LCP Proximal Radius Plates 2.4.

Plates for radial head rim and for radial head neck address individual fracture patterns of the proximal radius.

Surgical Technique

Instruments and implants approved by the AO Foundation.

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This description alone does not provide sufficient background for direct use of the instrument set. Instruction by a surgeon experienced in handling these instruments 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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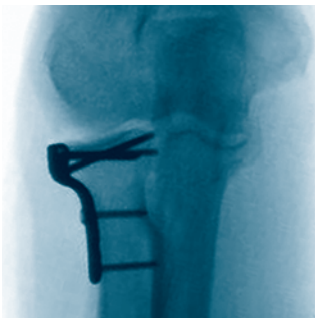
Plate features
- Nine LCP Proximal Radius Plates available to address various fracture patterns of the proximal radius
- Plates are precontoured for anatomical fit
- Combi holes allow fixation with locking screws in the threaded section for angular stability, and cortex screws in the Dynamic Compression Unit (DCU) section for distraction. A fixed-angle construct provides advantages in osteopenic bone or multifragment fractures, where traditional screw purchase is compromised.
- Carefully apply for osteoporotic bone

Additional features
- Limited-contact design shaft with 2, 3, and 4 combi-holes
- The holes in the head of the plate accept 2.4 mm locking screws
- The shaft holes accept 2.4 mm locking screws in the threaded portion or 2.7 mm cortex screws and 2.4 mm cortex screws in the distraction portion
- Plates for radial head rim available in right and left plates with a 5° tilt to match the anatomy of the radial head
- Plates for radial head neck fit both the left and right side of the proximal radius

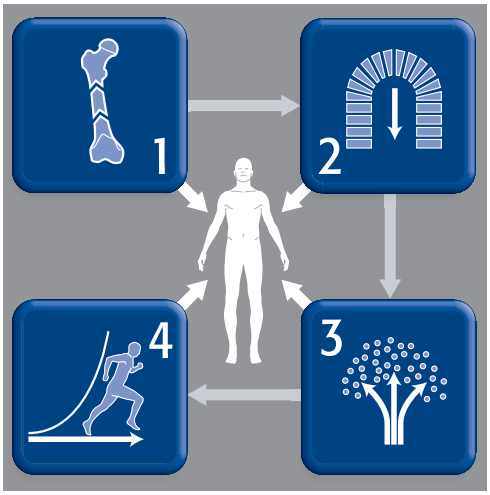


AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation[1,2].

Anatomic reduction
Fracture reduction and fixation to restore anatomical relationships.

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



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

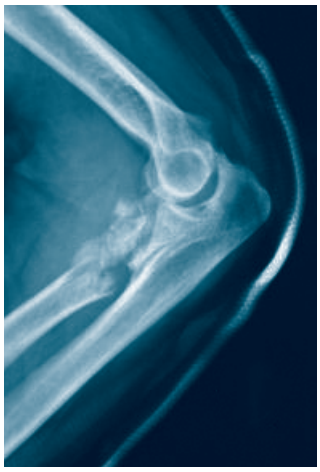
Preservation of blood supply
Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

[1] Müller ME, Allgöwer M, Schneider R, Willenegger H. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991.
[2] Rüedi TP, Buckley RE, Moran CG. AO Principles of Fracture Management. 2nd ed. Stuttgart, New York: Thieme. 2007.

Intended Use and Indications

Intended Use
The plate and screw implants included in the Radius Plate product family are intended for temporary fixation, correction or stabilization in the radius anatomical region.

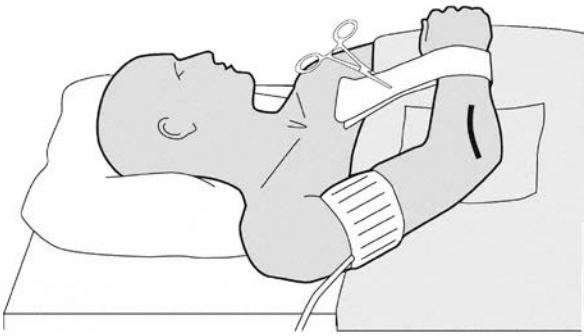
Indications
Extra-articular and intra-articular fractures of the proximal radius and multifragmented radial neck fractures.

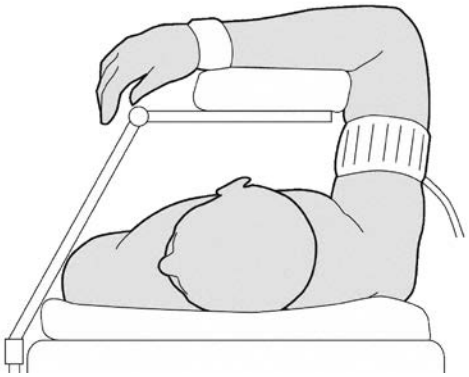


Preparation

Patient position

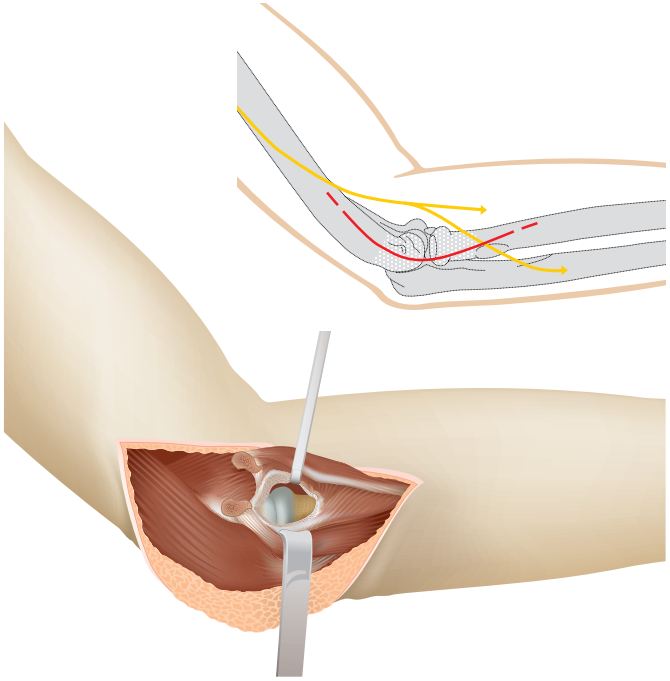
Position the patient supine on the table. Prepare the extremity from the axilla to the hand. This allows rotation of the forearm and flexion and extension of the elbow during the operative fixation.





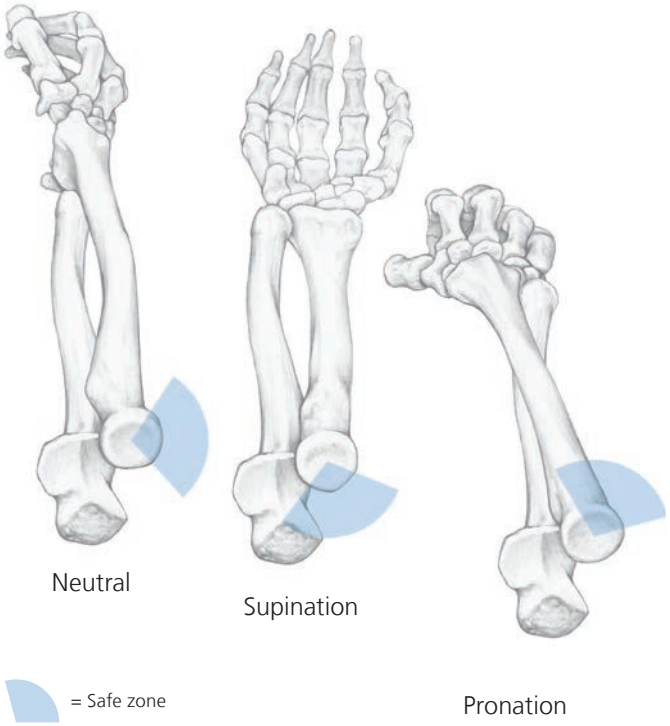
Approach

A lateral approach is most commonly used. Take care to avoid the deep branch of the radial nerve, which runs anterior to the capsule and the radial head. To minimize the risk of operative disruption of the lateral collateral ligament, the capsular incision should remain in the front of the anterior margin of the anconeus muscle and parallel to the fascial limit of the extensor carpi ulnaris. The annular ligament, a true thickening of the capsule, is opened laterally or slightly anteriorly to allow full inspection of the fragments. In selected cases, an osteotomy of the lateral epicondyle will allow an extensile approach.



Safe zone

Both plates fit within the Hotchkiss safe zone[2] which is described as an area of 105° on the radial head that is free of impingement between ulna and radius. The Hotchkiss safe zone is located on the opposite side of the radial tuberosity.



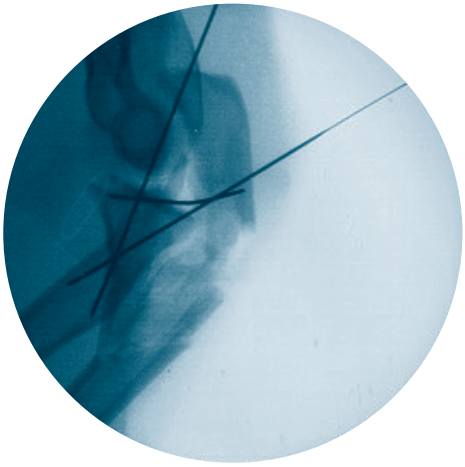
[2] Robert N. Hotchkiss, MD: "Displaced Fractures of the Radial Head: Internal Fixation or Excision?" AAOS, Vol. 5, No. 1, January/February 1997.

Reduction

1
Reduce fracture

Perform preliminary fixation with Kirschner wires.

Precaution: The plate reduction wires and Kirschner wires are single use items, do not re-use.



2
Apply Radial Head Plate

Instruments	
311.430	Handle with Quick Coupling, length 110 mm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding

After reducing the fracture, apply the plate and insert a preliminary cortex screw through the DCU portion of one of the elongated Combi holes.

Note: The plates are precontoured to fit the anatomy of the radial head. There are no undercuts on the plates to protect the threaded holes form distortion during bending. If it is necessary to bend the plate, use bending pliers.

Precaution: Reverse bending or use of the incorrect instrumentation for bending may weaken the plate and lead to premature plate failure (e.g. breakage). Do not bend the plate beyond what is required to match the anatomy.

Proximal Screw Insertion

3
Insert proximal screws

Instruments	
311.430	Handle with Quick Coupling, length 110 mm
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
511.776	Torque Limiter 0.8 Nm, with Quick Coupling
310.509	Drill Bit ∅ 1.8 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
323.029	LCP Drill Sleeve 2.4, with Scale up to 30 mm, for Drill Bits ∅ 1.8 mm

Use 2.4 mm locking screws in the head of the plate.

Precaution: Careful drilling is necessary, as interference with screws in the proximal portion of the plate is possible. In case of interference, stop drilling and use a screw of appropriate length.
See General Notes on Technique (page 10) for additional information.

4
Insert screws in the shaft of the plate

Instruments	
311.430	Handle with Quick Coupling, length 110 mm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding

For cortex screws 2.4 mm

310.509	Drill Bit ∅ 1.8 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
310.530	Drill Bit ∅ 2.4 mm, length 100/75 mm, 2-flute, for Quick Coupling
323.202	Universal Drill Guide 2.4

For cortex screws 2.7 mm

310.534	Drill Bit ∅ 2.0 mm, length 100/75 mm, 2-flute, for Quick Coupling
310.260	Drill Bit ∅ 2.7 mm, length 100/75 mm, 2-flute, for Quick Coupling
323.260	Universal Drill Guide 2.7

For locking screws 2.4 mm

310.509	Drill Bit ∅ 1.8 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
323.029	LCP Drill Sleeve 2.4, with Scale up to 30 mm, for Drill Bits ∅ 1.8 mm

Use 2.4 mm and 2.7 mm cortex screws and 2.4 mm locking screws in the shaft of the plate.

Determine screw choice
If planning a combination of locking and cortex screws, first use a cortex screw to pull the plate to the bone.

Precaution: If using a locking screw first, ensure that the plate is held securely to the bone, to avoid spinning of the plate as the screw locks into the plate.

Insert cortex screws

Instruments	
310.534	Drill Bit ∅ 2.0 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
310.260	Drill Bit ∅ 2.7 mm, length 100/75 mm, 2-flute, for Quick Coupling
310.509	Drill Bit ∅ 1.8 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
310.530	Drill Bit ∅ 2.4 mm, length 100/75 mm, 2-flute, for Quick Coupling
319.005	Depth Gauge for Screws ∅ 2.0 and 2.4 mm, measuring range up to 40 mm
323.202	Universal Drill Guide 2.4
323.260	Universal Drill Guide 2.7

– Use the 2.4 or 2.7 universal drill guide for an eccentric (distraction) or neutral (buttress) insertion of cortex screws.
– For the 2.4 mm cortex screw, use the 1.8 mm drill bit for the threaded hole and the 2.4 mm drill bit for the gliding hole. Determine the length of the screw by using the depth gauge. For 2.7 mm cortex screws, use the 2.0 mm drill bit for the threaded hole and the 2.7 mm drill bit for the gliding hole.

Insert locking screws

Instruments	
310.509	Drill Bit ∅ 1.8 mm, with marking, length 110/85 mm, 2-flute, for Quick Coupling
311.430	Handle with Quick Coupling, length 110 mm
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
511.776	Torque Limiter 0.8 Nm, with Quick Coupling
319.005	Depth Gauge for Screws ∅ 2.0 and 2.4 mm, measuring range up to 40 mm
323.029	LCP Drill Sleeve 2.4, with Scale up to 30 mm, for Drill Bits ∅ 1.8 mm

– Screw the LCP drill guide into a hole until fully seated.
– For the 2.4 mm locking screws, use the 1.8 mm drill bit with marking, to drill to the desired depth. Determine the screw length directly from the mark on the drill bit and scale on the drill sleeve. This may be verified using a depth gauge for 2.0 mm and 2.4 mm screws.
– Insert the locking screw manually with the screwdriver shaft handle and Torque Limiter 0.8 Nm. Carefully tighten the locking screw.

Alternative:
Locking screw insertion with holding sleeve

Instruments	
311.430	Handle with Quick Coupling, length 110 mm
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
511.776	Torque Limiter 0.8 Nm, with Quick Coupling
314.468	Holding Sleeve for Screws Stardrive ∅ 2.4 mm, T8, for Screwdriver Shafts ∅ 3.5 mm, for 314.467

An alternate method may be used for insertion of locking screws, using the locking screw to pull the plate to the bone. Place the holding sleeve onto the screwdriver shaft. Pick up the locking screw with the holding sleeve and insert the screw. With the locking screw still held by the holding sleeve, tighten the screw until the plate is drawn to the bone. Pull up on the holding sleeve to release the screw head, and tighten the screw until a click is heard.

Precaution: Take care to hold the plate securely on the bone to avoid spinning the plate as the screw locks to the plate.

Postoperative Treatment and Implant Removal

Postoperative treatment

Postoperative treatment with locking compression plates does not differ from conventional internal fixation procedures.

Implant removal

To remove locking screws, first unlock all screws from the plate and then remove the screws completely from the bone. This avoids rotation of the plate when removing the last locking screw.

Plates

Rim plates

2-hole plates	X41.680 (right)
	X41.681 (left)
3-hole plates	X41.682 (right)
	X41.683 (left)
4-hole plates	X41.684 (right)
	X41.685 (left)

Neck plates

2-hole plates	X41.690
3-hole plates	X41.691
4-hole plates	X41.692

All implants are available non-sterile or sterile packed.
Add suffix "S" to article number to order sterile product.

X = 2: Stainless Steel
X = 4: Titan (TiCP)

Screws

Cortex Screws 2.4 mm, self-tapping, Stardrive, T8
(X01.760 – X01.780, length 10–30 mm)
- For use in Combi holes in plate shaft, to provide distraction or neutral fixation
- Low-profile head in the plate holes
- Stardrive recess mates with self-retaining screwdriver
- 10 mm to 30 mm lengths

Locking Screws 2.4 mm, self-tapping, Stardrive, T8
(X12.806 – X12.830, length 6–30 mm)
- Threaded, conical head locks securely into the plate to provide angular stability
- Locked screws allow unicortical screw fixation and load transfer to the near cortex
- Stardrive recess mates with self-retaining screwdriver
- 6 mm to 30 mm lengths

Cortex Screws 2.7 mm, self-tapping, Stardrive, T8
(X02.870 – X02.886, length 10–26 mm)
- For use in Combi holes in plate shaft, to provide distraction or neutral fixation
- Low-profile head in the plate holes
- Stardrive recess mates with self-retaining screwdriver
- 10 mm to 26 mm lengths

Note: For information on fixation principles using conventional and locked plating techniques, please refer to the LCP Surgical Technique DSEM/TRM/0115/0278 (036.000.019).

All implants are available non-sterile or sterile packed.
Add suffix "S" to article number to order sterile product.

X = 2: Stainless Steel
X = 4: Titanium Alloy (TAN)

Instruments

311.430	Handle with Quick Coupling, length 110 mm	
314.467	Screwdriver Shaft Stardrive, T8, self-holding	
314.468	Holding Sleeve for Screws Stardrive 2.4, for Screwdriver Shaft 314.467	
323.029	LCP Drill Sleeve 2.4, with scale up to 30 mm, for Drill Bit 1.8 mm	
310.534	Drill Bit ∅ 2.0 mm with marking, length 110/85 mm, 2-fluted, for Quick Coupling	
310.509	Drill Bit ∅ 1.8 mm with marking, length 110/85 mm, 2-fluted, for Quick Coupling	
511.776	Torque Limiter 0.8 Nm, with Quick Coupling	
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm	

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F 2119-07

Non-clinical testing of a 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 91 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 F 2182-11a

Non-clinical electromagnetic and thermal simulations of a worst case scenario lead to temperature rises of 7.5 °C (1.5 T) and 6.1 °C (3 T) under MRI Conditions using RF Coils (whole body averaged specific absorption rate [SAR] of 2 W/kg for 15 minutes).

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 an MRI 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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