

# AEUMED<sup>®</sup>

Innovative solutions



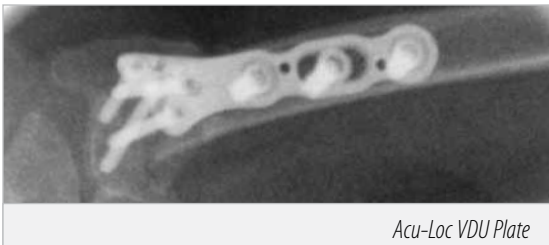
ACU-LOC<sup>®</sup>  
Wrist Plating System

# Acu-Loc® Wrist Plating 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.*



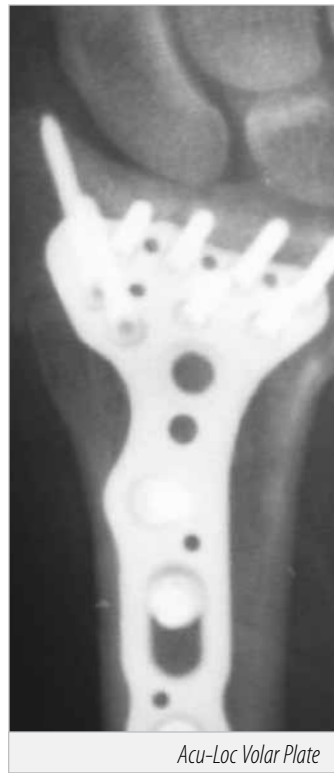
Acu-Loc EX Plate



Acu-Loc VDU Plate

In 2004, Acumed designed an innovative solution for repairing fractures of the distal radius by designing the first truly anatomic volar plate. The Acu-Loc Targeted Distal Radius Plate quickly became a market leader and since its introduction, over 100,000 plates have been implanted. The Acu-Loc had many features not seen previously in distal radius plating. Some of these pioneering features were:

- Aggressively targeting the styloid with two screws
- A mono-block targeting guide which then became the first radiolucent targeting guide
- A distal fitting plate to support complex intra-articular distal radius fractures



Acu-Loc Volar Plate



Acu-Loc Dorsal Plate

The Acu-Loc Targeted Distal Radius System has helped solve many complex injuries of the wrist. To further address the complications of wrist fractures, osteotomies and other wrist injuries, Acumed introduces three new plates to the system. The Acu-Loc Dorsal Plates, the Acu-Loc Extra-Articular (EX) Plates and the Acu-Loc Volar Distal Ulna (VDU) Plates.

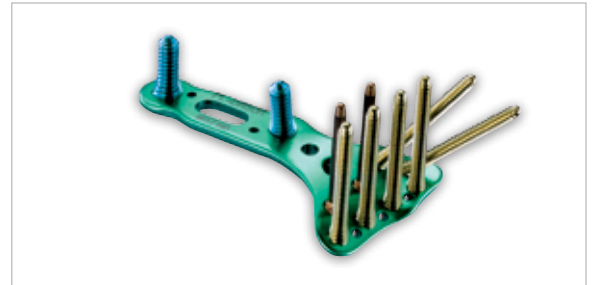
The locking **Acu-Loc Dorsal Plates** offer a solution to treat complex wrist injuries that need to be addressed from the dorsal side of the radius. The plate acts as a template to help restore the patient's anatomy and helps save valuable operating time. The strength of the distal cage of screws, along with fixed angle locking technology, supports the fracture during the healing process.

**The Acu-Loc EX Plates** provide a new option for extra-articular fractures. Plate positioning, low profile design and screw interface are intended to reduce soft tissue irritation and hardware prominence.

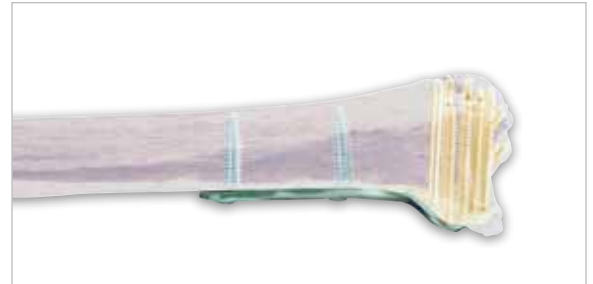
**The Acu-Loc VDU Plates** are designed specifically for peri-articular fractures of the distal ulna. The screw positioning and angulation of the Acu-Loc VDU Plate targets the distal fragments and provides secure, stable fracture fixation of the ulnar head and neck.

# Acu-Loc® Volar Distal Radius Plate

**Precise Screw Placement** enables the surgeon to maximize purchase in the distal radius and the radial styloid. The Acu-Loc Volar plates are designed to be placed more distal than many other volar plates. The distal screws, angled forward six degrees from the plate, maximize purchase in the subchondral bone. Two of the distal screws aggressively target the radial styloid to provide fixation along the entire distal radius.



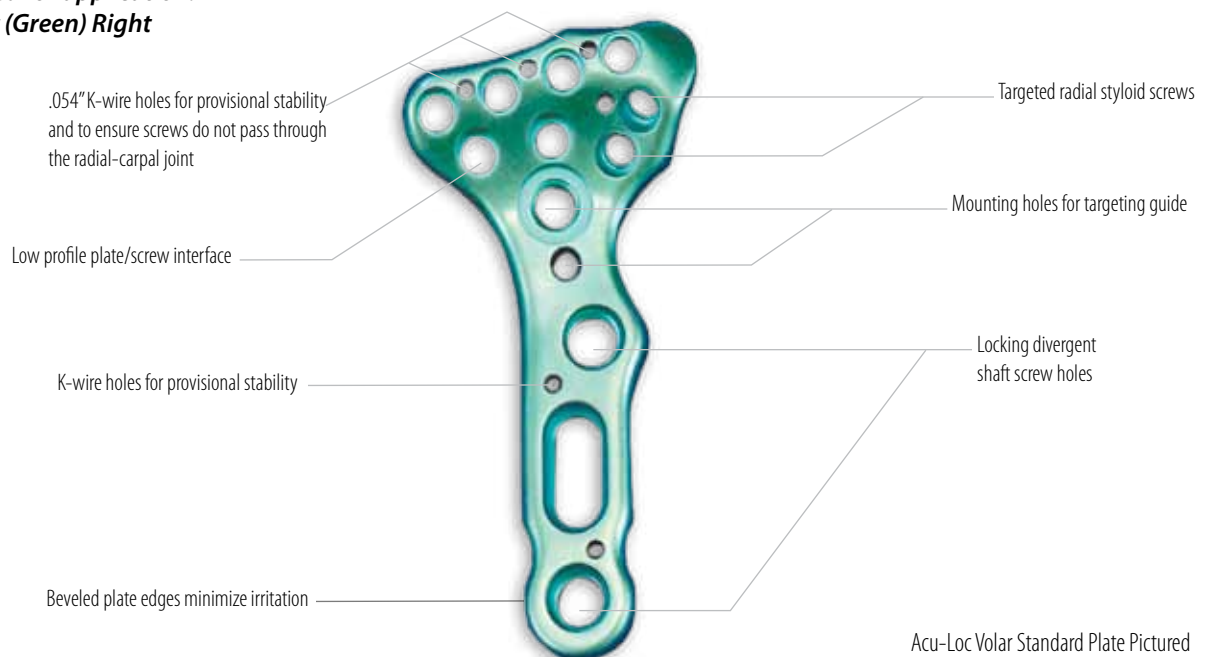
**Anatomic Plate Design** assists in restoring the original geometry of the patient's anatomy. Acumed's goal was to design a plate that most closely replicated the anatomical contours of the distal radius in order to maximize support and accurately reduce the fracture. The plate surface is angled upward to accommodate and support the radial styloid. The plate surface is angled back to accommodate the anatomical fluctuations of the volar-ulnar lip, which differs from patient to patient.



**Advanced Radiolucent Targeting Guides** are low profile and allow the surgeon to visualize and accurately target each of the distal screws. Drilling, measuring and inserting the screw through the guide saves valuable OR time and frustration associated with individual targeting guides. The K-wire holes are in line with the distal screws, allowing the surgeon to verify screw and plate placement.

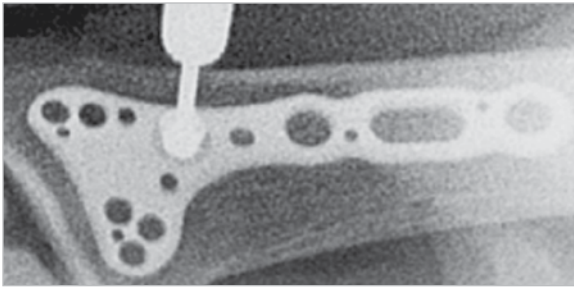


**Color coded for application.**  
**(Blue) Left (Green) Right**



Acu-Loc Volar Standard Plate Pictured

# Acu-Loc® Dorsal Plate



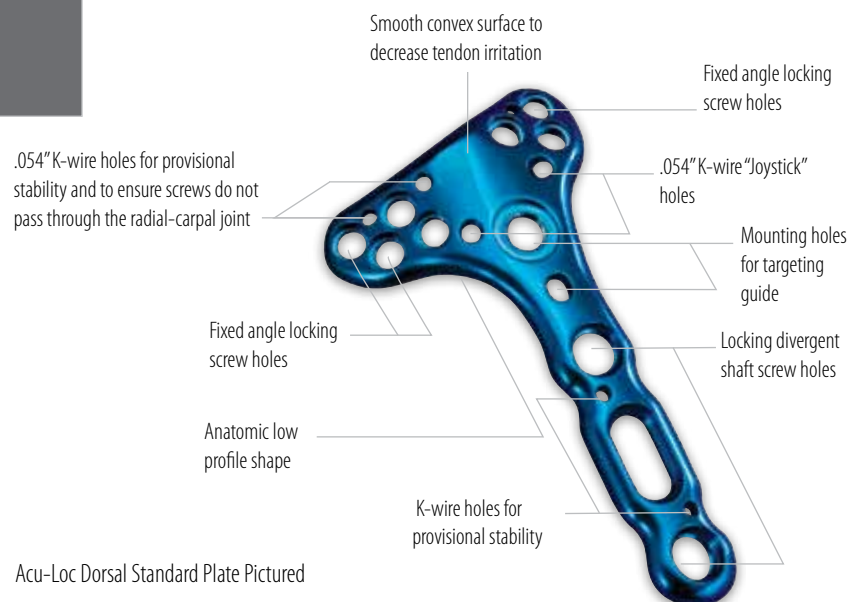
## Indications:

Buttress for Dorsal Fractures  
Corrective Osteotomy  
Dorsal Comminution

**Anatomic Plate Design** assists in restoring the original geometry of the patient's anatomy. Extensive cadaveric research aided in the development of an anatomically contoured and low profile plate design. Left and right specific plate options are available in the system that precisely match the anatomic curvature of the distal radius.

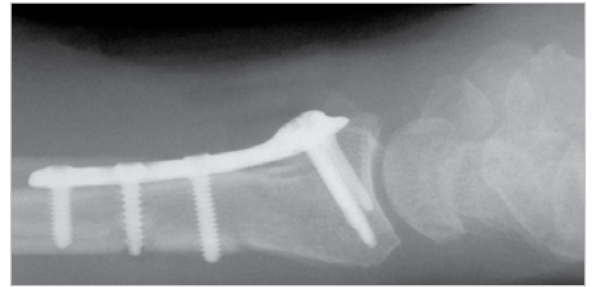
**Dorsal Approach** to the fracture allows the surgeon to visualize the fracture as well as use the plate to buttress the dorsal fragments for a simplified reduction. The proximal portion of the plate is placed just radial to the convex surface of the radial shaft. Plate positioning, low profile design and screw interface are intended to reduce soft tissue irritation and hardware prominence.

**Advanced Radiolucent Targeting Guide** is low profile and allows the surgeon to visualize and target each of the distal screws. Drilling, measuring and inserting the screw through the guide saves valuable OR time.



Acu-Loc Dorsal Standard Plate Pictured

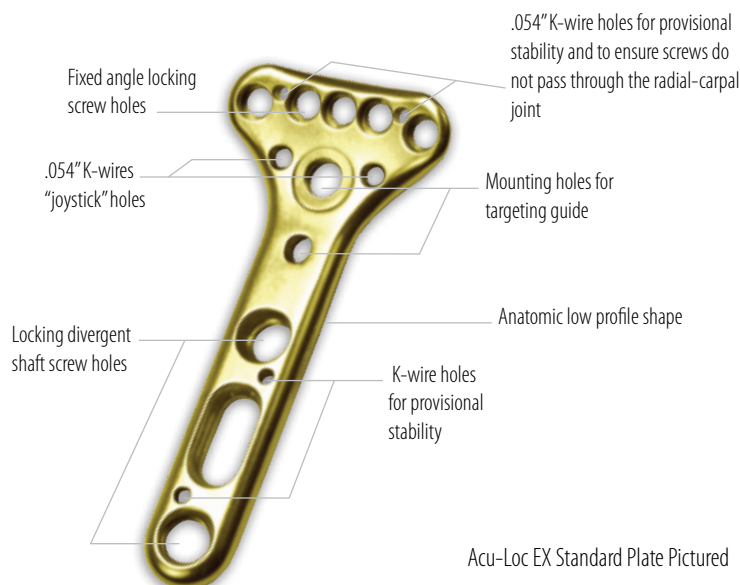
**Precise Screw Placement** enables the surgeon to maximize purchase in the distal radius. The distal locking screws are angled distally to support the dorsal lip of the radius, maximizing purchase in the subchondral bone.



**Anatomic Plate Design** assists in restoring the original geometry of the patient's anatomy. The plate is made to sit along the flat metaphyseal portion of the distal radius and sits more proximally than the standard Acu-Loc Volar Distal Radius Plate. The Acu-Loc EX plate surface accommodates the anatomical fluctuations of both left and right volar radii, which differ from patient to patient.



**Advanced Radiolucent Targeting Guide** is low profile and allows the surgeon to visualize and accurately target each of the distal screws. Drilling, measuring and inserting the screw through the guide saves valuable OR time.



## Indications:

Extra-articular fractures

Corrective Osteotomy

"Flat" Radius



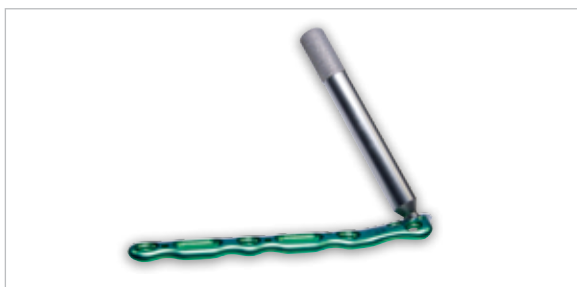
# Acu-Loc® VDU Plates



**Anatomic Plate Design** assists in restoring the original geometry of the distal ulna. The plate is designed to sit proximal to the DRUJ so it does not impinge pronation or supination. Left and right specific plate options, as well as long and standard lengths, are available in the system that precisely match the anatomical curvature of the distal ulna.



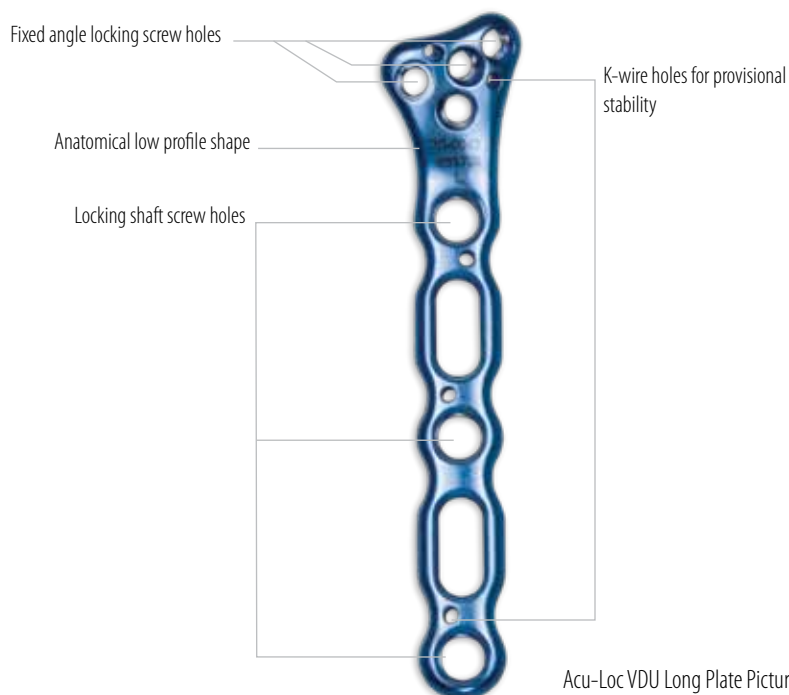
**Precise Screw Placement** enables the surgeon to maximize purchase in the distal ulna. The distal locking screws converge into the ulnar head targeting the best subchondral bone to maximize stability. Unicortical proximal locking screws provide stability while eliminating soft tissue impingement on the volar surface of the distal ulna.



**Advanced Instrumentation** system gives the surgeon a comprehensive, complete set of instruments to implant the plate. The Threaded Drill Guide is used for this fixed angle plate to ensure the distal screws are properly inserted and seated flush with the plate surface.

## Indications:

- Distal Ulna Shaft Fractures
- Ulna Neck Fractures
- Peri-articular Ulna Head Fractures



Acu-Loc VDU Long Plate Pictured

# Acu-Loc® Instrumentation

The Acu-Loc Targeted Distal Radius System features a unique targeting system for precise drilling and screw placement. The guide allows the surgeon to accurately and consistently target and insert all distal screws eliminating the time and frustration with traditional drilling and screw placement techniques. (Figure 1)

The low profile radiolucent targeting guide (Figure 2) has several features that contribute to an improved surgical technique. The distal K-wire holes in both the targeting guides and distal radius plates allow placement of one or more K-wires for provisional stability and to verify plate placement. The K-wire holes are in line with the distal screws of all Acu-Loc distal radius and ulna plates, allowing the surgeon to verify screw placement.

The Acu-Loc Volar Distal Radius targeting guide also features a dual hole, allowing accurate placement of the two radial styloid screws. (Figure 3) These targeting guides are left and right specific, with one guide to accommodate the standard, long and extra-long plates and a second guide to accommodate the wide plate. A third guide accommodates the narrow plate. All the Acu-Loc targeting guides are housed next to the appropriate plates in the base of the tray for ease of use.

The Acu-Loc instrumentation system (Figure 4) gives the surgeon a comprehensive, complete set of instruments to implant all of the distal radius and volar distal ulna plates. The system features a number of clamps, retractors and soft tissue protectors in addition to the drivers, drills and targeting assemblies. Acumed's goal is to have one self-contained kit with everything needed for a procedure, eliminating the hassle of opening other instrumentation sets for additional components.

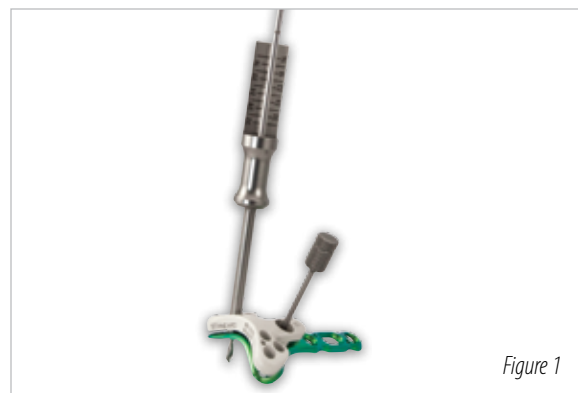


Figure 1

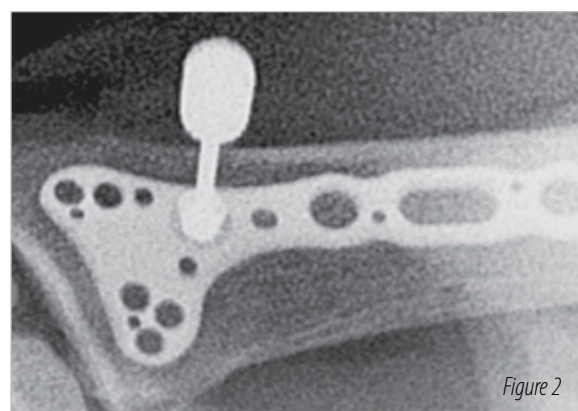


Figure 2

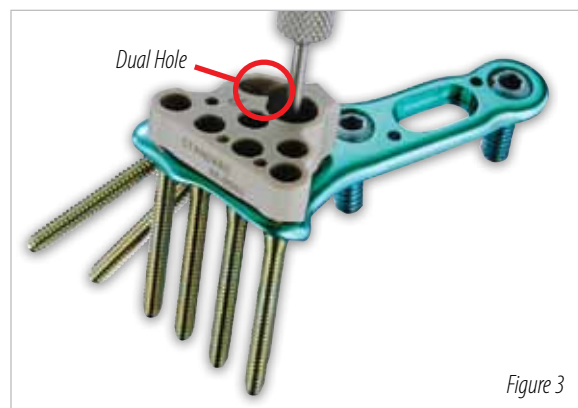
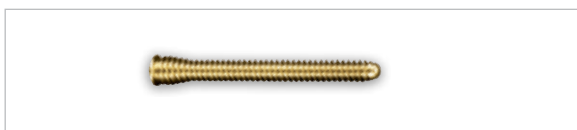


Figure 3



Figure 4

# Precise Screw Placement



In order to improve fixation, pull-out strength and minimize soft tissue irritation, the diverging proximal holes in the Acu-Loc® plates are threaded to accept 3.5mm unicortical locking screws. The surgeon also has the option to use traditional 3.5mm bicortical screws. The Acu-Loc Volar Distal Radius screw holes are angled to maximize pull-out strength, improving overall plate stability. When combined with the Acu-Loc's distal screw placement, the plate provides maximum fixation to promote fracture union.

Fully threaded locking screws, locking pegs and non-toggling screws are available from 8mm to 32mm lengths. The screw heads are designed to be low profile and sit below the plate's surface, minimizing soft tissue or tendon irritation.

- 2.3mm bronze smooth locking pegs for optional distal fragment fixation. Pegs are tapered under the head to facilitate insertion.
- 2.3mm gold fully threaded locking screws have the same pitch from tip to tail and are tapered under the head to facilitate insertion.
- 2.3mm silver non-locking screws with enlarged tail end to minimize the toggle effect.
- 3.5mm blue proximal locking screws have the same pitch from tip to tail and are tapered under the head to facilitate insertion.
- 3.5mm silver non-locking cortical screws for bi-cortical proximal fixation.



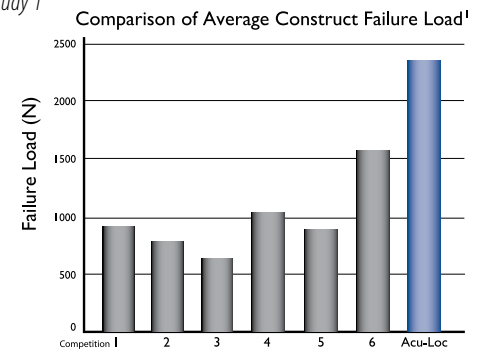
The ability of locked screws to resist the loads in the distal radius has been shown in several studies comparing the average construct failure load of several plates on the market. Acumed simulated the testing methods used in these studies to determine the failure load of the Acu-Loc® Volar Distal Radius Plate.

The failure load of the Acu-Loc plate was compared with the results of two recent biomechanical studies.

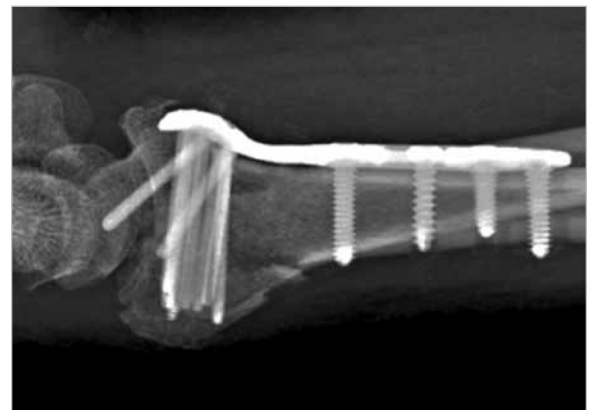
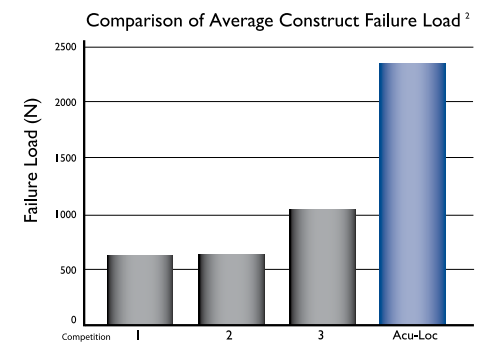
The biomechanical properties of six dorsal and volar plate designs were compared in Study<sup>1</sup>. Average construct failure load of the six plates was measured. The study stated that an estimated 250N of force is applied to the wrist joint in the flexed digit position. Testing conducted on the Acu-Loc plate resulted in a construct load of 2400N without failure, showing that the Acu-Loc can withstand over 9X or nearly 10X the force that is applied to the wrist during patient rehabilitation. All plates, including the Acu-Loc, exceeded this 250N benchmark. The six plates in the study failed in a similar fashion. Bending of the plates occurred without screw loosening.

The Acu-Loc plate's biomechanical results were also compared to the results of a second biomechanical study<sup>2</sup>. The average construct failure load of three volar plate designs were compared. Screw loosening and bending occurred at the point of failure for the three plates studied.

Study 1



Study 2



# Acu-Loc® Volar Plate



## Step 1: Incision and Dissection

The patient's forearm is supinated to expose the surgical site. To maximize exposure, a towel is positioned under the wrist placing it in extension. Make a longitudinal incision approximately six centimeters in length just radial to the FCR tendon to protect against injury to the palmar cutaneous branch of the median nerve.

The tendon sheath is opened and the tendon is retracted radially to protect the radial artery. The flexor pollicis longus is identified by passive flexion/extension of the thumb interphalangeal joint and is retracted ulnarly to protect the median nerve. Next, the pronator quadratus is identified by its transverse fibers and is released radial to ulnar to expose the fracture site.



## Step 2: Plate Placement & Provisional Fixation

The fracture is reduced and evaluated under fluoroscopy. The brachioradialis may need to be released from its insertion on the radial styloid to facilitate reduction and visualization of the fracture. The plate is designed to sit along the distal aspect of the radius to support the volar articular fracture fragments. Once the appropriate plate is selected, attach the corresponding targeting guide using the set screw (80-0038). This may be done on the back table prior to insertion. The plate's position is then secured proximally with a .045" K-wire and distally with a .054" K-wire. If the targeting guide is not already attached to the plate, you would then slide the guide over the distal K-wire and into position. Another method is to secure the plate to the bone with a cortical screw proximally and then attach the targeting guide.



## Step 3: Non-Locking Proximal Screw Placement

Place the first 3.5mm non-locking cortical screw through the slot in the plate. The position of the plate relative to the articular surface can then be fine tuned by sliding the plate proximal or distal under fluoroscopy. Using the 2.8mm drill (MS-DC28) and the drill guide (PL-2018), drill through the far cortex. Drill depth is measured with the depth gauge (MS-9020). Note that if provisional K-wires are in place, they may interfere with drilling and screw insertion. Insert the appropriate silver 3.5mm non-locking screw (CO-3xx0), taking care that the screw is the proper length. The screw may need to be downsized after the plate has been reduced down to the bone.



## Step 4: Drill Distal Screw Holes

To assess the position of the distal locking screws relative to the articular surface and the dorsum of the radius, a .054" K-wire may be placed through the distal holes on the targeting guide and plate. The fracture reduction, plate position, and the location of the K-wire relative to the joint is assessed under fluoroscopy. If the distal K-wires do not penetrate the joint, the distal 2.3mm screws will not either. Care should be taken not to angle the distal K-wires. Target one of the four distal holes first. Insert the drill guide (MS-DG23) into one of the holes, followed by the 2.0mm drill (MS-DCR20). Screw length is measured by using the laser mark on the drill and the scale on the drill guide. As an alternative, the depth probe (MS-DRPB) may be used by hooking the far cortex and measuring with the laser mark on the probe.

## Step 5: Distal Screw Selection

There are three types of 2.3mm screws that can be used in any of the eight distal holes: Fully-Threaded Locking Screws (gold), Smooth Locking Pegs (Bronze) and Non-Toggling Screws (silver). All 2.3mm screws are inserted using the 1.5mm driver tip (HPC-0015), sleeve (MS-SS23) and driver handle (MS-2210).

**Note:** An Individual Locking Drill Guide (MS-LDG23) is available in the system as an alternative for drilling the distal holes. Screw length can be read using the depth gauge (MS-9020).



## Step 6: Distal Screw Placement

It is at the discretion of the surgeon when to use the Threaded Locking Screws, the Smooth Locking Pegs, and the Non-Toggling (non-locking) Screws. The thread pitch on the Threaded Locking Screw is the same from the tip to the head minimizing the "differential pitch effect" as the screw is seated into the plate. All eight distal holes accept the three different screw designs.

The radial styloid screws are designed specifically to target and support the radial styloid fragment at angles of 41 and 53 degrees from the plate. A C-Arm overlay is available in the system to determine the trajectory of the distal/radial screw prior to screw insertion. The overlay is used with an A/P view of the distal radius.

**Note:** A minimum of 6 distal screws should be used in the four most distal holes and the two radial styloid holes.



## Step 7: Styloid Screw Placement

The two radial styloid screws are approached from the back of the targeting guide. Using the dual slot on the back of the guide, the distal/radial screw is targeted by inserting the drill guide to the radial side (1) of the dual slot. The more proximal/ulnar screw is targeted by inserting the drill guide to the ulnar side of the dual slot (2). Both radial styloid screws should be drilled through the targeting guide. Remove the guide to measure and insert the screws. The guide is removed to increase visualization of the drill holes when inserting the screws. With the targeting guide in place, it may be difficult to remove the radial styloid screws if a different size screw is needed. If resizing is necessary, remove the guide and the screw, measure with the depth gauge and insert the proper screw.



## Step 8: Proximal Locking Screw Placement

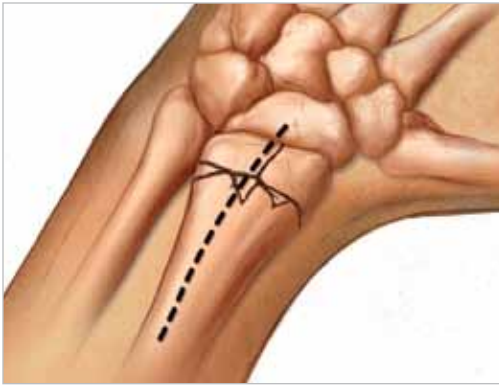
Select one of the two remaining proximal holes and insert the threaded drill guide (MS-LDG35). Drill with the 2.8mm drill (MS-DC28) and measure with the depth gauge (MS-9020). Insert the proper length 3.5mm light blue locking screw (COL-3XX0) using the 2.5mm driver tip (HPC-0025), sleeve (MS-SS35) and driver handle (MS-3200), taking care that the screw does not exit the bone dorsally. Using the same process, drill and place the final locking screw.



## Step 9: Closure and Post-op Protocol

Following thorough radiographic evaluation, check alignment and rotation, then close. Start immediate finger range of motion and forearm rotation post-op. Allow early functional use of the hand for light ADLs. Support the wrist according to bone quality and stability.

# Acu-Loc® Dorsal Plate



## Step 1: Incision & Dissection

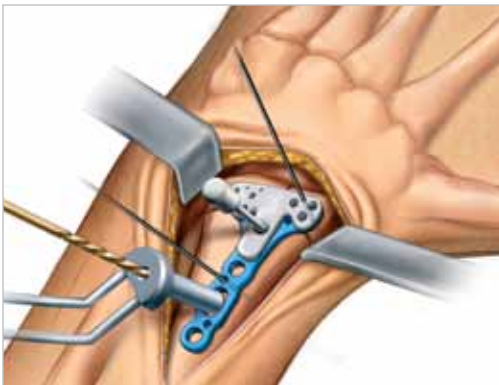
The dorsal approach incision is made in line with Lister's tubercle and the radial border of the long finger. Blunt dissection is carried down to protect the dorsal cutaneous nerve branches. The extensor pollicis longus tendon is identified distally in the wound and released through the third dorsal compartment. The second and fourth compartments are then subperiosteally elevated. Use caution when elevating the second and fourth dorsal compartments as bone fragments may have adhered to their undersurface.

A neurectomy of the posterior interosseous nerve may then be performed at the surgeon's discretion. The posterior interosseous nerve is identified on the radial aspect of the fourth compartment as it is elevated. A neurectomy is recommended on the proximal aspect of the incision to decrease neuroma pain.



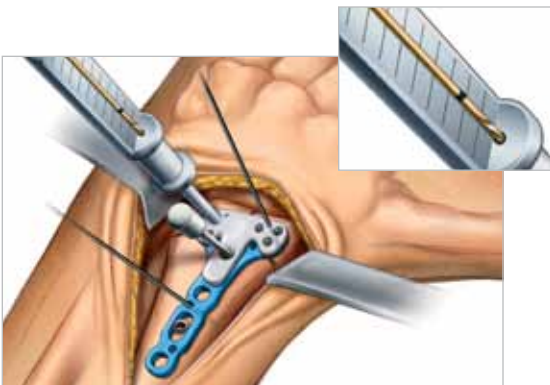
## Step 2: Plate Placement & Provisional Fixation

The fracture is then anatomically reduced with traction and volar translation. The plate can be used as a buttress to help push and reduce the dorsal displaced fracture fragments volarly. The reduction of the fracture and correct plate position are verified under fluoroscopy and the plate is provisionally stabilized with K-wires. The proximal shaft of the plate is placed just radial to the most convex position of the radial shaft. The appropriate right or left targeting guide may be attached to the appropriate plate on the back table prior to insertion and then placed on the bone.



## Step 3: Non-Locking Proximal Screw Placement

Place the first 3.5mm non-locking cortical screw in the center of the proximal slot in the plate. The position of the plate relative to the articular surface can then be fine tuned by sliding the plate proximal or distal under fluoroscopy. Using the 2.8mm drill (MS-DC28) and drill guide (PL-2018), drill through the far cortex. Drill depth is measured with the depth gauge (MS-9020). Insert the appropriate silver 3.5mm non-locking screw (CO-3XX0), taking care that the screw is the proper length. The screw reduces the plate down to the bone and the length of the screw should be assessed under fluoroscopy following the insertion of the remaining screws. The screw may need to be downsized after the plate has been reduced down to the bone.



## Step 4: Drill Distal Screw Holes

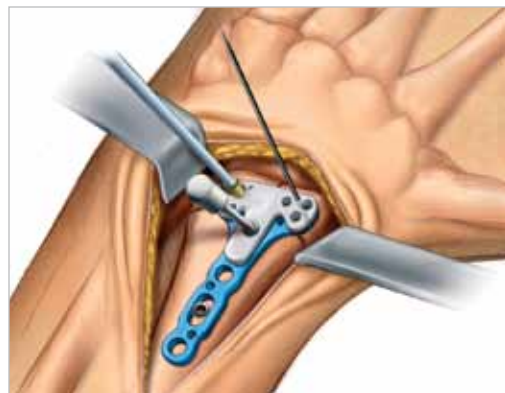
To assess the position of the distal locking screws relative to the articular surface and the dorsum of the radius, a .054" K-wire may be placed through the distal K-wire holes on the targeting guide and plate. The fracture reduction, plate position, and the location of the K-wire relative to the joint is assessed under fluoroscopy. If the distal K-wires do not penetrate the joint, the distal 2.3mm screws will not either. Care should be taken not to angle the distal K-wires. Select one of the four distal screw holes closest to the joint to drill first. Insert the drill guide (MS-DG23) into the selected hole followed by the 2.0mm drill (MS-DCR20). The depth of the screw is measured using the laser mark on the drill shaft and scale on the drill guide. As an alternative, the depth probe (MS-DRPB) may be used by hooking the far cortex and measuring with the laser mark on the probe.



## Step 5: Distal Screw Selection

There are three types of 2.3mm screws that can be used in any of the eight distal holes: Fully-Threaded Locking Screws (gold), Smooth Locking Pegs (Bronze) and Non-Toggling Screws (silver). All 2.3mm screws are inserted using the 1.5mm driver tip (HPC-0015), sleeve (MS-SS23) and driver handle (MS-2210).

**NOTE:** An individual drill guide (MS-LDG23) is available as an alternative for drilling the distal screw holes. The depth of the hole can be measured using the depth gauge (MS-9020).



## Step 6: Distal Screw Placement

It is at the discretion of the surgeon when to use the Threaded Locking Screws, the Smooth Locking Pegs and the Non-Locking Screws. The thread pitch on the Threaded Locking Screws is the same from the tip to the head minimizing the "differential pitch effect" as the screw is seated into the plate. All eight distal holes accept the three different screw designs. When finished placing all the distal screws, remove the targeting guide and check to ensure the screws have seated completely in the plate.



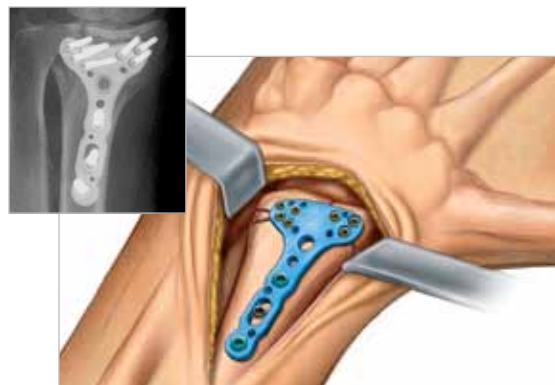
## Step 7: Proximal Locking Screw Placement

In the second proximal locking hole, thread in the 3.5mm locking drill guide (MS-LDG35). Drill using the 2.8mm drill (MS-DC28) and measure with the depth gauge (MS-9020). Insert the proper length 3.5mm blue locking screw (COL-3XX0) using the 2.5mm driver tip (HPC-0025), sleeve (MS-SS35) and driver handle (MS-3200). Place the final locking screw using the same process.



## Step 8: Closure & Post-op Protocol

Following thorough radiographic evaluation, the wound is closed in layers. The retinacula of the second and fourth dorsal compartments are repaired. The retinaculum for the third dorsal compartment may be repaired, or the extensor pollicis longus tendon may be left out of its compartment depending on the surgeon's discretion. Immediate finger range of motion is initiated postoperatively. Forearm rotation and wrist range of motion are progressed at the surgeon's discretion according to the bone quality, fracture stability and associated soft tissue injuries.





# Acu-Loc® EX Plate



## Step 1: Incision & Dissection

The patient's forearm is supinated to expose the surgical site. To maximize exposure, a towel is placed under the wrist placing it in extension. A longitudinal incision is made approximately six centimeters in length just radial to the FCR tendon to protect against potential injury to the palmar cutaneous branch of the median nerve.

The tendon sheath is opened and the tendon is retracted radially to protect the radial artery. The flexor pollicis longus is identified by passive flexion/extension of the thumb interphalangeal joint and is retracted ulnarly to protect the median nerve. Next, the pronator quadratus is identified by its transverse fibers and is released radial to ulnar to expose the fracture site.



## Step 2: Provisional Fixation and Plate Placement

The fracture is reduced and evaluated under fluoroscopy. The brachioradialis may need to be released from its insertion on the radial styloid to facilitate reduction and visualization.

The plate is made to sit along the flat metaphyseal portion of the distal radius. The appropriate targeting guide may be attached to the selected plate using the set screw (80-0038). This may be done on the back table prior to insertion. The plate's position is then secured proximally with a .045" K-wire and distally with a .054" K-wire. If the guide is not already attached to the plate, you would then slide the guide over the distal K-wire and into position. Another method is to secure the plate to the bone with a cortical screw proximally and then attach the targeting guide.



## Step 3: Non-Locking Proximal Screw Placement

Place the first 3.5mm non-locking cortical screw in the center of the proximal slot in the plate. The position of the plate relative to the articular surface can then be fine tuned by sliding the plate proximal or distal under fluoroscopy. Using the 2.8mm drill (MS-DC28) and drill guide (PL-2018), drill through the far cortex. Drill depth is measured with the depth gauge (MS-9020). Insert the appropriate silver 3.5mm non-locking screw (CO-3XX0), taking care that the screw is the proper length. The screw reduces the plate down to the bone and the length of the screw should be assessed under fluoroscopy following the insertion of the remaining screws. The screw may need to be downsized after the plate has been reduced down to the bone.



## Step 4: Drill Distal Screw Holes

To assess the position of the distal locking screws relative to the articular surface and the dorsum of the radius, a .054" K-wire may be placed through the distal K-wire holes on the targeting guide and plate. The fracture reduction, plate position, and the location of the K-wire relative to the joint is assessed under fluoroscopy. If the distal K-wires do not penetrate the joint, the distal 2.3mm screws will not either. Care should be taken not to angle the distal K-wires. Insert the drill guide (MS DG23) into one of the five distal holes followed by the 2.0 mm drill (MS-DCR20). The depth of the screw is measured using the laser mark on the drill shaft and scale on the drill guide. As an alternative, the depth probe (MS-DRPB) may be used by hooking the far cortex and measuring with the laser mark on the probe.

## Step 5: Distal Screw Selection

There are three types of 2.3mm screws that can be used in any of the five distal holes: Fully-Threaded Locking Screws (gold), Smooth Locking Pegs (Bronze) and Non-Toggling Screws (silver). All 2.3mm screws are inserted using the 1.5mm driver tip (HPC-0015), sleeve (MS-SS23) and driver handle (MS-2210).

**Note:** An Individual Locking Drill Guide (MS-LDG23) is available in the system as an alternative for drilling the distal holes. Screw length can be read using the Depth Gauge (MS-9020).



## Step 6: Distal Screw Placement

It is at the discretion of the surgeon when to use the Threaded Locking Screws, the Smooth Locking Pegs, and the Non-Toggling (non-locking) Screws. The thread pitch on the Threaded Locking Screw is the same from the tip to the head minimizing the "differential pitch effect" as the screw is seated into the plate. All five distal holes accept the three different screw designs.



## STEP 7: Proximal Locking Screw Placement

Select one of the two remaining proximal holes and insert the Threaded Drill Guide (MS-LDG35). Drill with the 2.8mm drill (MS-DC28) and measure with the depth gauge (MS-9020). Insert the proper length 3.5mm blue locking screw (COL-3XX0) using the 2.5mm driver tip (HPC-0025), sleeve (MS-SS35) and driver handle (MS-3200), taking care that the screw does not exit the bone dorsally. Using the same process, drill and place the final locking screw.



## STEP 8: Closure & Post-op Protocol

Following thorough radiographic evaluation, check alignment and rotation, then close. Start immediate finger range of motion and forearm rotation post-op. Allow early functional use of the hand for light ADLs. Support the wrist according to bone quality and stability.

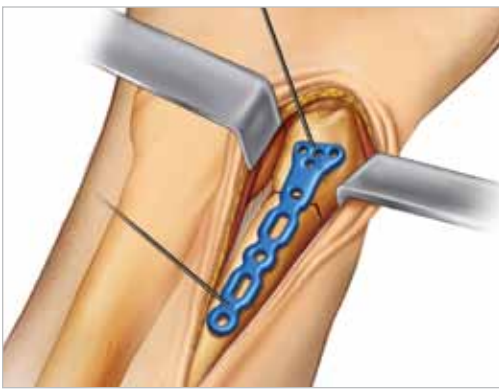


# Acu-Loc® VDU Plate



## STEP 1: Incision & Dissection

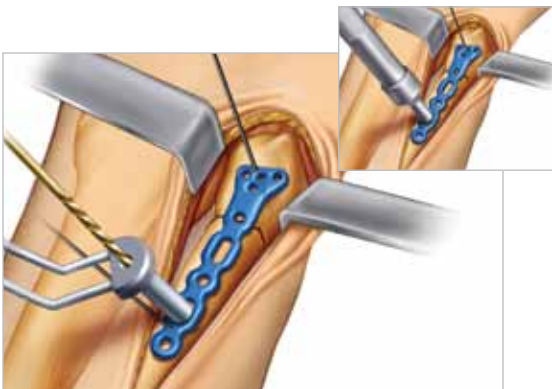
The Volar Distal Ulna Plate was designed for fractures involving the ulnar head, ulnar neck, and fractures of the distal ulna. Usually, these injuries are associated with fractures of the distal radius. The incision is made along the distal ulnar border of the forearm between the flexor carpi ulnaris and extensor carpi ulnaris. Blunt dissection is carried down to protect the dorsal sensory branch of the ulnar nerve, which may be seen on the volar distal portion of the incision. The flexor carpi ulnaris is retracted radially and the pronator quadratus is dissected off the anterior distal surface of the ulna. The fracture site is identified, cleared of fracture debris, and provisionally reduced.



## STEP 2: Provisional Fixation and Plate Placement

The VDU Plate is placed on the volar surface of the distal ulna so that the four distal locking screws will be positioned to go into the ulnar head. It is vital that the plate is placed just proximal to the lesser sigmoid notch of the distal radial ulnar joint. In this manner, the plate will not impinge with pronation and supination of the forearm.

Place a .045" K-wire in the proximal portion of the plate. Place a second K-wire in the distal portion of the plate to provisionally hold the plate to the bone.



## STEP 3: Non-Locking Proximal Screw Placement

Place the first 3.5mm non-locking cortical screw in the center of the proximal slot in the plate. The position of the plate relative to the articular surface can then be fine tuned by sliding the plate proximal or distal. Using the 2.8mm drill (MS-DC28) and drill guide (PL-2018), drill through the far cortex. Drill depth is measured with the depth gauge (MS-9020). Insert the appropriate silver 3.5mm non-locking screw (CO-3XX0), taking care that the screw is the proper length.



## STEP 4: Drill Distal Screw Holes

Place the individual Locking Drill Guide (MS-LDG23) in the most distal ulnar hole in the plate. Drill using the 2.0 mm drill (MS-DCR20), measure using the depth gauge (MS-9020).

**NOTE:** The Locking Drill Guide may also be attached to the selected plate prior to insertion on the back table.

## STEP 5: Distal Screw Selection

There are three types of 2.3mm screws that can be used in any of the four distal holes: Fully-Threaded Locking Screws (gold), Smooth Locking Pegs (Bronze) and Non-Toggling Screws (silver). All 2.3mm screws are inserted using the 1.5mm driver tip (HPC-0015), sleeve (MS-SS23) and driver handle (MS-2210).



## STEP 6: Distal Screw Placement

It is at the discretion of the surgeon when to use the Threaded Locking Screws, the Smooth Locking Pegs, and the Non-Toggling (non-locking) Screws. The thread pitch on the Threaded Locking Screw is the same from the tip to the head minimizing the "differential pitch effect" as the screw is seated into the plate. All four distal holes accept the three different screw designs. Remove the distal K-wire, if you have not done so already.



## STEP 7: Proximal Locking Screw Placement

Thread the Threaded Drill Guide (MS-LDG35) in the hole just proximal to the slotted hole in the shaft of the plate. Drill with the 2.8mm drill (MS-DC28) and measure with the depth gauge (MS-9020). Insert the proper length 3.5mm light blue locking screw (COL-3XX0) using the 2.5mm driver tip (HPC-0025), sleeve (MS-SS35) and driver handle (MS-3200), taking care that the screw does not exit the bone dorsally. Using the same process, drill and place the final locking screw in the remaining locking hole. Remove the proximal K-wire, if you have not done so already.



## STEP 8: Closure & Post-op Protocol

Following thorough radiographic evaluation, check alignment and rotation, then close. Start immediate finger range of motion and forearm rotation post-op. Allow early functional use of the hand for light ADLs. Support the wrist according to bone quality and stability.





# Ordering Information



## Acu-Loc® Plates

Acu-Loc® VDR Plate, Narrow, Left	PL-DR30L
Acu-Loc® VDR Plate, Narrow, Right	PL-DR30R
Acu-Loc® VDR Plate, Standard, Left	PL-DR50L
Acu-Loc® VDR Plate, Standard, Right	PL-DR50R
Acu-Loc® VDR Plate, Long, Left	PL-DR60L
Acu-Loc® VDR Plate, Long, Right	PL-DR60R
Acu-Loc® VDR Plate, X-Long, Left	PL-DR65L
Acu-Loc® VDR Plate, X-Long, Right	PL-DR65R
Acu-Loc® VDR Plate, Wide, Left	PL-DR70L
Acu-Loc® VDR Plate, Wide, Right	PL-DR70R
Acu-Loc® VDU Plate, Standard, Left	70-0045
Acu-Loc® VDU Plate, Standard, Right	70-0046
Acu-Loc® VDU Plate, Long, Left	70-0047
Acu-Loc® VDU Plate, Long, Right	70-0048
Acu-Loc® Dorsal Plate, Standard, Left	70-0055
Acu-Loc® Dorsal Plate, Standard, Right	70-0056
Acu-Loc® Dorsal Plate, Narrow, Left	70-0057
Acu-Loc® Dorsal Plate, Narrow, Right	70-0058
Acu-Loc® EX Standard	70-0063
Acu-Loc® EX Narrow	70-0064

## Instruments

1.5mm Hex Driver Tip (small shaft)	HPC-0015
2.5mm Quick Release Hex Driver	HPC-0025
2.8mm x 5" Quick Release Drill	MS-DC28
2.0mm Drill for Distal Radius System	MS-DCR20
.045" x 6" Guide Wire	WS-1106ST
.054" x 6" Guide Wire	WS-1406ST



## Ordering Information

### 2.3mm Threaded Locking Screws

2.3mm x 8mm Locking Cortical Screw	CO-T2308
2.3mm x 10mm Locking Cortical Screw	CO-T2310
2.3mm x 12mm Locking Cortical Screw	CO-T2312
2.3mm x 14mm Locking Cortical Screw	CO-T2314
2.3mm x 16mm Locking Cortical Screw	CO-T2316
2.3mm x 18mm Locking Cortical Screw	CO-T2318
2.3mm x 20mm Locking Cortical Screw	CO-T2320
2.3mm x 22mm Locking Cortical Screw	CO-T2322
2.3mm x 24mm Locking Cortical Screw	CO-T2324
2.3mm x 26mm Locking Cortical Screw	CO-T2326
2.3mm x 28mm Locking Cortical Screw	CO-T2328

### 2.3mm Threaded Non-Toggling Screws

2.3mm x 8mm Non-Toggling Cortical Screw	CO-N2308
2.3mm x 10mm Non-Toggling Cortical Screw	CO-N2310
2.3mm x 12mm Non-Toggling Cortical Screw	CO-N2312
2.3mm x 14mm Non-Toggling Cortical Screw	CO-N2314
2.3mm x 16mm Non-Toggling Cortical Screw	CO-N2316
2.3mm x 18mm Non-Toggling Cortical Screw	CO-N2318
2.3mm x 20mm Non-Toggling Cortical Screw	CO-N2320
2.3mm x 22mm Non-Toggling Cortical Screw	CO-N2322
2.3mm x 24mm Non-Toggling Cortical Screw	CO-N2324
2.3mm x 26mm Non-Toggling Cortical Screw	CO-N2326
2.3mm x 28mm Non-Toggling Cortical Screw	CO-N2328
2.3mm x 30mm Non-Toggling Cortical Screw	CO-N2330
2.3mm x 32mm Non-Toggling Cortical Screw	CO-N2332

### 2.3mm Smooth Locking Pegs

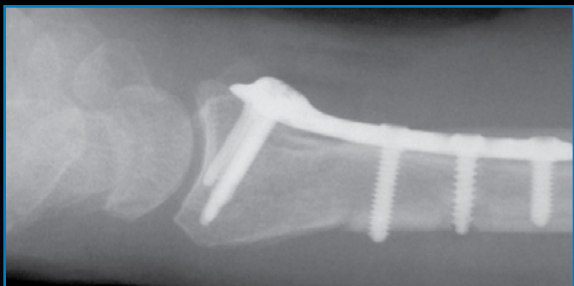
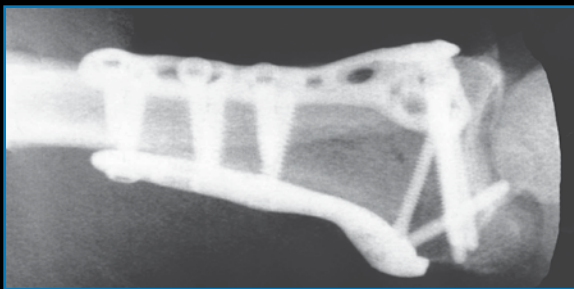
2.3mm x 8mm Locking Cortical Peg	CO-S2308
2.3mm x 10mm Locking Cortical Peg	CO-S2310
2.3mm x 12mm Locking Cortical Peg	CO-S2312
2.3mm x 14mm Locking Cortical Peg	CO-S2314
2.3mm x 16mm Locking Cortical Peg	CO-S2316
2.3mm x 18mm Locking Cortical Peg	CO-S2318
2.3mm x 20mm Locking Cortical Peg	CO-S2320
2.3mm x 22mm Locking Cortical Peg	CO-S2322
2.3mm x 24mm Locking Cortical Peg	CO-S2324
2.3mm x 26mm Locking Cortical Peg	CO-S2326
2.3mm x 28mm Locking Cortical Peg	CO-S2328

### 3.5mm Locking Cortical Screws

3.5mm x 8mm Locking Cortical Screw	COL-3080
3.5mm x 10mm Locking Cortical Screw	COL-3100
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 Cortical Screws

3.5mm x 10mm Cortical Screw	CO-3100
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



## REFERENCES

1. Osada, et. al. "Comparison of Different Distal Radius Dorsal and Volar Fracture Fixation Plates: A Biomechanical Study". The Journal of Hand Surgery, Vol. 28A No. 1 January 2003.
2. Osada, et. al. "Biomechanics in Uniaxial Compression of Three Distal Radius Volar Plates". The Journal of Hand Surgery, Vol. 29A No. 3 May 2004.

The charts from the two studies were reproduced by Acumed with the Acu-Loc information added for clarity.

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HNW00-01-C

Effective: 7/2009

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