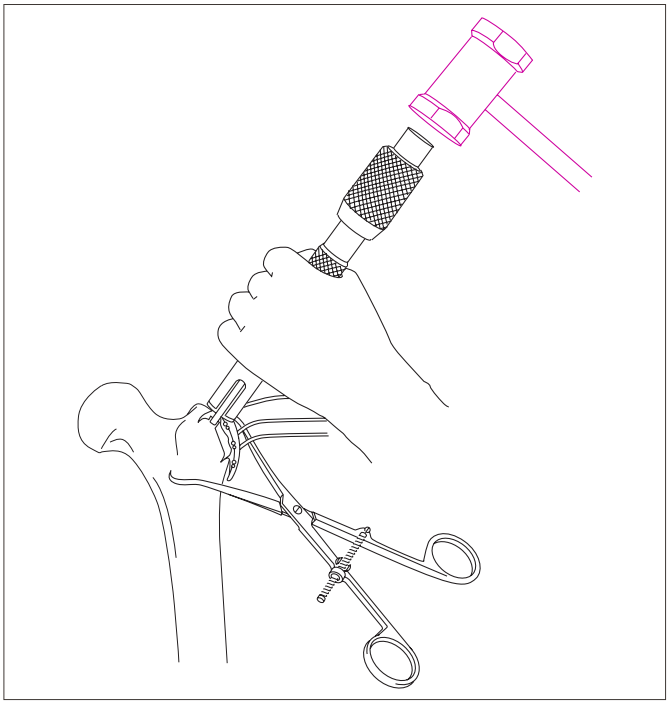
4. Position the TRD

Position the TRD over the trochanter so that the upper hooks engage and wrap around the superior portion of the trochanter.



5. Impact the TRD

Using a hammer, impact the TRD onto the greater trochanter, ensuring that it is fully seated. Impaction should always occur in the distal direction to prevent the trochanteric fragment from slipping proximally.



6. Select the cable passer

Instrument	
188.215	Cable System in Vario Case

Select the appropriate cable passer from the Orthopaedic Cable Instrument Set. The size and shape of the cable passer depend on the circumference of the bone and access to the surgical site. Select a cable passer that will allow passage of the instrument around the bone without causing significant damage to soft tissue or excessive stripping of the periosteum.

▲ Precaution:

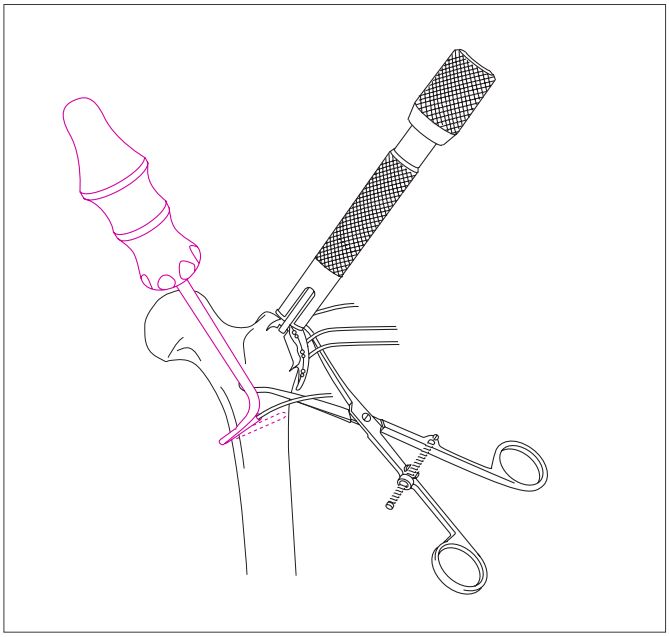
The cables should not be passed around a prosthesis.

7. Pass the cable

Place the cable passer around the bone. Thread the free end of a cable into the end-hole of the cable passer until the cable exits through the shaft hole.

▲ Precautions:

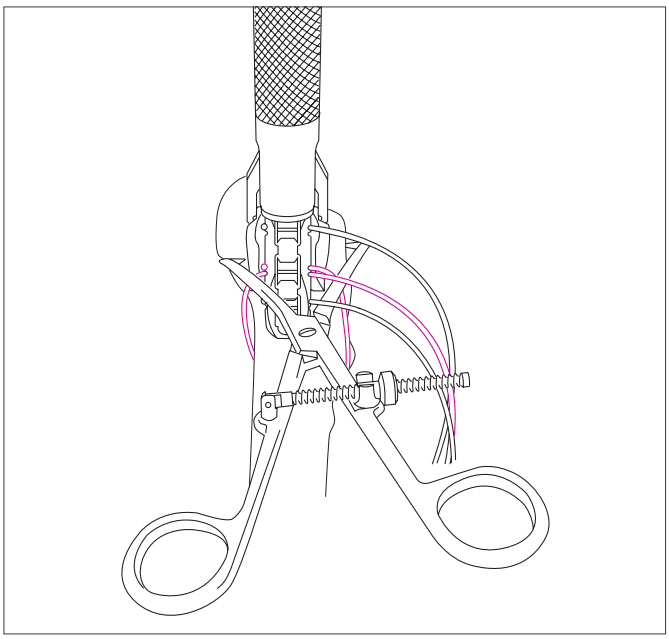
- The middle cable should be threaded first.
- Do not thread the cable into the shaft hole of the cable passer, since the cable crimp and TRD, which are attached to the other end of the cable, will prevent release of the cable passer.



8. Position the cable

Remove the cable passer, leaving the cable wrapped around the bone.

Thread the free end of the cable through the opposite side of the TRD, through the open hole of its respective cable crimp, and back out through the other side of the TRD.



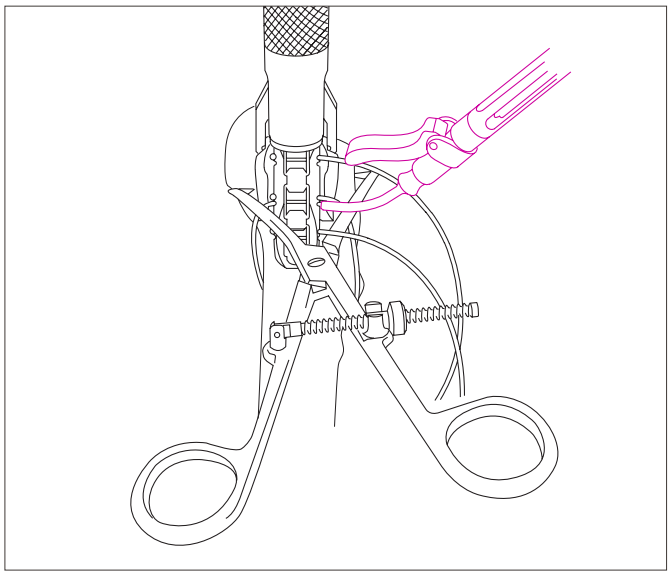
9. Insert cerclage cable into the cable tensioner

Instruments	
391.884	Tension Holder, for temporary use
391.883	Attachment Bit for Tension Holder
391.201	Cable Tensioner
Alternative instruments	
03.221.015	Cable Tensioner, one-hand operable*
and	
03.221.016	Cable Lock ∅ 1.0 mm, for Cable Tensioner, one-hand operable
or 03.221.017	Cable Lock ∅ 1.7 mm, for Cable Tensioner, one-hand operable

Mount the temporary tension holder and the attachment bit on the cable tensioner. To enable the cerclage cable to be inserted into the cable tensioner, turn the fluted knob at the end of the tensioner counterclockwise as far as possible. Insert the cerclage cable into the tensioner, and advance the attachment bit up to the crimp (see step 6 Insert cerclage cable into the cable tensioner section).

10. Position the cable tensioner assembly

Beginning with the central cable, thread the cable through the cable tensioner assembly. Advance the tensioner assembly along the cable until the attachment bit rests against the TRD. By hand, carefully take up any slack in the cable through the back of the cable tensioner.



* Note: The surgical steps to be taken when using the one-hand operable Cable Tensioner are described in the brochure One-hand operable Cable Tensioner. For all other steps this surgical technique applies.

11. Tension the cables

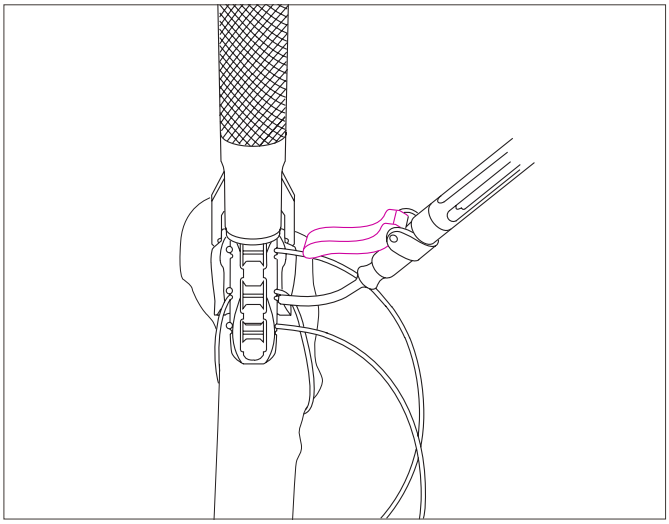
Turn the fluted knob on the tensioner until the desired tension is reached. The tension is shown by the markings on the tensioner. These lines indicate tension levels from 20 to 50 kg (see step 7 Tension cerclage cable section).

▲ Precaution:

Take care not to exceed 50 kg of tension. Applying more tension may cause the cable to cut through soft or osteoporotic bone.

12. Lock tensioned cable

When the desired tension is reached, the temporary tension holder may be engaged to hold tension in the cable while additional cables are placed. Pull back the lever of the cam lock into locked position.



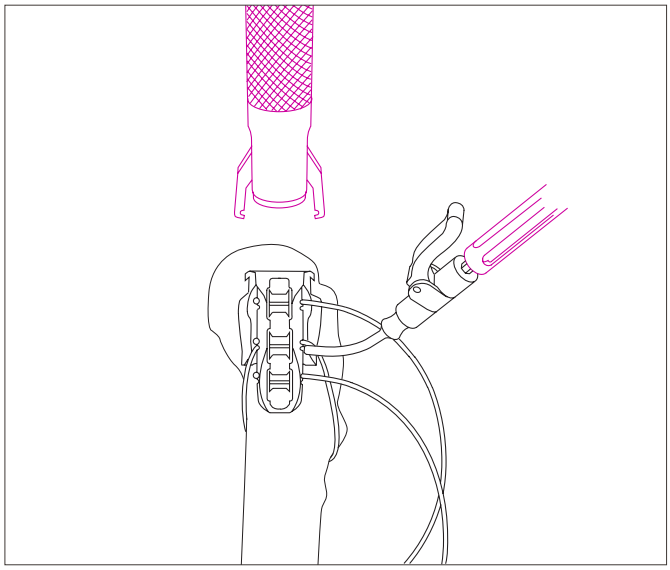
13. Remove tensioner and impactor

Prior to removing the cable tensioner from the temporary tension holder, turn the fluted knob of the tensioner as far as possible.

Then remove the tensioner and the impactor from the TRD.

■ Note:

There will be slight resistance when turning the knob for the last few turns before the tensioner is fully open. Turn the knob as far as it will go before removing the tensioner from the cable.



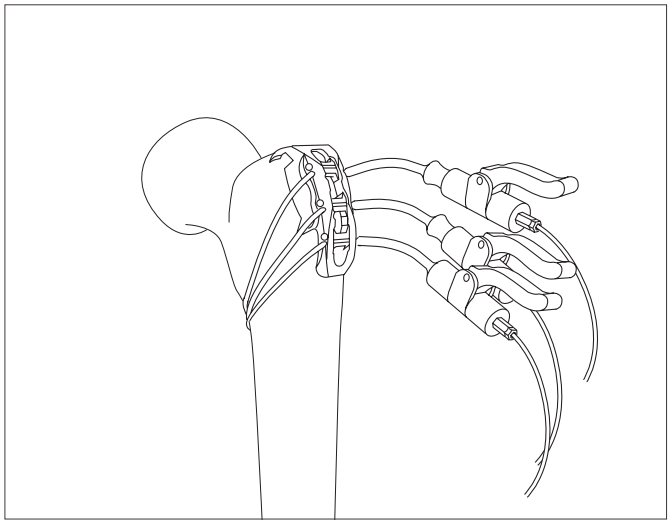
14. Pass and tension remaining cables

Pass remaining cables following steps 6 to 8 selection the cable passer, pass the cable and position the cable sections.

Tension and lock them with the temporary tension holder following steps 9 to 13 Insert cerclage cable into the cable tensioner, position the cable tensioner, tension the cables, lock tensioned cable and remove tensioner and impactor sections.

■ Note:

Alternatively all three cables can be passed prior to tensioning.



15. Check level of tension

Check that the desired level of tension has been applied to each cable. If necessary, further tensioning may be applied to each cable prior to final crimping.

▲ WARNING:

Repeated tensioning of the cable at high loads may cause fraying of the cable.

16. Crimp the cables

Instrument	
391.882	Cable Crimper

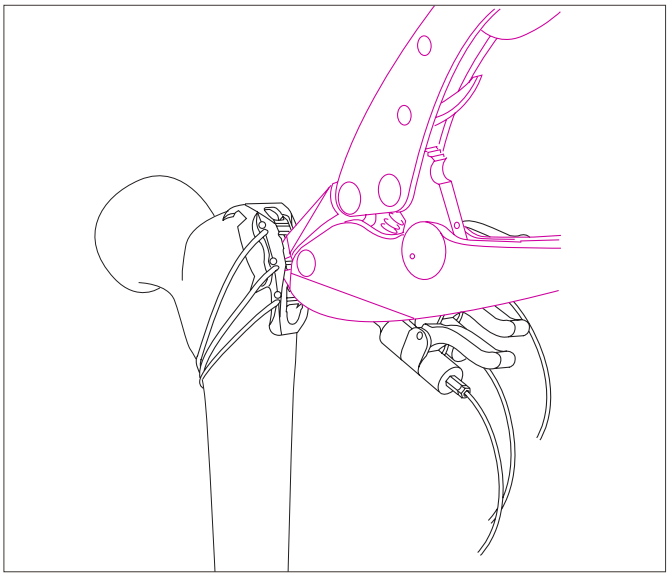
Place the jaws of the cable crimper over the center of the middle cable crimp, and squeeze the handles together. Use the starter handle to begin squeezing until the outer handle can be grasped.

The ratchet mechanism of the crimper controls the amount of deformation, thus preventing under- or over-crimping. The crimper will automatically release when the cable is crimped.

Crimp the other cables using the same procedure.

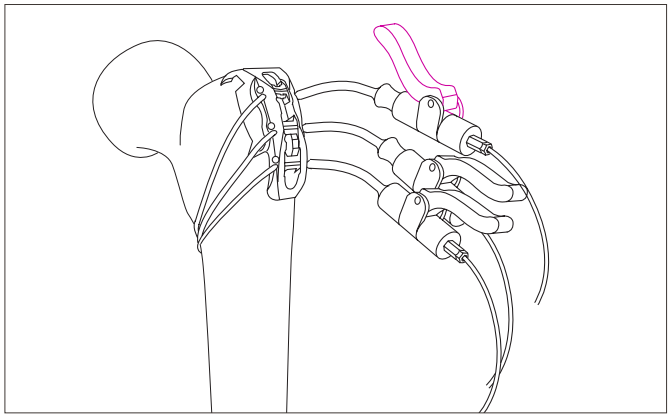
▲ Precaution:

Visually check that the cable crimp is centered and fully seated in the jaws of the crimper prior to crimping the cable. Improper placement may lead to cable slippage or crimp failure.



17. Remove temporary tension holders

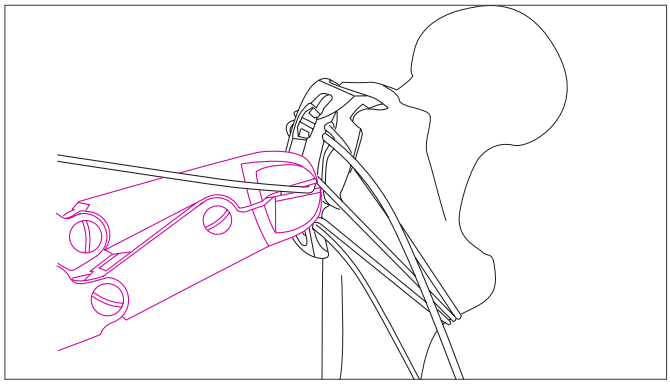
After crimping the cables, remove the temporary tension holders by pushing the lever forward to the “open” position.



18. Cut the cables

Instrument	
391.905	Cable Cutter, standard
or	
391.906	Cable Cutter, large

To cut the cables, pass the free end of the cable through the jaws of the cable cutter, and squeeze the handles together. Place the cable completely in the cutter jaws, but near the tip. Cut in one motion to ensure a clean cut. Cut the other cables using the same procedure.

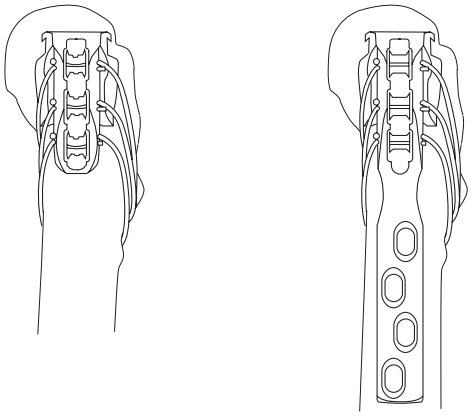


▲ Precaution:

Each cable should be cut as closely to the TRD as possible, taking care not to damage the adjacent cable.

■ Note:

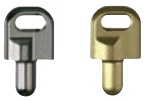
The TRD is also available in a large version. The operation steps are similar for the TRD. The large TRD is indicated when an additional femur neck fracture occurs.



Implant Removal

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments.

Implants

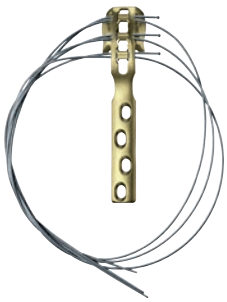
X98.838.01 X98.838.01S	Positioning Pin 3.5 with thread, for LCP Positioning Pin 3.5 with thread, for LCP, sterile	
X98.803.01 X98.803.01S	Positioning Pin 4.5 with thread, for LCP Positioning Pin 4.5 with thread, for LCP, sterile	
X98.837 X98.837S	Cerclage Positioning Pin for LCP 3.5 and LC-DCP 3.5 Cerclage Positioning Pin for LCP 3.5 and LC-DCP 3.5, sterile	
X98.839 X98.839S	Cerclage Positioning Pin for LCP 4.5 and LC-DCP 4.5 Cerclage Positioning Pin for LCP 4.5 and LC-DCP 4.5, sterile	
02.231.022	Positioning Pin for VA 5.0, cruciform, Stainless Steel	
04.231.022	Positioning Pin for VA 5.0, cruciform, Pure Titanium	
0X.221.002.05 0X.221.002S	Cerclage Eye for Screws ∅ 3.5 mm, Stardrive and hexagonal socket, pack of 5 units Cerclage Eye for Screws ∅ 3.5 mm, Stardrive and hexagonal socket, sterile	
0X.221.003.05 0X.221.003S	Cerclage Eye for Screws ∅ 4.5 mm, Stardrive and hexagonal socket, pack of 5 units Cerclage Eye for Screws ∅ 4.5 mm, Stardrive and hexagonal socket, sterile	
0X.221.004.05 0X.221.004S	Cerclage Eye for Hexagonal Socket, ∅ 4.0 mm, cannulated, pack of 5 units Cerclage Eye for Hexagonal Socket, ∅ 4.0 mm, cannulated, sterile	
X81.002 X81.002S	CerclageFix for LPC 4.5/5.0 CerclageFix for LCP 4.5/5.0, sterile	
281.001 281.001S	CerclageFix Insert CerclageFix Insert, sterile	

X98.800.01	Cerclage Cable with Crimp ∅ 1.0 mm
X98.800.01S	Cerclage Cable with Crimp ∅ 1.0 mm, sterile

298.801.01	Cerclage Cable with Crimp ∅ 1.7 mm, Stainless Steel
298.801.01S	Cerclage Cable with Crimp ∅ 1.7 mm, Stainless Steel, sterile
611.105.01	Cerclage Cable with Crimp ∅ 1.7 mm, Cobalt-Chrome Alloy
611.105.01S	Cerclage Cable with Crimp ∅ 1.7 mm, Cobalt-Chrome Alloy, sterile

498.806	TRD – Trochanter Reattachment Device, small, for Cable System, Titanium Alloy (TAN)
498.806S	TRD – Trochanter Reattachment Device, small, for Cable System, Titanium Alloy (TAN), sterile

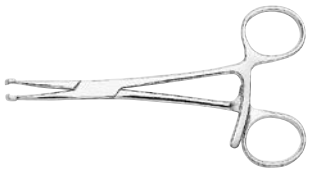
498.807	TRD – Trochanter Reattachment Device, large, for Cable System, Titanium Alloy (TAN)
498.807S	TRD – Trochanter Reattachment Device, large, for Cable System, Titanium Alloy (TAN), sterile



X=2: Stainless Steel
X=4: Titanium

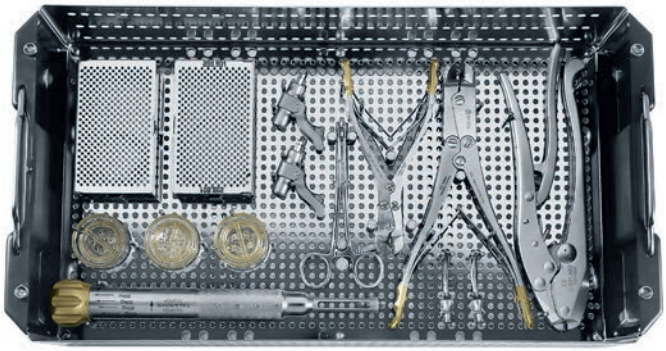
Instruments

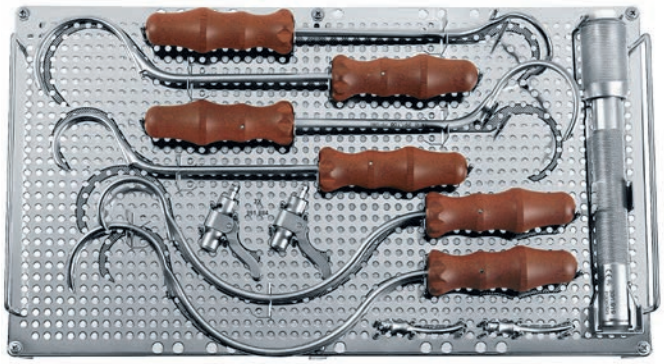
391.201	Cable Tensioner
03.221.015	Cable Tensioner, one-hand operable
03.221.016	Cable Lock ∅ 1.0 mm, for Cable Tensioner, one-hand operable
03.221.017	Cable Lock ∅ 1.7 mm, for Cable Tensioner, one-hand operable
391.883	Attachment Bit for Tension Holder
391.884	Tension Holder, for temporary use
391.882	Cable Crimper

391.885	Holding Forceps for Cerclage Eyes and Positioning Pin	
391.905	Cable Cutter, standard	
391.906	Cable Cutter, large	
391.103–108	Cable Passer, available in various designs and sizes	
391.919	Impactor for TRD, for Cable System	

Cable System in Vario Case

188.215	Cable System in Vario Case	
Instruments		
391.103	Cable Passer, medium, curved	1
391.104	Cable Passer, large, curved	1
391.105	Cable Passer, medium	1
391.106	Cable Passer, medium, 45° angle	1
391.107	Cable Passer, large	1
391.108	Cable Passer, large, 45° angle	1
391.201	Cable Tensioner	1
391.919	Impactor for TRD, for Cable System	1
391.882	Cable Crimper	1
391.883	Attachment Bit for Tension Holder	4
391.884	Tension Holder, for temporary use	4
391.885	Holding Forceps for Cerclage Eyes and Positioning Pin	1
391.905	Cable Cutter, standard	1
391.906	Cable Cutter, large	1
688.215	Vario Case for Cable System	1





■ Note:

For cases and trays for the one-hand operable Cable Tensioner please consult the One hand operable cable tensioner Surgical Technique.

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213, ASTM F 2052 and ASTM F2119

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

▲ Precautions:

The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermoregulation or temperature sensation should be excluded from MR scanning procedures.
- Generally, it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

Not all products are currently available in all markets.
This publication is not intended for distribution in the USA.
Intended use, Indications and Contraindications can be found in the corresponding system Instructions for Use.
All Surgical Techniques are available as PDF files at www.depuysynthes.com/ifu

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