

3.5 mm LCP Hook Plate. Part of the Synthes locking compression plate (LCP) system.

Technique Guide

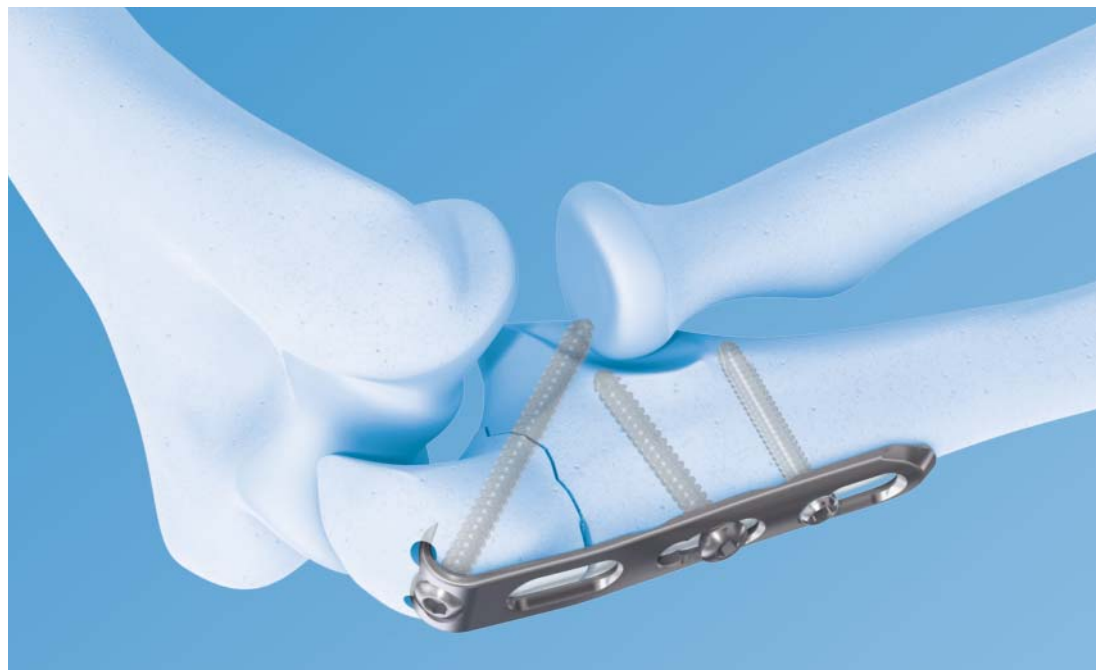


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3.5 mm LCP Hook Plate.

Part of the Synthes locking compression plate (LCP) system.

Low profile

- Minimal hardware prominence
- Hooks provide additional points of fixation
- Locking screws provide a fixed-angle construct, which provides advantages in osteopenic bone where traditional screw purchase is compromised

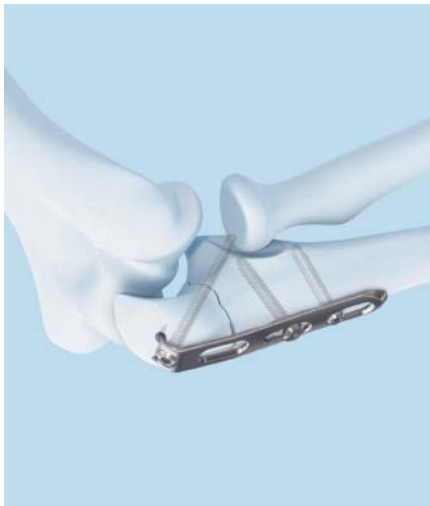
Precontoured

- Shaped to provide spring-effect, to aid in reduction
- Dual hook configuration facilitates placement

Versatile

- A single 3-hole plate can be used in multiple locations, applied to either the right or left side of the anatomy, resulting in less inventory required

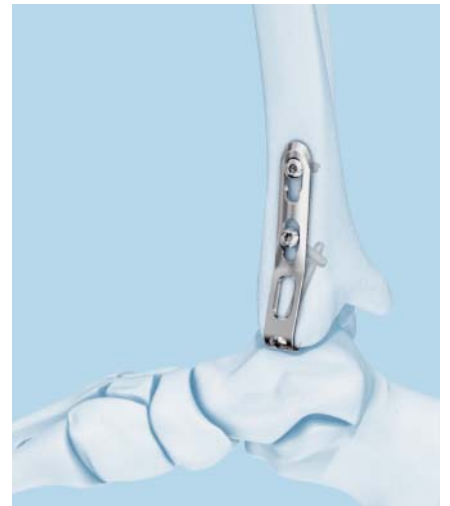




Olecranon



Distal fibula/lateral malleolus



Distal tibia/medial malleolus

Nonlocking hole between the hooks

Allows fracture compression with a lag screw ("home-run screw")

Elongated nonlocking hole

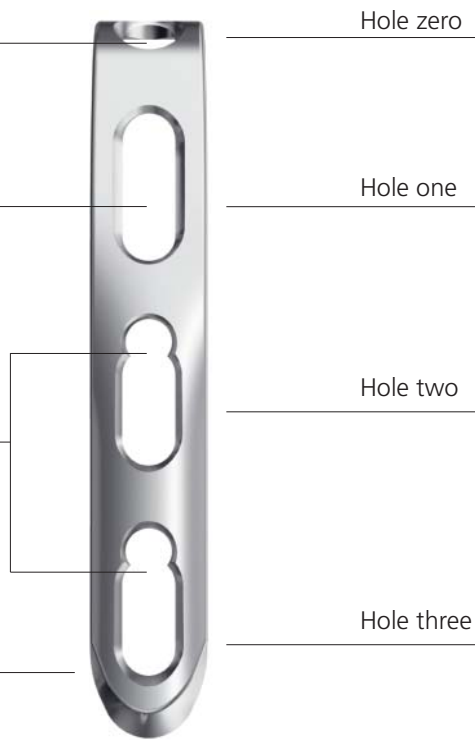
Designed for plate flexibility, and aids in placement and fracture compression

Elongated Combi holes

For controlled compression and optimal plate placement

Rounded edges

Minimize soft tissue irritation



AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation¹:

Anatomic reduction

Fracture reduction and fixation to restore anatomic relationships.

Stable fixation

Stability by fixation or splintage, as the personality of the fracture and the injury require.

Preservation of blood supply

Preservation of the blood supply to soft tissue and bone by careful handling.

Early, active mobilization

Early and safe mobilization of the part and patient.

1. M.E. Müller, M. Allgöwer, R. Schneider, and H. Willenegger, *Manual of Internal Fixation*, 3rd Edition. Berlin: Springer Verlag, 1991.

Indications

The 3.5 mm LCP Hook Plate is indicated for fractures, osteotomies and nonunions of small bones, including the ulna, radius, tibia and fibula, particularly in osteopenic bone.

Clinical Cases

Case 1*

- 78-year-old, gender unknown
- 21-B3 fracture: right arm
- Poor bone quality



Preoperative lateral



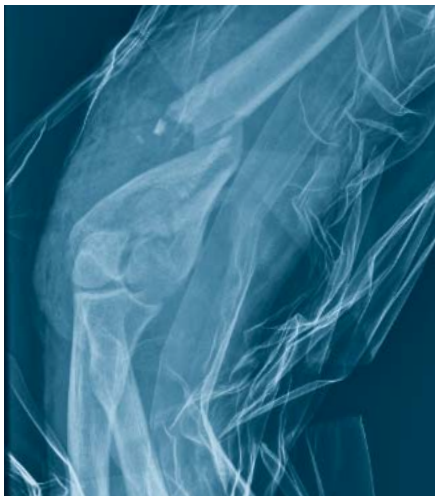
Postoperative AP



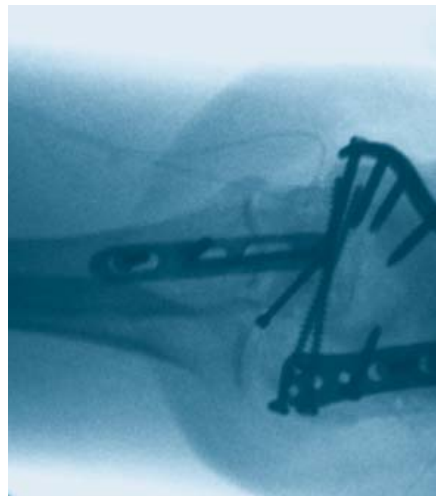
Postoperative lateral

Case 2*

- 61-year-old male
- Open distal humerus fracture: right arm
- Good bone quality
- Olecranon osteotomy required to repair distal humerus



Preoperative lateral



Postoperative AP



Postoperative lateral

*Results from case studies are not predictive of results in other cases.
Results in other cases may vary.

Preparation

Required set

-
- | | |
|-------------|---------------------------------------------------------------------------|
| 01.212.006/ | Small Fragment LCP Instrument and Implant |
| 01.212.009 | Set, with 3.5 mm Hex Drive Cortex Screws
(stainless steel or titanium) |
-

Note: The following technique is specific to the olecranon. Steps 1, 2 and 3 are specific to this surgical site, and should be modified when applied to other anatomy and fracture locations.



Position Patient

1

Position patient

For an olecranon procedure, place the patient in lateral decubitus with the elbow flexed over a side rest.

A small padded table can be placed under the forearm to support the elbow in extension if necessary.

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

Note: For more information on fixation principles using conventional and locked plating techniques, please refer to the *Small Fragment Locking Compression Plate (LCP) System Technique Guide*.

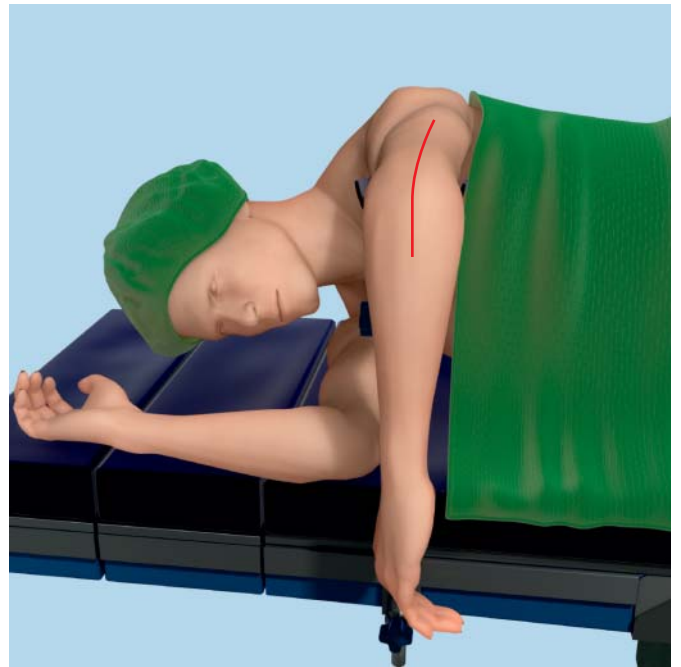


Approach

2

Approach

Make a posterior midline incision centered over the fracture or osteotomy site. The incision can also be slightly curved to the radial side to protect the ulnar nerve.



Reduce Fracture

3a

Reduce fracture

Instruments

292.20/ 2.0 mm Kirschner Wire, 150 mm, trocar point
492.20 (stainless steel or titanium)

or

292.71 1.6 mm Kirschner Wire with Thread, 150 mm,
trocar point, 5 mm thread length

- Reduce the fracture directly or indirectly depending on the type of fracture. Temporarily fix the fragment using Kirschner wires and/or forceps. Examine the reduction of the olecranon using image intensification. Ensure Kirschner wires or forceps will not interfere with plate placement.



Perform Osteotomy and Fix Temporarily

3b

Perform osteotomy and fix temporarily

Perform an incomplete osteotomy of the dorsal cortex of the olecranon using a thin oscillating saw blade. Complete the osteotomy with a chisel in order to obtain an interdigitating fracture line. The fracture line should ideally run through the bare area of the sigmoid notch.

The olecranon fragment is then placed to the lateral side.

Protect the ulnar nerve on the medial side and the muscular branch to the anconeus on the lateral side.

Perform surgery on the distal humerus as required.



3b. Perform osteotomy and fix temporarily continued

Instrument

292.56 1.6 mm Kirschner Wire, 150 mm, trocar points on both ends

Insert a 1.6 mm Kirschner wire with trocar points on both ends into the proximal olecranon fragment and reduce the osteotomy using an “inside-out” technique.

Insert the wire into the fragment through the osteotomy from distal to proximal. The insertion point should be close to the articular surface and the wire should exit the fragment at the distal insertion line of the triceps tendon.

Grasp wire from the tip exiting the proximal end of the olecranon. Retract wire proximally until its tip no longer protrudes from the osteotomy line.

Reduce the olecranon. Check for an anatomic reduction of the articular surface. Advance the previously placed wire from proximal to distal until it passes through the cortex of the coronoid process.

Insert additional Kirschner wires if greater preliminary stability is required.

Note: Take care not to drill in a radial direction, as the tip of the Kirschner wires and potential screws may interfere with forearm rotation.



Predrill for Hooks

4

Predrill for hooks

Instruments

310.21 2.0 mm Drill Bit, quick coupling, 125 mm

323.26 2.7 mm Universal Drill Guide

Drill two holes for hook placement using the plate as a guide. The holes should lie approximately 4 mm proximal to the insertion line of the triceps and centered over the olecranon.

Note: The holes are drilled through longitudinal splits in the tendon fibers.



Position 3.5 mm LCP Hook Plate

5

Position 3.5 mm LCP hook plate

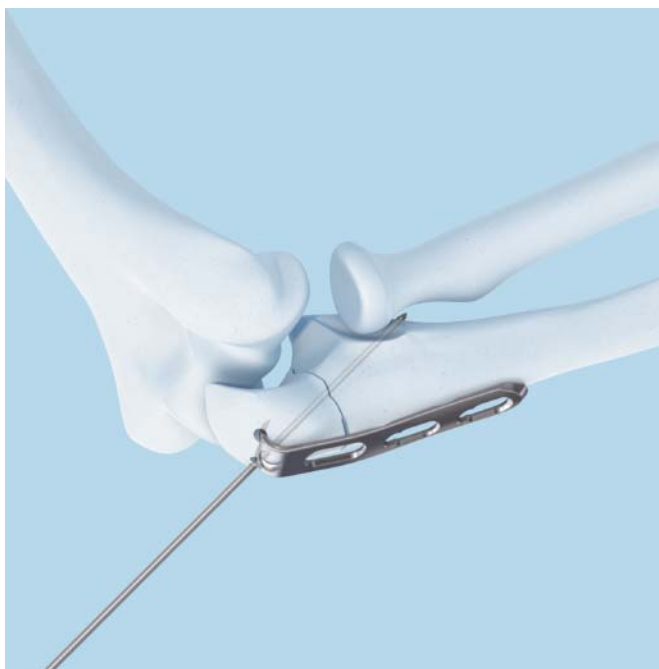
Optional instruments

329.04	Bending Pliers for 2.7 mm and 3.5 mm plate, 150 mm length
and	
329.05	Bending Pliers for 2.7 mm and 3.5 mm plate, 150 mm length
or	
329.07	Bending Pliers for 2.7 mm and 3.5 mm Reconstruction Plates, 180 mm length, (two required)

Place the plate on the olecranon, sinking the hooks into the predrilled holes. Be careful not to damage the surgical gloves or the patient's surrounding soft tissues with the sharp hooks.

Align the plate in the axis of the proximal ulna.

Note: If required, the plate can be bent using bending pliers. Pay attention not to bend the plate over the Combi holes to prevent deformity of the locking portion. The plate hooks must not be bent.



Insert Screws

6

Insert cortex screws

Instruments

310.25	2.5 mm Drill Bit, quick coupling, 110 mm gold
314.02	Small Hexagonal Screwdriver, with holding sleeve
or	
311.43	Handle, with quick coupling, small
and	
314.03	Small Hexagonal Screwdriver Shaft
319.01	Depth Gauge
323.36	3.5 mm Universal Drill Guide
398.80	Self-centering Bone Forceps
or	
399.091	Bone Holding Forceps, soft ratchet

Drill a screw hole in the dynamic compression unit (DCU) portion of the middle elongated Combi hole, ensuring that the drill will not collide with the reduction Kirschner wires.

Measure for screw length, using the depth gauge.

Insert a 3.5 mm cortex screw. Do not fully tighten the screw.

A 4.0 mm cancellous bone screw may also be used in this step.

Next, drill a screw hole approximately 20 mm–30 mm from the end of the plate, through the near cortex only, and aligned with the centerline of the plate.

Insert a 3.5 mm cortex screw, leaving the screwhead approximately 2 mm–4 mm above the bone.



6. Insert cortex screws continued

Apply compression outside the plate using a bone holding forceps and the 3.5 mm cortex screw. Tighten the previously inserted 3.5 mm cortex screw in the middle elongated combi-hole of the plate.

Remove the forceps and the independent 3.5 mm cortex screw that had been used to apply compression.

Note: Although inserting a cortex screw eccentrically can gain limited compression, it is recommended that additional compression be obtained using external means.



7

Insert screw between hooks

Instruments

310.21	2.0 mm Drill Bit, quick coupling, 125 mm and
323.26	2.7 mm Universal Drill Guide
or	
310.25	2.5 mm Drill Bit, quick coupling, 110 mm gold and
323.36	3.5 mm Universal Drill Guide
314.02	Small Hexagonal Screwdriver, with holding sleeve
or	
311.43	Handle, with quick coupling, small and
314.03	Small Hexagonal Screwdriver Shaft
319.01	Depth Gauge, for 2.7 mm and small screws

Drill the screw hole between the hooks with a 2.5 mm drill bit. Be sure to angle the drill away from the long axis of the plate to avoid colliding with other screws in the plate.

Measure for screw length, using the depth gauge.

Ensure that the screw will not collide with the reduction Kirschner wires.

Insert and tighten a 3.5 mm cortex screw. Alternatively, use a 2.7 mm cortex screw in this hole.

Remove the forceps and the independent 3.5 mm cortex screw used to apply compression in Step 6.



8

Insert locking screws

Instruments

310.288	2.8 mm Drill Bit, quick coupling, 165 mm
312.648	2.8 mm Threaded Drill Guide, for 3.5 mm Locking Screws
314.115 or 311.43 and 314.116	StarDrive Screwdriver, T15 Handle with quick coupling, small StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
319.01	Depth Gauge, for 2.7 mm and small screws
511.773 or 511.770	Torque Limiting Attachment, 1.5 Nm, quick coupling Torque Limiting Attachment, 1.5 Nm

Insert the threaded drill guide into the locking portion of the other (open) elongated Combi hole in the plate shaft until fully seated.

Use the 2.8 mm drill bit to the desired depth. Remove the drill guide and use the depth gauge to determine the screw length.

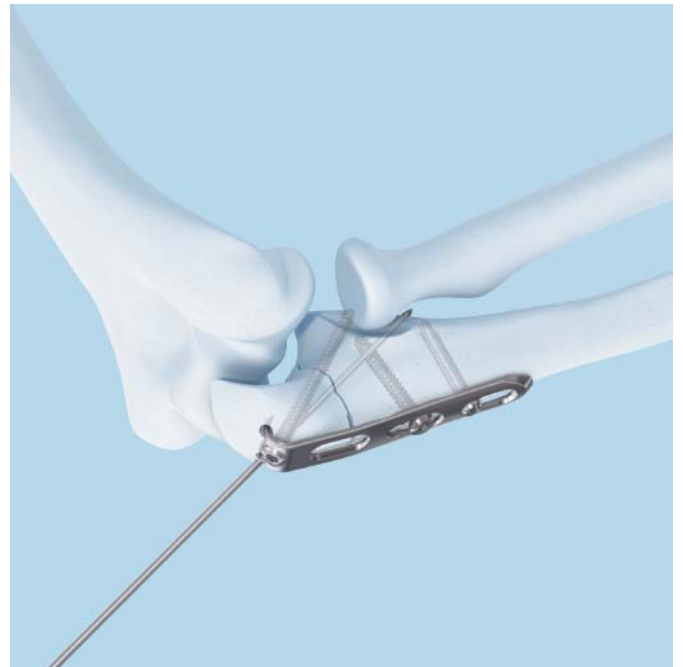
Insert the self-tapping 3.5 mm locking screw using the StarDrive screwdriver shaft with torque limiting attachment or using the StarDrive screwdriver.



Remove the 1.6 mm Kirschner wire.

Note: Always use a torque limiting attachment when using power to insert screws.

Alternatively, follow the appropriate steps for inserting a 3.5 mm cortex screw into this hole.



Implant Removal (Optional)

Optional set

01.240.001 Screw Removal Set

Optional instruments

309.520 Conical Extraction Screw

311.43 Handle, with quick coupling

To remove locking screws, 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 the screws cannot be removed with the screwdriver (e.g. if the hexagonal or StarDrive recess of a locking screw is damaged, or if the screws are stuck in the plate), insert the conical extraction screw with left-handed thread into the screwhead using the handle with quick coupling and loosen the locking screw by turning it counterclockwise.



Screws Used with the 3.5 mm LCP Hook Plate

2.7 mm Cortex Screws, self-tapping*

- May be used in the nonlocking hole between the hooks
- Compress the plate to the bone



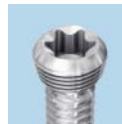
3.5 mm Cortex Screws, self-tapping*

- May be used in the DCU portion of the Combi holes in the plate shaft
- May be used in the nonlocking hole between the hooks
- Compress the plate to the bone or create axial compression
- Hex Drive or T15 StarDrive recess



3.5 mm Locking Screws, self-tapping*

- Used in locking portion of the Combi holes
- Create a locked, fixed-angle screw/plate construct



4.0 mm Cancellous Bone Screws*

- May be used in the DCU portion of the Combi holes in the plate shaft
- Compress the plate to the bone or create axial compression
- Fully or partially threaded shaft



*Found in the Small Fragment LCP Screw Set

Selected Instruments from the Small Fragment LCP Instrument and Implant Sets (01.212.006, 01.212.009)

292.20 2.0 mm Kirschner Wire, 150 mm, trocar point
or
492.20



292.56* 1.6 mm Kirschner Wire, 150 mm, trocar point
on both ends



292.71 1.6 mm Kirschner Wire with Thread, 150 mm,
trocar point, 5 mm thread length



310.21 2.0 mm Drill Bit, quick coupling, 125 mm



310.25 2.5 mm Drill Bit, quick coupling, 110 mm, gold



310.288 2.8 mm Drill Bit, quick coupling, 165 mm



310.35 3.5 mm Drill Bit, quick coupling, 110 mm



* Also available

311.43 Handle, with quick coupling



311.431* Large Handle, with quick coupling



312.648 2.8 mm Threaded Drill Guide



314.02 Small Hexagonal Screwdriver, with holding sleeve



314.03 Small Hexagonal Screwdriver Shaft



314.115 StarDrive Screwdriver, T15



314.116 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling



* Also available

319.01 Depth Gauge, for 2.7 mm and small screws



323.26 2.7 mm Universal Drill Guide



323.36 3.5 mm Universal Drill Guide



329.04 Bending Iron, for 2.7 mm and 3.5 mm plates,
150 mm
– Used with 329.05



329.05 Bending Iron, for 2.7 mm and 3.5 mm plates,
150 mm
– Used with 329.04



329.07 Bending Iron, for 2.7 mm and 3.5 mm
Reconstruction Plates



329.15* Bending Pliers, for 2.7 mm and 3.5 mm plates, 230 mm



398.80*** Self-Centering Bone Forceps, 10 mm serrated jaw, speed lock



399.091** Bone Holding Forceps, soft ratchet for plates to 9 mm wide



511.770* Torque Limiting Attachment, 1.5 Nm



511.773 Torque Limiting Attachment, 1.5 Nm, quick coupling



*Also available
**SS Set only
***Ti Set only

Product Information

3.5 mm LCP Hook Plates[◇]

- | | |
|------------|------------------------------------------------|
| 02.113.103 | 3.5 mm LCP Hook Plate, 3 holes, 62 mm |
| 04.113.103 | 3.5 mm Titanium LCP Hook Plate, 3 holes, 62 mm |



The 3.5 mm LCP Hook Plate is a part of the following sets:

- | | |
|------------|-----------------------------------------|
| 01.104.000 | 3.5 mm LCP Elbow System Set |
| 01.104.004 | 3.5 mm Titanium LCP Elbow System Set |
| 01.104.015 | 3.5 mm LCP Olecranon Plate Set |
| 01.104.016 | 3.5 mm Titanium LCP Olecranon Plate Set |

The 3.5 mm LCP Hook Plate can be housed in the following graphic cases:

- | | |
|------------|-----------------------------------------------|
| 60.104.015 | 3.5 mm LCP Olecranon Plate Graphic Case |
| 690.415 | 3.5 mm LCP Elbow System Graphic Case |
| 690.417 | 3.5 mm Titanium LCP Elbow System Graphic Case |

in combination with:

- | | |
|---------|----------------------------------------------------------------|
| 690.479 | Retrofit Kit for 3.5 mm Titanium LCP Elbow System Graphic Case |
|---------|----------------------------------------------------------------|

The 3.5 mm LCP Hook Plate requires one of the following sets:

- | | |
|------------|---------------------------------------------------------------------------------------------|
| 01.212.005 | Small Fragment LCP Instrument and Implant Set, with 3.5 mm StarDrive Cortex Screws |
| 01.212.006 | Small Fragment LCP Instrument and Implant Set, with 3.5 mm Hex Drive Cortex Screws |
| 01.212.007 | Small Fragment LCP Instrument and Implant Set, with 4 mm Cannulated Screws |
| 01.212.008 | Small Fragment LCP Instrument and Titanium Implant Set, with 3.5 mm StarDrive Cortex Screws |
| 01.212.009 | Small Fragment LCP Instrument and Titanium Implant Set, with 3.5 mm Hex Drive Cortex Screws |

[◇] Available nonsterile or sterile-packed.

Add "S" to catalog number to order sterile product.

Note: For additional information, please refer to package insert.

For detailed cleaning and sterilization instructions, please refer to

<http://us.synthes.com/Medical+Community/Cleaning+and+Sterilization.htm>

or to the below listed inserts, which will be included in the shipping container:

- Processing Synthes Reusable Medical Devices—Instruments, Instrument Trays and Graphic Cases—DJ1305
- Processing Non-sterile Synthes Implants—DJ1304

Also Available

01.240.001	Screw Removal Set
60.104.014	3.5 mm LCP Hook Plate Retrofit Kit for Olecranon Plate Tray
60.104.017	3.5 mm LCP Olecranon Graphic Case Tray
690.419	Retrofit Kit for 3.5 mm LCP Elbow System Graphic Case



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