LCP Olecranon Plate. The anatomical fixation system with angular stability for olecranon and proximal ulnar fractures.
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 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
# Table of Contents

## Introduction
- LCP Olecranon Plate 2
- AO Principles 4
- Indications and Contraindications 5
- Clinical Cases 6

## Surgical Technique
- Implantation 8
- Implant Removal 15

## Product Information
- Implants 16
- Instruments 18

## Bibliography

## MRI Information
**LCP Olecranon Plate.** The anatomical fixation system with angular stability for olecranon and proximal ulnar fractures.

**Anatomically precontoured**
- Plates are precontoured for anatomical fit.
- Notches in the plate shaft to allow the plate to be shaped to the individual anatomy of the bone.
- The tab can be cut off if not required.

**Designed for patient comfort**
- The proximal, spoon-shaped part of the plate is slightly thinner than the shaft.
- The position and angle of the screws are anatomically adapted to allow reduction of fractures.

**Allows MIS technique**
The LCP Olecranon Plate System provides stable fracture fixation aiming at preserving vascular supply. This helps to create an improved environment for bone healing, helping to accelerate patient’s return to previous mobility and function.
Part of the complete Synthes LCP Elbow Set

LCP Olecranon Plate
Variety of plates:
- Left and right version
- Choice of six lengths with 2, 4, 6, 8, 10 or 12 LCP combi-holes in the shaft
Proximal portion of the plate with 8 locking holes allows to set a maximum number of locking screws.
Guide block for correct insertion.

Indications
Complex extra- and intra-articular olecranon fractures.
Pseudoarthrosis of the proximal ulna.
Simple olecranon fractures.
Repair of the olecranon after osteotomies in distal humerus surgery.

LCP Distal Humerus Plates
Variety of plates:
- Dorsolateral plates with and without support
- Medial plates
- All plates in a left and right version
- All plates in five lengths: 3, 5, 7, 9 and 14 holes
Anatomically precontoured: no or only minimal bending necessary.
Extensive options for fixation.
Guide block for correct insertion.

Indications
Intra-articular fractures of the distal humerus, especially for osteoporotic bone.
Supracondylar fractures of the distal humerus.
Nonunions of the distal humerus.

LCP Metaphyseal Distal Medial Humerus Plate
Available in five lengths: 7, 9, 11, 13 and 15 holes.
Anatomically precontoured: no or only minimal bending necessary.
Plate undercuts to reduce plate-to-bone contact to help bone vascularisation.
Guide block for correct insertion.

Indications
Juxta-articular distal humerus fractures.

LCP Locking Compression Plate
Angular stable fixation of fragments regardless of bone quality
To reduce risk of primary and secondary loss of reduction, even under high dynamic loading
Limited plate contact to reduce impairment of periosteal blood supply
Good purchase also in osteoporotic bone and in multifragment fractures

LCP combi-hole
Intraoperative choice between compression and angular stable locking
With standard screws: interfragmental or dynamic-axial compression
With locking screws: stable plate-screw connection without loss of reduction, regardless of plate modelling
In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation\textsuperscript{1,2}.

\textbf{Anatomic reduction}
Fracture reduction and fixation to restore anatomical relationships.

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

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

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


Indications and Contraindications

**Indications**
- Complex extra- and intra-articular olecranon fractures
- Pseudoarthroses of the proximal ulna
- Osteotomies
- Simple olecranon fractures

**Contraindications**
- Acute infections
- Children in growth phase
Clinical Cases

Case 1
- Male patient, 79 years old
- Olecranon fracture: 21-B1, right arm
- Bad bone quality
- Implant: LCP Olecranon Plate with 8 holes

Case 2
- Male patient, 41 years old
- Olecranon fracture: 21-C2, right arm
- Implant: LCP Olecranon Plate with 4 holes
Preoperative, AP view

Image intensifier during surgery, lateral view

Postoperative (1 day after surgery), AP view

Preoperative, lateral view

Postoperative (10 days after surgery), lateral view

Postoperative (10 days after surgery), AP view
Implantation

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

1
Position the patient

Place the patient either in the prone or the lateral position with the elbow flexed over a side rest. Depending on the fracture, use a posterior access up to approximately 5 cm distal from the supracondylar region.

The supine position with the forearm placed across the chest is an acceptable option, especially with extended approaches to the lateral pillar or column.

Note: The position is chosen by the surgeon depending on his or her preference.
2 Surgical approach

The incision runs posterior from the supracondylar area to a point 4 or 5 cm distal to the fracture. It can be slightly curved to the radial side to protect the ulnar nerve.

3 Reduce the fracture and provide temporary fixation

Reduce the fracture directly or indirectly depending on the type of fracture. Examine the reduction of the coronoid process to determine if it is correct before fixation.

Use Kirschner wires for temporary fixation.
4

Determine plate length and adapt the plate

Required instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>329.150</td>
<td>Bending Pliers for Plates 2.4 to 4.0, length 230 mm</td>
</tr>
<tr>
<td>or 329.081</td>
<td>LCP Bending Iron for Reconstruction Plates</td>
</tr>
<tr>
<td>or 329.040/050</td>
<td>Bending Iron for Plates 2.4 to 3.5, length 145 mm</td>
</tr>
<tr>
<td>329.916</td>
<td>Bending Pin for LCP Plates 3.5, with thread</td>
</tr>
<tr>
<td>329.151</td>
<td>Cutting Pliers with Positioning Pin Ø 3.0 mm</td>
</tr>
<tr>
<td>or 391.931</td>
<td>Cutting Pliers for Plates, length 230 mm</td>
</tr>
</tbody>
</table>

Select a plate length appropriate for the fracture.

The plate can be bent slightly to adapt to the shape of the bone.

The plate can be bent at max. 4° at each notch in the plane of the shaft.

The tendon may have to be split in order to apply the plate from a posterior direction.

Evaluate whether or not the proximal tab should be used. If not, it can be cut off.

The tab can be bent for appropriate screw positioning, using the bending pin.

Precaution: If the tab is bent, take care that the screw does not collide with proximal screws.
5
Attach the plate temporarily

**Required instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>312.910</td>
<td>Aiming Block, right, for LCP Olecranon Plate</td>
</tr>
<tr>
<td>312.911</td>
<td>Aiming Block, left, for LCP Olecranon Plate</td>
</tr>
<tr>
<td>323.053</td>
<td>Centering Sleeve 6.0/5.0, for PHILOS Aiming Device</td>
</tr>
<tr>
<td>323.054</td>
<td>Drill Sleeve 5.0/2.9, for PHILOS Aiming Device</td>
</tr>
<tr>
<td>323.055</td>
<td>Centering Sleeve for Kirschner Wire Ø 1.6 mm, length 70 mm, for Nos. 323.027 and 323.054</td>
</tr>
</tbody>
</table>

- 314.030  Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
- or
- 314.116  Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling

After adapting the plate, mount the aiming device, drill and centering sleeves on the proximal part of the plate.

Position the plate on the reduced bone, and attach it temporarily with a cortex screw Ø 3.5 mm.
Determine screw length for proximal part

Required instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>323.060</td>
<td>PHILOS Direct Measuring Device for Kirschner Wire Ø 1.6 mm</td>
</tr>
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</table>

Alternative

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>319.010</td>
<td>Depth Gauge for Screws Ø 2.7 to 4.0 mm, measuring range up to 60 mm</td>
</tr>
</tbody>
</table>

Determine the screw position and length in the proximal region with a Kirschner wire and the direct measuring device.

After positioning the plate, insert the Kirschner wire to the desired location using an image intensifier. Determine the length of the screw with the direct measuring device.

Alternative: Remove the Kirschner wire and centering sleeves, and determine the length of the screw hole with the depth gauge after drilling.

Precaution: If screws longer than 30 mm are used in the proximal part, they can collide with the shaft screws.
Drill screw hole and insert screw in proximal part

Required instruments

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.284</td>
<td>Drill Bit $\varnothing$ 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling</td>
</tr>
<tr>
<td>511.770</td>
<td>Torque Limiter, 1.5 Nm, for Compact Air Drive and for Power Drive</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>511.773</td>
<td>Torque Limiter, 1.5 Nm, for AO/ASIF Quick Coupling</td>
</tr>
</tbody>
</table>

Remove the centering sleeve. Pre-drill the screw hole with the drill bit. Remove the drill sleeve and drill bit.

Insert the screw manually or using a power tool. Always use the torque limiter to restrict the maximum torque. A distinct click can be heard when the maximum torque is reached, indicating a secure fit. Remove the screwdriver and centering sleeve.

Repeat steps 6 and 7 until all required proximal screws are inserted.
8  
Insert the screws in the shaft area

**Required instruments**

<table>
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<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>323.027</td>
<td>LCP Drill Sleeve 3.5, for Drill Bits Ø 2.8 mm</td>
</tr>
<tr>
<td>310.284</td>
<td>Drill Bit Ø 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling</td>
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<td></td>
</tr>
<tr>
<td>314.116</td>
<td>Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling</td>
</tr>
</tbody>
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Carefully screw the LCP drill sleeve into the threaded part of the desired combination hole until the thread completely engages. Pre-drill the screw hole with the 2.8 mm drill bit. Determine the screw length with the depth gauge or scaled drill bit. Insert the screw as described in step 7.

Repeat this step until stable plate-bone fixation is achieved.

**Note:** If screws longer than 30 mm were used in the proximal part, they can collide with the shaft screws. See page 12.
Implant Removal

Required instruments

- 314.030 Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
  or
- 314.116 Screwdriver Shaft Stardrive 3.5, T15, self-holding, for AO/ASIF Quick Coupling

- 309.520 Extraction Screw, conical, for Screws Ø 2.7, 3.5 and 4.0 mm
- 309.521 Extraction Screw for Screws Ø 3.5 mm
- 311.430 Handle with Quick Coupling, length 110 mm

Unlock all screws from the plate, then remove the screws completely from the bone. This prevents simultaneous rotation of the plate when unlocking the last locking screw.

If a screw cannot be removed with the screwdriver (e.g. if the hexagonal or Stardrive recess of the locking screw is damaged or if the screw is stuck in the plate), use the T-Handle with Quick-Coupling (311.440) to insert the Extraction Screw (309.520 or 309.521) into the screw head, and unscrew the screw in a counter-clockwise direction.
**Implants**

**LCP Olecranon Plates 3.5**

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Titanium</th>
<th>Number of shaft holes</th>
<th>Length mm</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>236.502</td>
<td>436.502</td>
<td>2</td>
<td>86</td>
<td>right</td>
</tr>
<tr>
<td>236.504</td>
<td>436.504</td>
<td>4</td>
<td>111</td>
<td>right</td>
</tr>
<tr>
<td>236.506</td>
<td>436.506</td>
<td>6</td>
<td>138</td>
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</tr>
<tr>
<td>236.508</td>
<td>436.508</td>
<td>8</td>
<td>163</td>
<td>right</td>
</tr>
<tr>
<td>236.510*</td>
<td>436.510*</td>
<td>10</td>
<td>190</td>
<td>right</td>
</tr>
<tr>
<td>236.512*</td>
<td>436.512*</td>
<td>12</td>
<td>216</td>
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</tr>
<tr>
<td>236.503</td>
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<td>236.505</td>
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<tr>
<td>236.507</td>
<td>436.507</td>
<td>6</td>
<td>138</td>
<td>left</td>
</tr>
<tr>
<td>236.509</td>
<td>436.509</td>
<td>8</td>
<td>163</td>
<td>left</td>
</tr>
<tr>
<td>236.511*</td>
<td>436.511*</td>
<td>10</td>
<td>190</td>
<td>left</td>
</tr>
<tr>
<td>236.513*</td>
<td>436.513*</td>
<td>12</td>
<td>216</td>
<td>left</td>
</tr>
</tbody>
</table>

All plates are available sterile packed. For sterile implants add suffix S to article number.

* Optional in sets 186.603/608/613/618.
<table>
<thead>
<tr>
<th>Article Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X12.102–124</td>
<td>Locking Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with Stardrive recess</td>
</tr>
<tr>
<td>X13.012–060</td>
<td>Locking Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with hexagonal recess</td>
</tr>
<tr>
<td>X04.814–860</td>
<td>Cortex Screw Ø 3.5 mm, length 14–60 mm, self-tapping, with hexagonal recess</td>
</tr>
</tbody>
</table>

All screws are available sterile packed. For sterile implants add suffix S to article number.

- X=2: Stainless Steel
- *X=4 TAN
- **X=4 TiCP
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<tr>
<td>311.430</td>
<td>Handle with Quick Coupling length 110 mm</td>
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</tbody>
</table>

**Note:** The Olecranon Plate is compatible with 3.5 LCP instruments and standard small-fragment instruments. These additional instruments are also required, although they are not shown here.

**X-ray Template**

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>034.000.470</td>
<td>LCP Olecranon Plate, Template</td>
</tr>
</tbody>
</table>


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 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 F 2182-11a
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 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.