

Wrist Fusion Instrument and Implant Set.

Surgical Technique



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This publication is not intended for distribution in the USA.

Instruments and implants approved by the AO Foundation.

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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.depuyssynthes.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.depuyssynthes.com/hcp/reprocessing-care-maintenance>

Three Plate Options

Standard Bend (X42.510*)

Accommodates average-sized individuals.



Short Bend (X42.520*)

Fits small-statured individuals or patients with previous proximal row carpectomy.



Straight Plate (X42.530*)

- May be contoured to unusual anatomy or the severely deformed wrist joint.
- For patients with severe bone loss requiring a cortico-cancellous strut from the iliac crest.



* X=2: Stainless Steel

* X=4: Pure Titanium (TiCP)

All implants are available non-sterile or sterile packed.

Add suffix "S" to article number to order sterile product.

Indications

- Post-traumatic arthritis of the joints of the wrist
- Rheumatoid wrist deformities requiring restoration
- Complex carpal instability
- Destruction of the wrist joint by infection
- Post-septic arthritis of the wrist
- Severe unremitting wrist pain related to motion
- Brachial plexus nerve palsies
- Tumor resection
- Spastic deformities



Features of the Wrist Fusion Plates

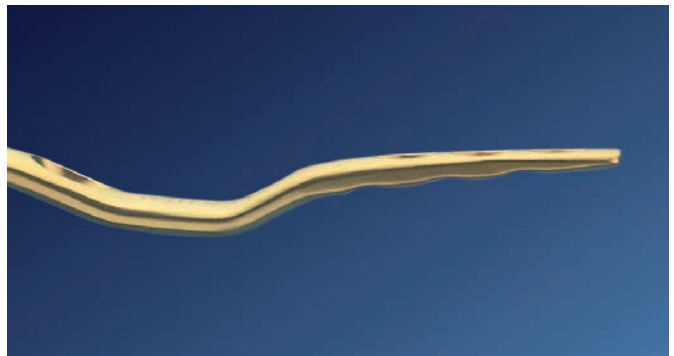
Precontoured plates reduce the need for intraoperative bending.



Built-in fusion angle of 10° dorsiflexion provides optimum hand position.



Reduced-profile plates with tapered ends minimize plate prominence; LC-DCP® plate design minimizes periosteal contact.



3.5 mm screws fit the proximal holes and 2.7 mm screws fit the distal holes for appropriate use in the carpals and metacarpals.



Preoperative Evaluation

Evaluate the condition of the soft tissues. Compare the standard bend, short bend and straight plates to the patient's wrist, and determine which plate to use for fusion. See discussion of the use of each implant on page 9, "Wrist Fusion Implants."

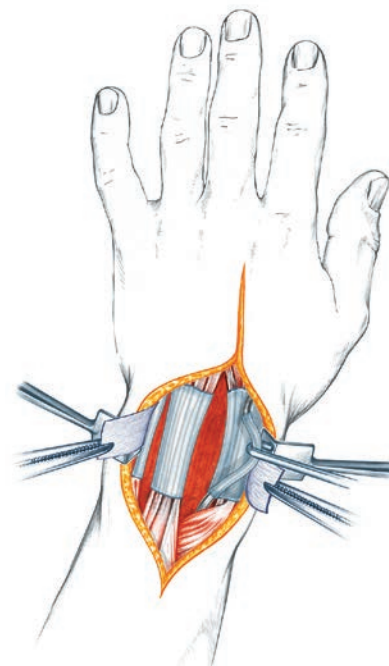


1. Incision

Place the patient in the supine position with the hand and arm on a hand table. Make a longitudinal incision from the radial aspect of the third metacarpal across Lister's tubercle to the dorsum of the distal radius.

Open the third dorsal compartment, and transpose the extensor pollicis longus (EPL) radially. Retract the digital extensors of the index and middle fingers to expose the dorsal aspect of the third metacarpal.

Make an incision through the wrist capsule and extend it proximally to the radius along its dorsal surface. Elevate the capsule and second dorsal compartment radially, and the capsule and fourth dorsal compartment ulnarly.



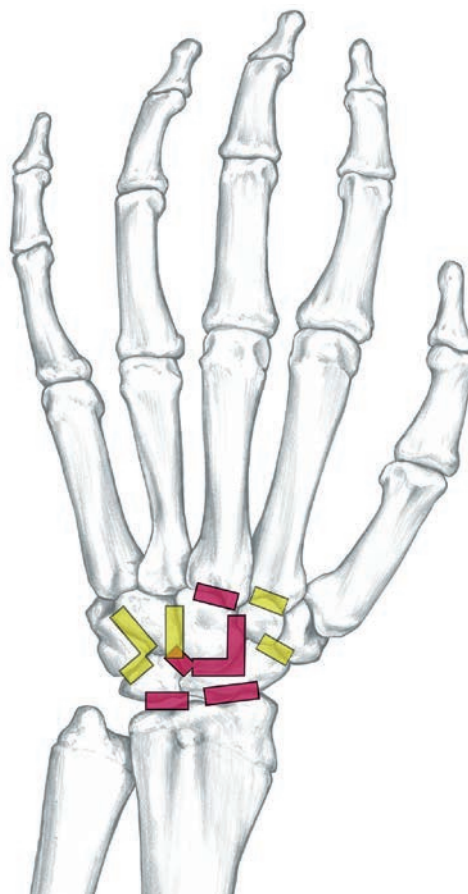
Radial transposition of the EPL

2. Joint preparation

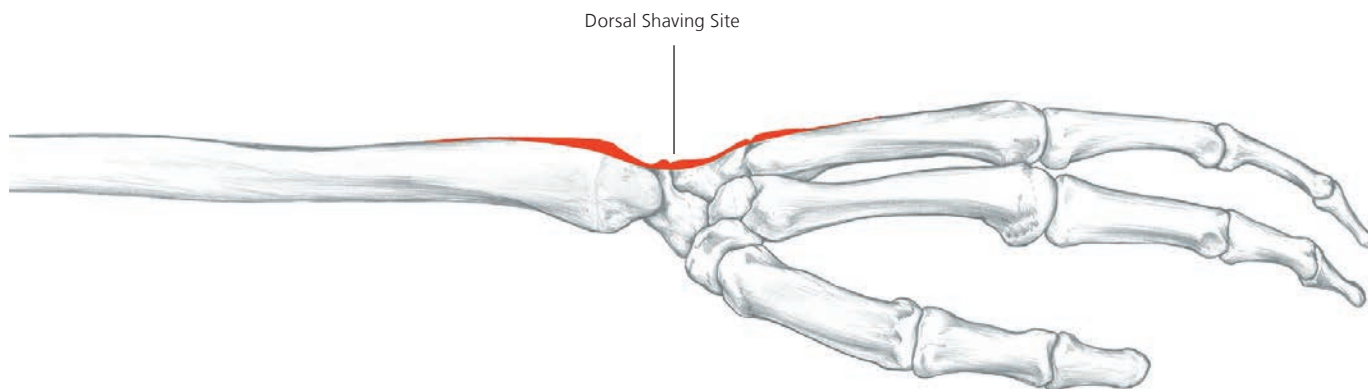
Expose and decorticate the joint surfaces to be included in the fusion. These include the scaphocapitate joint, capitulunate joint, radioscaphoid joint and radiolunate joint. In some cases, the ulnar midcarpal and second and third carpometacarpal joints may be included.

Remove Lister’s tubercle and the dorsal distal aspect of the radius with an osteotome. Decorticate the dorsal surfaces of the scaphoid, lunate, and capitate.

The dorsal shavings can be saved for later use as cancellous bone graft. Cancellous bone can also be harvested from the radius, radial to the most distal screw position. If more bone is needed, it may also be obtained from the olecranon or iliac crest.



Joints to Fuse
 Always Fuse
 Optional



3. Plate fixation

Pack all joints to be fused with cancellous bone prior to plate fixation. Fix the plate to the third metacarpal and then to the radius. Insert screws in the sequence shown.

Position the plate directly over the dorsal aspect of the third metacarpal. Mark the position of the most distal hole. Remove the plate and drill the hole with the 2.0 mm drill bit (310.190) being sure to drill precisely in the midline, dorsal to volar. Reposition the plate and measure the depth of the hole through it. If using non-self-tapping screws, tap the hole with a 2.7 mm tap (311.260). Insert the correct length 2.7 mm cortex screw.

Insert the most proximal of the three metacarpal screws, and then the middle metacarpal screw.

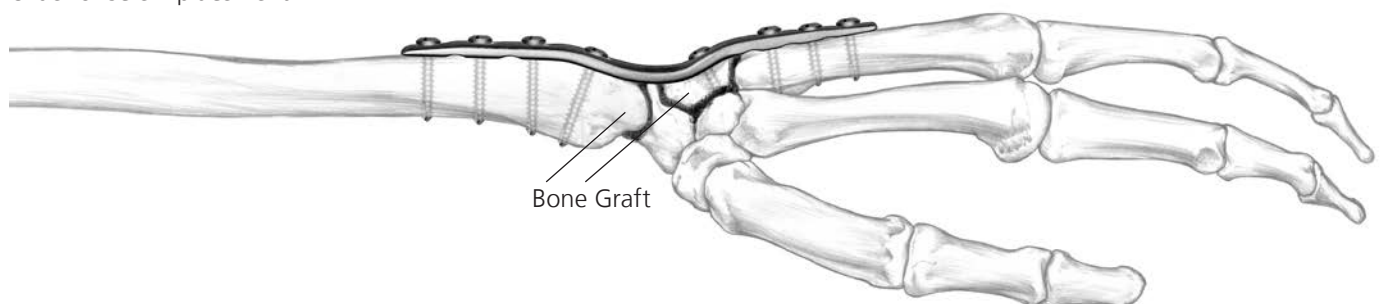
Fix the plate to the capitate in a similar manner.

Precaution: If the plate sits off of the dorsal capitate, be careful not to lag the capitate up to the plate. This would distort the carpal canal and lead to volar screw prominence.

In aligning the plate over the radius, a small amount of ulnar deviation may be preferred. With the plate aligned and the hand properly oriented, begin fixation to the radius with the second-most distal hole. Place the screw in the **load position**. Drill with the 2.5 mm drill bit (310.250), tap, if needed, with the 3.5 mm tap (311.320), and insert a 3.5 mm cortex screw. Continue fixing the plate to the radius with 3.5 mm screws in the order shown, using compression or load placement if desired.

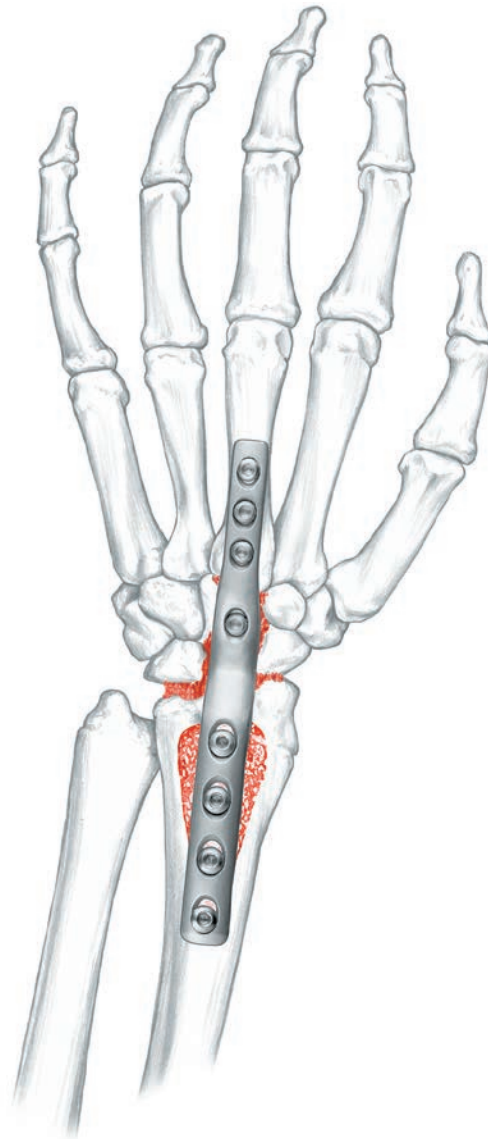
Order of screw placement

7 6 5 8 4 2 3 1



4. Wound closure

Close the wound in a routine fashion. Close the capsule over the plate as completely as possible. Leave the EPL radially transposed and check that it does not rub against the plate. Apply a soft, bulky dressing and/or splint to protect the wrist.



5. Implant Removal

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments. In case of difficult removal circumstances, a Screw Extraction Set is available with corresponding instructions (036.000.918, DSEM/TRM/0614/0104).

Wrist Fusion Implants

Wrist Fusion Plates

Standard bend (X42.510*) is used for medium to large wrist fixation.



Standard Bend

Short bend (X42.520*) is used for smaller wrist fixation and for fusion following proximal row carpectomy.



Short Bend

Straight (X42.530*) is used for wrist fixation when the standard and short bend plates do not fit the anatomy. This plate can be contoured to the anatomy of the patient's wrist.



Straight Plate

* X=2: Stainless Steel

* X=4: Pure Titanium (TiCP)

All implants are available non-sterile or sterile packed.

Add suffix "S" to article number to order sterile product.

Self-tapping screws in instrument and implant set

2.7 mm Cortex Screws, self-tapping

Hex recess (X02.810–X02.824)* attach the wrist fusion plate distally to the metacarpal; 10 mm to 24 mm lengths in 2 mm increments, 5 each.



3.5 mm Cortex Screws, self-tapping

Hex recess (X04.812–X04.828)* attach the wrist fusion plate proximally to the radius; 12 mm to 28 mm lengths in 2 mm increments, 5 each.



Non-Self-tapping Screws

2.7 mm Cortex Screws

Hex recess (X02.010–X02.024)* attach the wrist fusion plate distally to the metacarpal; 10 mm to 24 mm lengths in 2 mm increments, 5 each.



3.5 mm Cortex Screws

Hex recess (X04.012–X04.028)* attach the wrist fusion plate proximally to the radius; 12 mm to 28 mm lengths in 2 mm increments, 5 each.



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Wrist Fusion Instruments

2.0 mm Drill Bit, 100 mm, quick coupling

(310.190) is used to drill holes for 2.7 mm screws



Tap for 2.7 mm Cortex Screws, 100 mm (311.260)



2.5 mm Drill Bit, 110 mm, quick coupling

(310.250) is used to drill holes for 3.5 mm screws



Tap for 3.5 mm Cortex Screws, 110 mm (311.320)



Handle with quick coupling (311.430)



2.7 mm Universal Drill Guide (323.260) is used to center the drill bit and tap in the distal holes of the Wrist Fusion Plate.

For neutral screw position, press the drill guide down into the plate.

For load or buttress positions, place the drill guide at either end of the plate hole, without downward pressure. To adjust the load, vary the downward pressure applied.



3.5 mm Universal Drill Guide (323.360) is used to center the drill bit and tap in the proximal holes of the Wrist Fusion Plate.



Depth Gauge for 2.7 mm to 4.0 mm screws (319.010)

Measures depths to 60 mm



Screw Forceps, self-retaining (319.970)



Periosteal Elevator (399.480), 3 mm width, curved blade



Small Hexagonal Screwdriver with Holding Sleeve (314.020)



Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07

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 F2182-11a

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 thermo regulation 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.
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