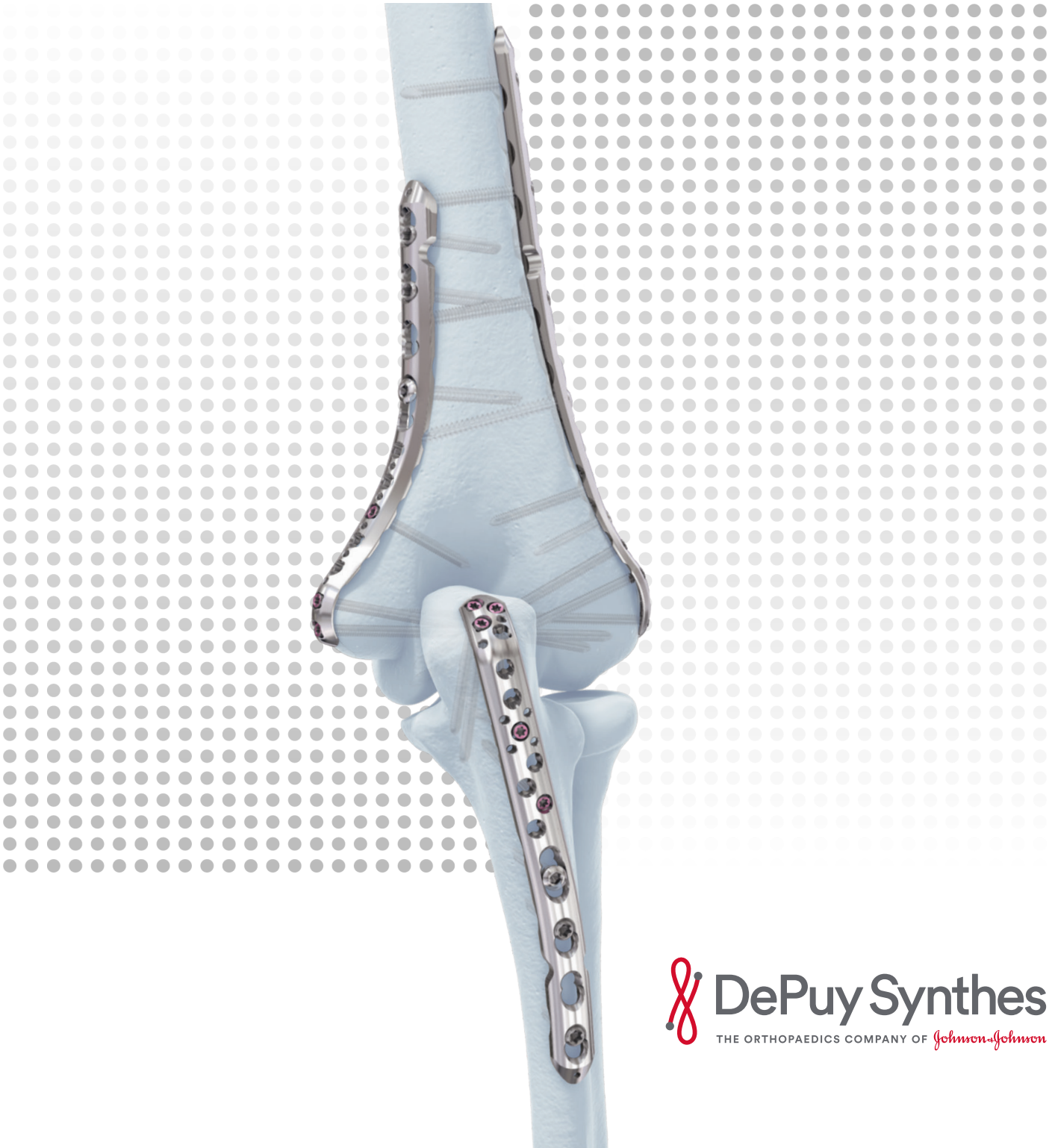
2.7 MM/3.5 MM VARIABLE ANGLE LCP™ ELBOW SYSTEM

Part of the Depuy Synthes Variable Angle Locking Compression Plate (VA LCP™) System

Surgical Technique



DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

The DePuy Synthes VA LCP™ Elbow System is a result of a technological milestone in locked plating technology. The system utilizes the variable angle locking technology platform that is based on a common approach to implant design and instrumentation, reducing complexity and ensuring a familiar technique.

Table of Contents

MR Information
The 2.7 mm / 3.5 mm Variable Angle LCP™ Elbow System has not been evaluated for safety and compatibility in the MR environment. It has not been tested for heating, migration or image artifact in the MR environment. The safety of the 2.7 mm / 3.5 mm Variable Angle LCP™ Elbow System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

Image Intensifier Control

2.7 mm/3.5 mm Variable Angle LCP Elbow System

Built on Success

DePuy Synthes 2.7 mm/3.5 mm VA LCP Elbow Plates accept 2.7 mm variable angle locking screws in the metaphyseal region. The 2.7 mm variable angle locking screws allow a fixed angle construct, 15° off normal axis, or variable angulation within a 30° cone. The variable angle screw holes feature four points of threaded locking between the plate and the variable angle locking screw to create a fixed-angle construct at the desired screw angle.

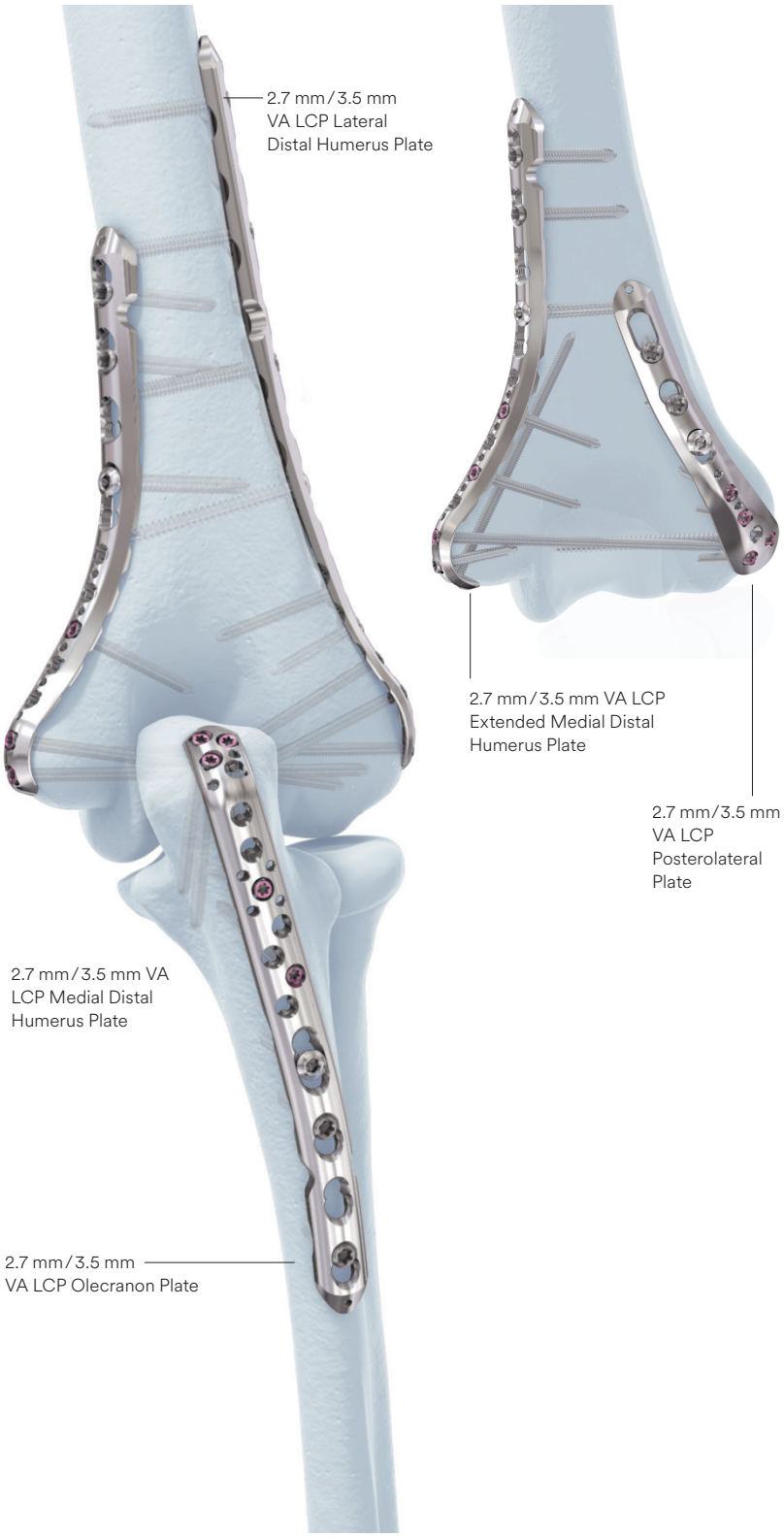
Designed for the Patient

DePuy Synthes is a company dedicated to improving patient care. Our products are a combination of innovation and surgeon partnerships. A dedicated, global surgeon team was integral on the design of this system through extensive consultation and participation in multiple design labs. Surgeon interviews, design and development meetings, and collaboration with key opinion leaders determined the clinical components necessary for the DePuy Synthes VA LCP Elbow system.

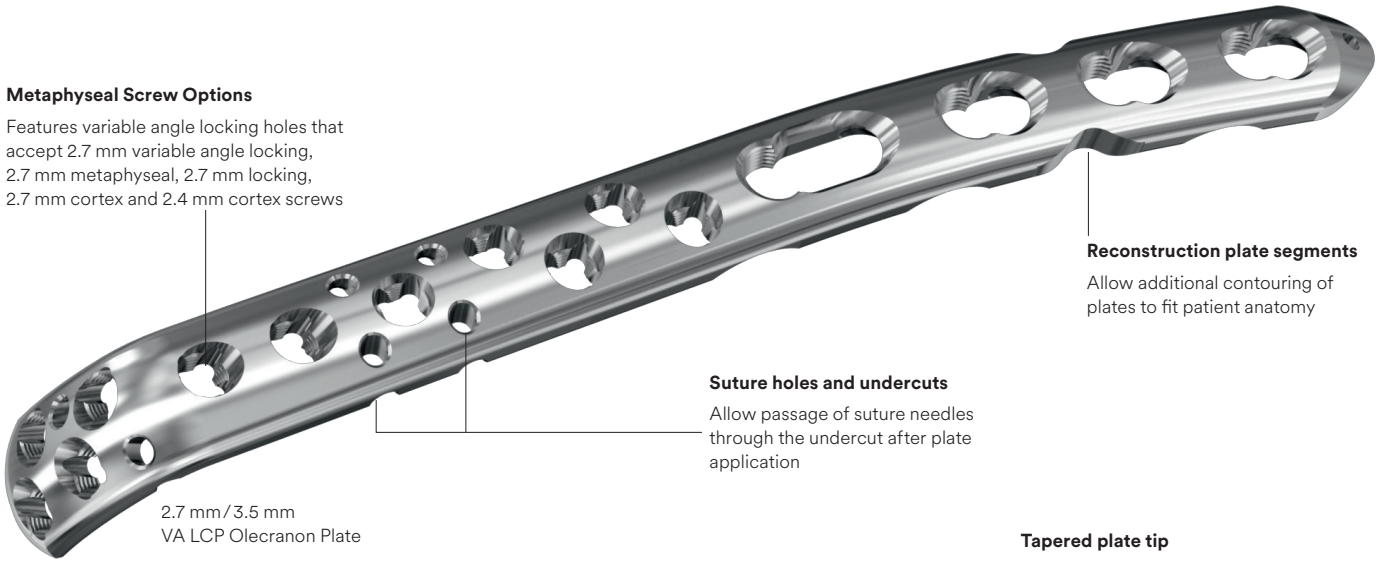
The anatomic shape for each plate is based on a detailed analysis of over 100 skeletal specimens. Plates are designed with a rounded profile to help reduce the risk for soft tissue irritation.

System Snapshot

- Short, medium, long, and extra long, plates with additional longer lengths available, sterile only
- Available in 316L stainless steel and titanium alloy (Ti-6Al-7Nb)
- Left and right plate designs
- New depth gauge allows for measurement of longer screws
- Two forceps to aid in reduction
- Available sterile-packed
- Used with the DePuy Synthes Locking Small Fragment System



2.7 mm/3.5 mm VA LCP Elbow Plates



Metaphyseal Screw Options

Features variable angle locking holes that accept 2.7 mm variable angle locking, 2.7 mm metaphyseal, 2.7 mm locking, 2.7 mm cortex and 2.4 mm cortex screws

Reconstruction plate segments

Allow additional contouring of plates to fit patient anatomy

Suture holes and undercuts

Allow passage of suture needles through the undercut after plate application

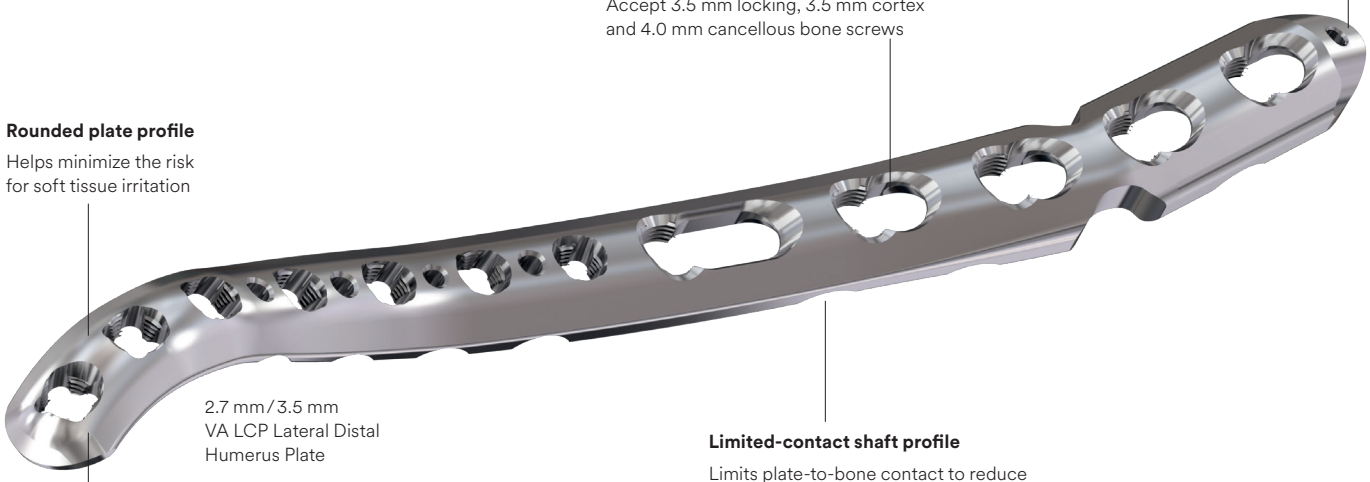
2.7 mm / 3.5 mm
VA LCP Olecranon Plate

Tapered plate tip

Tapered end for submuscular plate insertion which may help to preserve tissue viability

Combi holes

Accept 3.5 mm locking, 3.5 mm cortex and 4.0 mm cancellous bone screws



Rounded plate profile

Helps minimize the risk for soft tissue irritation

2.7 mm / 3.5 mm
VA LCP Lateral Distal
Humerus Plate

Limited-contact shaft profile

Limits plate-to-bone contact to reduce impairment of blood supply

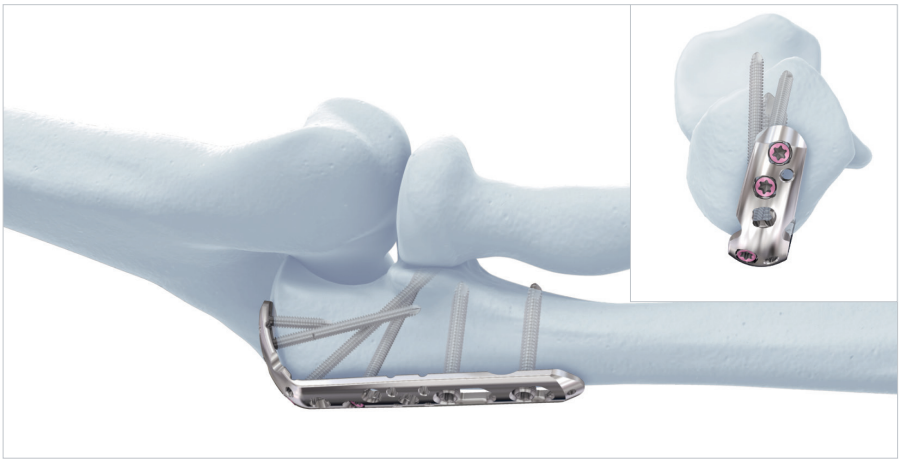
Variable Angle Screw Holes

Recess for screwhead helps minimize screw prominence to create a low-profile construct when used at the nominal angle. Screws can also be angled within a 30° cone around the central axis of the plate hole.

Recommended Use for Olecranon Plates

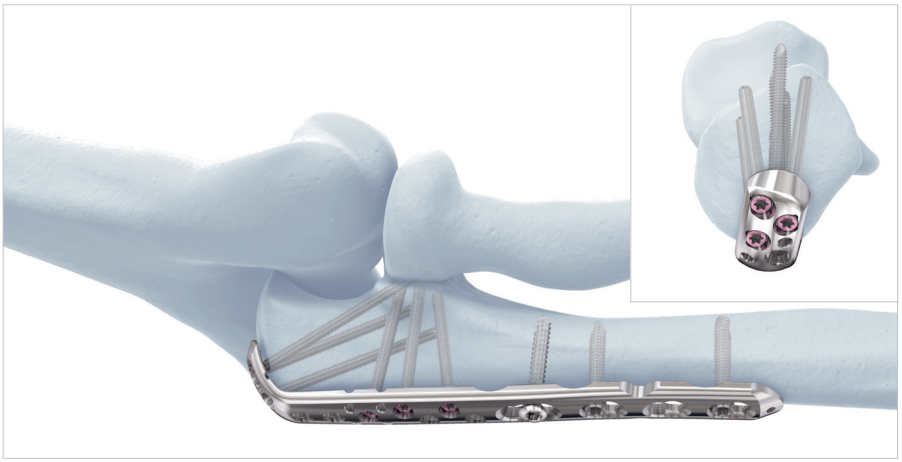
Proximal Olecranon Plate

For very proximal, short, comminuted avulsion type fractures (fractures that are above the coronoid)



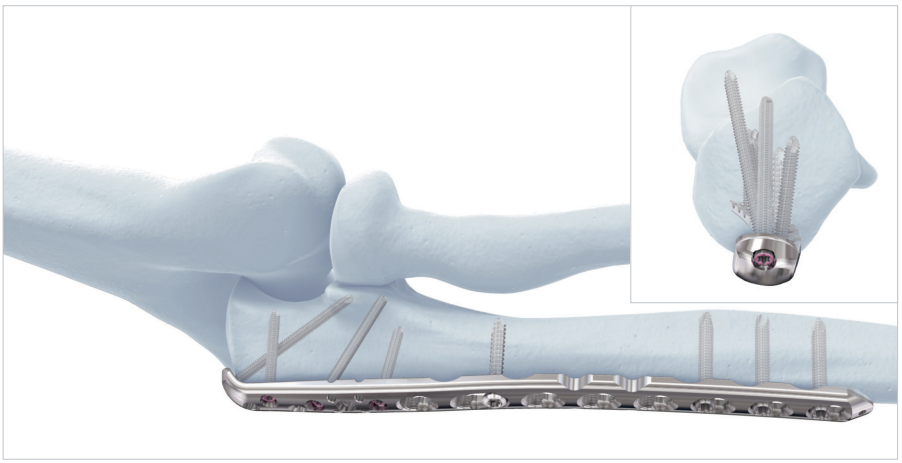
Olecranon Plate

For complex fractures involving the trochlear notch of ulna and coronoid



Extra Articular Proximal Ulna Plate

For proximal ulna metaphyseal-diaphyseal fractures (fractures that are distal to the coronoid)



Screws for the 2.7 mm / 3.5 mm Variable Angle LCP Elbow System

2.7 mm Metaphyseal Screws

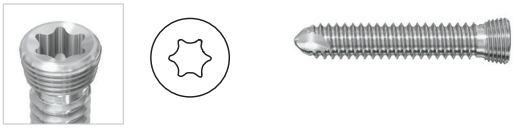
- Low profile screw that can be used in the metaphyseal portion of the plate (2.7 mm VA holes) to pull the plate to the bone
- Shaft profile is identical to a 2.7 mm variable angle locking screw
- 2.7 mm metaphyseal screws allow 15° off–normal axis, or variable angulation within a 30° cone
- 2.7 mm metaphyseal screws can also be replaced with locking screws after plate to bone compression is achieved.
- The 2.7 mm locking screw shaft profile had a higher average pull-out resistance than a 2.7 mm cortex screw shaft profile. In-house testing on file at DePuy Synthes, MT10-636. Test conducted using 20 PCF Foam.*

2.7 mm Variable Angle Locking Screws

- Threaded, rounded heads lock securely into the variable angle locking holes
- Color coded for easier identification
- T8 StarDrive™ Recess
- Self-tapping tip

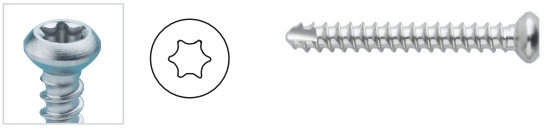
2.7 mm Locking Screws

- Only for axial insertion in the variable angle locking holes
- Threaded, rounded conical head locks securely into the variable angle locking holes
- T8 StarDrive Recess
- Self-tapping tip



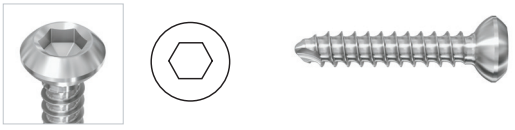
2.4 mm Cortex Screws

- Can be used in variable angle holes to compress the plate to the bone
- Self-tapping tip



2.7 mm Cortex Screws

- Can be used in variable angle holes
- Used to provide compression or neutral fixation
- Self-tapping tip



*Bench tests do not necessarily reflect clinical performance.

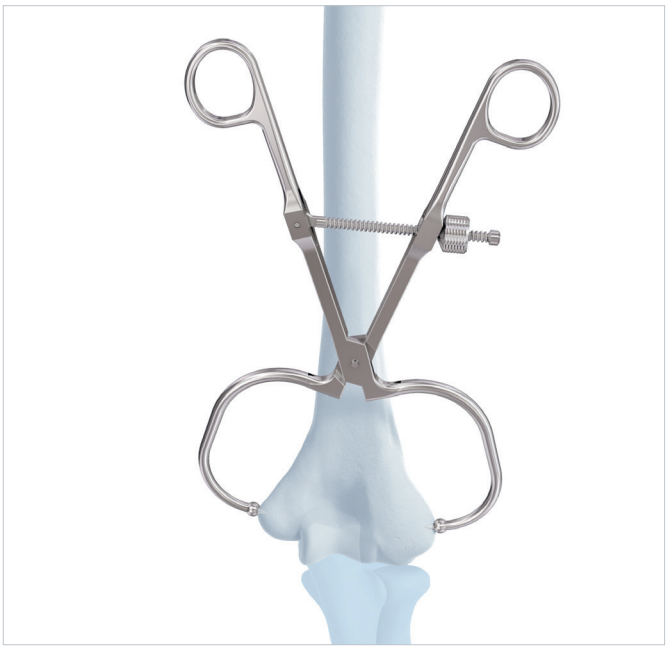
Two Forceps to Aid in Reduction/Compression

Straight/Curved Reduction Forceps

- 2.5 mm drill bit is used to create a small hole in the shaft to accommodate the straight tip of the forceps
- Curved tip will engage tip of olecranon to allow placement of the plate while holding reduction

Periarticular Reduction Forceps, 6.5 mm ball and pointed tip, small

- Appropriately sized for distal humerus reduction, among other fractures
- Curved tips allow access to and visualization of distal humerus while holding reduction



The AO Principles of Fracture Management

Mission

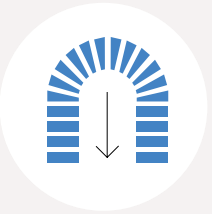
The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

AO Principles[1,2]

1.

Fracture reduction and fixation to restore anatomical relationships.

2.



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

3.

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

4.

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

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

Indications

The DePuy Synthes Variable Angle LCP Elbow System is intended for fixation of fractures of the distal humerus, olecranon, and ulna in adults and adolescents (12-21) in which the growth plates have fused.

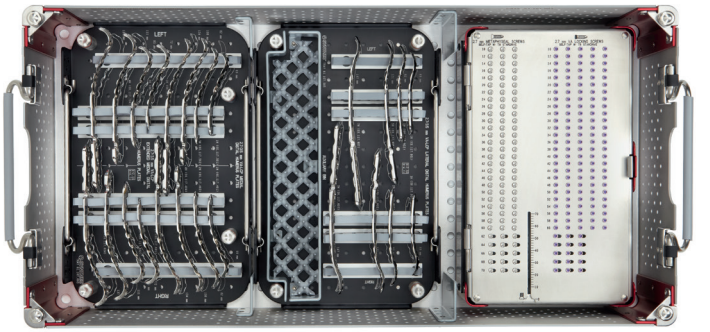
Specifically,

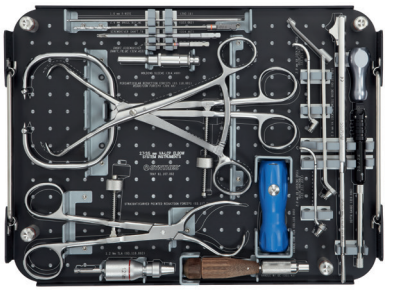
- Distal humerus plates are indicated for intra-articular fractures, comminuted supracondylar fractures, osteotomies, malunions, and nonunions of the distal humerus
- Olecranon and proximal ulna plates are indicated for fractures, osteotomies, malunions, and nonunions of the olecranon and proximal ulna

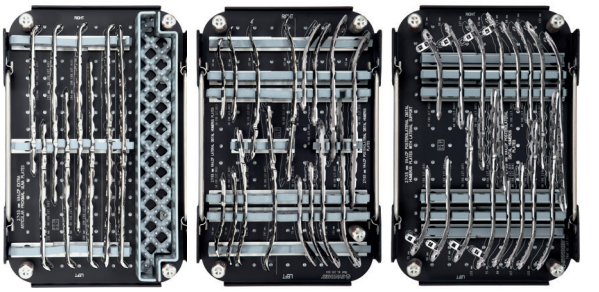
Parallel Distal Humerus Plating Preparation

Required sets

01.107.002 /	2.7 mm / 3.5 mm Variable Angle LCP Elbow
01.107.004	Instrument and Implant Set (stainless steel or titanium)
or	
01.107.006	2.7 mm / 3.5 mm Variable Angle LCP Elbow Instrument and Implant Set – Compact
105.434 / 145.434	Small Fragment LCP Instrument and Implant Set, with self-tapping screws (stainless steel or titanium)





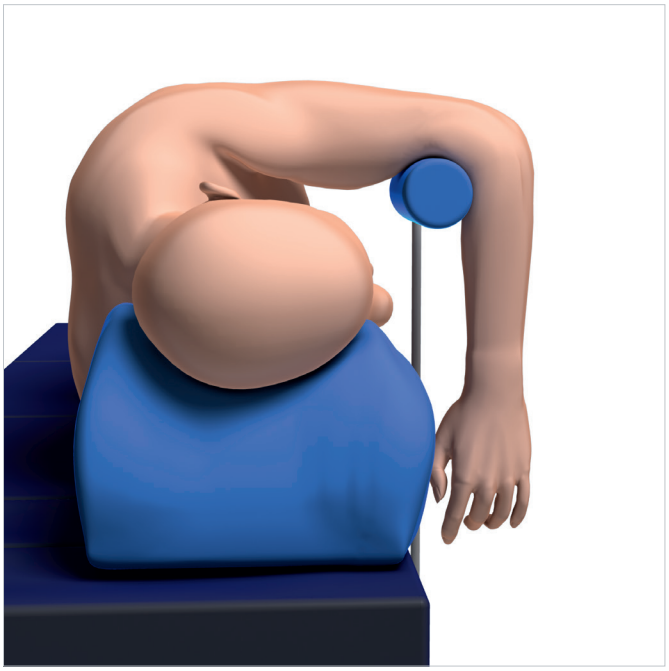


1. Position patient

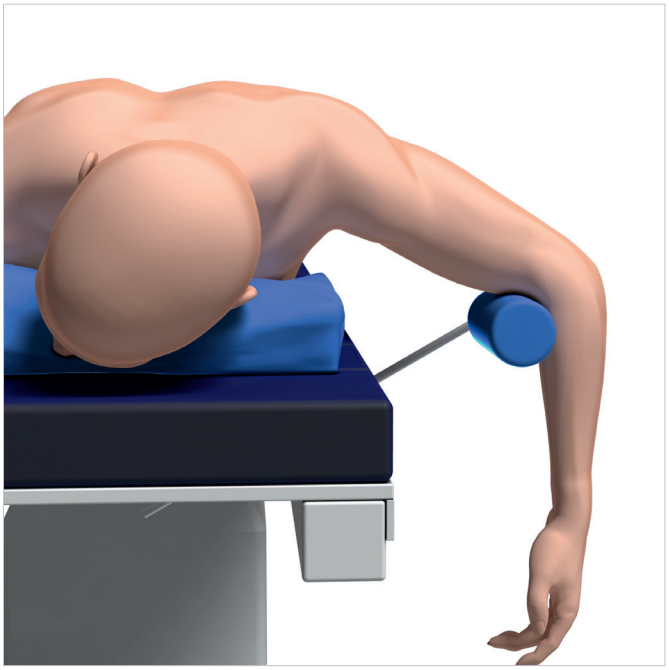
The lateral decubitus position is usually chosen.

The fully prone position can be used if the patient is otherwise fit.

The arm is rested on a padded bar allowing elbow flexion of 120°.



Lateral decubitus



Fully prone

2. Approach

Fractures are approached through a slightly curved posterior incision just radial to the olecranon.

After creating full thickness subcutaneous flaps, the ulnar nerve is identified and protected throughout the procedure. Depending on the fracture configuration, the ulnar nerve may remain in the cubital tunnel region or be transposed to the anterior subcutaneous tissue.

For direct fracture exposure, the triceps may be split longitudinally, reflected to either side, or an olecranon osteotomy may be used. The innervation from the radial nerve to the triceps and anconeus muscle should be respected during these approaches. The choice of triceps management and the necessity of an osteotomy depends on the fracture type, the amount of anterior exposure necessary and associated soft-tissue conditions.

3. Reduce fracture and provide temporary fixation

- Use K-wires and/or pointed reduction forceps under image intensification. Temporarily fix the distal block to the shaft using K-wires and/or forceps to ensure that the anatomy of the distal humerus is restored. Ensure that K-wires or forceps will not interfere with subsequent plate placement. If necessary, reduce the articular surface using lag screws.

4. Determine plate length

Choose plate lengths that offer sufficient fixation proximal to the fracture line. To help prevent extensive diaphyseal stress, it is recommended that the medial and lateral plates are not the same length. For example, use a short medial plate with a medium lateral plate.

■ Note:

To achieve sufficient stability for early mobilization, use the two-plate technique.

Lateral Plate Insertion

1. Bend plate

Instruments	
329.04/ 329.05	Bending Irons, for 2.7 mm and 3.5 mm Plates
329.16	Bending Pliers, for 2.7 mm and 3.5 mm Plates
or	
329.29	Bending Pliers, for 2.7 mm and 3.5 mm Reconstruction Plates

Optional Instruments	
329.291	Bending Pliers, 227 mm length, for 3.5 mm Clavicle Plates
329.30	Plate-Bending Press

Due to varying patient anatomy, slight bending may be necessary for the plates. Contour plates as needed using the bending irons. Alternatively, bending pliers may be used.

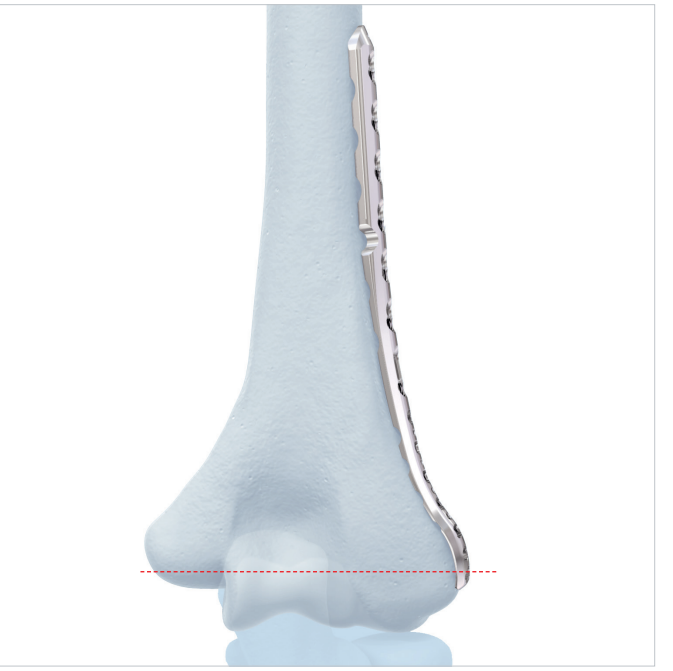
▲ Precautions:

- **When contouring the plate around the axis of the undercuts, contour the plate precisely at the level of the undercuts to avoid deformation of the plate holes.**
- **When contouring the plate around the axis of the reconstruction notches, contour the plate precisely at the level of the notches to avoid deformation of the plate holes.**

2. Determine lateral plate placement

■ Note:

Position the plate on the lateral ridge of the distal humerus. The most distal screw hole should lay on the anatomical joint axis.



3. Secure plate to bone

Determine combination of screws to be used for fixation. If a combination of locking and cortex screws will be used, cortex screws should be inserted first to ensure that the plate has appropriate bone contact.

■ Note:

To secure the plate to the bone prior to locking screw insertion, it is recommended to pull the plate to the bone using a cortex screw. The 2.7 mm metaphyseal screw may also be used in the metaphyseal portion of the plate. Refer to page 18.

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
314.03	Small Hexagonal Screwdriver Shaft
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide

After reducing the fracture, apply the plate and insert a 3.5 mm cortex screw through the DCU portion of the elongated Combi hole. 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 nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screw using a small hexagonal screwdriver.

Insert the screw using the small hexagonal screwdriver for manual insertion or the small hexagonal screwdriver shaft with a power drive or a handle.

Insert Distal Screws

1. Insert 2.7 mm metaphyseal screws (optional)

■ Note:

Insert metaphyseal screws prior to locking screws to ensure appropriate bone contact with the plate. Using variable angle drilling and the presence of another plate can increase the risk of drill and screw collisions.

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm, quick coupling
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm Cortex Screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

Variable angle

Nominal angle

The 2.7 mm metaphyseal screws can be inserted into the metaphyseal portion of the lateral plates to pull the plate to the bone. To insert the metaphyseal screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.

Variable angle drilling

Insert the variable angle locking drill guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the drill guide to drill holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Nominal angle drilling

The drill guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the drill guide ensures that the drill bit follows the nominal trajectory of the locking hole.

■ Note:

When drilling, the tip of the drill guide should remain fully seated in hole.

Remove the drill guide and use the depth gauge to measure for screw length.

When inserting the 2.7 mm metaphyseal screw, we recommend using the 1.2 Nm torque limiting attachment. The 2.7 mm metaphyseal screw can be inserted manually or with power. For power insertion, use the T8 StarDrive Screwdriver shaft attached to the 1.2 Nm torque limiting attachment. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for StarDrive Screwdriver shaft, if necessary.

▲ Precaution:

Carefully tighten the metaphyseal compression screws 2.7 mm by hand as with conventional cortical screws in order to prevent the screw thread stripping out of the bone.

■ Note:

When using the universal VA drill guide inserting the screw at the nominal angle will ensure lowest possible profile construct.

2. Insert 2.7 mm variable angle locking screws

▲ Precautions:

- The use of variable angle screws in close proximity to another plate increases the risk of drill and screw collisions.
- Do not use a threaded drill guide in the variable angle locking holes, as it could damage the threads in the hole.
- If using 2.7 mm locking screws (non-VA), use the 2.0 mm Universal Variable Angle Locking Drill Guide and always drill and insert screws at the nominal angle.
- Always use the torque limiter to restrict the maximum torque.

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

The 2.7 mm variable angle locking screws can be inserted into the metaphyseal portion of the plates. To insert the variable angle screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.

Variable angle drilling

Insert the variable angle locking drill guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the drill guide to drill holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Nominal angle drilling

The drill guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the drill guide ensures that the drill bit follows the nominal trajectory of the locking hole.

■ Note:

When drilling, the tip of the drill guide should remain fully seated in hole.

▲ Precautions:

- **Do not angulate more than 15° from the central axis of the screw hole.**
- **Screws can only be removed and inserted at different angles prior to final tightening with the 1.2 Nm torque limiter.**

Variable angle

Nominal angle

■ Note:

Use the 2.0 mm universal variable angle locking drill guide to insert 2.7 mm locking screws. Always drill and insert at nominal angle.

Remove the drill guide and use the depth gauge to measure for screw length.

The 2.7 mm variable angle locking screw can be inserted manually or with power. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for the StarDrive Screwdriver shaft, if necessary. Initial insertion of the variable angle locking screws may be done using power equipment. Do not lock the screws with power tools. Confirm screw position and length prior to final tightening. Final tightening must be done manually using the 1.2 Nm torque limiting attachment.

■ Note:

Do not use the torque limiting attachment for screw removal.

▲ Precautions:

- **Ensure that the screws do not protrude in the articular surface of the incisura trochlearis.**
- **Do not engage the screw head with the plate hole while inserting with power. Screw engagement and final locking must be done manually with the 1.2 Nm torque limiting attachment.**

Medial Plate Insertion

1. Determine placement of medial plate or extended medial plate

Position the medial plate on the medial ridge slightly dorsal to the intermuscular septum. The extended medial plate will wrap around the medial epicondyle.

Distal release of the medial intermuscular septum may be necessary in order to achieve optimal position of the medial plate.

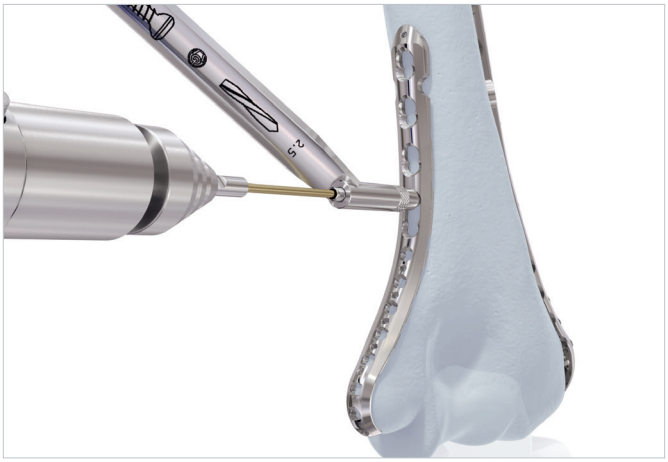
Metaphyseal screws should reach as far as possible into the bone. Choose a plate position that allows the longest possible screws. If necessary, bend the metaphyseal part of the plate to ensure optimal position of the long screws through the articular block.

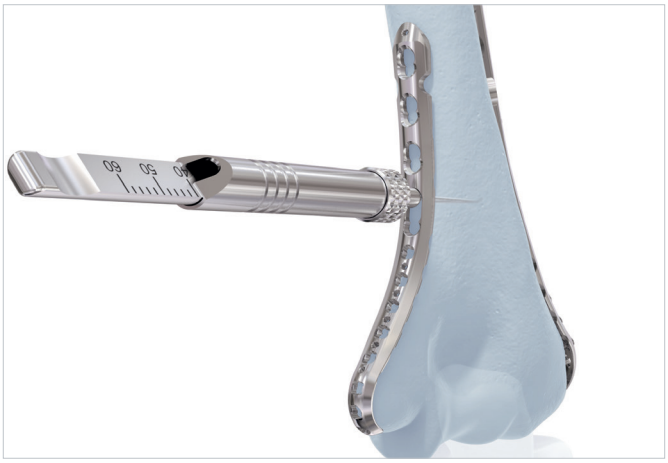
Medial

Extended medial

2. Preliminary plate fixation

After fracture is reduced, apply plate to the bone and insert a self-tapping 3.5 mm cortex screw through the DCU portion of the elongated Combi hole (see page 16).

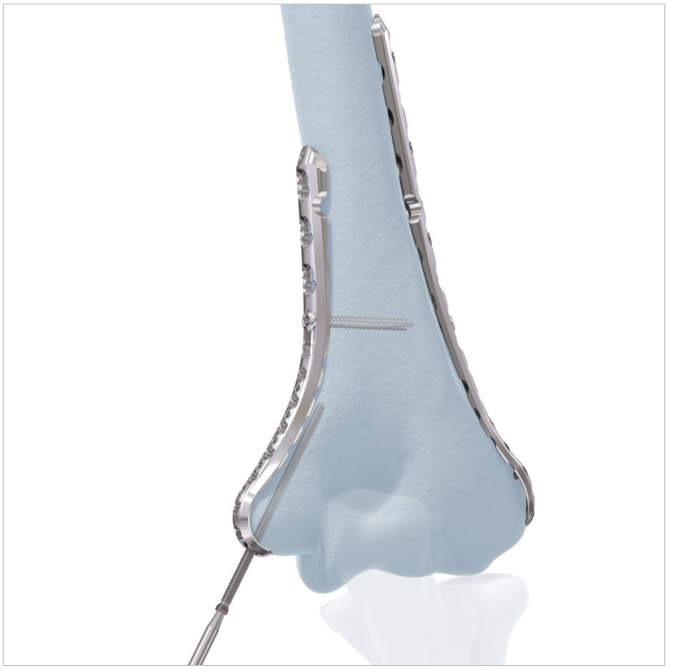




Insert Distal Screws in Medial Plate

1. Fixation with 2.7 mm metaphyseal screws and/or 2.7 mm variable angle locking screws

Use a similar procedure to the lateral plate for variable angle locking and / or metaphyseal screw insertion (see page 18 for details).



Notes:

- When inserting screws distally in the extended medial distal humerus plate, it is recommended to insert the most distal screw first to avoid collision with other screws.
- Careful drilling is necessary, as interference with screws in the lateral plate is possible. In case of interference, stop drilling and use an appropriate length screw or choose a different screw trajectory.

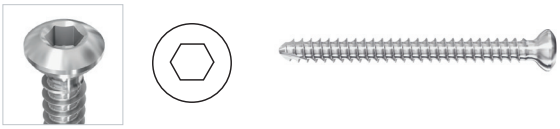
Insert Screws in Plate Shaft

1. Fixation with 3.5 mm cortex screws and/or 3.5 mm locking screws

Instruments

310.25	2.5 mm Drill Bit, quick coupling, 110 mm, gold
310.288	2.8 mm Drill Bit, quick coupling
312.648	2.8 Threaded Drill Guide
314.02 or 311.43	Small Hexagonal Screwdriver with Holding Sleeve Handle with quick coupling
314.03	Small Hexagonal Screwdriver Shaft
314.115	StarDrive Screwdriver Shaft, T15, self-retaining
314.116	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide
511.770	Torque limiting Attachment, 1.5 Nm
511.773	Torque limiting Attachment, 1.5 Nm, quick coupling

After fixing the metaphyseal portion of the lateral and medial plates, determine where locking or cortex screws will be used in the shaft of either plate.



3.5 mm Cortex Screws, self tapping

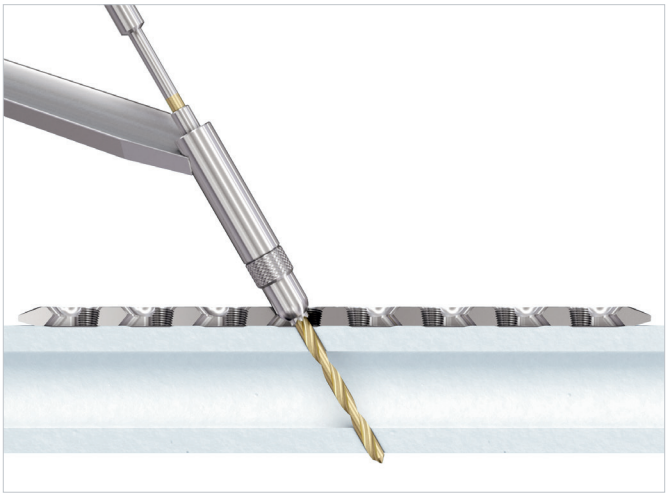
3.5 mm Locking Screws, self tapping

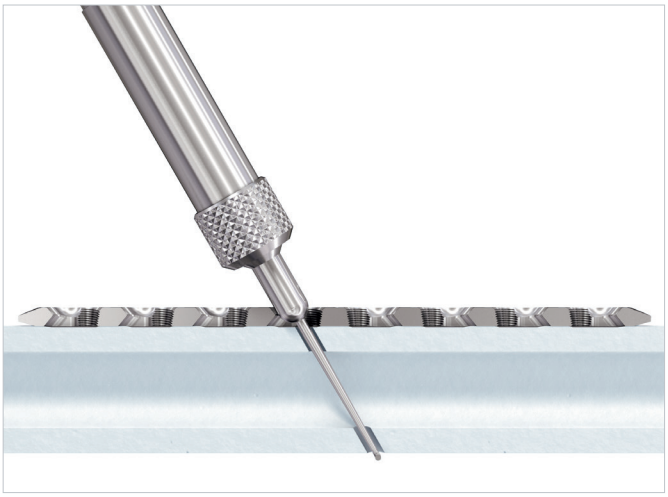
3.5 mm cortex screws

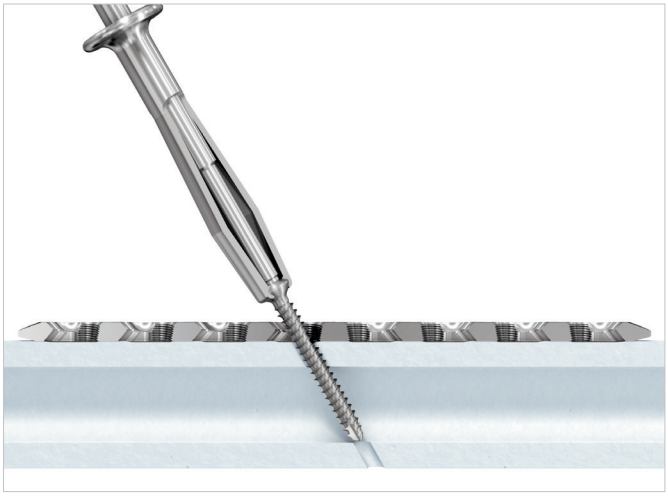
Use the 2.5 mm drill bit through the 3.5 mm universal drill guide to predrill the bone. For the neutral position, press the drill guide down in the nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screwusing a small hexagonal screwdriver.



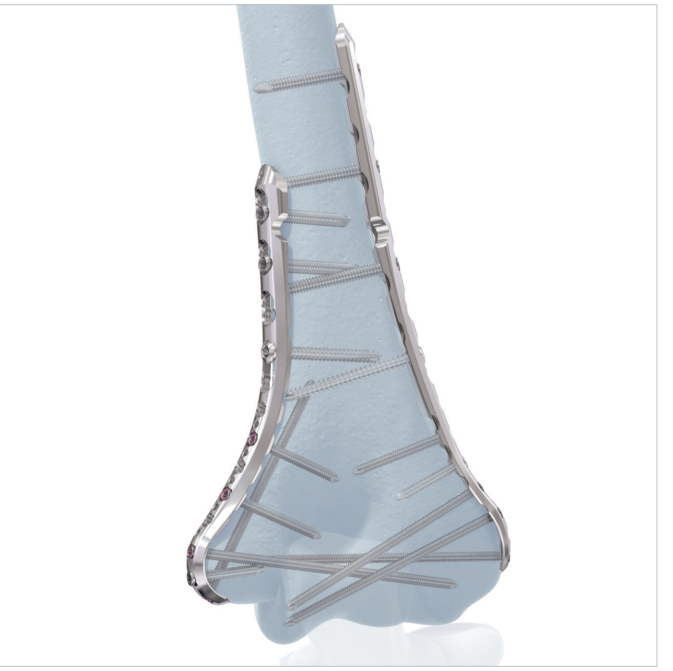




3.5 mm locking screws

Use the 2.8 mm drill bit through the 2.8 mm threaded guide. Remove threaded drill guide and measure using the depth gauge to determine screw length.

Select and insert the appropriate length 3.5 mm locking screw using the StarDrive Screwdriver shaft and the TLA.



■ Note:

Thoroughly irrigate the wound prior to closure. Locking screws can be inserted manually or with power. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for the StarDrive Screwdriver shaft, if necessary. Initial insertion of the locking screws may be done using power equipment. Do not lock the screws with power tools. Confirm screw position and length prior to final tightening. Final tightening must be done manually using the 1.5 Nm torque limiting attachment.

▲ Precaution:

Do not engage the screw head with the plate hole while inserting with power. Screw engagement and final locking must be done manually with the 1.5 Nm torque limiting attachment.

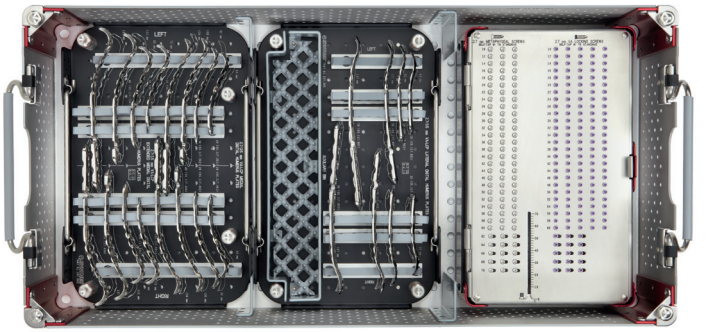
■ Note:

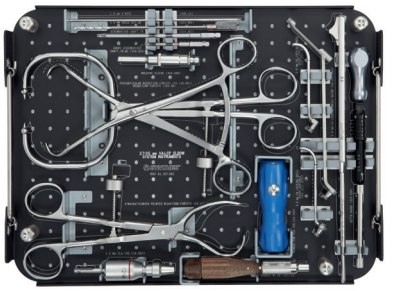
Do not use the torque limiting attachment for screw removal.

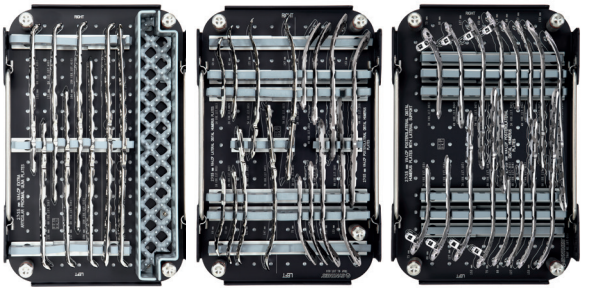
Perpendicular Distal Humerus Plating Preparation

Required sets

01.107.002/ 01.107.004	2.7 mm / 3.5 mm Variable Angle LCP Elbow Instrument and Implant Set (stainless steel or titanium)
or 01.107.006	2.7 mm / 3.5 mm VA LCP Elbow Instrument and Implant Set – Compact
105.434/ 145.434	Small Fragment LCP Instrument and Implant Set, with self-tapping screws (stainless steel or titanium)





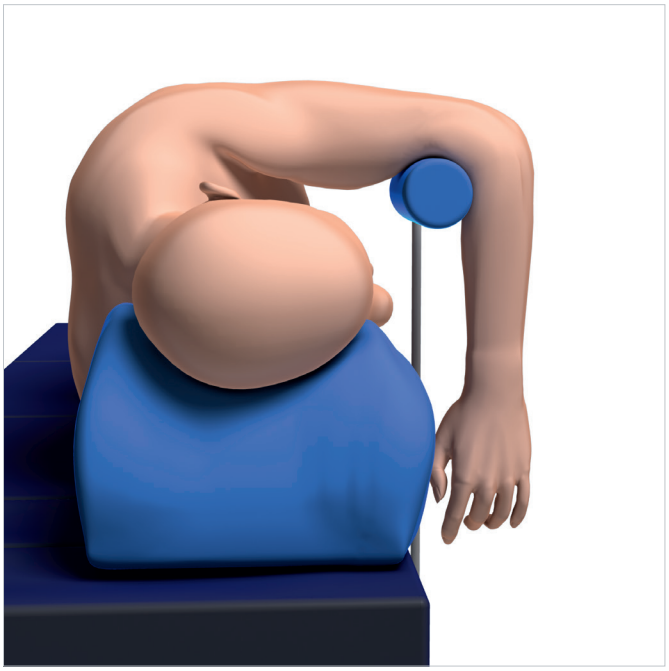


1. Position patient

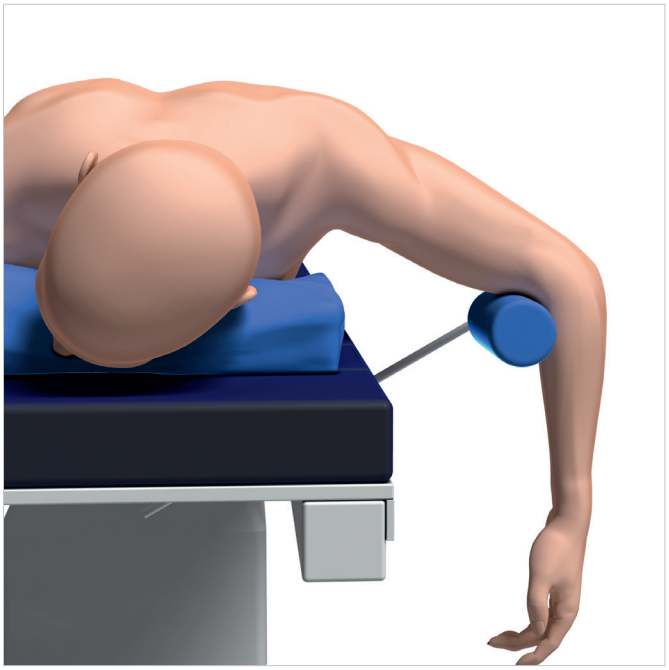
The lateral decubitus position is usually chosen.

The fully prone position can be used if the patient is otherwise fit.

The arm is rested on a padded bar allowing elbow flexion of 120°.



Lateral decubitus



Fully prone

2. Approach

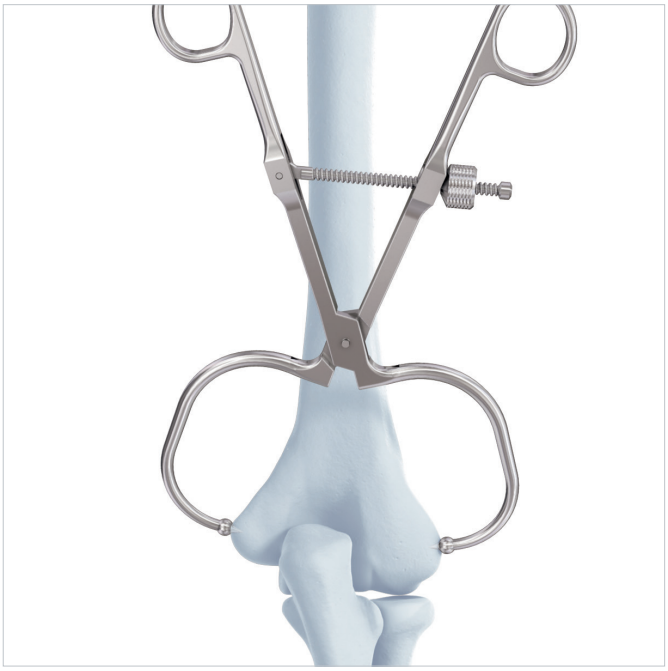
Fractures are approached through a slightly curved posterior incision just radial to the olecranon.

After creating full thickness subcutaneous flaps, the ulnar nerve is identified and protected throughout the procedure. Depending on the fracture configuration, the ulnar nerve may remain in the cubital tunnel region or be transposed to the anterior subcutaneous tissue.

For direct fracture exposure, the triceps may be split longitudinally, reflected to either side, or an olecranon osteotomy may be used. The innervation from the radial nerve to the triceps and anconeus muscle should be respected during these approaches. The choice of triceps management and the necessity of an osteotomy depends on the fracture type, the amount of anterior exposure necessary and associated soft-tissue conditions.

3. Reduce fracture and provide temporary fixation

Use K-wires and / or pointed reduction forceps under image intensification. Temporarily fix the distal block to the shaft using K-wires and/or forceps to ensure that the anatomy of the distal humerus is restored. Ensure that K-wires or forceps will not interfere with subsequent plate placement. If necessary, reduce the articular surface using lag screws.



4. Determine plate length

Choose plate lengths that offer sufficient fixation proximal to the fracture line. To prevent extensive diaphyseal stress, it is recommended that the medial and lateral plates are not the same length. For example, use a short medial plate with a medium posterolateral plate.

Note:

To achieve sufficient stability for early mobilization, use the two-plate technique.

Posterolateral Plate Insertion

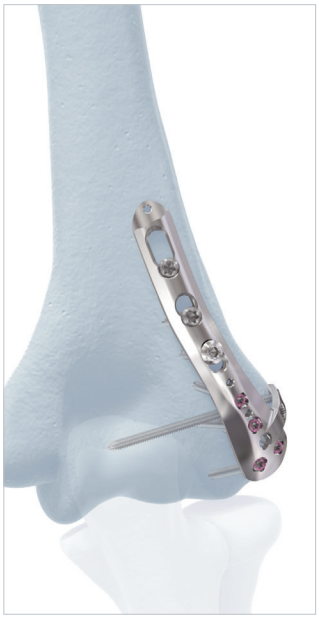
1. Select 2.7 mm/3.5 mm VA LCP Posterolateral Plate with or without lateral support

For the posterolateral side, choose the type of implant to be used. The posterolateral plates allow screw insertion in a posterior-anterior direction. The plate with lateral support allows additional screw insertion through the lateral epicondyle in a lateral-medial direction.

Notes:

- On very small humeri, the support may protrude extensively over the lateral epicondyle, in which case the use of the plate without lateral support is recommended
- When using the posterolateral plate without lateral support, it is important to reduce and fix the distal block with lag screws according to the AO Principles of Fracture Management.

Posterolateral plate



Posterolateral plate with lateral support

2. Bend plate

Instruments	
329.04/ 329.05	Bending Irons, for 2.7 mm and 3.5 mm Plates
329.16	Bending Pliers, for 2.7 mm and 3.5 mm Plates
or	
329.29	Bending Pliers, for 2.7 mm and 3.5 mm Reconstruction Plates
Optional Instruments	
329.291	Bending Pliers, 227 mm length, for 3.5 mm Clavicle Plates
329.30	Plate-Bending Press

Due to varying patient anatomy, slight bending may be necessary for the plates. Contour plates as needed using the bending irons. Alternatively, bending pliers may be used.

▲ Precaution:

Contour the plate precisely at the level of the undercuts or reconstruction notches to avoid deformation of the plate holes.

3. Determine posterolateral plate placement

Position the plate on the posterolateral aspect of the distal humerus with the distal spoon-shape portion covering the nonarticulating part of the capitulum and with the lateral support extending over the most protruding tip of the lateral epicondyle, just proximal to the lateral collateral ligament insertion. Ensure that the shaft portion is positioned at a safe distance from the olecranon fossa.

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

4. Secure plate to bone

Determine the combination of screws to be used for fixation. If a combination of locking and cortex screws will be used, cortex screws should be inserted first to ensure that the plate has appropriate bone contact.

■ Note:

To secure the plate to the bone prior to locking screw insertion, it is recommended to pull the plate to the bone using a cortex screw. The 2.7 mm metaphyseal screw may also be used in the metaphyseal portion of the plate. Refer to page 39.

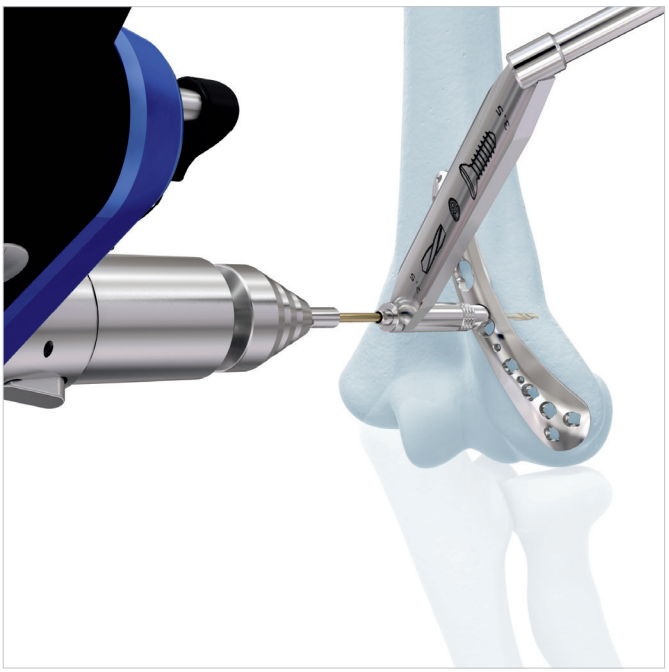
Instruments	
310.25	2.5 mm Drill Bit, quick coupling 110 mm, gold
314.02 or 311.43	Small Hexagonal Screwdriver, with Holding Sleeve Handle with quick coupling
314.03	Small Hexagonal Screwdriver Shaft
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide

After reducing the fracture, apply the plate and insert a 3.5 mm cortex screw through the DCU portion of the elongated Combi hole. 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 nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screw using a small hexagonal screwdriver.

Insert the screw using the small hexagonal screwdriver for manual insertion of the small hexagonal screwdriver shaft with a power drive or a handle.



■ Note:

Do not completely tighten the screws.

Insert Distal Screws in Posterolateral Plate

1. Insert 2.7 mm metaphyseal screws (optional)

■ Note:

Insert metaphyseal screws prior to locking screws to ensure appropriate bone contact with the plate. Using variable angle drilling and the presence of another plate can increase the risk of drill and screw collisions.

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm, quick coupling
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm Cortex Screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

The 2.7 mm metaphyseal screws can be inserted into the metaphyseal portion of the lateral plates to pull the plate to the bone. To insert the metaphyseal screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.

Variable angle drilling

Insert the variable angle locking drill guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the drill guide to drill holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Nominal angle drilling

The drill guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the drill guide ensures that the drill bit follows the nominal trajectory of the locking hole.

■ Note:

When drilling, the tip of the drill guide should remain fully seated in hole.

Remove the drill guide and use the depth gauge to measure for screw length.

When inserting the 2.7 mm metaphyseal screw, we recommend using the 1.2 Nm torque limiting attachment. The 2.7 mm metaphyseal screw can be inserted manually or with power. For power insertion, use the T8 StarDrive Screwdriver shaft attached to the 1.2 Nm torque limiting attachment. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for StarDrive Screwdriver shaft, if necessary.

▲ Precaution:

Carefully tighten the metaphyseal compression screws 2.7 mm by hand as with conventional cortical screws in order to prevent the screw thread stripping out of the bone.

■ Note:

When using the universal VA drill guide inserting the screw at the nominal angle will ensure lowest possible profile construct.

2. Insert 2.7 mm variable angle locking screws

▲ Precautions:

- The use of variable angle in close proximity to another plate increases the risk of drill and screw collisions.
- Do not use a threaded drill guide in the variable angle locking holes, as it could damage the threads in the hole.
- If using 2.7 mm locking screws (non-VA), use the 2.0 mm Universal Variable Angle Locking Drill Guide and always drill and insert screws at the nominal angle.
- Always use the torque limiter to restrict the maximum torque.

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

The 2.7 mm variable angle locking screws can be inserted into the metaphyseal portion of the plates. To insert the variable angle screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.

Variable angle drilling

Insert the variable angle locking Drill Guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the Drill Guide to drill holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Nominal angle drilling

The Drill Guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the Drill Guide ensures that the drill bit follows the nominal trajectory of the locking hole.

■ Note:

When drilling, the tip of the Drill Guide should remain fully seated in hole.

Remove the drill guide and use the depth gauge to measure for screw length.

▲ Precautions:

- **Do not angulate more than 15° from the central axis of the screw hole.**
- **Screws can only be removed and inserted at different angles prior to final tightening with the 1.2 Nm torque limiter.**

Variable angle

Nominal angle

The 2.7 mm variable angle locking screw can be inserted manually or with power. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for the StarDrive Screwdriver shaft, if necessary. Initial insertion of the variable angle locking screws may be done using power equipment. Do not lock the screws with power tools. Confirm screw position and length prior to final tightening. Final tightening must be done manually using the 1.2 Nm torque limiting attachment.

▲ Precaution:

Do not engage the screw head with the plate hole while inserting with power. Screw engagement and final locking must be done manually with the 1.2 Nm torque limiting attachment

■ Notes:

- Do not use the torque limiting attachment for screw removal
- Use the 2.0 mm universal variable angle locking drill guide to insert 2.7 mm locking screws. Always drill and insert at nominal angle.

▲ Precaution:

Ensure that the screws do not protrude in the articular surface of the incisura trochlearis.

Medial Plate Insertion

1. Determine placement of medial plate or extended medial plate

Position the medial plate on the medial ridge slightly dorsal to the intermuscular septum. The extended medial plate will wrap around the medial epicondyle.

Distal release of the medial intermuscular septum may be necessary in order to achieve optimal position of the medial plate.

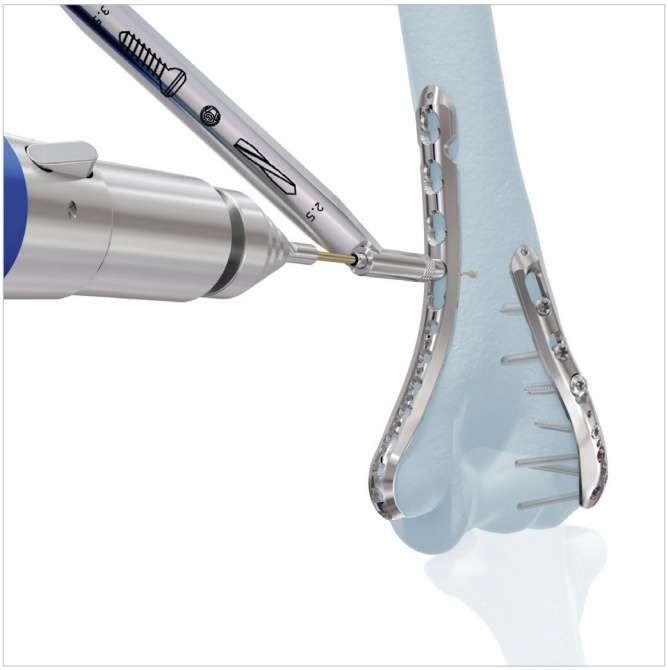
Metaphyseal screws should reach as far as possible into the bone. Choose a plate position that allows the longest possible screws. If necessary, bend the metaphyseal part of the plate to ensure optimal position of the long screws through the articular block.

Medial

Extended medial

2. Preliminary fixation of plate to bone

After reducing the fracture, apply the plate and insert a self-tapping 3.5 mm cortex screw through the DCU portion of the elongated Combi hole (see page 37).



Insert Distal Screws in Medial Plate

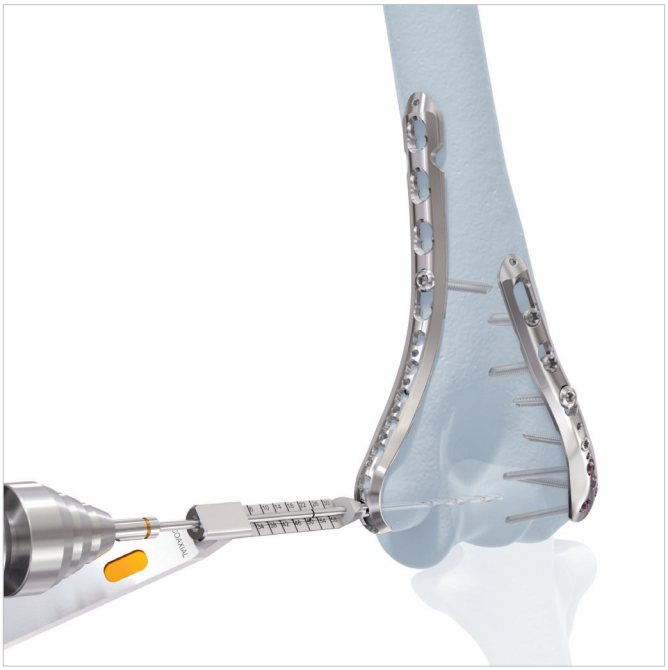
1. Fixation using 2.7 mm metaphyseal screws and/or 2.7 mm variable angle locking screws

Use a similar procedure to the posterolateral plate for locking and/or metaphyseal screw insertion (see page 39 for details).

Notes:

- When inserting screws distally in the extended medial distal humerus plate, insert the most distal screw first to avoid collision with other screws.
- Careful drilling is necessary, as interference with screws in the posterolateral plate is possible. In case of interference, stop drilling and use an appropriate length screw or choose a different screw trajectory.

Use of the torque limiting attachment provides consistent insertion torque to provide uniform plate-screw interface.



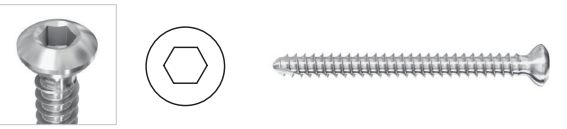
Insert Screws in Plate Shaft

1. Fixation using 3.5 mm cortex screws and/or 3.5 mm locking screws

Instruments

310.25	2.5 mm Drill Bit, quick coupling, 110 mm, gold
310.288	2.8 mm Drill Bit, quick coupling
312.648	2.8 Threaded Drill Guide
314.02 or 311.43	Small Hexagonal Screwdriver with Holding Sleeve Handle with quick coupling
314.03	Small Hexagonal Screwdriver Shaft
314.115	StarDrive Screwdriver Shaft, T15, self-retaining
314.116	StarDrive Screwdriver Shaft, T15
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide
511.770	Torque limiting Attachment, 1.5 Nm
511.773	Torque limiting Attachment, 1.5 Nm, quick coupling

After fixing the metaphyseal portion of the posterolateral and medial plates, determine where locking or cortex screws will be used in the shaft of either plate.



3.5 mm Cortex Screws, self tapping

3.5 mm Locking Screws, self tapping

3.5 mm cortex screws

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 nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screw using a small hexagonal screwdriver.

3.5 mm locking screws

Use the 2.8 mm drill bit through the 2.8 mm threaded guide. Remove threaded drill guide and measure using the depth gauge to determine screw length.

Select and insert the appropriate length 3.5 mm locking screw using the StarDrive Screwdriver shaft and the TLA.

■ Note:

Thoroughly irrigate the wound prior to closure.

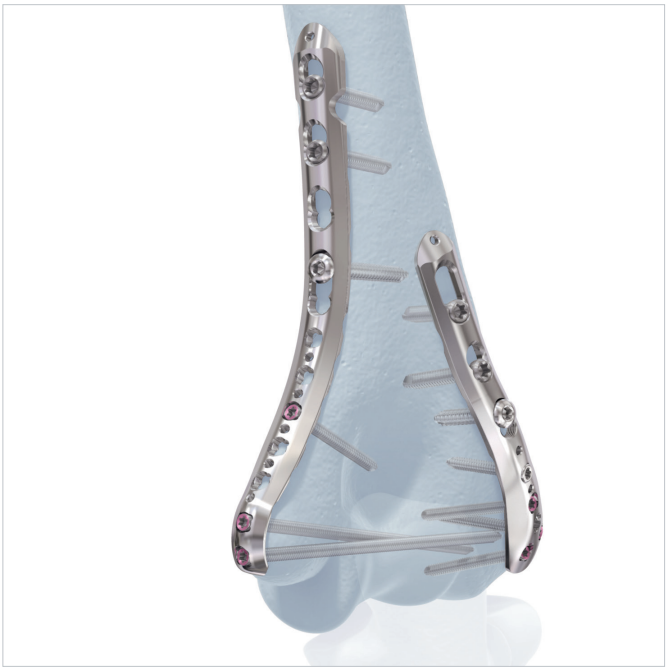
Locking screws can be inserted manually or with power. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for the StarDrive Screwdriver shaft, if necessary. Initial insertion of the locking screws may be done using power equipment. Do not lock the screws with power tools. Confirm screw position and length prior to final tightening. Final tightening must be done manually using the 1.5 Nm torque limiting attachment.

▲ Precaution:

Do not engage the screw head with the plate hole while inserting with power. Screw engagement and final locking must be done manually with the 1.5 Nm torque limiting attachment.

■ Note:

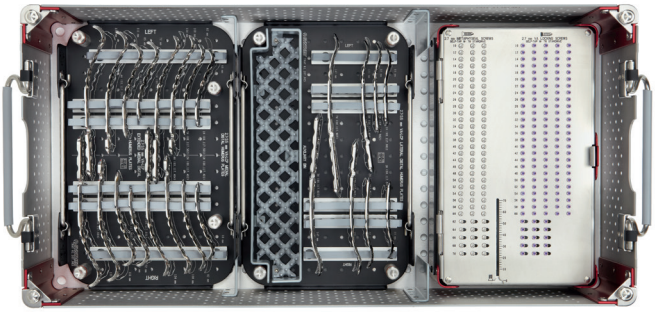
Do not use the torque limiting attachment for screw removal.

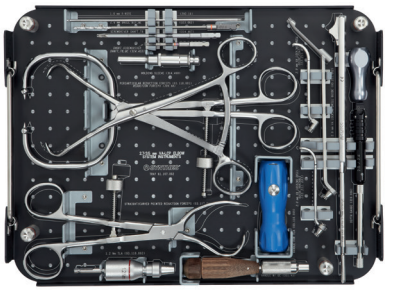


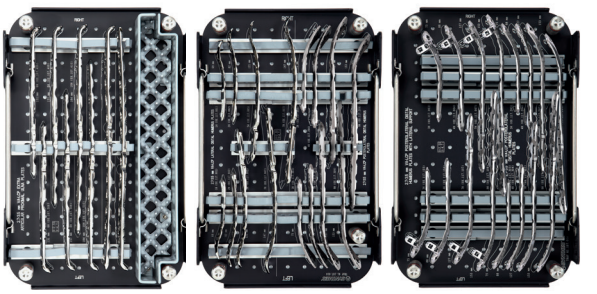
Olecranon Plating Preparation

Required sets

01.107.002/	2.7 mm / 3.5 mm Variable Angle LCP Elbow
01.107.004	Instrument and Implant Set (stainless steel or titanium)
or	
01.107.006	2.7 mm / 3.5 mm Variable Angle LCP Elbow Instrument and Implant Set – Compact
105.434 / 145.434	Small Fragment LCP Instrument and Implant Set, with self-tapping screws (stainless steel or titanium)



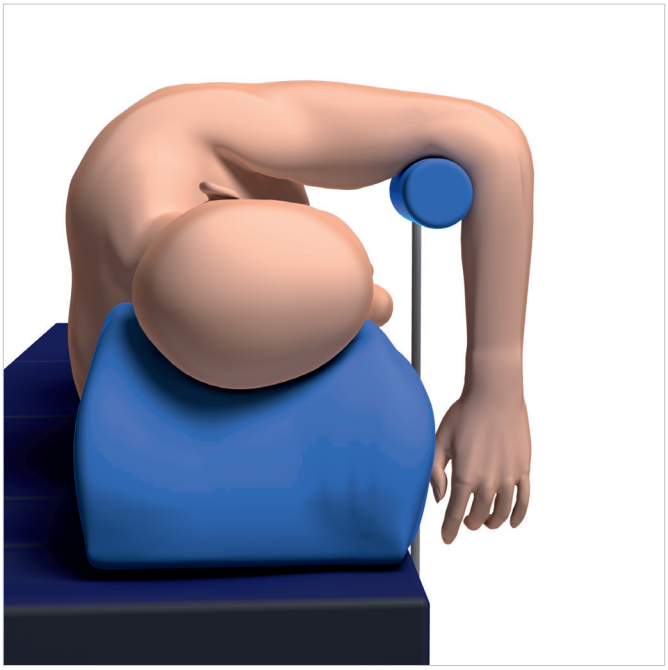




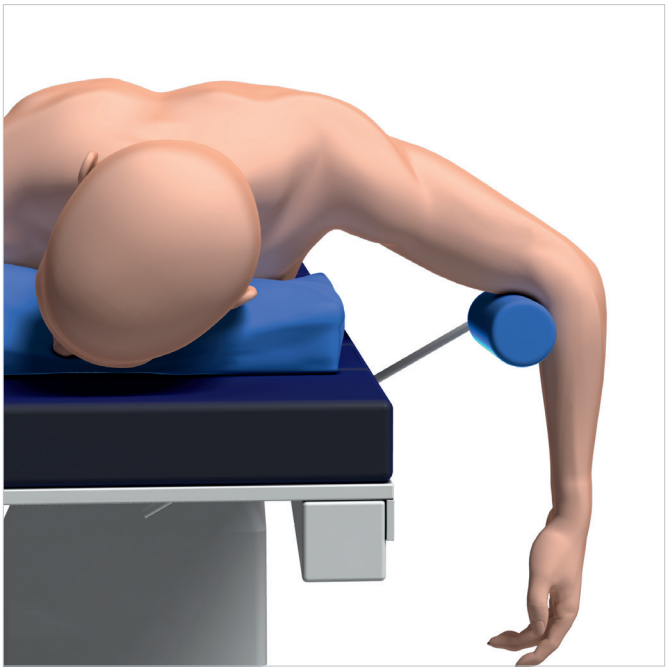
1. Position patient

Place the patient in either the lateral or the prone 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 also an acceptable option.



Lateral decubitus



Fully prone

2. Approach

Make an incision running posteriorly from the supracondylar area to a point 4 cm – 5 cm distal to the fracture. The incision may curve toward the ulnar or radial aspect depending on the exposure necessary.

For the proximal olecranon plate, the triceps must be split to apply the plate. The olecranon plate can be applied with or without splitting the triceps. For the extra-articular proximal ulna plate, triceps splitting is not necessary.

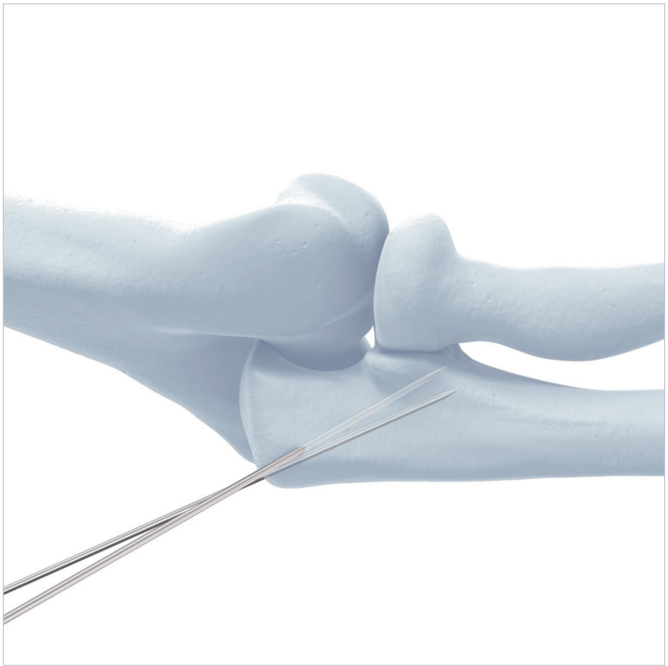
3. Reduce fracture and provide temporary fixation

Instrument	
03.117.998 Forceps	Straight / Curved Pointed Reduction
310.25	2.5 mm Drill Bit, quick coupling, 110 mm, gold

Reduce the fracture directly or indirectly depending on the type of fracture. Ensure that the coronoid is properly reduced before fixation.

Use Kirschner wires for temporary fixation.

Use the 2.5 mm drill bit to drill a small hole to accommodate the straight tip of the forceps.



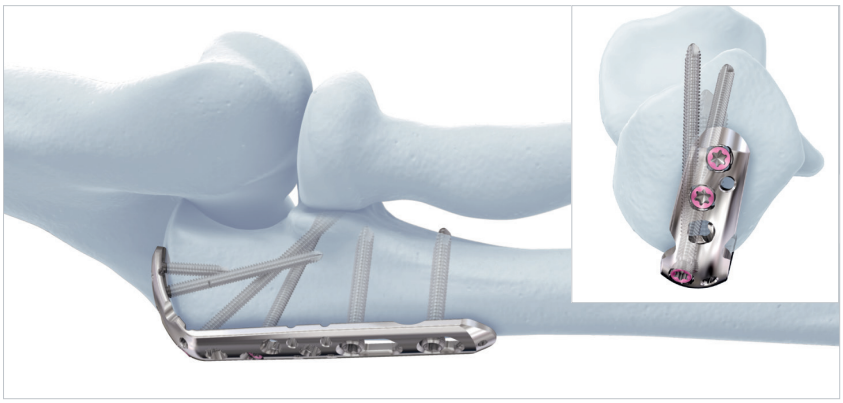
4. Determine plate length

Select the appropriate olecranon plate for the fracture.

Recommended Use for Olecranon Plates

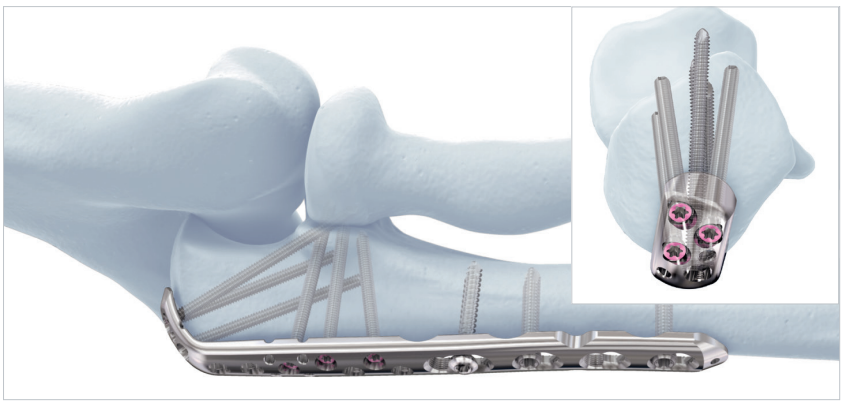
Proximal Olecranon Plate

For very proximal, short, comminuted avulsion type fractures (fractures that are above the coronoid)



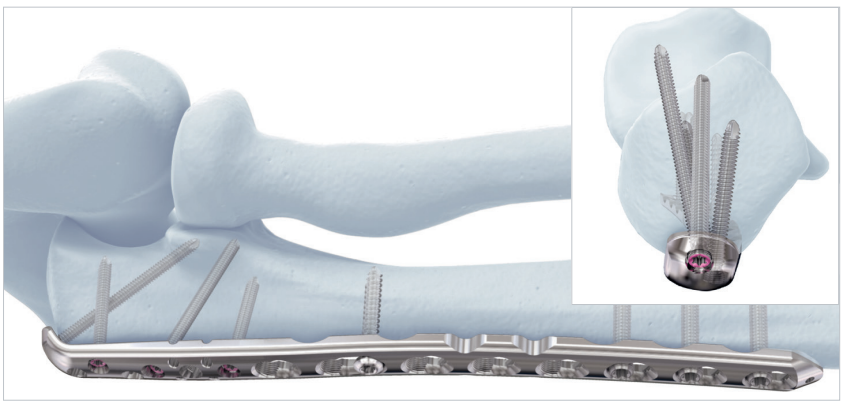
Olecranon Plate

For complex fractures involving the trochlear notch of ulna and coronoid



Extra-Articular Proximal Ulna Plate

For proximal ulna metaphyseal-diaphyseal fractures (fractures that are distal to the coronoid)



Olecranon Plate Insertion

1. Bend plate

Instruments	
329.04/ 329.05	Bending Irons, for 2.7 mm and 3.5 mm Plates
329.29	Bending Pliers, for 2.7 mm and 3.5 mm Reconstruction Plates
Optional Instruments	
329.291	Bending Pliers, 227 mm length, for 3.5 mm Clavicle Plates
329.30	Plate-Bending Press

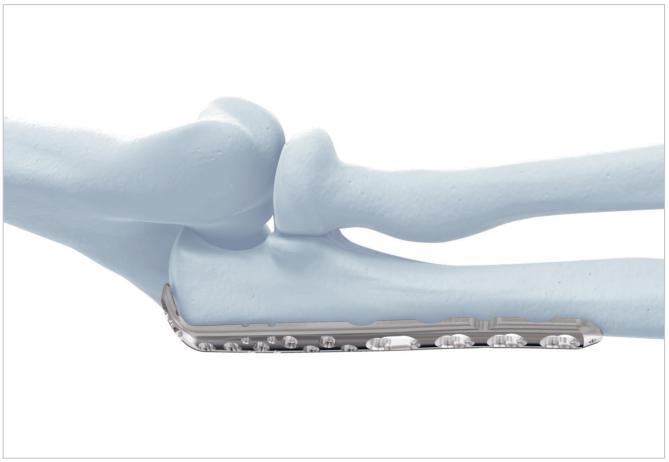
Due to varying patient anatomy, slight bending might be necessary. Using bending irons, contour plates as needed.

▲ Precaution:

Contour the plate precisely at the level of the undercuts or reconstruction notches to avoid deformation of the plate holes.

2. Secure plate to bone

Determine the combination of screws to be used for fixation. If a combination of locking and cortex screws will be used, insert cortex screws first to ensure that the plate has appropriate bone contact.



■ Note:

To secure the plate to the bone prior to locking screw insertion, it is recommended to pull the plate to the bone using a cortex screw. The 2.7 mm metaphyseal screw may also be used in the metaphyseal portion of the plate. Refer to page 58.

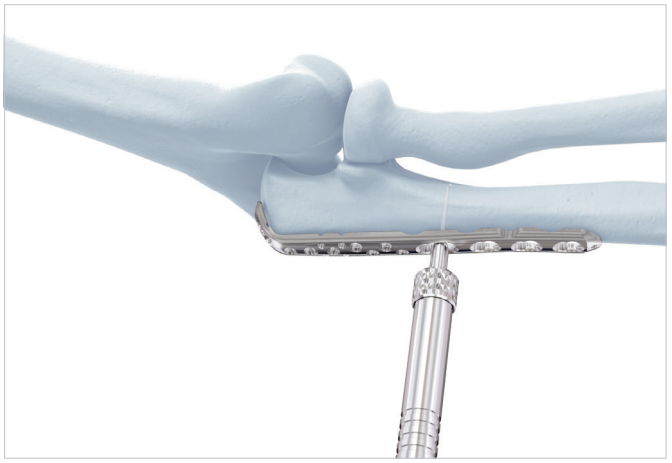
Instruments	
310.25	2.5 mm Drill Bit, quick coupling 110 mm, gold
314.02 or 311.43 314.03	Small Hexagonal Screwdriver, with Holding Sleeve Handle, with quick coupling with Small Hexagonal Screwdriver Shaft
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide

After reducing the fracture, apply the plate and insert a 3.5 mm cortex screw through the DCU portion of the elongated Combi hole. 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 nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screw using a small hexagonal screwdriver.

Insert the screw using the small hexagonal screwdriver for manual insertion or the small hexagonal screwdriver shaft with a power drive or a handle.



Insert Proximal Screws

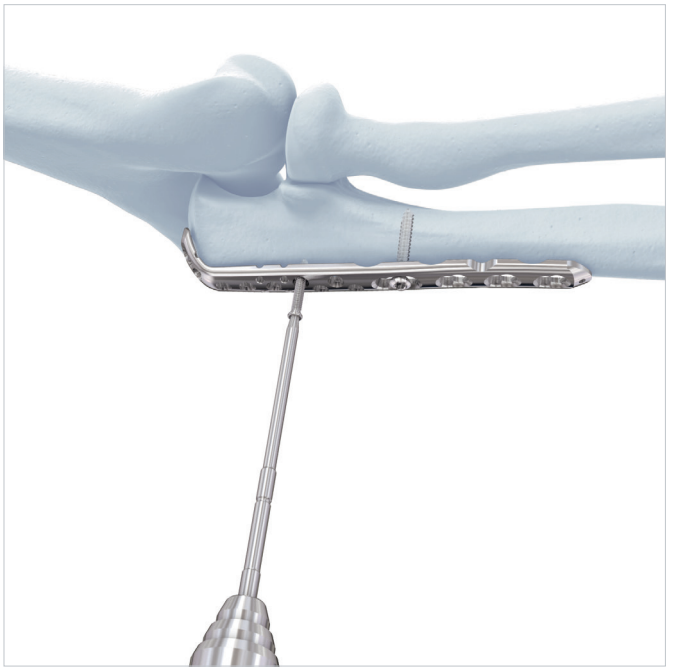
1. Insert 2.7 mm metaphyseal screws (optional)

Notes:

- Insert metaphyseal screws first, prior to locking screws, to ensure the plate has appropriate bone contact
- Using variable angle can increase the risk of drill and screw collisions

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

The 2.7 mm metaphyseal screws can be inserted into the proximal portion of the olecranon plates to pull the plate to the bone. To insert the metaphyseal screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.



Variable angle drilling

Insert the variable angle locking drill guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the drill guide to drill variable angle holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Variable angle

Nominal angle drilling

The drill guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the drill guide ensures that the drill bit follows the nominal trajectory of the locking hole.

■ Note:

When drilling, the tip of the drill guide should remain fully seated in hole.

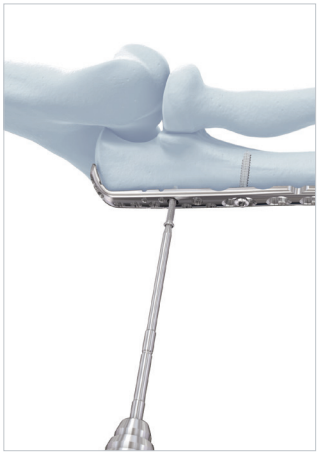
Remove the drill guide and use the depth gauge to measure for screw length.

When inserting the 2.7 mm metaphyseal screw, we recommend using the 1.2 Nm torque limiting attachment. The 2.7 mm metaphyseal screw can be inserted manually or with power. For power insertion, use the T8 StarDrive Screwdriver shaft attached to the 1.2 Nm torque limiting attachment. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for StarDrive Screwdriver shaft, if necessary.


Nominal angle

▲ Precaution:

Carefully tighten the metaphyseal compression screws 2.7 mm by hand as with conventional cortical screws in order to prevent the screw thread stripping out of the bone.



■ Note:

When using the universal VA drill guide, inserting the screw at the nominal angle will ensure lowest possible profile construct.

2. Insert 2.7 mm variable angle locking screws

▲ Warning:

Always use a torque limiting attachment when inserting locking screws under power.

■ Note:

Using variable angle drilling can increase the risk of drill and screw collisions.

Instruments	
03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
311.43	Handle with quick coupling
314.453	StarDrive Screwdriver Shaft, T8, self-retaining, quick coupling, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve, for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge, for 2.0 mm and 2.4 mm screws
323.062	2.0 mm Drill Bit with Depth Mark, quick coupling, 140 mm
Optional instruments	
03.211.003	2.0 mm Variable Angle Locking Single Cone Drill Guide
03.211.004	2.0 mm Variable Angle Locking Single Coaxial Drill Guide

The 2.7 mm variable angle locking screws can be inserted into the metaphyseal portion of the plates. To insert the variable angle screws, use a 2.0 mm universal variable angle locking drill guide and the 2.0 mm drill bit to drill to the desired depth.

Variable angle drilling

Insert the variable angle locking drill guide into the variable angle screw hole, ensuring that the drill guide tip keys into the cloverleaf portion of the hole.

Use the cone-shaped end of the drill guide to drill variable angle holes at the desired angle. The cone allows the drill bit a total variation in angulation of 30°.

Verify the drill bit angle under fluoroscopy to ensure the desired angle has been achieved. If necessary, drill at a different angle and verify again under fluoroscopy.

Nominal angle drilling

The drill guide can also be inserted coaxially into the variable angle hole. The fixed-angle end of the drill guide ensures that the drill bit follows the nominal trajectory of the locking hole.

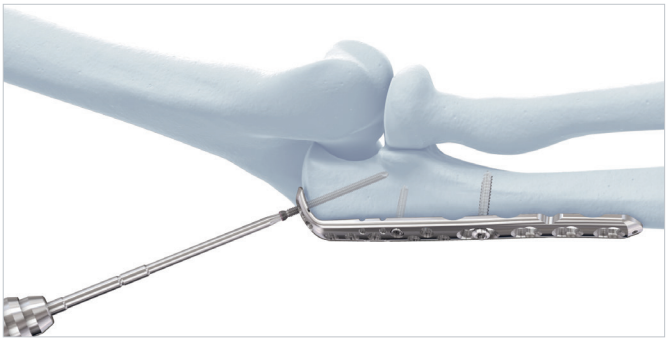
■ Note:

When drilling, the tip of the drill guide should remain fully seated in hole.

Remove the drill guide and use the depth gauge to measure for screw length. The 2.7 mm variable angle locking screw can be inserted manually or with power. For manual insertion, use the handle for torque limiting attachment. Use the holding sleeve for the StarDrive Screwdriver shaft, if necessary. Initial insertion of the variable angle locking screws may be done using power equipment. Do not lock the screws with power tools. Confirm screw position and length prior to final tightening. Final tightening must be done manually using the 1.2 Nm torque limiting attachment.

Variable angle

Nominal angle



▲ Precaution:

Do not engage the screw head with the plate hole while inserting with power. Screw engagement and final locking must be done manually with the 1.2 Nm torque limiting attachment

■ Notes:

- Do not use the torque limiting attachment for screw removal.
- Use the 2.0 mm universal variable angle locking drill guide to insert 2.7 mm locking screws, always drill and insert at nominal angle.

Insert Distal Screws

1. Fixation using 3.5 mm cortex screws and/or 3.5 mm locking screws

Instruments	
310.25	2.5 mm Drill Bit, quick coupling, 110 mm, gold
310.288	2.8 mm Drill Bit, quick coupling
312.648	2.8 mm Threaded Drill Guide
314.02 or 311.43	Small Hexagonal Screwdriver with Holding Sleeve Handle with quick coupling
314.03	Small Hexagonal Screwdriver Shaft
314.115	StarDrive Screwdriver Shaft, T15, self-retaining
314.116	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
319.01	Depth Gauge, for 2.7 mm and small screws
323.36	3.5 mm Universal Drill Guide
511.770	Torque limiting Attachment, 1.5 Nm
511.773	Torque limiting Attachment, 1.5 Nm, quick coupling

After fixing the metaphyseal portion of the olecranon plate, determine combination of locking and / or cortex screws to be used in the shaft of the plate.

■ Note:

If a combination of cortex and locking screws is used, a cortex screw should be inserted first to the pull the plate to the bone.

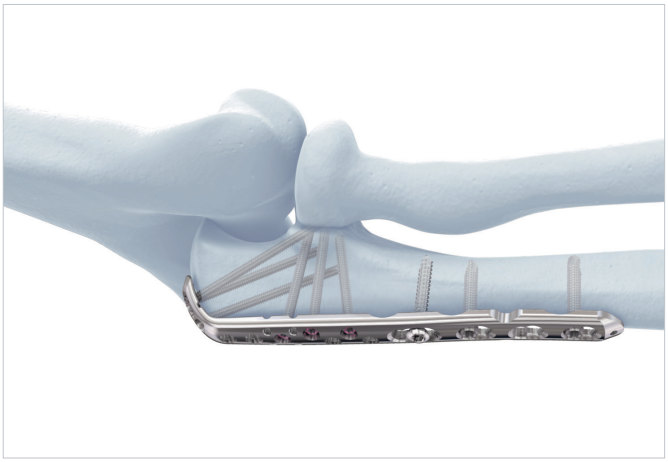
3.5 mm cortex screws
Use the 2.5 mm drill bit through the 3.5 mm universal drill guide to predrill the bone. For the neutral position, press the drill guide down in the nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.

Select and insert the appropriate length 3.5 mm cortex screw using a small hexagonal screwdriver.

3.5 mm locking screws
Use the 2.8 mm drill bit through the 2.8 mm threaded guide. Remove threaded drill guide and measure using the depth gauge to determine screw length.

Select and insert the appropriate length 3.5 mm locking screw using the StarDrive Screwdriver shaft and the TLA (see page 49).



■ Note:

Thoroughly irrigate the wound prior to closure.

▲ Precaution:

Ensure that the screws do not protrude in the articular surface of the incisura trochlearis.

Postoperative Treatment and Implant Removal

Postoperative treatment

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

Implant removal

Optional set	
01.240.001	Screw Removal Set
Optional instruments	
311.43	Handle with quick coupling
309.510	Conical Extraction Screw, for 1.5 mm and 2.0 mm Cortex Screws
309.520	Conical Extraction Screw, for 2.7 mm and 3.5 mm Cortex Screws

To remove locking screws, first 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.

The last screw removed should be a nonlocking screw on the shaft. This prevents the plate from spinning when locking screws are removed.

If the screws cannot be removed with the screwdriver (eg, if the hexagonal or StarDrive Recesses of the locking screws are 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 counterclockwise.

Implants

2.7 mm/3.5 mm VA LCP Proximal Olecranon Plates

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.107.002	04.107.002	2	Right	73
02.107.102	04.107.102	2	Left	73

02.107.002

2.7 mm/3.5 mm VA LCP Olecranon Plates

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.107.202	04.107.202	2	Right	90
02.107.302	04.107.302	2	Left	90
02.107.204	04.107.204	4	Right	116
02.107.304	04.107.304	4	Left	116
02.107.206	04.107.206	6	Right	142
02.107.306	04.107.306	6	Left	142
02.107.208S*	04.107.208*	8	Right	169
02.107.308S*	04.107.308*	8	Left	169

02.107.204

2.7 mm/3.5 mm VA LCP Extra-articular Proximal Ulna Plates

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.107.406	04.107.406	6	Right	131
02.107.506	04.107.506	6	Left	131
02.107.408	04.107.408	8	Right	157
02.107.508	04.107.508	8	Left	157
02.107.410	04.107.410	10	Right	184
02.107.510	04.107.510	10	Left	184
02.107.412	04.107.412	12	Right	211
02.107.512	04.107.512	12	Left	211

02.107.406

* Available sterile only

2.7 mm/3.5 mm VA LCP Posterolateral Distal Humerus Plates with Lateral Support

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.117.003	04.117.003	3	Right, short	75
02.117.103	04.117.103	3	Left, short	75
02.117.004	04.117.004	4	Right, medium	88
02.117.104	04.117.104	4	Left, medium	88
02.117.007	04.117.007	7	Right, long	127
02.117.107	04.117.107	7	Left, long	127
02.117.009	04.117.009	9	Right, extra long	153
02.117.109	04.117.109	9	Left, extra long	153
02.117.011S*	04.117.011S*	11	Right	179
02.117.111S*	04.117.111S*	11	Left	179
02.117.013S*	04.117.013S*	13	Right	205
02.117.113S*	04.117.113S*	13	Left	205

02.117.003

2.7 mm/3.5 mm VA LCP Posterolateral Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.117.203	04.117.203	3	Right, short	75
02.117.303	04.117.303	3	Left, short	75
02.117.204	04.117.204	4	Right, medium	88
02.117.304	04.117.304	4	Left, medium	88
02.117.207	04.117.207	7	Right, long	127
02.117.307	04.117.307	7	Left, long	127
02.117.209	04.117.209	9	Right, extra long	153
02.117.309	04.117.309	9	Left, extra long	153
02.117.211S*	04.117.211S*	11	Right	179
02.117.311S*	04.117.311S*	11	Left	179
02.117.213S*	04.117.213S*	13	Right	205
02.117.313S*	04.117.313S*	13	Left	205

02.117.203

* Available sterile only

2.7 mm/3.5 mm VA LCP Medial Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.117.401	04.117.401	1	Right, short	69
02.117.501	04.117.501	1	Left, short	69
02.117.402	04.117.402	2	Right, medium	82
02.117.502	04.117.502	2	Left, medium	82
02.117.404	04.117.404	4	Right, long	108
02.117.504	04.117.504	4	Left, long	108
02.117.406	04.117.406	6	Right, extra long	134
02.117.506	04.117.506	6	Left, extra long	134
02.117.408S*	04.117.408S*	8	Right	160
02.117.508S*	04.117.508S*	8	Left	160
02.117.410S*	04.117.410S*	10	Right	186
02.117.510S*	04.117.510S*	10	Left	186

02.117.404

2.7 mm/3.5 mm VA LCP Extended Medial Distal Humerus Plates

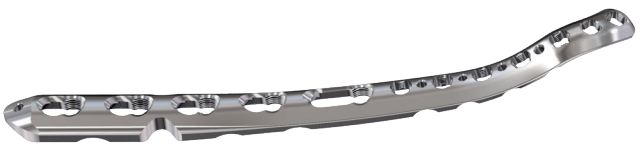
Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.117.601	04.117.601	1	Right, short	72
02.117.701	04.117.701	1	Left, short	72
02.117.602	04.117.602	2	Right, medium	85
02.117.702	04.117.702	2	Left, medium	85
02.117.604	04.117.604		Right, long	111
02.117.704	04.117.704	4	Left, long	111
02.117.606	04.117.606	6	Right, extra long	137
02.117.706	04.117.706	6	Left, extra long	137
02.117.608S*	04.117.608S*	8	Right	163
02.117.708S*	04.117.708S*	8	Left	163
02.117.610S*	04.117.610S*	10	Right	189
02.117.710S*	04.117.710S*	10	Left	189

02.117.604

* Available sterile only

2.7 mm/3.5 mm VA LCP Lateral Distal Humerus Plates

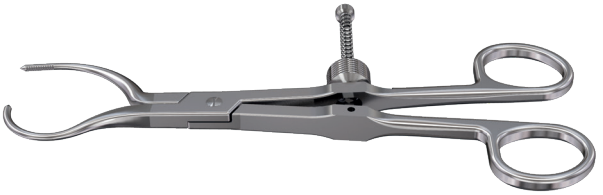
Stainless Steel	Titanium	Holes	Right/left	Length (mm)
02.117.801	04.117.801	1	Right, short	69
02.117.901	04.117.901	1	Left, short	69
02.117.802	04.117.802	2	Right, medium	82
02.117.902	04.117.902	2	Left, medium	82
02.117.805	04.117.805	5	Right, long	121
02.117.905	04.117.905	5	Left, long	121
02.117.807	04.117.807	7	Right, extra long	147
02.117.907	04.117.907	7	Left, extra long	147
02.117.809S*	04.117.809S*	9	Right	173
02.117.909S*	04.117.909S*	9	Left	173
02.117.811S*	04.117.811S*	11	Right	199
02.117.911S*	04.117.911S*	11	Left	199



02.117.805

* Available sterile only

Instruments

03.110.002	Torque limiting Attachment, 1.2 Nm	
03.110.005	Handle for Torque limiting Attachment	
03.117.998	Straight / Curved Pointed Reduction Forceps	
03.118.001	Periarticular Reduction Forceps, 6.5 mm ball and pointed tip, small	
03.118.007	Percutaneous Depth Gauge, for 2.7 mm screws	
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide	
292.16	1.6 mm Kirschner Wire with trocar point, 150 mm	

311.43	Handle with quick coupling	
314.453	StarDrive Screwdriver Shaft, T8, 55 mm	
314.467	StarDrive Screwdriver Shaft, T8, 105 mm	
314.468	Holding Sleeve for StarDrive Screwdriver Shaft, T8	
319.006	Depth Gauge for 2.0 mm and 2.4 mm screws	
319.97	Screw Forceps	
323.062	2.0 mm Drill Bit with depth mark, quick coupling, 140 mm	

2.7 mm/3.5 mm Variable Angle LCP Elbow Instrument and Implant Set

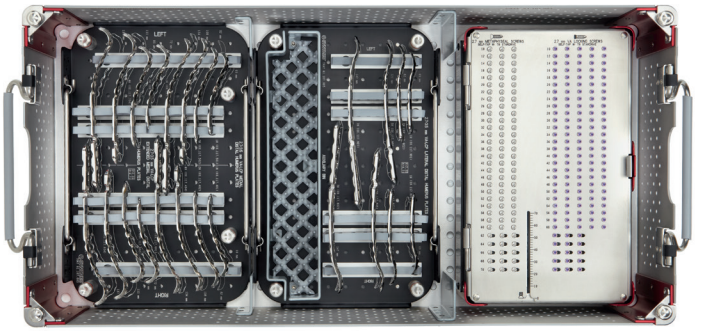
Stainless Steel (01.107.002) and Titanium (01.107.004)

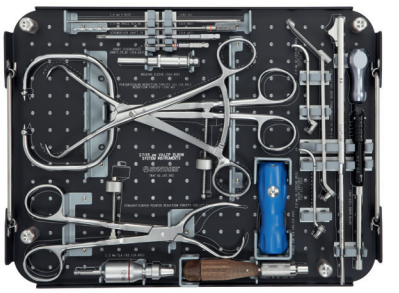
Graphic Case

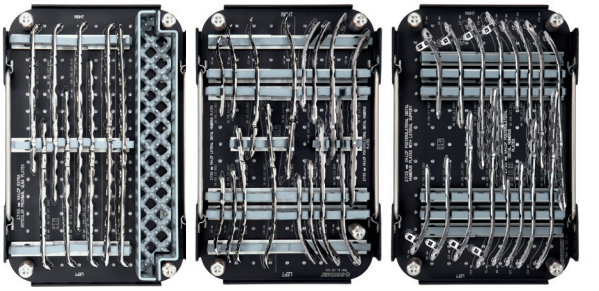
61.107.001	Graphic Case for 2.7 mm / 3.5 mm VA LCP Elbow System

Instruments

03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.117.998	Straight / Curved Pointed Reduction Forceps, 2 ea.
03.118.001	Periarticular Reduction Forceps, 6.5 mm ball and pointed tip, small
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
292.16	1.6 mm Kirschner Wire with trocar point, 150 mm
311.43	Handle with quick coupling, small
314.453	StarDrive Screwdriver Shaft, T8, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge for 2.0 mm and 2.4 mm screws
319.97	Screw Forceps
323.062	2.0 mm Drill Bit with depth mark, quick coupling, 140 mm, 3 ea.







Note: For additional information, please refer to the package insert or www.e-ifu.com.

For detailed cleaning and sterilization instructions, please refer to www.depuysynthes.com/hcp/cleaning-sterilization or sterilization instructions, if provided in the instructions for use.

Implants

2.7 mm / 3.5 mm VA LCP Proximal Olecranon Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.107.002	04.107.002	2	Right	73
02.107.102	04.107.102	2	Left	73

2.7 mm / 3.5 mm VA LCP Olecranon Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.107.202	04.107.202	2	Right	90
02.107.302	04.107.302	2	Left	90
02.107.204	04.107.204	4	Right	116
02.107.304	04.107.304	4	Left	116
02.107.206	04.107.206	6	Right	142
02.107.306	04.107.306	6	Left	142
02.107.208S*	04.107.208S*	8	Right	169
02.107.308S*	04.107.308S*	8	Left	169

2.7 mm / 3.5 mm VA LCP Extra-articular Proximal Ulna Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.107.406	04.107.406	6	Right	131
02.107.506	04.107.506	6	Left	131
02.107.408	04.107.408	8	Right	157
02.107.508	04.107.508	8	Left	157
02.107.410	04.107.410	10	Right	184
02.107.510	04.107.510	10	Left	184
02.107.412	04.107.412	12	Right	211
02.107.512	04.107.512	12	Left	211

2.7 mm / 3.5 mm VA LCP Posterolateral Distal Humerus Plates with Lateral Support

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.117.003	04.117.003	3	Right, short	75
02.117.103	04.117.103	3	Left, short	75
02.117.004	04.117.004	4	Right, medium	88
02.117.104	04.117.104	4	Left, medium	8
02.117.007	04.117.007	7	Right, long	127
02.117.107	04.117.107	7	Left, long	127
02.117.009	04.117.009	9	Right, extra long	153
02.117.109	04.117.109	9	Left, extra long	153
02.117.011S*	04.117.011S*	11	Right	179
02.117.111S*	04.117.111S*	11	Left	179
02.117.013S*	04.117.013S*	13	Right	205
02.117.113S*	04.117.113S*	13	Left	205

2.7 mm / 3.5 mm VA LCP Posterolateral Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.117.203	04.117.203	3	Right, short	75
02.117.303	04.117.303	3	Left, short	75
02.117.204	04.117.204	4	Right, medium	88
02.117.304	04.117.304	4	Left, medium	88
02.117.207	04.117.207	7	Right, long	127
02.117.307	04.117.307	7	Left, long	127
02.117.209	04.117.209	9	Right, extra long	153
02.117.309	04.117.309	9	Left, extra long	153
02.117.211S*	04.117.211S*	11	Right	179
02.117.311S*	04.117.311S*	11	Left	179
02.117.213S*	04.117.213S*	13	Right	205
02.117.313S*	04.117.313S*	13	Left	205

* Available sterile only

2.7 mm / 3.5 mm Variable Angle LCP Elbow Instrument and Implant Set
Stainless Steel (01.107.002) and Titanium (01.107.004)

2.7 mm / 3.5 mm VA LCP Medial Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.117.401	04.117.401	1	Right, short	69
02.117.501	04.117.501	1	Left, short	69
02.117.402	04.117.402	2	Right, medium	82
02.117.502	04.117.502	2	Left, medium	82
02.117.404	04.117.404	4	Right, long	108
02.117.504	04.117.504	4	Left, long	108
02.117.406	04.117.406	6	Right, extra long	134
02.117.506	04.117.506	6	Left, extra long	134
02.117.408S*	04.117.408S*	8	Right	160
02.117.508S*	04.117.508S*	8	Left	160
02.117.410S*	04.117.410S*	10	Right	186
02.117.510S*	04.117.510S*	10	Left	186

2.7 mm / 3.5 mm VA LCP Lateral Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.117.801	04.117.801	1	Right, short	69
02.117.901	04.117.901	1	Left, short	69
02.117.802	04.117.802	2	Right, medium	82
02.117.902	04.117.902	2	Left, medium	82
02.117.805	04.117.805	5	Right, long	121
02.117.905	04.117.905	5	Left, long	121
02.117.807	04.117.807	7	Right, extra long	147
02.117.907	04.117.907	7	Left, extra long	147
02.117.809S*	04.117.809S*	9	Right	173
02.117.909S*	04.117.909S*	9	Left	173
02.117.811S*	04.117.811S*	11	Right	199
02.117.911S*	04.117.911S*	11	Left	199

2.7 mm / 3.5 mm VA LCP Extended Medial Distal Humerus Plates

Stainless Steel	Titanium	Holes	Right / left	Length (mm)
02.117.601	04.117.601	1	Right, short	72
02.117.701	04.117.701	1	Left, short	72
02.117.602	04.117.602	2	Right, medium	85
02.117.702	04.117.702	2	Left, medium	85
02.117.604	04.117.604	4	Right, long	111
02.117.704	04.117.704	4	Left, long	111
02.117.606	04.117.606	6	Right, extra long	137
02.117.706	04.117.706	6	Left, extra long	137
02.117.608S*	04.117.608S*	8	Right	163
02.117.708S*	04.117.708S*	8	Left	163
02.117.610S*	04.117.610S*	10	Right	189
02.117.710S*	04.117.710S*	10	Left	189

* Available sterile only

2.7 mm Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 2 ea.

Stainless Steel	Titanium	Length (mm)
02.118.510	04.118.510	10
02.118.512	04.118.512	12
02.118.514	04.118.514	14
02.118.516	04.118.516	16
02.118.518	04.118.518	18
02.118.520	04.118.520	20
02.118.522	04.118.522	22
02.118.524	04.118.524	24
02.118.526	04.118.526	26
02.118.528	04.118.528	28
02.118.530	04.118.530	30
02.118.532	04.118.532	32
02.118.534	04.118.534	34
02.118.536	04.118.536	36
02.118.538	04.118.538	38
02.118.540	04.118.540	40
02.118.542	04.118.542	42
02.118.544	04.118.544	44
02.118.546	04.118.546	46
02.118.548	04.118.548	48
02.118.550	04.118.550	50
02.118.552	04.118.552	52
02.118.554	04.118.554	54
02.118.556	04.118.556	56
02.118.558	04.118.558	58
02.118.560	04.118.560	60
02.118.562	04.118.562	62
02.118.564	04.118.564	64
02.118.566	04.118.566	66
02.118.568	04.118.568	68
02.118.570	04.118.570	70

2.7 mm Variable Angle Locking Screws, self-tapping, with T8 StarDrive Recess

Stainless Steel	Titanium	Length (mm)	Qty.
02.211.010	04.211.010	10	3
02.211.012	04.211.012	12	3
02.211.014	04.211.014	14	3
02.211.016	04.211.016	16	3
02.211.018	04.211.018	18	3
02.211.020	04.211.020	20	3
02.211.022	04.211.022	22	3
02.211.024	04.211.024	24	3
02.211.026	04.211.026	26	3
02.211.028	04.211.028	28	3
02.211.030	04.211.030	30	5
02.211.032	04.211.032	32	5
02.211.034	04.211.034	34	5
02.211.036	04.211.036	36	5
02.211.038	04.211.038	38	5
02.211.040	04.211.040	40	5
02.211.042	04.211.042	42	5
02.211.044	04.211.044	44	5
02.211.046	04.211.046	46	5
02.211.048	04.211.048	48	5
02.211.050	04.211.050	50	5
02.211.052	04.211.052	52	5
02.211.054	04.211.054	54	5
02.211.056	04.211.056	56	5
02.211.058	04.211.058	58	5
02.211.060	04.211.060	60	5

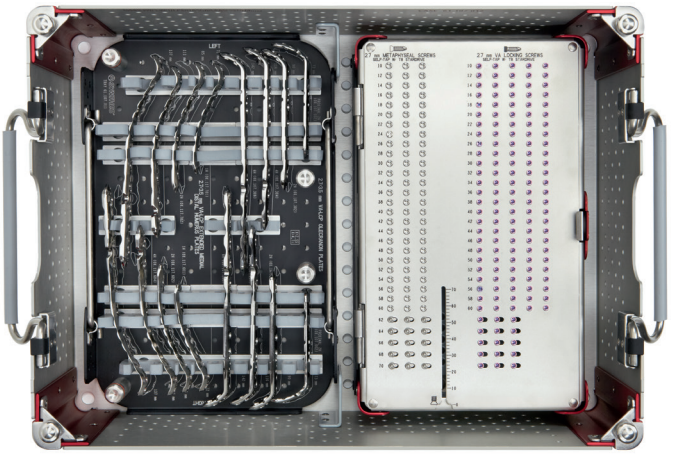
2.7 mm/3.5 mm Variable Angle LCP Elbow Instrument and Implant Set – Compact (01.107.006)

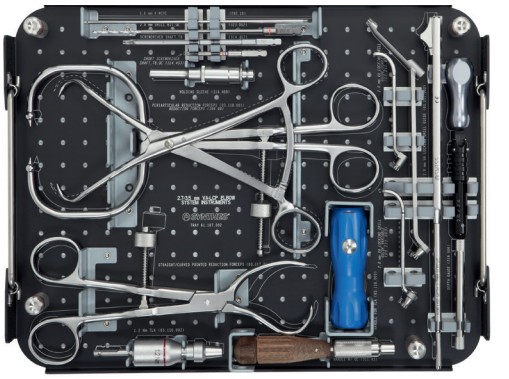
Graphic Case

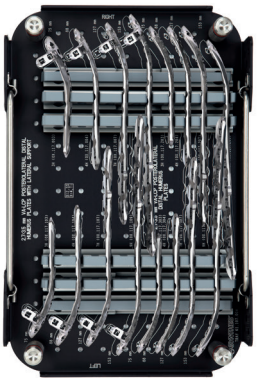
61.107.012	Graphic Case for 2.7 mm/3.5 mm VA LCP Elbow Compact Set

Instruments (in Tray 61.107.002)

03.110.002	Torque limiting Attachment, 1.2 Nm
03.110.005	Handle for Torque limiting Attachment
03.117.998	Straight/Curved Pointed Reduction Forceps, 2 ea.
03.118.001	Periarticular Reduction Forceps, 6.5 mm ball and pointed tip, small
03.118.007	Percutaneous Depth Gauge for 2.7 mm screws
03.211.002	2.0 mm Universal Variable Angle Locking Drill Guide
292.16	1.6 mm Kirschner Wire with trocar point, 150 mm
311.43	Handle with quick coupling, small
314.453	StarDrive Screwdriver Shaft, T8, 55 mm
314.467	StarDrive Screwdriver Shaft, T8, 105 mm
314.468	Holding Sleeve for StarDrive Screwdriver Shaft, T8
319.006	Depth Gauge for 2.0 mm and 2.4 mm screws
319.97	Screw Forceps
323.062	2.0 mm Drill Bit with depth mark, quick coupling, 140 mm, 3 ea.







Implants (in Tray 61.107.010)

2.7 mm / 3.5 mm VA LCP Posterolateral Distal Humerus Plates

Stainless Steel	Holes	Right / left	Length (mm)
02.117.203	3	Right, short	75
02.117.303	3	Left, short	75
02.117.204	4	Right, medium	88
02.117.304	4	Left, medium	88
02.117.207	7	Right, long	127
02.117.307	7	Left, long	127
02.117.209	9	Right, extra long	153
02.117.309	9	Left, extra long	153

2.7 mm / 3.5 mm VA LCP Lateral Distal Humerus Plates

Stainless Steel	Holes	Right / left	Length (mm)
02.117.801	1	Right, short	69
02.117.901	1	Left, short	69
02.117.802	2	Right, medium	82
02.117.902	2	Left, medium	82
02.117.805	5	Right, long	121
02.117.905	5	Left, long	121
02.117.807	7	Right, extra long	147
02.117.907	7	Left, extra long	147

Screws (in Rack 61.107.008)

2.7 mm Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 2 ea.

02.118.510 – 02.118.570	10 mm – 70 mm (in 2 mm increments)

2.7 mm Variable Angle Locking Screws, self-tapping, with T8 StarDrive Recess

02.211.010 –	10 mm – 28 mm (in 2 mm increments), 3 ea.
02.211.060	30 mm – 60 mm (in 2 mm increments), 5 ea.

Implants (in Tray 61.107.011)

2.7 mm / 3.5 mm VA LCP Proximal Olecranon Plates

Stainless Steel	Holes	Right / left	Length (mm)
02.107.002	2	Right	73
02.107.102	2	Left	73

2.7 mm / 3.5 mm VA LCP Olecranon Plates

Stainless Steel	Holes	Right / left	Length (mm)
02.107.202	2	Right	90
02.107.302	2	Left	90
02.107.204	4	Right	116
02.107.304	4	Left	116
02.107.206	6	Right	142
02.107.306	6	Left	142

2.7 mm / 3.5 mm VA LCP Extended Medial Distal Humerus Plates

Stainless Steel	Holes	Right / left	Length (mm)
02.117.601	1	Right, short	72
02.117.701	1	Left, short	72
02.117.602	2	Right, medium	85
02.117.702	2	Left, medium	85
02.117.604	4	Right, long	111
02.117.704	4	Left, long	111
02.117.606	6	Right, extra long	137
02.117.706	6	Left, extra long	137

Modular Graphic Cases

61.116.081 Modular Graphic Case, 2/3 Length, 2 High

Designed to house one of the following combinations:

- One instrument tray (61.107.002) and up to two (2) implant trays
- One screw rack (61.107.008) and up to two (2) implant trays
- Up to four (4) implant trays

61.116.082 Modular Graphic Case, 2/3 Length, 3 High

Designed to house one screw rack (61.107.008), one instrument tray (61.107.002), and up to two (2) implant trays.

Trays and Screw Racks

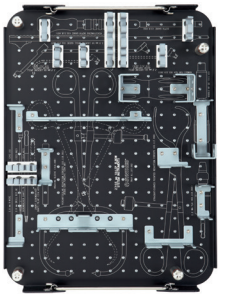
61.107.002	Instrument Tray for 2.7 mm / 3.5 mm VA LCP Elbow System
61.107.003	Implant Tray for 2.7 mm / 3.5 mm VA LCP Medial and Extended Medial Distal Humerus Plates
61.107.004	Implant Tray for 2.7 mm / 3.5 mm VA LCP Posterolateral Distal Humerus Plates and Posterolateral Distal Humerus Plates With Lateral Support
61.107.005	Implant Tray for 2.7 mm / 3.5 mm VA LCP Lateral Distal Humerus Plates
61.107.006	Implant Tray for 2.7 mm / 3.5 mm VA LCP Proximal Olecranon, Olecranon, and 3.5 mm LCP Olecranon Hook Plate
61.107.007	Implant Tray for 2.7 mm / 3.5 mm VA LCP Extra Articular Proximal Ulna Plates
61.107.010	Implant Tray for Lateral and Posterolateral Distal Humerus Plates
61.107.011	Implant Tray for Extended Medial Distal Humerus Plates and Olecranon Plates
61.107.008	Screw Rack for 2.7 mm VA LCP and 2.7 mm Metaphyseal Screws

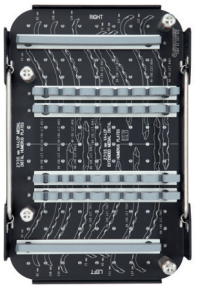
Labels

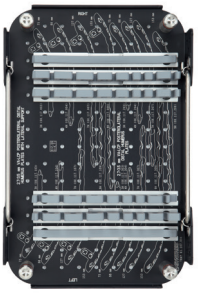
60.107.009	Variable Angle LCP Elbow System Label Packs

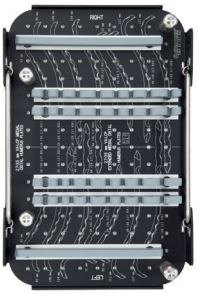
Components

61.116.015	Replacement Lid for Modular Graphic Cases, full length
61.116.016	Replacement Lid for Modular Graphic Cases, 2/3 length
60.116.018	Support Bracket Kit for Trays for Modular Graphic Cases
60.116.019	Support Posts for Screw Racks for Modular Graphic Cases


61.107.002

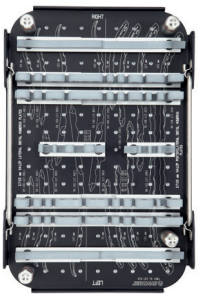

61.107.003

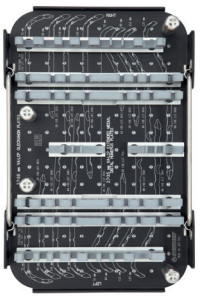

61.107.004


61.107.005


61.107.006


61.107.007


61.107.010


61.107.011

61.107.008

Also Available

Screws

02.118.575S	2.7 mm Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 75 mm, sterile
02.118.580S	2.7 mm Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 80 mm, sterile
04.118.575S	2.7 mm Titanium Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 75 mm, sterile
04.118.580S	2.7 mm Titanium Metaphyseal Screws, self-tapping, with T8 StarDrive Recess, 80 mm, sterile

Templates

03.107.002	Template for VA LCP Proximal Olecranon Plate, 2 hole, right, 73 mm
03.107.102	Template for VA LCP Proximal Olecranon Plate, 2 hole, left, 73 mm
03.107.204	Template for VA LCP Olecranon Plate, 4 hole, right, 116 mm
03.107.304	Template for VA LCP Olecranon Plate, 4 hole, left, 116 mm
03.107.408	Template for VA LCP Extra Articular Proximal Ulna Plate, 8 hole, right, 157 mm
03.107.508	Template for VA LCP Extra Articular Proximal Ulna Plate, 8 hole, left, 157 mm
03.117.004	Template for VA LCP Posterolateral Distal Humerus Plate with Lateral Support, 4 hole, right, 88 mm
03.117.104	Template for VA LCP Posterolateral Distal Humerus Plate with Lateral Support, 4 hole, left, 88 mm
03.117.602	Template for VA LCP Extended Medial Distal Humerus Plate, 2 hole, right, 85 mm
03.117.702	Template for VA LCP Extended Medial Distal Humerus Plate, 2 hole, left, 85 mm
03.117.802	Template for VA LCP Lateral Distal Humerus Plate, 2 hole, right, 82 mm
03.117.902	Template for VA LCP Lateral Distal Humerus Plate, 2 hole, left, 82 mm

Instruments

329.291	Bending Pliers, 227 mm length, for 3.5 mm Clavicle Plates
329.30	Plate-Bending Press

Limited Warranty and Disclaimer: DePuy Synthes products are sold with a limited warranty to the original purchaser against defects in workmanship and materials. Any other express or implied warranties, including warranties of merchantability or fitness, are hereby disclaimed.

Please also refer to the package insert(s) or other labeling associated with the devices identified in this surgical technique for additional information.

CAUTION: Federal Law restricts these devices to sale by or on the order of a physician.

Some devices listed in this technique guide may not have been licensed in accordance with Canadian law and may not be for sale in Canada. Please contact your sales consultant for items approved for sale in Canada.

Not all products may currently be available in all markets.

DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

Manufactured or distributed by:

Synthes USA Products, LLC
1302 Wrights Lane East
West Chester, PA 19380

Synthes USA, LLC
1101 Synthes Avenue
Monument, CO 80132

Synthes GmbH
Luzernstrasse 21
4528 Zuchwil, Switzerland

To order (USA): 800-523-0322
To order (Canada): (844)-243-4321

Note: For recognized manufacturer, refer to the product label.

www.depuysynthes.com

DSUS/TRM/1016/1130 Rev C 10/22