

# AETUMED®



Mayo Clinic

**Congruent Elbow Plate System**

# Congruent Elbow Plate System

*Since 1988, Acumed has been designing solutions to the demanding situations facing orthopaedic surgeons, hospitals and their patients. Our strategy has been to know the indication, design a solution to fit, and deliver quality products and instrumentation.*



Designed to address fractures of the distal humerus, olecranon and coronoid, Mayo Clinic Congruent Elbow Plates offer pre-contoured, indication specific plates featuring variable angle Tap-Loc® Technology.

Orthopaedic surgeons are continually developing improved methods of fracture fixation and rehabilitation. Acumed recognizes that often these new fixation methods require changes and advancements in orthopaedic implants and technology. Our goal is to design implants and instrumentation that address new fixation techniques, solve issues with current fixation methods and provide the best possible outcome for the patient.

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Mayo Clinic Congruent Elbow Plates, designed by Shawn O'Driscoll, Ph.D., M.D., have revolutionized the way orthopaedic surgeons treat and manage elbow fractures. Dr. O'Driscoll's experience has shown that the "parallel" plate placement on the distal humerus, combined with increased plate strength over standard reconstruction plates<sup>1</sup>, allows for early rehabilitation and preservation of elbow function and motion.

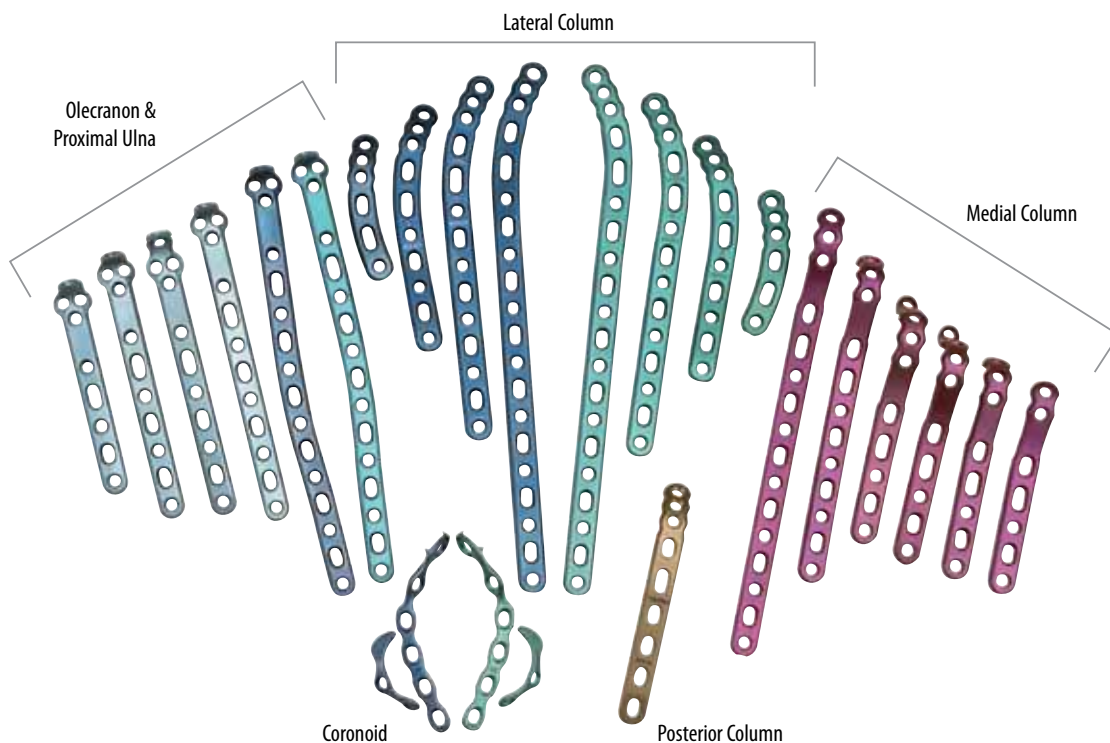
Acumed believes that surgeons should have the ability to determine the trajectory of the locking screws in the distal humerus. This freedom offers the surgeon a means to maximize fixation in the distal fragments, providing the best possible outcome for the patient. Our distal humerus plates offer patented Tap-Loc® Technology, allowing the surgeon to choose the optimal locking screw trajectory in the distal fragments.

# Congruent Elbow Plate System

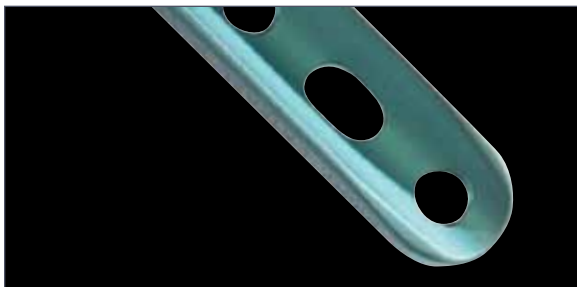
**Pre-contoured Plates** eliminate the need for the surgeon to bend the plates to match the anatomy of the patient. For complex fractures, the plates act as a template to restore the natural anatomic geometry of the distal humerus.

**Parallel Plate Placement** provides a more stable construct than plates placed at a 90° orientation<sup>2</sup>. Biomechanical data shows that parallel plate placement has greater strength and stability, especially when the elbow is subjected to A/P and torsional forces<sup>3</sup>.

**Tap-Loc® Technology** allows the surgeon to angle the locking screws in the distal humerus up to 20° in each direction and create threads in the plate hole with a customized tap. This provides flexibility when capturing fracture fragments while maintaining the benefits of a traditional locking screw.



## Pre-contoured Plates



Mayo Clinic Congruent Elbow Plates are pre-contoured to match the natural anatomy of the elbow, minimizing the need for the surgeon to bend the plates prior to application. For complex fractures, the plates are able to act as a template for anatomic restoration of the elbow.

Traditional straight plates weaken with repeated bending in the OR. Pre-contoured plates offer a stronger alternative than straight reconstruction plates<sup>4</sup> while maintaining a low profile. The design of the plates allows for maximum fixation and stability in the distal humerus and proximal ulna.

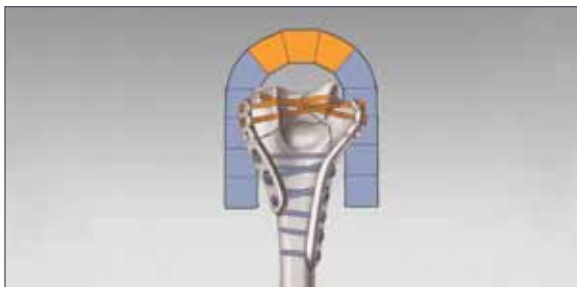
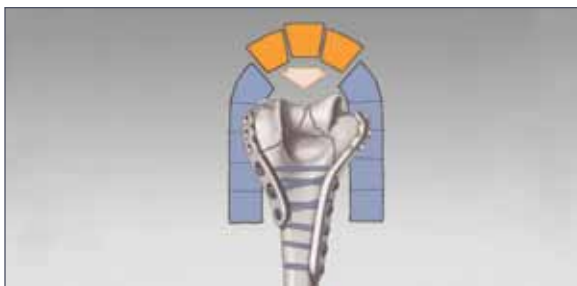
**Plates should maximize stability of periarticular fragments to facilitate rehabilitation.**

Clustered screw holes in the articular region increase stability and strength of the reconstruction. This improved stability allows the plates to compress these articular fragments with the shaft to achieve union of the fracture fragments. Plate profile and screw/plate interface were designed with the soft tissues in mind. The plates thin down in the periarticular region and the screw heads are recessed within the low profile plates.

**Plate thickness should be optimized for each region of the bone.**

Continuous change in thickness provides strength along the metaphysis/diaphysis where it is needed, while maintaining a low profile in the periarticular areas where limited soft tissue coverage may be an issue.

## Parallel Plate Placement



The parallel placement of Mayo Clinic Congruent Elbow Plates provides a strong and stable construct so that the surgeon does not have to immobilize the elbow for an extended period post-op. The strength of the plates, along with the parallel application and locking technology, greatly reduces the chance of hardware failure. This also allows the patient to begin rehabilitation and range of motion exercises immediately after surgery.

Because screws come from opposing sides of the condyles, long screws are able to interdigitate in the distal fragments, creating an “arch” construct. The interdigitating screws provide the keystone to the arch, creating a stable construct for immediate, aggressive rehabilitation.

With Mayo Clinic Congruent Elbow Plates, Dr. O’Driscoll has designed a system of pre-contoured plates that maximize fixation in the articular fragments, contributing to the stability of the entire reconstruction.

## Biomechanical Testing

90° plate orientation was supported early on in a study that compared 90° plating to a Y-plate and crossed screws, but did not compare “perpendicular” to “parallel” plating<sup>5</sup>. A second comprehensive study found “parallel” plating to be the best construct for reconstruction of a comminuted distal humerus<sup>6</sup>. This study proved that plates placed in parallel configuration on the medial and lateral columns were stronger than 90° plating when a gap was present between the articular fragments and the shaft, as when the humerus is severely fractured. Both studies were written before the introduction of Mayo Clinic Congruent Elbow Plates, which optimize the biomechanics even further with their locking capability, placement and strength.

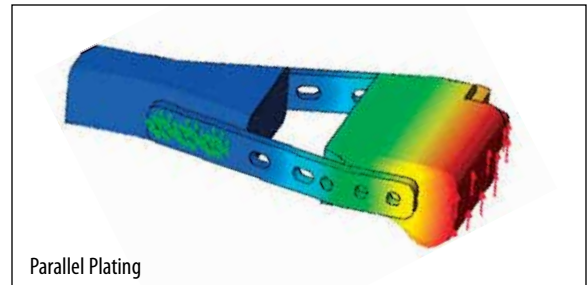
Early biomechanical testing done in a finite element analysis program at Acumed indicate significant advantages of parallel plating versus 90° plating<sup>7</sup>. For this study, a computer modeled a distal humerus fracture and assumed equivalent plate fixation and strength (two areas in which Mayo Clinic Congruent Elbow Plates are significantly better than 90° plating with reconstruction or tubular plates). The program simulated a load of 50 lbs. in three different planes: A/P, M/L, and Torsion. The results supported parallel plating, especially in torsional loads.

### 90° Plating Displaced

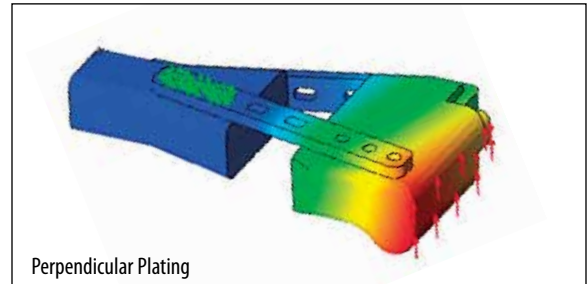
Anterior/Posterior: 53% more

Medial/Lateral: 5% less

Torsion: 80% more



Parallel Plating



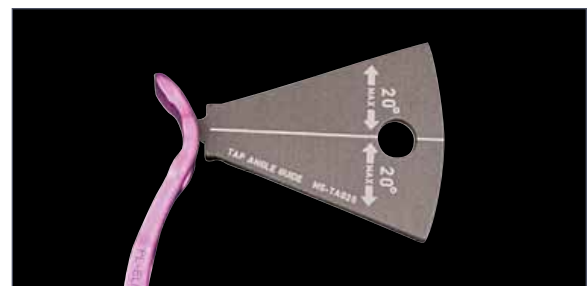
Perpendicular Plating

## Instrumentation

In addition to the innovative features of the Mayo Clinic Congruent Elbow Plates, Acumed designed the instrumentation set for ease of use by including everything the surgeon needs for the case in a well organized tray.

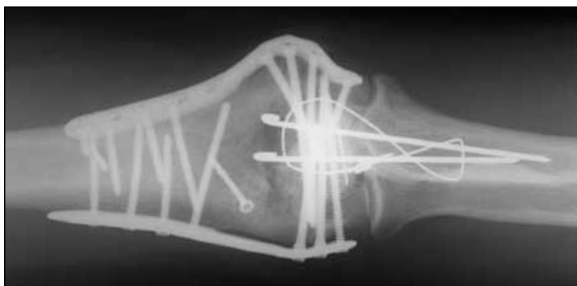
A custom targeted drill guide is included in the system to provide an accurate and efficient means of targeting the trajectory of the screws in the distal humerus. A cannula is placed through the drill guide and into the selected plate hole. The opposing end of the drill guide is then placed at the desired exiting point of the screw.

A Tap Screw Angle Guide is also included in the system to verify proper angulation of the Tap-Loc® Screws prior to drilling the bone and tapping the plate. The angle guide is placed next to the plate hole when inserting a wire or drill to verify that the angle is equal to or less than 20°.





# Tap-Loc® Technology



Dr. O'Driscoll's goal is to combine his principles for distal humeral fracture treatment with variable angle locking technology. Because anatomy and fracture patterns in the distal humerus vary from patient to patient, he saw the importance of allowing the surgeon to choose the angle of the distal locking screws. In addition, the locking threads of each locking screw should accurately coincide with the threads in the plate to ensure maximum locking strength and stability. Mayo Clinic Locking Distal Humeral Plates, featuring patented Tap-Loc® Technology, offer the surgeon a system with these benefits as the next generation for the treatment of distal humeral fractures.

Results of a biomechanical study<sup>8</sup> tested perpendicular 3.5mm LCP Distal Humerus Plates (316L) versus parallel Mayo Clinic Locking Distal Humerus Plates (titanium) for stiffness in compression and internal/external rotation, plastic deformation and failure in torsion. Both systems were utilized for fixation of a distal intraarticular humerus fracture with a metaphyseal comminution in osteoporotic bone. Results showed that Acumed's "parallel locking system showed improved stability compared with the perpendicular locking system, and therefore may be more indicated."

Mayo Clinic distal humerus plates provided a significantly higher stability in compression and external rotation, and a greater ability to resist axial plastic deformation.

- Axial compressive stiffness of our plates was 2.3 times GREATER than the perpendicular locking system.
- The perpendicular locking plates experienced an average of 2.9 times GREATER axial plastic deformation than Acumed's plates.

**T-Handle**  
provides control when  
tapping plate holes.

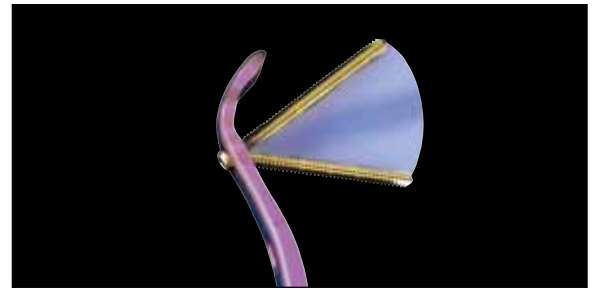
3.5mm and 2.7mm plate tap sizes  
accommodate the screw diameters  
provided in the system.

**Quick Release**  
instrumentation provides an  
efficient way to switch from  
2.7mm to 3.5mm plate taps.

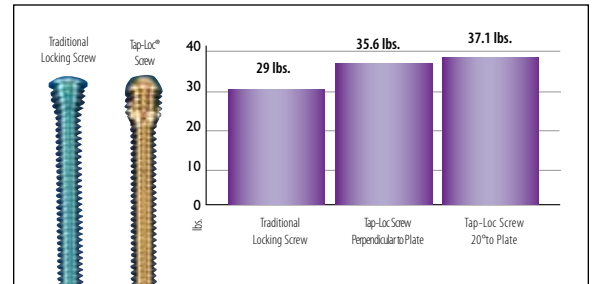


# Tap-Loc® Technology

**Multidirectional Screw Angles** give the surgeon the freedom to angle the distal locking screws up to 20° in each direction. This provides flexibility when capturing fracture fragments while maintaining the benefits of a traditional locking screw.



**Tap Biomechanical Data** shows that tapping a plate by hand does not result in a weaker screw-to-plate interface between the tapped hole and the locking screw when compared to a traditional locking plate<sup>9</sup>.

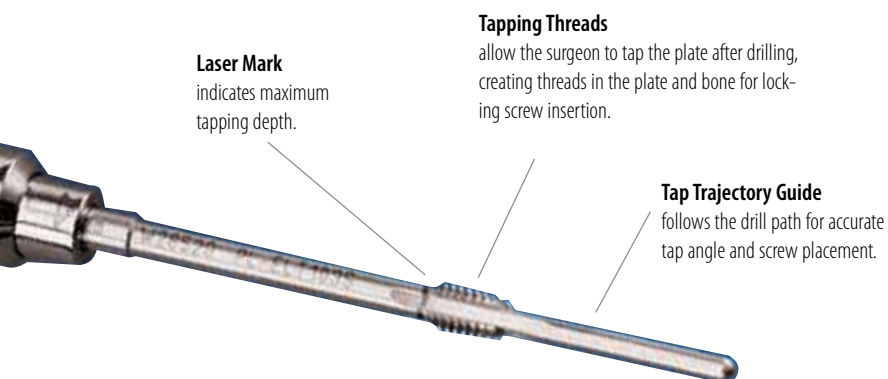


**Targeted Drill Guide** allows the surgeon to drill and position the distal screws with confidence and accuracy. The drill guide cannula is placed in the appropriate plate hole and the tip of the guide is positioned in the desirable location of the screws' ending point.

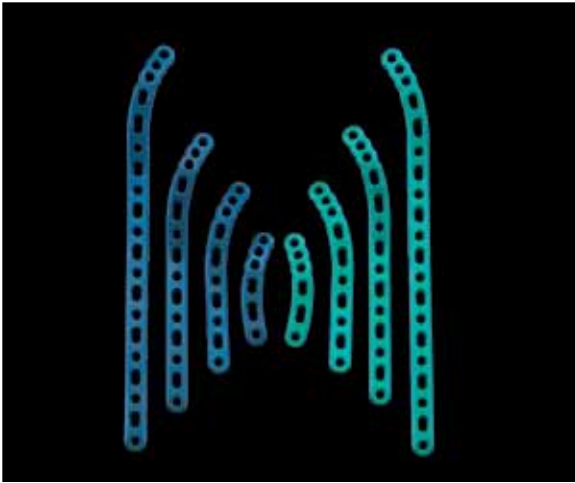


## Tapping Instructions:

- Do not tap deeper than the start of the laser line.
- Clean debris from tap after tapping each hole.
- Irrigate hole prior to tapping.
- Do not tap a slot.
- Do not re-tap a hole (use a non-locking screw).
- Tap by hand, not under power.
- Angle of tapped hole must not exceed 20°.



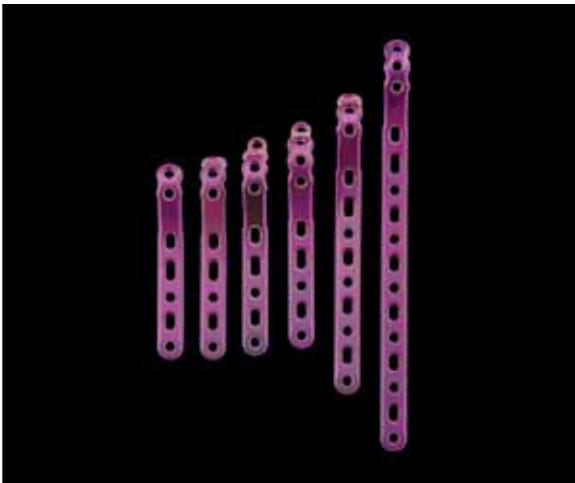
# Distal Humerus Plates



Pre-contoured in three planes, the locking distal humerus plates offer multiple lengths and sizes to treat a wide variety of fractures.

## Lateral Column Plates

These plates improve upon posterior plating biomechanically by enabling the use of longer screws that interdigitate with screws coming from the medial side. The lateral plates come in both left (blue) and right (green) and are 11mm in width and 2.0mm at the thickest point. Lengths range from 58mm to 206mm.



## Medial Column Plates

Distally these plates extend down to, or wrap around the medial epicondyle or even extend down onto the medial trochlea. Extending up the condylar ridge, these locking plates offer solid fixation and compression. This fixation is maximized when the screws in the articular fragments can interdigitate with those coming from the lateral side. The medial plates are 11mm wide and 2.0mm at the thickest point and offer 2-4 screw holes for fixation of the articular fragments. Lengths range from 84mm to 175mm.



### Technical Objectives for Locking Distal Humerus Plates:

1. Every screw should pass through a plate.
2. Each screw engages a fragment on the opposite side that is also attached to a plate.
3. Each screw should be as long as possible.
4. Each screw should engage as many fragments as possible.
5. The screws in the distal fragments should lock together by interdigitation, creating a "fixed angle" structure.
6. Plates should be applied such that compression is achieved at the supracondylar level for both columns.
7. Plates must be strong and stiff enough to resist breaking or bending before union occurs.

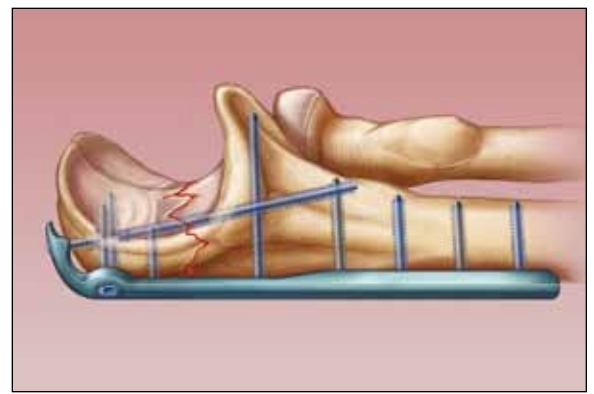


## Olecranon Plates

Locking Olecranon Plates in the Mayo Clinic Congruent Elbow Plate System provide excellent fixation in the proximal ulna for both fractures and osteotomies. Prongs on the proximal tip of the plates provide provisional fixation into the triceps tendon, assisting with reduction and improving final stability. The plate is placed directly over the triceps tendon, eliminating the need for a triceps split. An extended plate without prongs is also offered for the treatment of fractures that extend proximally. Olecranon plate lengths range from 86mm to 173mm.

### Technical Objectives for Locking Olecranon Plates:

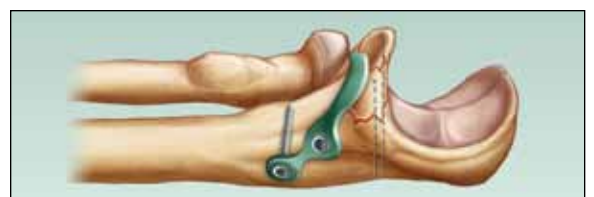
1. Each screw should be as long as possible.
2. Locking screws should interlock to provide a stable "fixed angle" structure inside the bone fragment.
3. Plate should buttress against anterior pull of elbow flexors.
4. Plate should provide stable fixation of the ulnar shaft.
5. Plate should be applied with compression across the fracture.
6. Plate must be strong and stiff enough to resist bending before union occurs.



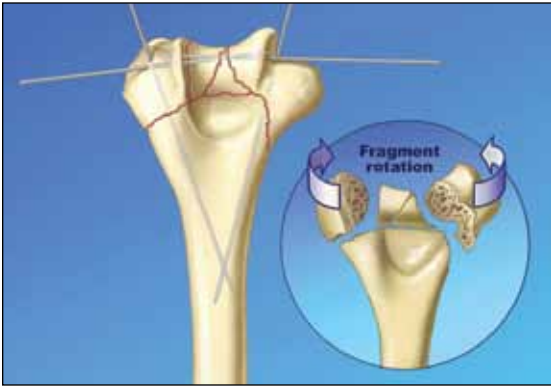
## Coronoid Plates

Mayo Clinic Congruent Coronoid Plates are offered in both standard and extended lengths. The standard size plates are indicated for fractures of the anteromedial facet of the coronoid. The plate acts as a buttress to the coronoid and counteracts the tendency of the elbow to subluxate. Threaded .035" and .045" titanium wires are included for supplementary fixation of the small coronoid fragments if necessary.

An extended version of the plate is available for the treatment of coronoid fractures with associated distal comminution. The plate holes are elongated, allowing the surgeon to angle the screws to achieve a trajectory that adequately addresses individual fracture patterns.

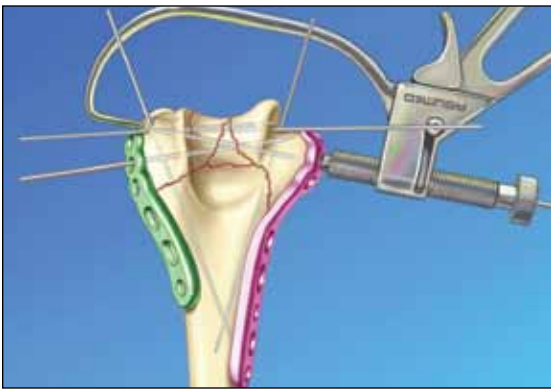


# Distal Humerus Plates



## Step 1: Articular Fragment Reduction

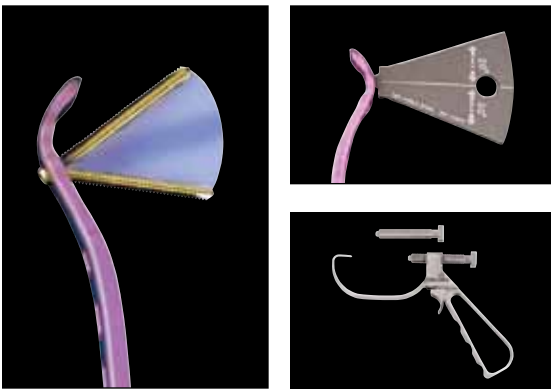
The articular fragments, which tend to be rotated toward each other in the axial plane, are reduced anatomically and provisionally held with .045" smooth K-wires (WS-1106ST). It is essential that these wires be placed close to the subchondral level to avoid interference with later screw placement, and away from where the plates will be placed on the lateral and medial columns (see Step 2). One or two strategically placed wires can then be used to provisionally hold the distal fragments in alignment with the humeral shaft.



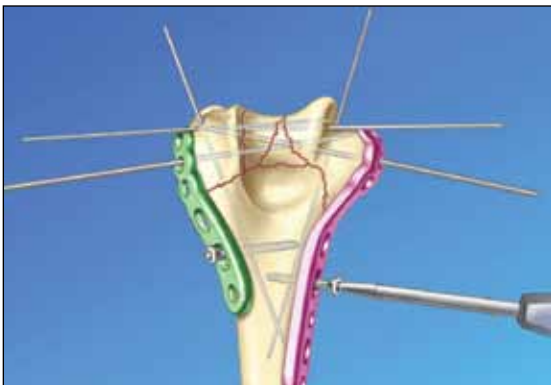
## Step 2: Plate Placement and Provisional Fixation

The selected medial and lateral plates are placed and held apposed to the distal humerus, while one smooth 2.0mm K-wire (WS-2009ST) is inserted through hole #2 (numbered from distal to proximal) of each plate through the epicondyles and across the distal fragments to maintain provisional fixation. These 2.0mm wires are left in place until after Step 7 to simplify placing the locking screws in the distal fragments. The distal Tap-Loc® screws are able to be angled up to 20° in any direction.

A tap screw angle guide (MS-TAG20) is included in the system to verify proper angulation prior to inserting the 2.0mm wires, which will later be replaced with locking screws. Place the angle guide next to the plate hole when inserting the wire to verify that the angle is equal to or less than 20°.



A targeted drill guide (PL-CLAMP) is available in the system for accurate placement of the 2.0mm wires and future distal screws. Place the 2.0mm cannula (PL-20CLAMP) through the drill guide and into the plate hole. The opposing end of the guide is placed at the desired exiting point of the wire. A 2.8mm cannula (PL-28CLAMP) is also available for accurate drilling and placement of 3.5mm screws in later steps.



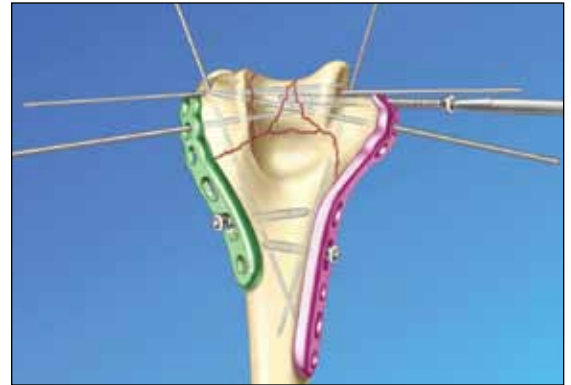
## Step 3: Initial Proximal Screw Placement

Insert a 3.5mm screw into a slotted hole of each plate proximal to the fracture site. Loosely tighten, allowing some freedom for the plate to move proximally during compression later. (Because the undersurface of each plate is tubular in the metaphyseal and diaphyseal regions, the screw in the slotted hole only needs to be tightened slightly to provide excellent provisional fixation of the entire distal humerus.) Bone taps (MS-LTT27/35) are recommended for patients with dense bone.

## Step 4: Non-Locking Distal Screw Placement

Drill and insert screws through hole #1 on both the medial and lateral side. The targeted drill guide cannot be used in hole #1 of the medial plate if the angle of the non-locking screw exceeds 20°. After drilling, measure depth and insert the appropriate size 3.5mm cortical screw. 2.7mm screws may be used in osteoporotic bone to enable more screws to be placed in the distal fragments to maximize stability.

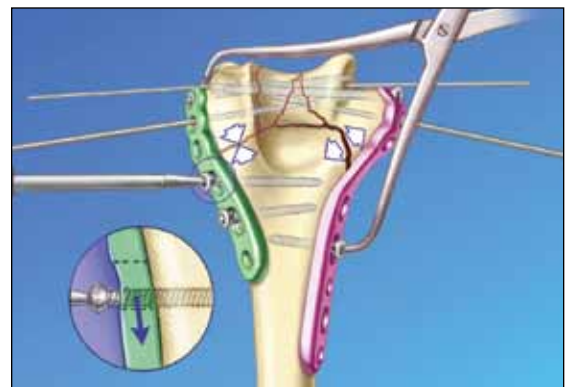
Long drills (MS-LDC20/28) and quick release pins (MS-PIN20/28) are meant to be used with the targeted drill guide. As more screws are inserted into the distal fragments in later steps, the quick release pins may be used in place of the long drills to glide past previously inserted screws.



## Step 5: Compress Lateral Column

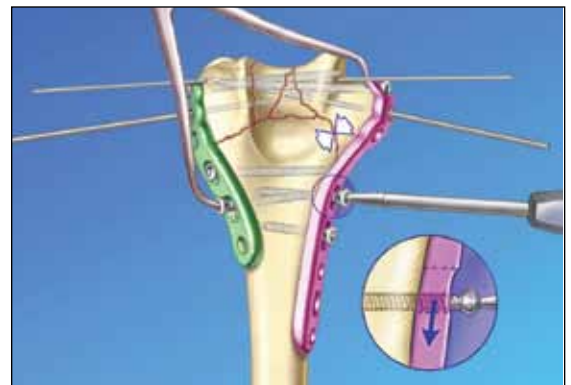
Using a large tenaculum (MS-1280) to provide interfragmentary compression across the fracture at the supracondylar level, the lateral column is first fixed. A screw is inserted in the lateral plate in dynamic compression mode in a slotted hole proximal to the fracture site (image inset) using the offset drill guide (PL-2095). Tightening this screw further enhances interfragmentary compression at the supracondylar level (converging arrows) to the point of causing some distraction at the medial supracondylar ridge (diverging arrows). The .045" wires used for provisional fixation may be removed at this point.

**Note:** The proximal slotted holes are NOT to be tapped.



## Step 6: Compress Medial Column

The medial column is then compressed in a similar manner using the large tenaculum (MS-1280), and a 3.5mm non-locking (CO-3XX0) screw is inserted in the medial plate in dynamic compression mode in a slotted hole proximal to the fracture site, using the offset drill guide (PL-2095). If the plates are slightly under contoured, they can be compressed against the metaphysis with a large bone clamp, giving further supracondylar compression. Remove the 2.0mm wires that were inserted in Step 2.

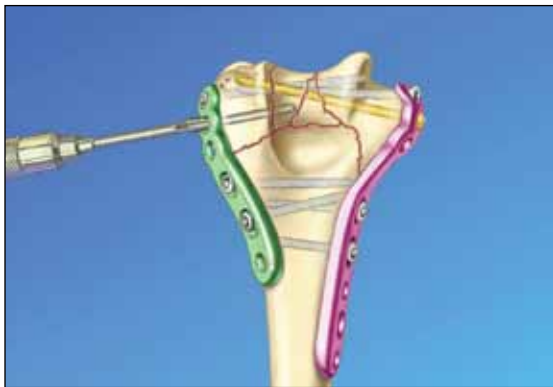


## Technical Objectives Checklist:

1. Every screw should pass through a plate.
2. Each screw engages a fragment on the opposite side that is also attached to a plate.
3. Each screw should be as long as possible.
4. Each screw should engage as many fragments as possible.
5. The screws in the distal fragments should lock together by interdigitation, creating a "fixed angle" structure.
6. Plates should be applied such that compression is achieved at the supracondylar level for both columns.
7. Plates must be strong and stiff enough to resist breaking or bending before union occurs.

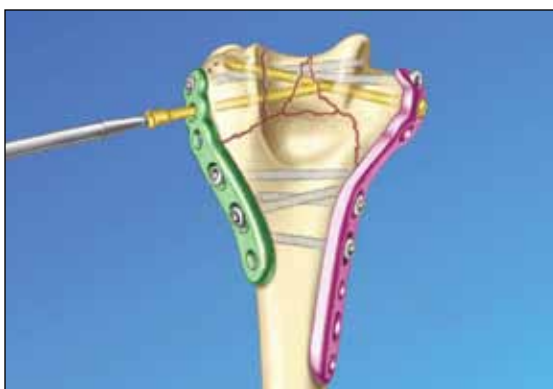
Screw Diameter	Drill Diameter
2.7mm	2.0mm
3.5mm & 4.0mm	2.8mm

# Distal Humerus Plates



## Step 7: Tap Distal Plate Hole

If using a 3.5mm screw, use the 2.8mm drill or quick release pin in the path of the wire. If using a 2.7mm screw (osteoporotic bone), the 2.0mm wire has already created the appropriate size hole for the screw. Measure drill depth (MS-9022) to determine screw size. After drilling, connect the tap (PL-ELT1027/35) to the T-Handle (MS-T1212) and tap the plate. The front end of the tap will act as a guide to ensure that the locking screw follows the correct trajectory. Turning the tap one-half turn at a time, tap the plate taking care not to insert the tap further than the start of the laser line on the tap threads (See Tapping Instructions). The T-Handle (MS-T1212) should only be used with the plate taps and not for locking or non-locking screw insertion.



## Step 8: Insert Distal Locking Screw

Insert the appropriate size Tap-Loc® screw. Care should be taken to not overtighten the screw.

The #3 holes on both the medial and lateral columns are optional. However, if these holes are used be sure to use locking screws if locking screws have already been inserted in previous steps.



## Step 9A: Drill for Proximal Locking Screw

The remaining locking shaft screws may be inserted at the surgeon's discretion. To insert the 2.7mm or 3.5mm locking shaft screws (COL-xxx0), thread the appropriate size locking drill guide (MS-LDG27/35) into the locking hole in the plate. Drill with the appropriate size drill (MS-DC5020 or MS-DC28).



## Step 9B: Insert Proximal Locking Screw

Insert the appropriate size shaft locking screw (COL-xxx0). Note that the plate holes in the humeral shaft are pre-threaded, fixed angle screws.

## Step10: Final Screw Placement

The remaining locking shaft screws may be inserted at the surgeon's discretion.



## Post-op Protocol:

Immediately after closure, the elbow is placed in a bulky non-compressive Jones dressing with an anterior plaster slab to maintain the elbow in extension, and the upper extremity is kept elevated. The initial rehabilitation is planned according to the extent of soft-tissue damage. When the fracture is associated with severe soft-tissue damage, the extremity is kept immobilized and elevated with the elbow in extension for 3-7 days postoperatively. If the fracture is closed and there is no severe swelling or fracture blisters, the Jones dressing is removed after two days and an elastic non-constrictive sleeve is applied over an absorbent dressing placed on the wound. A physical therapy program including active and passive motion is then initiated.



### Acumed Single Use Tapping Instrument Precautions:

Tapping a plate using a plate tap will cause titanium debris to be generated, which should be removed. Failure to remove the plate debris can cause, among other complications, inflammation, cartilage damage, and patient discomfort. The taps are single surgery use and should be discarded after each surgery or if the tap becomes dull or damaged. If the resistance increases while using a tap, discard the tap immediately. Breakage to the tap can occur due to excessive torque or levering and care should be taken to avoid such conditions. Should breakage occur, carefully remove all tap pieces.

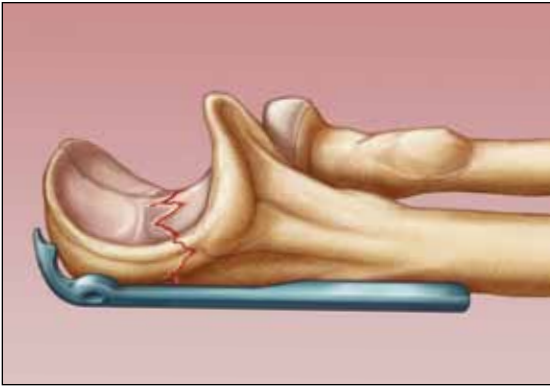
### Tapping Instructions:

- Do not tap deeper than the start of the laser line.
- Clean debris from tap after tapping each hole.
- Irrigate hole prior to tapping.
- Do not tap a slot.
- Do not re-tap a hole (use a non-locking screw).
- Tap by hand, not under power.
- Angle of tapped hole must not exceed 20°.



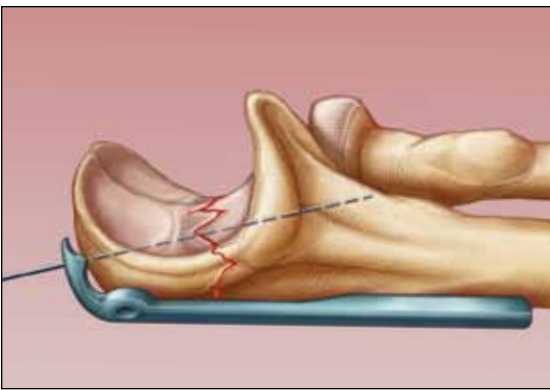


# Olecranon Plate



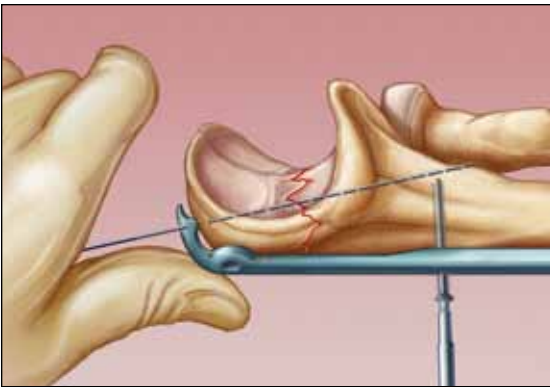
## Step1: Fracture Reduction and Plate Placement

Flex the elbow 90°, reduce the fracture and apply the plate. The prongs in the proximal end of the plate should penetrate the triceps tendon and provide provisional fixation. These prongs do not compress the tendon, and a gap between the plate and the bone should be visible on X-ray (as shown in images).



## Step 2: Provisional Wire Placement

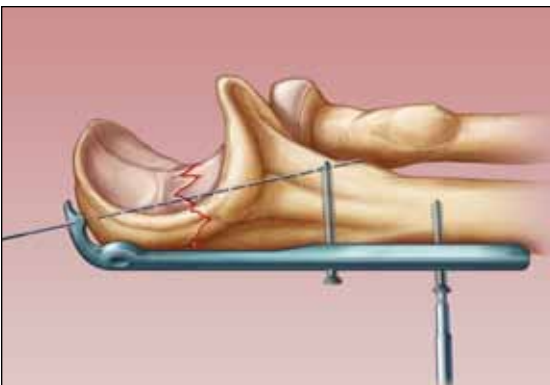
A 2.0mm wire (WS-2009ST) is drilled through the proximal hole of the plate and across the fracture site, penetrating the anterior metaphyseal cortex. If a locking screw is to be utilized, thread the 2.7mm locking drill guide (MS-LDG27) into the plate hole and then insert the wire. Do not remove this wire until Step 6. Alternatively, two .062" wires can be placed across the fracture, one on each side of the plate.



## Step 3: Non-Locking Distal Screw Placement

With provisional reduction confirmed, drill (MS-DC28) and insert a 3.5mm non-locking screw (CO-3xx0) through the slotted hole distal to the fracture site and into the ulnar shaft. Connect the 2.5mm hex driver tip (HPC-0025) to the driver handle (MS-3200 or MS-1210) and tighten the screw partially to allow for later compression.

Bone taps (MS-LTT27/35) are recommended for patients with dense bone.

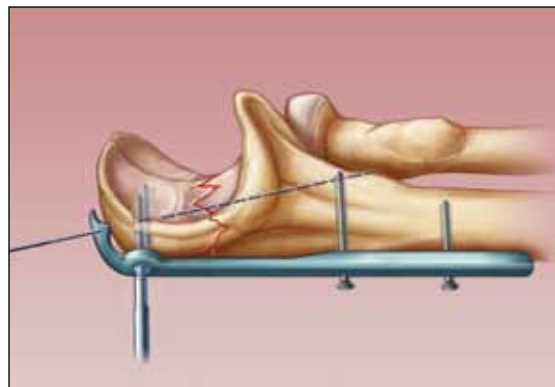


## Step 4: Fracture Site Compression

Insert a 3.5mm non-locking screw (CO-3xx0) in dynamic compression mode into a distal slot along the ulnar shaft using the offset drill guide (PL-2095). The proximal shaft screw may be loosened to allow for compression. If a longer plate is used and further compression is required, insert another non-locking screw into a distal slot in dynamic compression mode, loosening the first two screws to allow for plate movement.

## Step 5: Proximal Locking Screw Placement

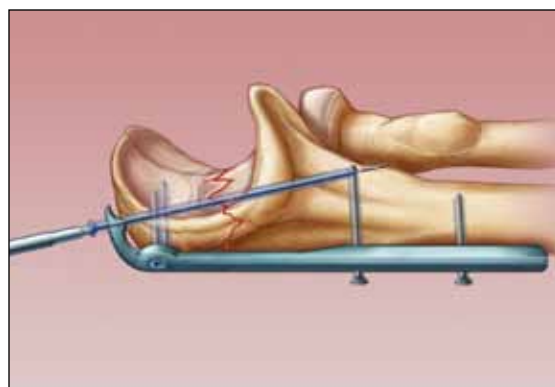
Insert two 2.7mm locking screws (COL-2xx0) into the proximal holes on either side of the 2.0mm wire, using the 2.7mm locking drill guide (MS-LDG27). When drilling (MS-DC5020), be careful not to exit the bone. The fixed angle locking screw trajectory is meant to create maximum fixation in the small proximal fragments.



## Step 6: "Home Run" Screw Placement

Remove the 2.0mm wire and insert a locking 3.5mm (COL-3xx0), "home run" screw. Attach the 3.5mm locking drill guide and use the 2.8mm long drill (MS-LDC28) in the path of the wire. Measure depth and insert the screw.

If using a non-locking 2.7mm "home run" screw, the 2.0mm wire has already created the appropriate size hole and trajectory for the locking screw.



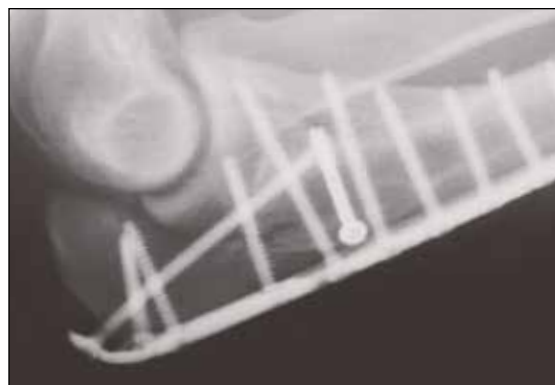
## Step 7: Final Screw Placement

The remaining screws are inserted at the surgeon's discretion. If a locking screw is used in the most proximal of the distal plate holes, the screw must be short enough (max. 16mm) to avoid contact with the locking "home run" screw. If a longer screw is necessary, use a non-locking screw and angle it slightly to avoid contact with the locking "home run" screw. A non-locking screw must be used in the most distal of the proximal cluster of holes to avoid contacting the locking "home run" screw.

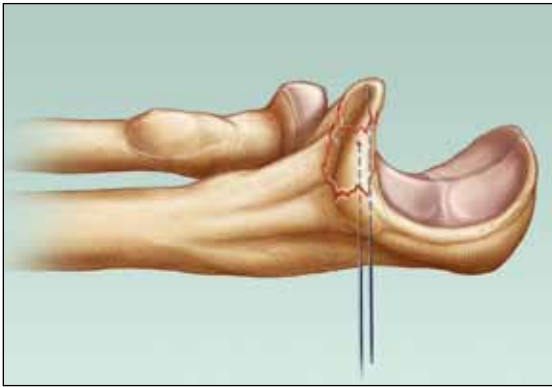


## Post-op Protocol:

Immediately after closure, the elbow is placed in a bulky non-compressive Jones dressing with an anterior plaster slab to maintain the elbow in extension, and the upper extremity is kept elevated. The initial rehabilitation is planned according to the extent of soft-tissue damage. When the fracture is associated with severe soft-tissue damage, the extremity is kept immobilized and elevated with the elbow in extension for 3-7 days postoperatively. If the fracture is closed and there is no severe swelling or fracture blisters, the Jones dressing is removed after two days and an elastic non-constrictive sleeve is applied over an absorbent dressing placed on the wound. A physical therapy program including active and passive motion is then initiated.

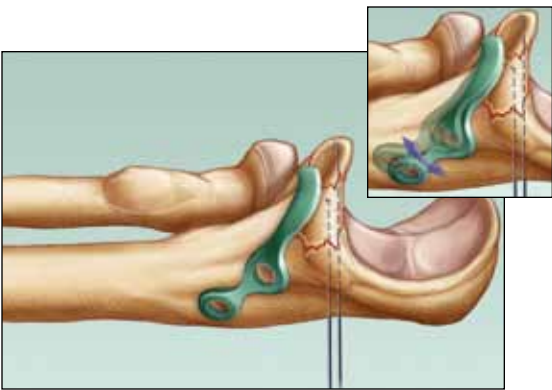


# Coronoid Plate



## Step 1: Fracture Fragment Fixation

Expose the coronoid through an anteriomedial approach. Reduce and provisionally hold the fragments with threaded titanium wires (WT-xx0xSTT) drilled from posterior to anterior. These are best placed when retracting the coronoid fragments, so that you can see the wires emerge into the fracture surface. They are then backed past the fracture site to allow for reduction. Once a proper reduction is achieved, re-advance the wires past the fracture site and into the fragments.



## Step 2: Plate Placement

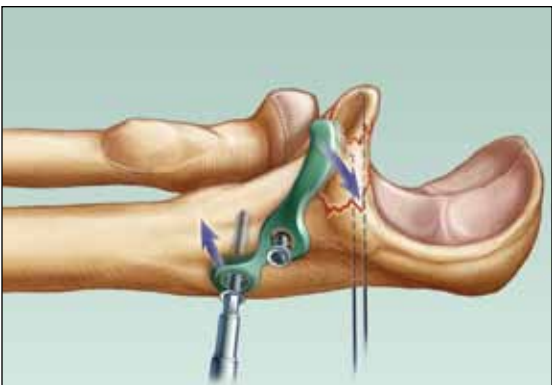
Apply the Mayo Clinic Congruent Coronoid Plate so that the sharp prongs grasp and buttress the section of the coronoid between its tip and its sublime tubercle on which the anterior bundle of the MCL inserts. The plate should wrap around the brachialis tendon insertion onto the medial side of the ulna distally.



## Step 3: Initial Screw Placement

While holding the plate reduced, drill the middle hole (MS-DC5020) and insert a 2.7mm screw (CO-27xx). Do not tighten the screw.

Bone taps (MS-LTT27/35) are recommended for patients with dense bone.

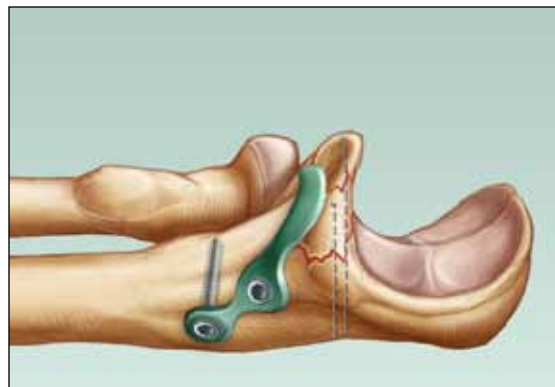


## Step 4: Buttress Fragments with Plate

Push the distal tip of the plate anteriorly, applying a lever force against the coronoid fragments, and insert a 2.7mm screw (CO-27xx) through the distal hole. Do not tighten the screw.

## Step 5: Tighten Screws

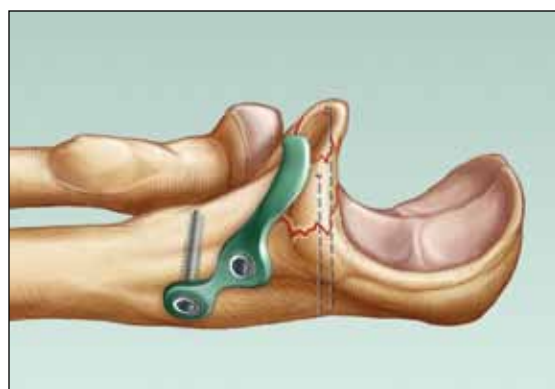
Tighten the proximal screw to bring the midsection of the plate to the bone and fully secure the buttress against the coronoid fragments. Tighten the distal screw. The plate will flex and contour to follow the line of the bone as this final screw is tightened.



## Step 6: Cut Threaded Wires

Cut the threaded titanium wires flush with the ulna, eliminating soft tissue irritation.

**Note:** If buttressing is excellent, the wires can be removed. If they are to be left in they must be titanium and threaded (WT-xx0xSTT), not smooth.



## Post-op Protocol:

Immediately after closure, the elbow is placed in a bulky non-compressive Jones dressing with an anterior plaster slab to maintain the elbow in extension, and the upper extremity is kept elevated. The initial rehabilitation is planned according to the extent of soft tissue damage. When the fracture is associated with severe soft tissue damage, the extremity is kept immobilized and elevated with the elbow in extension for 3-7 days post-op. If the fracture is closed and there is no severe swelling or fracture blisters, the Jones dressing is removed after two days and an elastic non-constrictive sleeve is applied over an absorbent dressing placed on the wound.

In cases in which fracture stability is not a concern, a program of continuous passive motion begins within the limits of motion determined by soft tissue compliance, which itself is diminished due to fluid accumulation at the elbow region. Edema control is important post-op, as swelling limits elbow motion. It is essential that gravitational varus stresses are avoided, as these will result in displacement of the medial coronoid fracture fragment. Therefore, the arm is maintained in a vertical plane when the elbow is being moved and supporting the wrist whenever the arm is moved away from the body unloads the weight of the forearm. Both active and passive motion are permissible in most coronoid fractures treated with the described technique.

If by 4-6 weeks motion is not returning satisfactorily, a program of patient-adjusted static flexion and extension splinting should be commenced to assist with regaining motion. If heterotopic ossification is forming, the splinting program should still be used. The forces generated are small, and not a risk of worsening the heterotopic ossification.



# Ordering Information

## Mayo Clinic Congruent Elbow Plates

16 Hole Locking Medial Plate (175mm)	PL-LEM16
12 Hole Locking Medial Plate (130mm)	PL-LEM12
9 Hole Locking Medial Plate, Long (95mm)	PL-LEM9L
9 Hole Locking Medial Plate, Short (96mm)	PL-LEM9S
8 Hole Locking Medial Plate (88mm)	PL-LEM8
7 Hole Locking Medial Plate (84mm)	PL-LEM7
20 Hole Locking Lateral Plate, Left (206mm)	PL-LEL20L
20 Hole Locking Lateral Plate, Right (206mm)	PL-LEL20R
14 Hole Locking Lateral Plate, Left (142mm)	PL-LEL14L
14 Hole Locking Lateral Plate, Right (142mm)	PL-LEL14R
10 Hole Locking Lateral Plate, Left (100mm)	PL-LEL10L
10 Hole Locking Lateral Plate, Right (100mm)	PL-LEL10R
6 Hole Locking Lateral Plate, Left (58mm)	PL-LEL6L
6 Hole Locking Lateral Plate, Right (58mm)	PL-LEL6R
17 Hole Locking Olecranon Plate, Left (173mm)	PL-LEO17L
17 Hole Locking Olecranon Plate, Right (173mm)	PL-LEO17R
13 Hole Locking Olecranon Plate (129mm)	PL-LEO13
13 Hole Extended Locking Olecranon Plate (109mm)	PL-LEO13E
11 Hole Locking Olecranon Plate (106mm)	PL-LEO11
9 Hole Locking Olecranon Plate (86mm)	PL-LEO9
Coronoid Plate Left (33mm)	PL-ELCOL
Coronoid Plate Right (33mm)	PL-ELCOR
Extended Coronoid Plate, Left (68mm)	PL-ELCLL
Extended Coronoid Plate, Right (68mm)	PL-ELCLR
Posterior Plate (95mm)	PL-ELPO

## 2.7mm Locking Cortical Screws

2.7mm x 12mm Locking Cortical Screw	COL-2120
2.7mm x 14mm Locking Cortical Screw	COL-2140
2.7mm x 16mm Locking Cortical Screw	COL-2160
2.7mm x 18mm Locking Cortical Screw	COL-2180
2.7mm x 20mm Locking Cortical Screw	COL-2200
2.7mm x 22mm Locking Cortical Screw	COL-2220

## 2.7mm Tap Locking Screws

2.7mm x 36mm Tap Locking Screw	FA-C02736
2.7mm x 38mm Tap Locking Screw	FA-C02738
2.7mm x 40mm Tap Locking Screw	FA-C02740

## 2.7mm Tap Locking Screws (cont.)

2.7mm x 45mm Tap Locking Screw	FA-C02745
2.7mm x 50mm Tap Locking Screw	FA-C02750
2.7mm x 55mm Tap Locking Screw	FA-C02755
2.7mm x 60mm Tap Locking Screw	FA-C02760

## 2.7mm Cortical Screws

2.7mm x 12mm Cortical Screw	CO-2712
2.7mm x 14mm Cortical Screw	CO-2714
2.7mm x 16mm Cortical Screw	CO-2716
2.7mm x 18mm Cortical Screw	CO-2718
2.7mm x 20mm Cortical Screw	CO-2720
2.7mm x 22mm Cortical Screw	CO-2722
2.7mm x 24mm Cortical Screw	CO-2724
2.7mm x 26mm Cortical Screw	CO-2726
2.7mm x 28mm Cortical Screw	CO-2728
2.7mm x 30mm Cortical Screw	CO-2730
2.7mm x 32mm Cortical Screw	CO-2732
2.7mm x 34mm Cortical Screw	CO-2734
2.7mm x 36mm Cortical Screw	CO-2736
2.7mm x 38mm Cortical Screw	CO-2738
2.7mm x 40mm Cortical Screw	CO-2740
2.7mm x 45mm Cortical Screw	CO-2745
2.7mm x 50mm Cortical Screw	CO-2750
2.7mm x 55mm Cortical Screw	CO-2755
2.7mm x 60mm Cortical Screw	CO-2760
2.7mm x 65mm Cortical Screw	CO-2765

## 3.5mm Locking Cortical Screws

3.5mm x 12mm Locking Cortical Screw	COL-3120
3.5mm x 14mm Locking Cortical Screw	COL-3140
3.5mm x 16mm Locking Cortical Screw	COL-3160
3.5mm x 18mm Locking Cortical Screw	COL-3180
3.5mm x 20mm Locking Cortical Screw	COL-3200
3.5mm x 22mm Locking Cortical Screw	COL-3220
3.5mm x 24mm Locking Cortical Screw	COL-3240
3.5mm x 26mm Locking Cortical Screw	COL-3260
3.5mm x 28mm Locking Cortical Screw	COL-3280
3.5mm x 30mm Locking Cortical Screw	COL-3300



# Ordering Information

## 3.5mm Locking Cortical Screws (cont.)

3.5mm x 32mm Locking Cortical Screw	COL-3320
3.5mm x 34mm Locking Cortical Screw	COL-3340
3.5mm x 36mm Locking Cortical Screw	COL-3360
3.5mm x 38mm Locking Cortical Screw	COL-3380
3.5mm x 40mm Locking Cortical Screw	COL-3400
3.5mm x 45mm Locking Cortical Screw	COL-3450
3.5mm x 50mm Locking Cortical Screw	COL-3500

## 3.5mm Tap Locking Screws

3.5mm x 36mm Tap Locking Screw	FA-C03536
3.5mm x 38mm Tap Locking Screw	FA-C03538
3.5mm x 40mm Tap Locking Screw	FA-C03540
3.5mm x 45mm Tap Locking Screw	FA-C03545
3.5mm x 50mm Tap Locking Screw	FA-C03550
3.5mm x 55mm Tap Locking Screw	FA-C03555
3.5mm x 60mm Tap Locking Screw	FA-C03560

## 3.5mm Cortical Screws

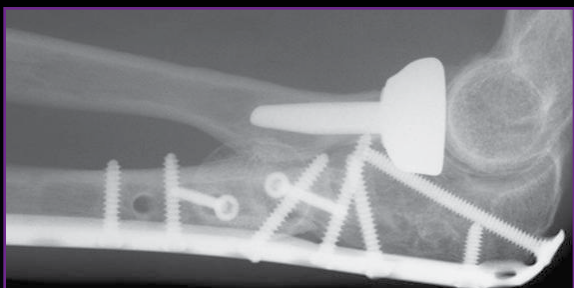
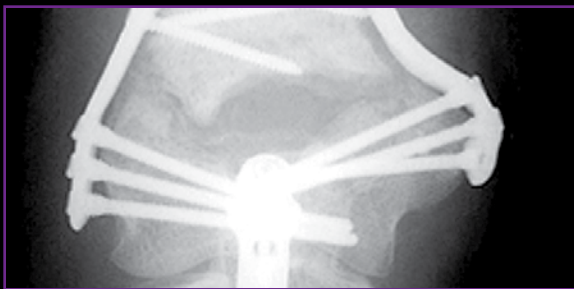
3.5mm x 12mm Cortical Screw	CO-3120
3.5mm x 14mm Cortical Screw	CO-3140
3.5mm x 16mm Cortical Screw	CO-3160
3.5mm x 18mm Cortical Screw	CO-3180
3.5mm x 20mm Cortical Screw	CO-3200
3.5mm x 22mm Cortical Screw	CO-3220
3.5mm x 24mm Cortical Screw	CO-3240
3.5mm x 26mm Cortical Screw	CO-3260
3.5mm x 28mm Cortical Screw	CO-3280
3.5mm x 30mm Cortical Screw	CO-3300
3.5mm x 32mm Cortical Screw	CO-3320
3.5mm x 34mm Cortical Screw	CO-3340
3.5mm x 36mm Cortical Screw	CO-3360
3.5mm x 38mm Cortical Screw	CO-3380
3.5mm x 40mm Cortical Screw	CO-3400
3.5mm x 45mm Cortical Screw	CO-3450
3.5mm x 50mm Cortical Screw	CO-3500
3.5mm x 55mm Cortical Screw	CO-3550
3.5mm x 60mm Cortical Screw	CO-3600
3.5mm x 65mm Cortical Screw	CO-3650

## 4.0mm Cancellous Screws

4.0mm x 12mm Cancellous Screw	CA-4120
4.0mm x 14mm Cancellous Screw	CA-4140
4.0mm x 16mm Cancellous Screw	CA-4160
4.0mm x 18mm Cancellous Screw	CA-4180
4.0mm x 20mm Cancellous Screw	CA-4200
4.0mm x 22mm Cancellous Screw	CA-4220
4.0mm x 24mm Cancellous Screw	CA-4240
4.0mm x 26mm Cancellous Screw	CA-4260
4.0mm x 28mm Cancellous Screw	CA-4280
4.0mm x 30mm Cancellous Screw	CA-4300
4.0mm x 35mm Cancellous Screw	CA-4350
4.0mm x 40mm Cancellous Screw	CA-4400
4.0mm x 45mm Cancellous Screw	CA-4450
4.0mm x 50mm Cancellous Screw	CA-4500
4.0mm x 55mm Cancellous Screw	CA-4550
4.0mm x 60mm Cancellous Screw	CA-4600

## Instruments

.045" x 6" SS Guide Wire	WS-1106ST
2.0mm x 9" Guide Wire	WS-2009ST
2.0mm Quick Release Drill	MS-DC5020
2.8mm Quick Release Drill	MS-DC28
3.5mm Quick Release Drill	MS-DC35
2.0mm Long Quick Release Drill	MS-LDC20
2.8mm Long Quick Release Drill	MS-LDC28
2.0mm Long Quick Release Pin	MS-PIN20
2.8mm Long Quick Release Pin	MS-PIN28
2.7mm Quick Release Plate Tap	PL-ELT1027
3.5mm Quick Release Plate Tap	PL-ELT1035
2.7mm Long Tap Tip (Bone Tap)	MS-LTT27
3.5mm Long Tap Tip (Bone Tap)	MS-LTT35
2.5mm Quick Release Driver Tip	HPC-0025
.062" x 6" Threaded Titanium Wire	WT-1606STT
.035" x 6" Threaded Titanium Wire	WT-0906STT



1. Data on file at Acumed.
2. "Biomechanical Evaluation of Methods of Internal Fixation of the Distal Humerus," Schemitsch, Tencer and Henley, Journal of Orthopaedic Trauma, 1994.
3. Data on file at Acumed.
4. Data on file at Acumed.
5. "Internal Fixation of the Distal Humerus: A Biomechanical Comparison of Methods," Helfet and Hotchkiss, Journal of Orthopaedic Trauma, 1990.
6. "Biomechanical Evaluation of Methods of Internal Fixation of the Distal Humerus," Schemitsch, Tencer and Henley, Journal of Orthopaedic Trauma, 1994.
7. Data on file at Acumed.
8. "Comparative Stability of Perpendicular Versus Parallel Double-Locking Plating Systems in Osteoporotic Comminuted Distal Humerus Fractures," Stoffel, et. al, Journal of Orthopaedic Research, 2008.
9. Data on file at Acumed.

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