

LCP Extra-articular Distal Humerus Plate.

The anatomically shaped and angular stable fixation system for extra-articular fractures of the distal humerus.

Technique Guide

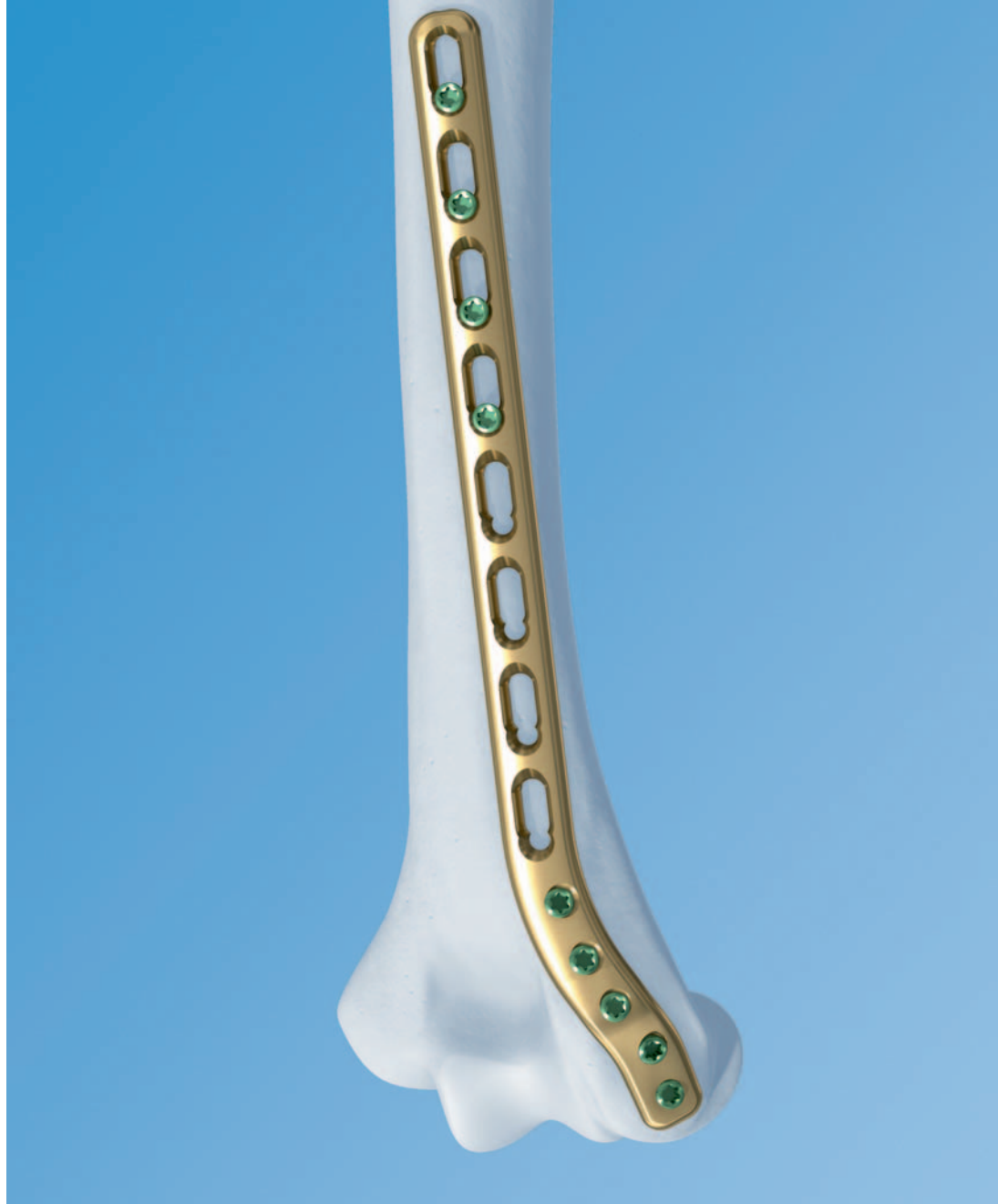


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 Image intensifier control

Warning

This description alone does not provide sufficient background for direct use of the product. Instruction by a surgeon experienced in handling this product is highly recommended.

Reprocessing, Care and Maintenance of Synthes Instruments

For general guidelines, function control and dismantling of multi-part instruments, please refer to: www.synthes.com/reprocessing

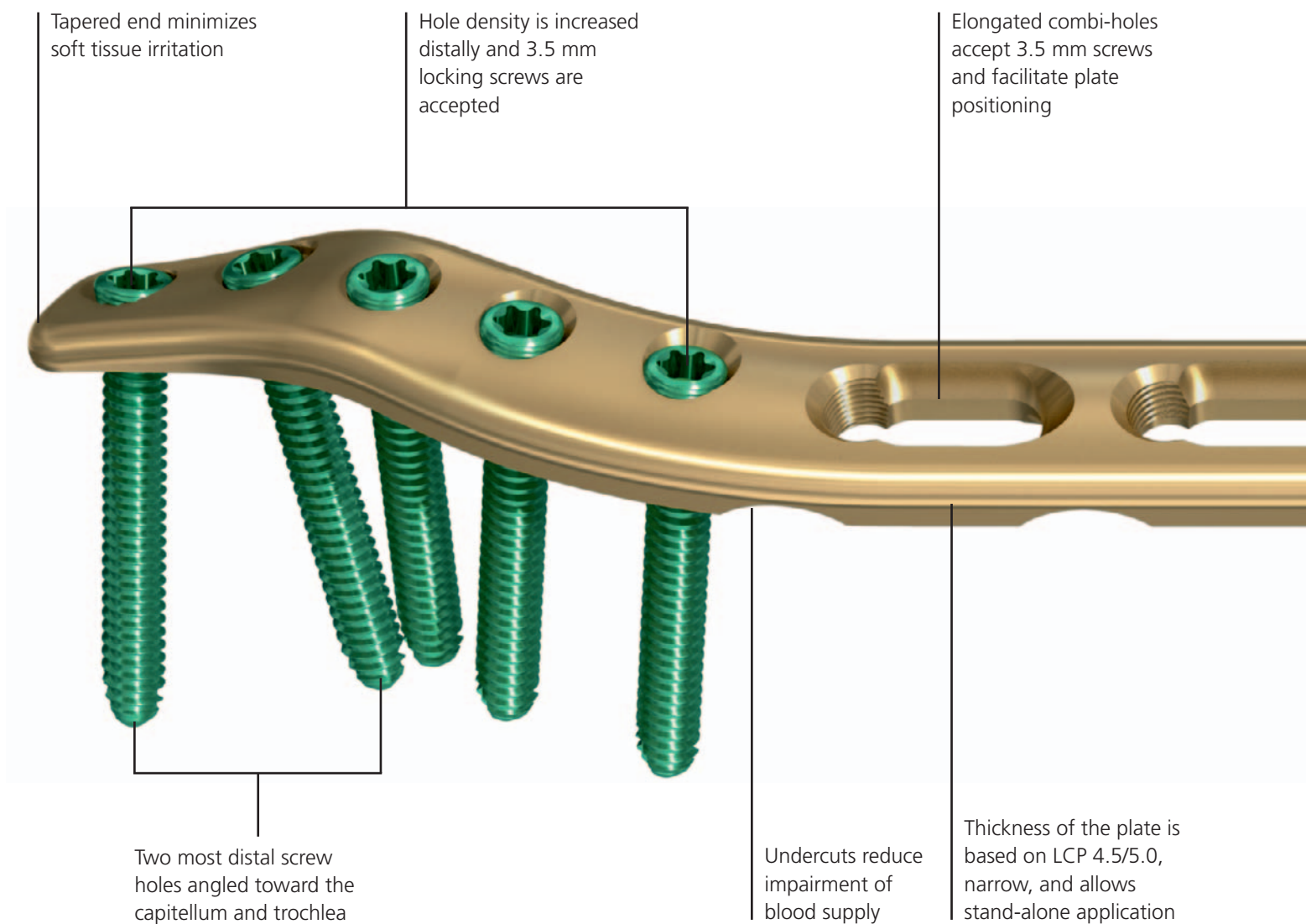
LCP Extra-articular Distal Humerus

Plate. The anatomically shaped and angular stable fixation system for extra-articular fractures of the distal humerus.

Indications

- Extra-articular fractures of the distal humerus
- Malunions of the distal humerus
- Non-unions of the distal humerus

Features and Benefits



Anatomically pre-contoured LCP selection for the distal humerus



LCP Extra-articular Distal Humerus Plate

Primary Indication

- Extra-articular fractures of the distal humerus

Features

- Plate thickness based on LCP 4.5/5.0, narrow
- Optimized angles of distal screw holes
- Tapered plate end near the joint
- Increased hole density in the distal part

Portfolio

- Plates in six lengths



LCP Distal Humerus Plates

Primary Indication

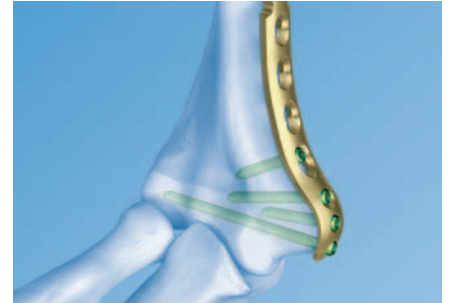
- Intra-articular fractures of the distal humerus, especially for osteoporotic bone
- Supracondylar fractures of the distal humerus

Features

- 90° plating technique possible
- Small distal screws for multiple fixation options for the distal block
- Position and compression device available
- Aiming block for easy and correct screw insertion

Portfolio

- Dorsolateral plates with or without support
- All plates in five lengths



LCP Metaphyseal Distal Medial Humerus Plate

Primary Indication

- Juxta-articular distal humerus fractures

Features

- Notches on plate shaft
- Tapered plate end near the joint
- Aiming block for easy and correct screw insertion
- Increased hole density for improved anchorage

Portfolio

- One plate for left and right
- Plates in five lengths

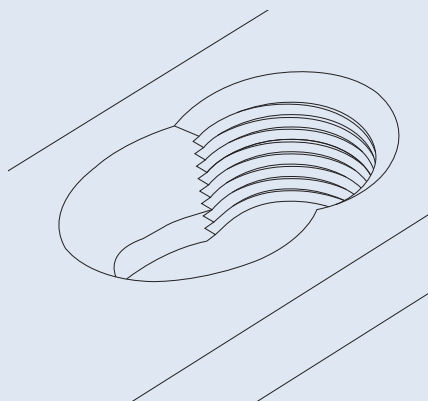
LCP Locking Compression Plate

Angular stable fixation of fragments regardless of bone quality

Minimised risk of primary and secondary loss of reduction, even under high dynamic loading

Reduced impairment of periosteal blood supply due to the limited plate contact

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.¹ These principles, as applied to the LCP Extra-articular Distal Humerus Plate, are:

Anatomic Reduction

Multiple combi-holes and plate lengths provide fixation options for various fracture patterns. Precontoured plates assist reduction of metaphysis segment to diaphysis.

May be used in combination with the medial distal humerus plate for intra-articular distal humerus fractures.

Stable Fixation

Locking screws create a fixed-angle construct, providing angular stability.

Preservation of Blood Supply

Limited-contact plate design reduces plate-to-bone contact, limiting vascular trauma and insult to bone.

Early, Active Mobilization

Early mobilization per standard AO technique creates an environment for bone healing, expediting a return to optimal function.

¹Müller ME, Allgöwer M, Schneider R, Willenegger H (1995) Manual of Internal Fixation. 3rd, expanded and completely revised ed. 1991. Berlin, Heidelberg, New York: Springer

Indications

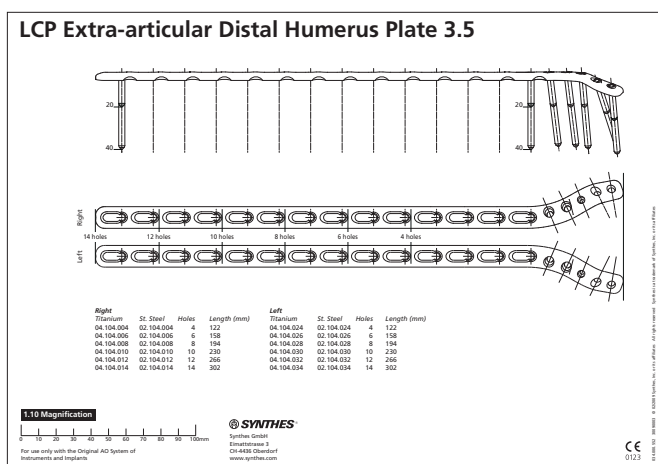
-
- Extra-articular fractures of the distal humerus
 - Malunions of the distal humerus
 - Non-unions of the distal humerus

Preparation and Approach

1

Preoperative planning

Complete the preoperative radiographic assessment and prepare the preoperative plan. Use the x-ray template for LCP Extra-articular Distal Humerus Plate (Art. No. 034.000.552 for right and for left humerus) to determine the length of the plate and the position of the screws.



2

Position patient

Positioning is by surgeon preference. However, the lateral decubitus position is frequently chosen. The arm is rested on a padded bar allowing elbow flexion of 120°.



3

Approach

Possible approaches include a triceps split approach or a posterolateral approach; where the triceps are elevated off the back of the humerus from lateral to medial. Distally, this is the posterior side of a standard Kocher approach. Proximally, one can identify the radial nerve in the manner described by Gerwin et al.²

Caution: If the plate is long, the radial nerve needs to be elevated off the back of the humerus and the plate placed underneath. Also consider the nerve when inserting screws.

Otherwise, the ulnar nerve rarely needs to be identified by more than palpation and almost never needs to be isolated or elevated with these fractures.

An olecranon osteotomy is not necessary for plate placement.



²Gerwin, Michelle, et al. "Alternative Operative Exposures of the Posterior Aspect of the Humeral Diaphysis. With Reference to the Radial Nerve." *The Journal of Bone and Joint Surgery* 78:1690-5 (1996)

1

Reduce fracture and fix temporarily

Use pointed forceps for temporary fixation in restoring the anatomy. Ensure that forceps will not interfere with subsequent plate placement.

2

Determine plate length

Choose a plate length that offers sufficient fixation proximal to the fracture.

3

Position plate on the bone

Optional instruments

329.020	Bending Iron for LC-DCP 4.5 and DCP 4.5, length 250 mm (×2)
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329.300	Bending Press, length 400 mm
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Position the plate so that the shaft portion of the plate is located centrally on the posterior aspect of the bone while the distal end curves along the back of the lateral column. Ensure that the plate is at a safe distance from the olecranon fossa so that complete elbow extension is not impeded.

The position of the plate should allow distal screw insertion through the lateral flange to reach far into the trochlea.

Due to varying patient anatomy, slight bending may be necessary. Contour plate as needed using the bending irons or the plate-bending press.



4**Preliminary fixation and compression****Instruments**

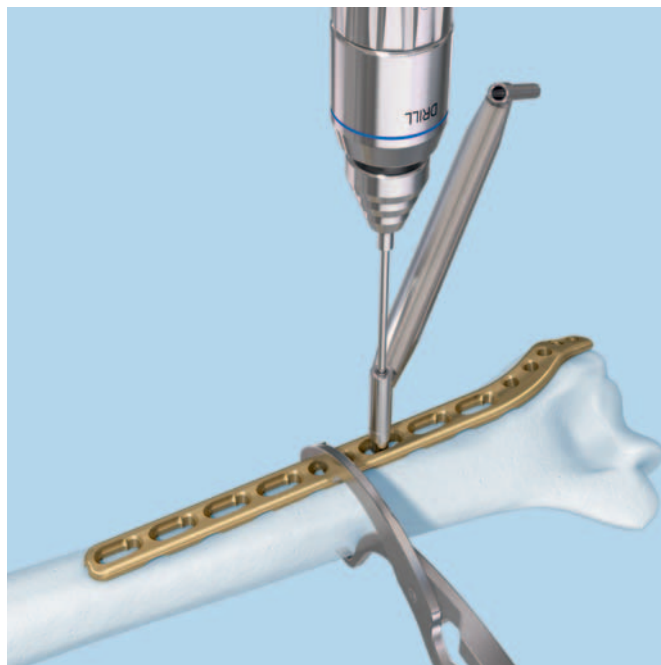
323.360	Universal Drill Guide 3.5
310.250	Drill Bit Ø 2.5 mm, length 110/85 mm, 2-flute, for Quick Coupling
311.431	Handle with Quick Coupling
314.030	Screwdriver Shaft, hexagonal, small, Ø 2.5 mm
314.020	Screwdriver, hexagonal, small, with Holding Sleeve

After reducing the fracture, apply the plate and insert a non-locking screw through the center of the DCU portion of an elongated combi-hole proximal to the fracture.

Use the 2.5 mm drill bit through the 3.5 mm universal drill guide to predrill the bone. For the neutral position, press the drill guide down in the non-threaded hole.

Use the depth gauge to determine screw length.

Select and insert a 3.5 mm cortex screw of appropriate length. Do not completely tighten the screw. Make any final adjustments to plate placement. Manually tighten the screw to maintain the plate placement and compress the plate to the bone.



5

Insert two most distal locking screws

Instruments

323.027	LCP Drill Sleeve 3.5, for Drill Bits \varnothing 2.8 mm
323.055	Centering Sleeve for Kirschner Wire \varnothing 1.6 mm, length 70 mm
292.160	Kirschner Wire \varnothing 1.6 mm with trocar tip, length 150 mm
323.060	PHILOS Direct Measuring Device for Kirschner Wire \varnothing 1.6 mm
310.284	LCP Drill Bit \varnothing 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling
314.030	Screwdriver Shaft, hexagonal, small, \varnothing 2.5 mm
or	
314.116	Screwdriver Shaft Stardrive 3.5, T15
511.770/773	Torque Limiter, 1.5 Nm
397.705/ 311.431	Handle for Torque Limiter/Handle with Quick Coupling

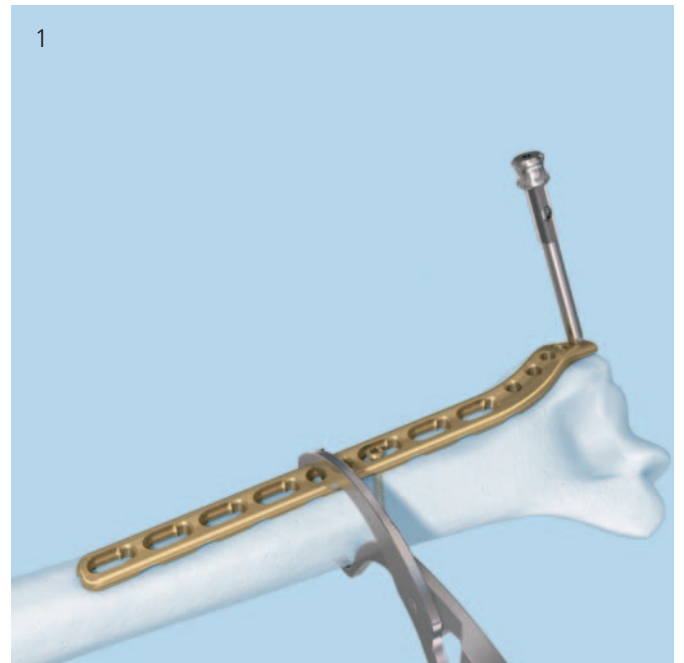
Insert the centering sleeve into the LCP drill sleeve (1).

Insert the LCP drill sleeve assembly into the most distal locking hole until fully seated.

Insert a 1.6 mm K-wire through the centering sleeve and drill to the desired depth.

- Ⓒ Verify the K-wire placement under image intensification to determine if final screw placement will be acceptable. This wire should be at or slightly distal to the equator of the capitellum for plate placement to be correct.

Important: The K-wire position represents the final position of the locking screw. Confirm that the K-wire does not enter the joint.

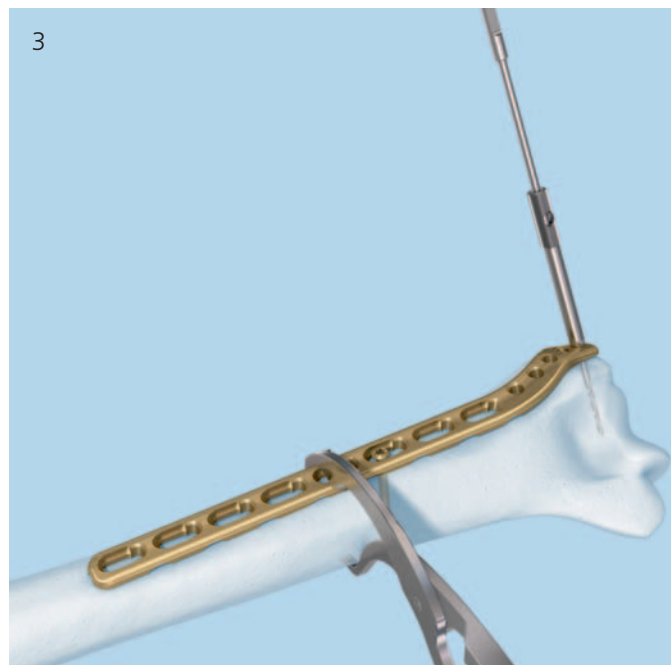
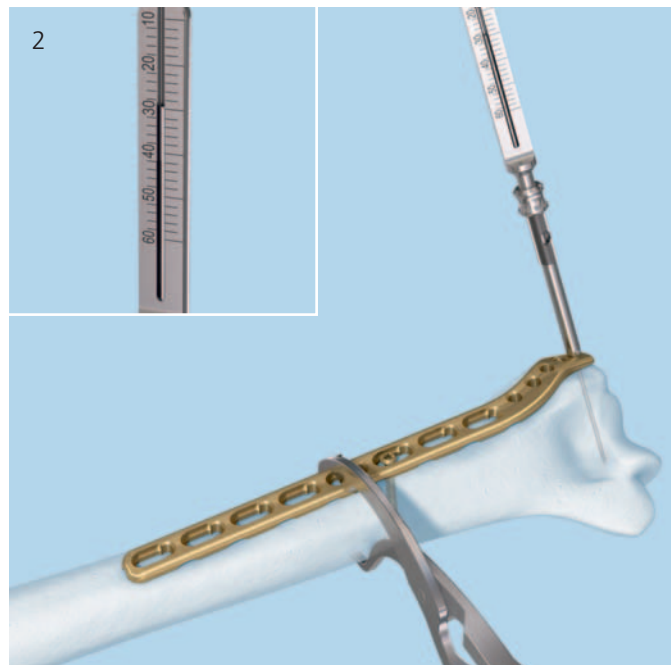


Measure for screw length by sliding the tapered end of the direct measuring device over the K-wire down to the centering sleeve (2).

Remove the direct measuring device, K-wire and 1.6 mm centering sleeve, leaving the threaded drill sleeve in place (3).

- Under image intensification, use the 2.8 mm drill bit to predrill for the screw.

Remove the threaded drill sleeve.



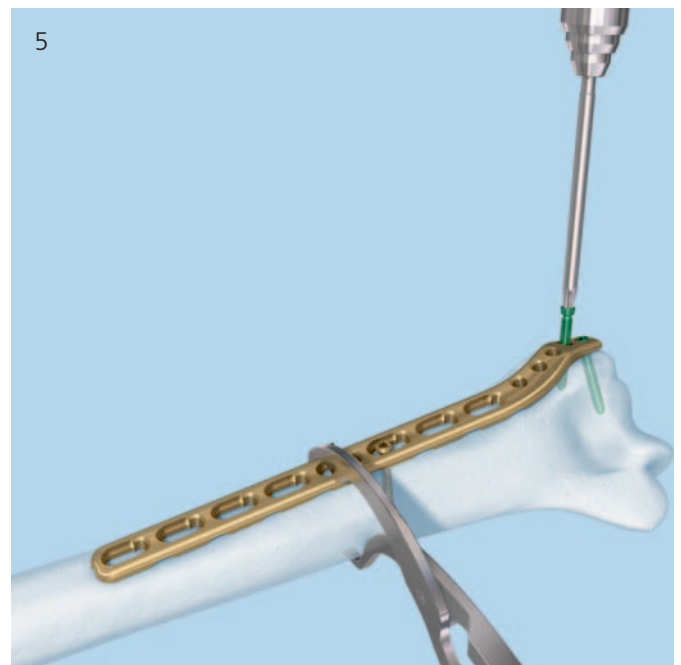
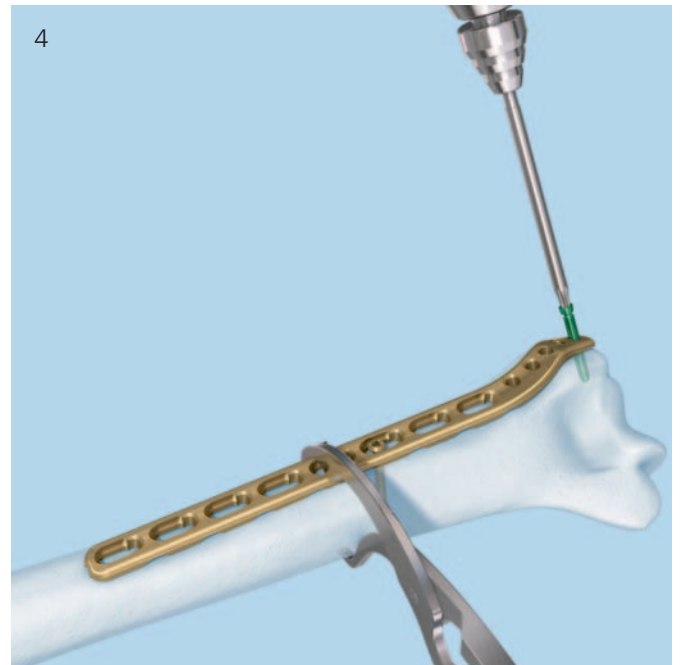
Select a locking screw with the appropriate length.

Insert the locking screw with the appropriate screwdriver shaft (hexagonal or Stardrive recess) mounted on the 1.5 Nm torque limiter (4).

Insert the screw manually or by power until a click is heard. If a power tool is used, reduce speed when screwing the head of the locking screw into the plate.

Repeat this process for the second most distal locking screw (5).

Tip: If additional compression of the distal fragment to the plate is needed, insert a 4.0 mm cancellous screw prior to inserting the locking screws. This screw may be inserted into one of the proximal locking holes in the head of the plate (but not one of the two most distal holes). After fixation with locking screws through the remaining holes, this screw can be replaced with a locking screw.



6**Insert locking screws****Instruments**

323.027	LCP Drill Sleeve 3.5, for Drill Bits \varnothing 2.8 mm
310.284	LCP Drill Bit \varnothing 2.8 mm with Stop, length 165 mm, 2-flute, for Quick Coupling
319.010	Depth Gauge for Screws \varnothing 2.7 to 4.0 mm, measuring range up to 60 mm
314.030	Screwdriver Shaft, hexagonal, small, \varnothing 2.5 mm
or	
314.116	Screwdriver Shaft Stardrive 3.5, T15
511.770/773	Torque Limiter, 1.5 Nm
397.705/ 311.431	Handle for Torque Limiter / Handle with Quick Coupling

Insert locking screws into the remaining head holes.

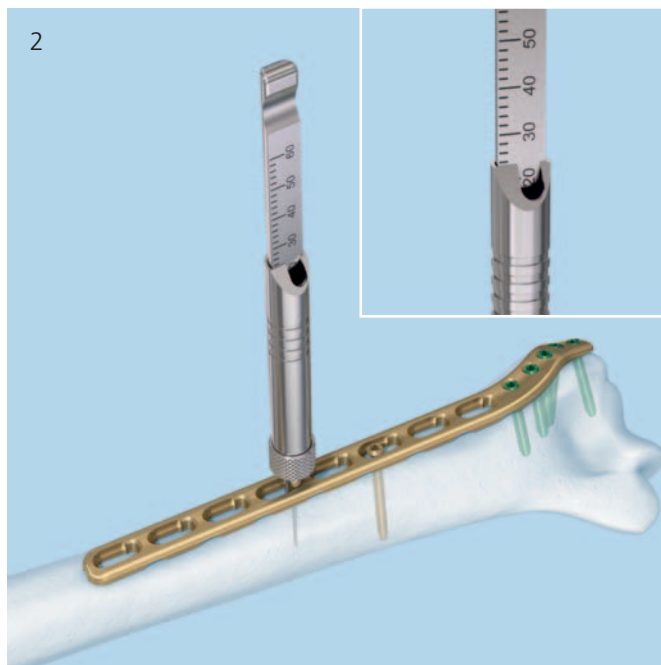
Determine where locking screws will be used in the shaft portion of the plate. Working from the fracture up the shaft, insert locking screws into the desired holes until desired fixation is achieved.

Insert the LCP drill sleeve into the locking portion of the combi-hole until fully seated (1).

Use the 2.8 mm drill bit to drill to the desired depth (2).

Remove the drill guide.

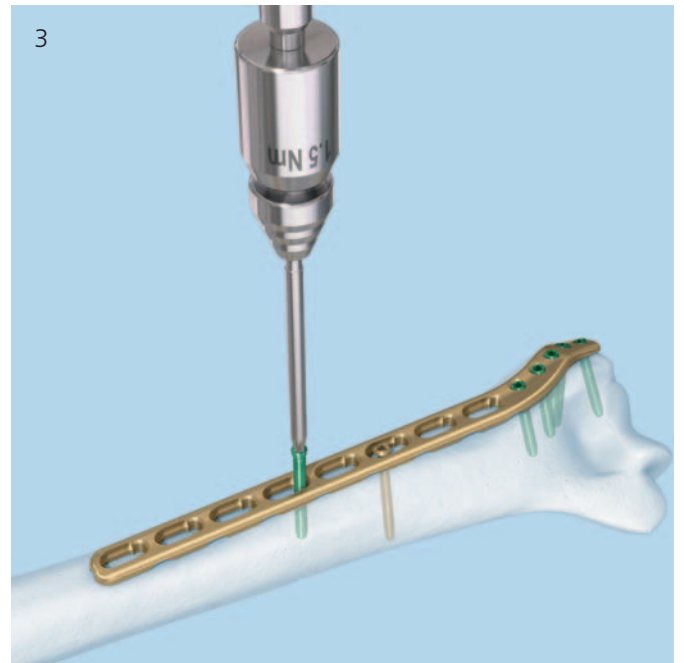
Use the depth gauge to determine screw length.



Select a locking screw with the appropriate length.

Insert the locking screw with the appropriate screwdriver shaft (Hexagonal or Stardrive recess) mounted on the 1.5 Nm torque limiter (3).

Insert the screw manually or by power until a click is heard. If a power tool is used, reduce speed when screwing the head of the locking screw into the plate.



7

Insert bone graft (optional)

If desired, fill any bone defect with autogenous bone graft or bone graft substitute. When using bone graft substitute, follow the manufacturer's directions for use.

Implant Removal

Instruments

314.030 Screwdriver Shaft, hexagonal, small,
Ø 2.5 mm

or

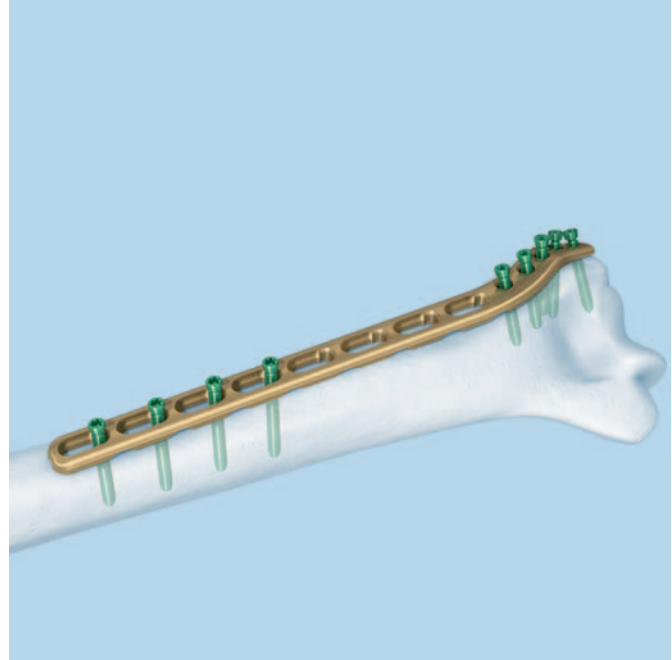
314.116 Screwdriver Shaft Stardrive 3.5, T15

309.521 Extraction Screw

311.430 Handle with Quick Coupling

To remove the plate, first unlock all the screws with the screwdriver. Remove the plate in a second step since it could otherwise rotate while unlocking the last screw, which can cause soft tissue damage.

If a screw cannot be removed with the screwdriver, use the handle with quick-coupling to insert the conical extraction screw into the screw head, and unscrew the screw in a counter-clockwise direction.



Important: For problem-free removal of an implant, the proper instruments must be available.

Implants

LCP Extra-articular Distal Humerus Plates

Right	Left	Holes	Length (mm)
OX.104.004	OX.104.024	4	122
OX.104.006	OX.104.026	6	158
OX.104.008	OX.104.028	8	194
OX.104.010	OX.104.030	10	230
OX.104.012	OX.104.032	12	266
OX.104.014	OX.104.034	14	302



All plates and screws are also available sterile packed.
For sterile implants add suffix "S" to article number.

X=2: stainless steel
X=4: titanium

Screws used with the LCP Extra-articular Distal Humerus Plate

✳ X12.102–124 Locking Screw Stardrive Ø 3.5 mm, length 12–60 mm, self-tapping



● X13.012–060 Locking Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with hexagonal recess



● X04.814–860 Cortex Screw Ø 3.5 mm, length 12–60 mm, self-tapping, with hexagonal recess



✳ Stardrive
● Hexagonal

The LCP Extra-articular Distal Humerus Plate is compatible with 3.5 LCP instruments and standard small-fragment instruments. In addition to the 3.5 LCP instruments, this instrument is also required:

323.055 Centering Sleeve for Kirschner Wire
Ø 1.6 mm, length 70 mm,
for Nos. 323.027 and 323.054



Modular tray for the LCP Extra-articular Distal Humerus Plates

68.104.010	Tray for LCP Distal Humeral Plates, extraarticular, for Vario Case
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Modular small fragment instrument trays

68.122.013	Modular Small Fragment Basic Instrument Tray
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68.122.019	Modular Small Fragment Bending Instrument Tray
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68.122.014	Modular Small Fragment Reduction Instrument Tray
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68.122.015	Modular Small Fragment Screw Insertion Tray
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Also available:

Modular tray for LCP Elbow Plates 3.5/2.7

68.104.005	Tray for LCP Elbow Plates 3.5/2.7, for Vario Case
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Synthes Biomaterials Overview

Synthetic and allogenic bone replacement materials have the advantage of uniform quality, unlimited availability and absence of potential complications at a donor site.

Additionally, the application of synthetic and allogenic bone graft substitutes reduces the duration of the surgery.

Synthes offers a wide range of synthetic biomaterial products in different application forms and with distinct biological properties:

chronOS



Osteoconductive, resorbable, synthetic

chronOS Perfusion Concept



Enhancing chronOS with biological factors

chronOS Inject



Injectable remodelling

Norian SRS



Injectable stability

DBX*



Osteoinductive power

MTF Musculoskeletal
Transplant
Foundation
THE ALLOGRAFT LEADER™

*Facilitated through Synthes

Furthermore a comprehensive portfolio of allograft products is available in selected countries.

For more detailed information about a specific product or availability of allografts please contact your local Synthes representative.

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