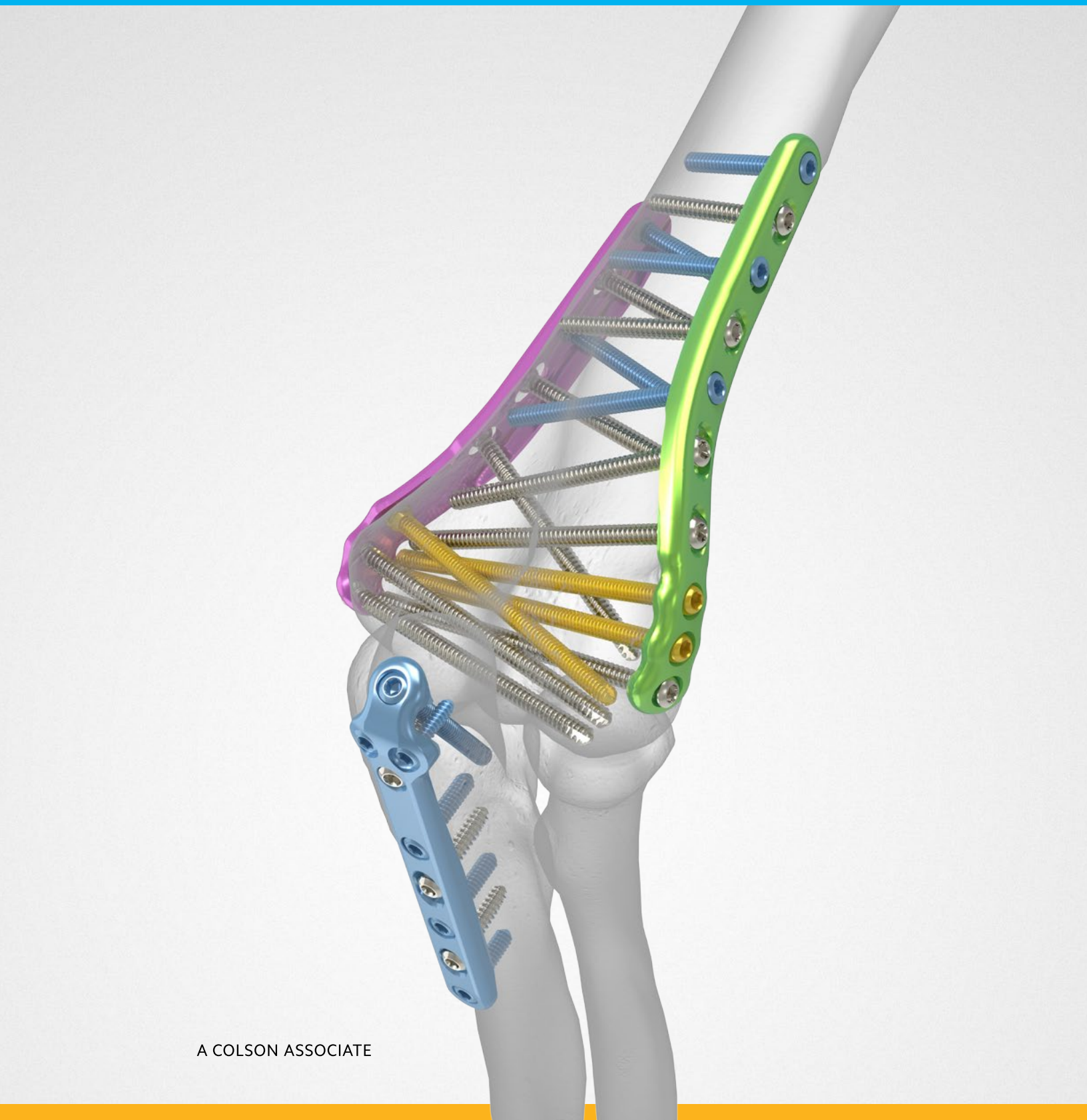
acumed®

Congruent Elbow Plating System

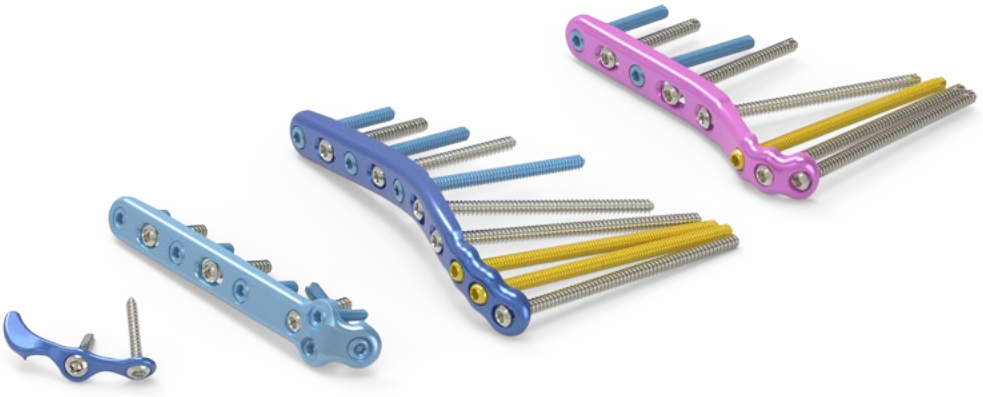
Surgical Technique

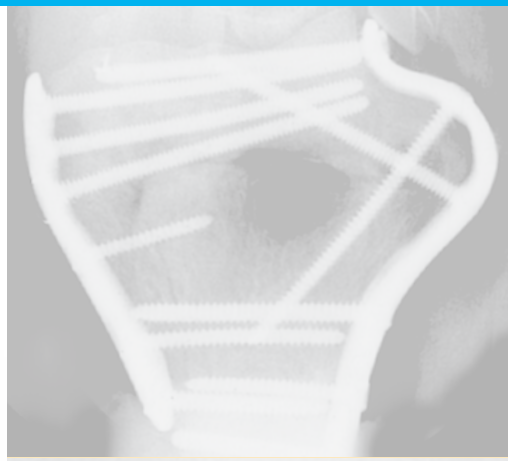


A COLSON ASSOCIATE

Acumed® is a global leader of innovative orthopaedic and medical solutions.

We are dedicated to developing products, service methods, and approaches that improve patient care.





Acumed® Congruent Elbow Plating System

Designed in conjunction with Shawn W. O'Driscoll, MD, PhD, the Acumed Congruent Elbow Plating System is designed to address fractures of the distal humerus, olecranon, and coronoid.

The Congruent Elbow Plating System offers precontoured, fracture-specific plates, including an Olecranon Plate and Coronoid Plates, and features instrumentation to aid with plate and screw insertion. This system also includes variable angle Tap-Loc® Technology for the Medial and Lateral Distal Humerus Plates. A Posterior Plate is offered in addition to the Medial and Lateral Distal Humerus Plates to provide multiple plating solutions for elbow fracture management.

Indications for Use:

- Fractures of the distal humerus, olecranon, and coronoid
- Osteotomies of the olecranon

	Definition
Warning	Indicates critical information about a potential serious outcome to the patient or the user.
Caution	Indicates instructions that must be followed in order to ensure the proper use of the device.
Note	Indicates information requiring special attention.

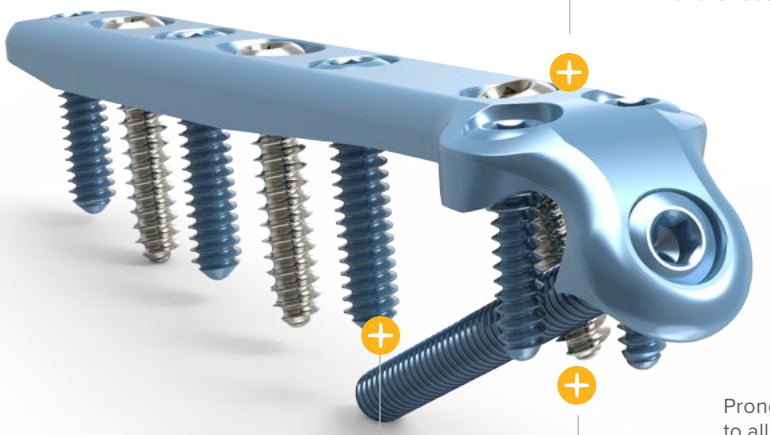
Table of Contents

System Features

Key Plate Features

- Elbow plates are precontoured to match the natural anatomy of the elbow, minimizing the need for the surgeon to bend the plates intraoperatively. For complex fractures, the plates are designed to act as a template for anatomic restoration of the elbow
- 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
- A continuous change in thickness is designed to provide strength along the metaphysis/diaphysis while maintaining a low profile in the periarticular areas where limited soft tissue coverage may be an issue

Olecranon Plate



The clustered screw holes in the articular region are designed to increase the stability and strength of the reconstruction

Prongs on the proximal end are designed to allow the plate to sit on top of the triceps tendon and allows plate placement without splitting the triceps tendon

Screw trajectory is designed to capture fracture fragments

An extended Olecranon Plate without prongs is also offered for the treatment of fractures that extend proximally

Length: 86 mm–173 mm

System Features [continued]

Coronoid Plate

Holes in the buttress portion of the plate are designed to allow screws to capture fragments

Prongs allow for provisional plate fixation on the anteromedial portion of the coronoid

An extended Coronoid Plate (left and right specific) is included for the treatment of more basal coronoid fractures

Posterior Distal Humerus Plate

Proximal taper is engineered to minimize stress concentrations

A posterior plate in the system offers an alternative to the lateral plate, and may be used in 90–90 plate placement for distal humerus fractures

System Features [continued]

The Acumed Congruent Elbow Plating System was the first to offer parallel plates for the stabilization of distal humerus fractures. A biomechanical evaluation of humerus plating systems have demonstrated that parallel plate placement provides a more stable construct than plates placed at a 90° orientation.[1] Biomechanical data shows parallel locking plates have higher stability in compression and external rotation and a greater ability to resist axial plastic deformation than perpendicular plates.[2]

Medial Column Plates

Medial Column Plates offer 2 to 4 screw holes for fixation of the articular fragments. Lengths range from 84 mm to 175 mm.

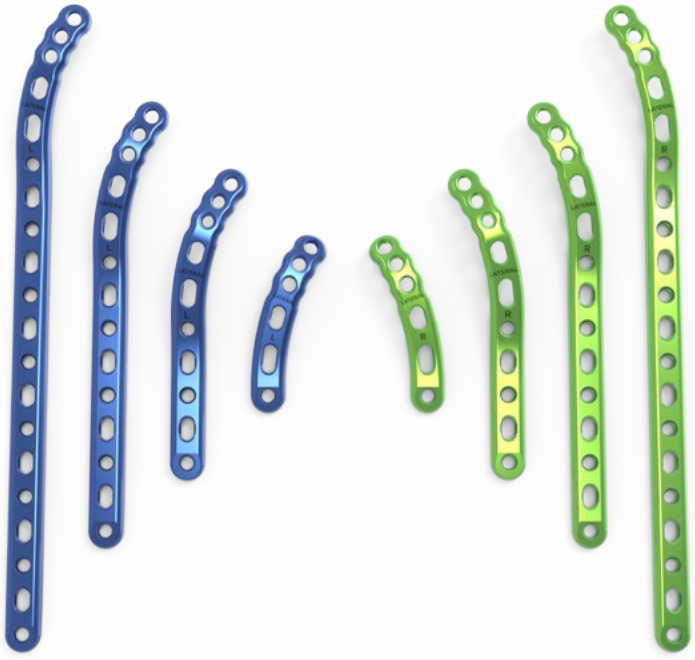
The Medial Column Plates are designed to offer fixation and compression of fractures of the distal humerus by extending down distally, or wrapping around, the medial epicondyle and extending up the condylar ridge.

Long screws in the Medial Column Plate are designed to interdigitate with screws from the Lateral Column Plate

System Features [continued]

Lateral Column Plates

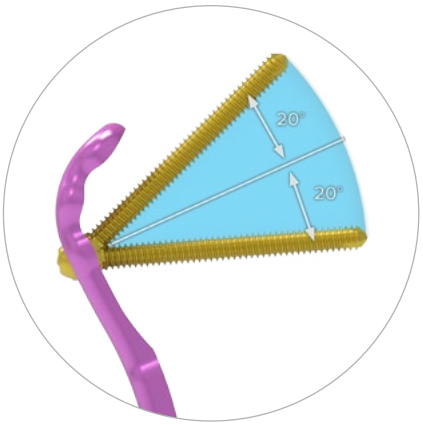
The Lateral Column Plates are engineered to allow the longer screws in the articular fragments to interdigitate with the screws from the medial side. When used in conjunction with Acumed Medial Column Plates, the parallel construct acts as a template for complex fractures of the distal humerus.



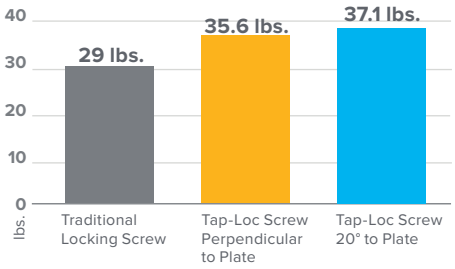
System Features [continued]

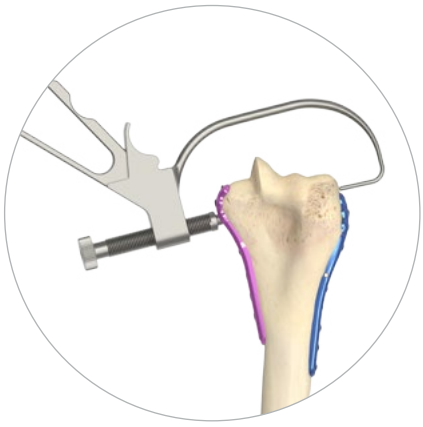
Tap-Loc® Technology

Multidirectional screw angles give surgeons the freedom to angle the distal locking screws up to 20 degrees in each direction. This provides flexibility when capturing fracture fragments while maintaining the benefits of a traditional locking screw.



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.[3]





Targeted Drill Guide facilitates drilling and positioning of the distal screws. 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.

System Features [continued]

Tap-Loc® Technology

The Acumed Tap-Loc technology is designed to be used only with the Medial and Lateral Distal Humerus Plates to insert locking screws with up to 20 degrees of angulation.

Instrument Overview

.045" x 6" ST Guide Wire
(WS-1106ST)

2.0 mm x 9" Guide Wire
(WS-2009ST)

.062 x 5.75 STT Guide Wire, Titanium
(WT-1606STT)

.035 x 5.75 STT Guide Wire, Titanium
(WT-0906STT)

2.0 mm x 5" Quick Release Drill
(MS-DC5020)

2.8 mm x 5" Quick Release Drill
(MS-DC28)

3.5 mm x 5" Quick Release Drill
(MS-DC35)

2.0 mm Long Quick Release Drill
(MS-LDC20)

2.8 mm Long Quick Release Drill
(MS-LDC28)

2.0 mm Quick Release Steinman Pin
(MS-PIN20)

2.8 mm Quick Release Steinman Pin
(MS-PIN28)

2.7 mm Tap Screw Tap
(PL-ELT1027)

3.5 mm Tap Screw Tap
(PL-ELT1035)

2.7 mm Cortical Screw Bone Tap
(MS-LTT27)

3.5 mm Cortical Screw Bone Tap
(MS-LTT35)

2.5 mm Quick Release Hex Driver
(HPC-0025)

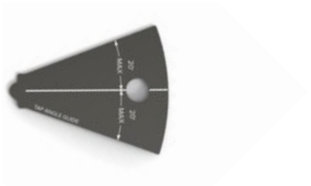
Instrument Overview [continued]

8" Bone Reduction Forceps
(MS-1280)

2.7 mm Locking Drill Guide
(MS-LDG27)

3.5 mm Locking Drill Guide
(MS-LDG35)

Large Cannulated Quick Release Driver Handle
(MS-3200)



Tap Screw Angle Guide (20 degree)
(MS-TAG20)

Offset Drill Guide
(PL-2095)

6 mm–70 mm Depth Gauge
(MS-9022)

Quick Release T-Handle
(MS-T1212)

Targeted Drill Guide
(PL-CLAMP)

2.0 mm Drill Guide Cannula
(PL-20CLAMP)

2.8 mm Drill Guide Cannula
(PL-28CLAMP)

Surgical Technique Overview

Distal Humerus Plates Surgical Technique

Articular Fragment Reduction

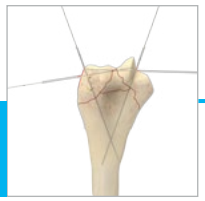
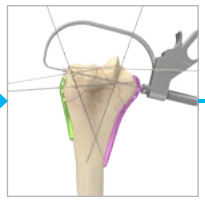
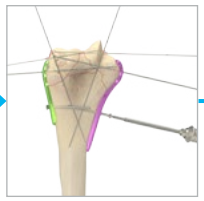


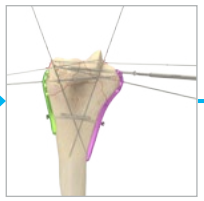
Plate Placement and Provisional Fixation



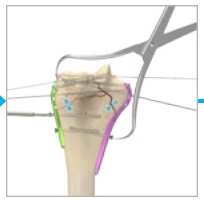
Initial Proximal Screw Placement



Nonlocking Distal Screw Placement



Compress Lateral Column



Olecranon Plate Surgical Technique

Fracture Reduction & Plate Placement

Provisional Wire Placement

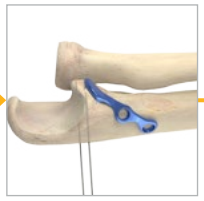
Nonlocking Distal Screw Placement

Fracture Site Compression

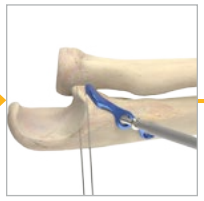
Coronoid Plate Surgical Technique

Fracture Fragment Fixation

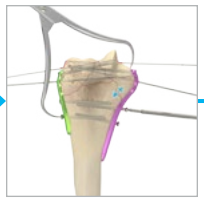
Plate Placement



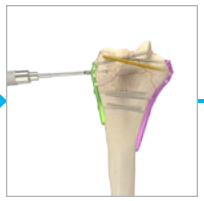
Initial Screw Placement



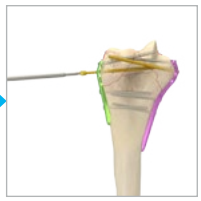
Compress Medial Column



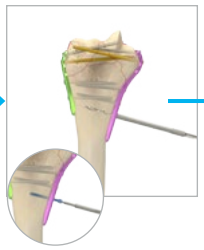
Tap Distal Plate Hole



Insert Distal Locking Screw



Drill for Proximal Locking Screw



Final Screw Placement

Proximal Locking Screw Placement

"Home Run" Screw Placement

Final Screw Placement

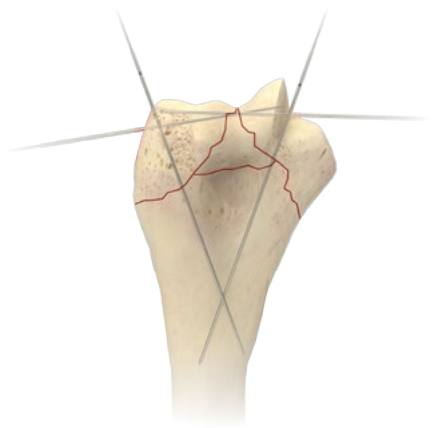
Buttress Fragments with Plate

Tighten Screws

Cut Threaded K-wires

Distal Humerus Plates Surgical Technique

Figure 1

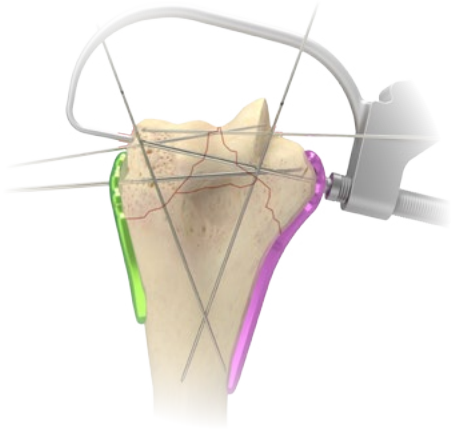


1 Articular Fragment Reduction

The articular fragments, which tend to be rotated toward each other in the axial plane, are reduced anatomically and provisionally held with .045" x 6" ST K-wires (WS-1106ST). One or two strategically placed K-wires can then be used to provisionally hold the distal fragments in alignment with the humeral shaft.

Note: Place the wires holding the articular fragments 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.

Figure 2



2 Plate Placement and Provisional Fixation

The selected Locking Medial and Locking Lateral Plates (PL-LEMXX and PL-LELXX) are placed and held apposed to the distal humerus, while one 2.0 mm x 9" ST 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 2.0 mm K-wires are left in place until after Step 7 to simplify placing the locking screws in the distal fragments. The distal Tap-Loc® screws may be angled up to 20 degrees in any direction.

A Tap Screw Angle Guide (MS-TAG20) is included in the system to verify proper angulation prior to inserting the 2.0 mm K-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 degrees.

A Targeted Drill Guide (PL-CLAMP) is included in the system for accurate placement of the 2.0 mm wires and future distal screws. Place the 2.0 mm Drill Guide 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 2.8 mm Drill Guide Cannula (PL-28CLAMP) is also provided for accurate drilling and placement of 3.5 mm screws in later steps.

.045" x 6" ST Guide Wire
(WS-1106ST)
Also used as a K-wire

Locking Medial Plate
(PL-LEMXX)

Locking Lateral Plate
(PL-LELXX)

2.0 mm x 9" ST Guide Wire
(WS-2009ST)
Also used as a K-wire

Tap Screw Angle Guide
(MS-TAG20)

Targeted Drill Guide
(PL-CLAMP)

2.0 mm Drill Guide Cannula
(PL-20CLAMP)

2.8 mm Drill Guide Cannula
(PL-28CLAMP)

Distal Humerus Plates Surgical Technique [continued]

3 Initial Proximal Screw Placement

Insert a 3.5 mm Cortical Screw (CO-3XX0) 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 sufficient provisional fixation of the entire distal humerus.)

Note: The 2.7 mm Cortical Screw Bone Tap (MS-LTT27) or 3.5 mm Cortical Screw Bone Tap (MS-LTT35) is recommended for patients with dense bone.

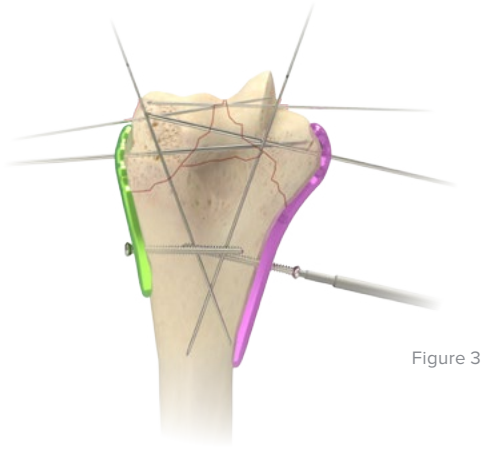


Figure 3

4 Nonlocking Distal Screw Placement

Drill and insert screws through Hole #1 on both the medial and lateral side. The Targeted Drill Guide (PL-CLAMP) cannot be used in Hole #1 of the medial plate if the angle of the nonlocking screw exceeds 20 degrees. After drilling, measure depth and insert the appropriate-size 3.5 mm Cortical Screw (CO-3XX0). The 2.7 mm Cortical Screws (CO-27XX) may be used to allow placement of more screws in the distal fragments to maximize stability.

Long Quick Release Drills (MS-LDC20/28) and Quick Release Steinman 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.

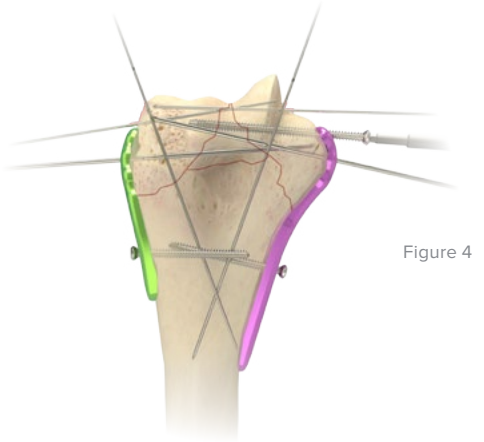


Figure 4

3.5 mm Cortical Screw (CO-3XX0)

2.7 mm Cortical Screw Bone Tap (MS-LTT27)

3.5 mm Cortical Screw Bone Tap (MS-LTT35)

Targeted Drill Guide (PL-CLAMP)

Long Quick Release Drill (MS-LDC20 or MS-LDC28)

Quick Release Steinman Pin (MS-PIN20 or MS-PIN28)

Distal Humerus Plates Surgical Technique [continued]

Figure 5

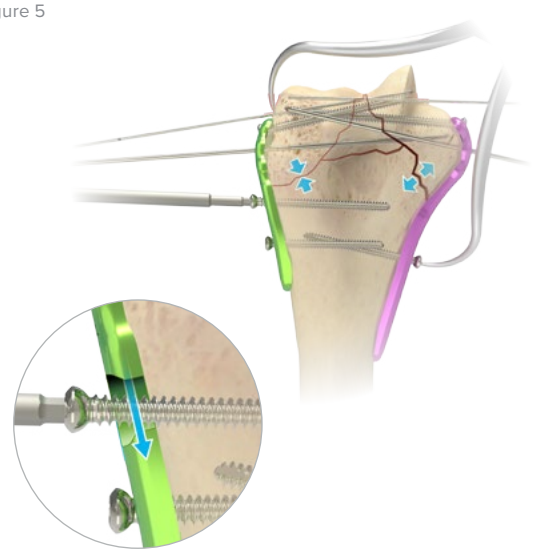


Figure 6

5 Compress Lateral Column

Using the 8" Bone Reduction Forceps (MS-1280) to provide interfragmentary compression across the fracture at the supracondylar level, the lateral column is fixed first. 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" x 6" ST K-wire (WS-1106ST) used for provisional fixation may be removed at this point.

Caution: The proximal slotted holes are NOT to be tapped.

Figure 7

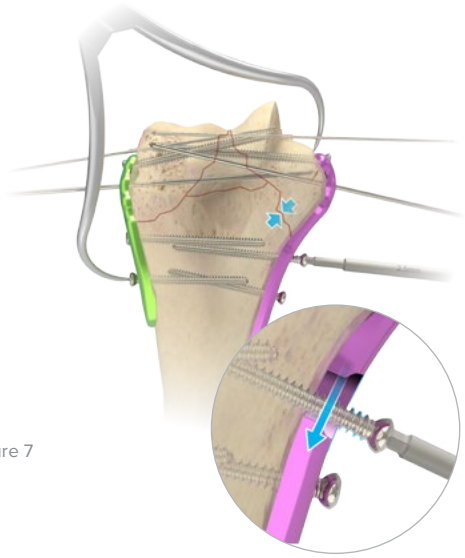


Figure 8

6 Compress Medial Column

The medial column is then compressed in a similar manner using the 8" Bone Reduction Forceps (MS-1280), and a 3.5 mm Cortical Screw (CO-3XX0) 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 2.0 mm K-wires that were inserted in Step 2.

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

8" Bone Reduction Forceps
(MS-1280)

Offset Drill Guide
(PL-2095)

.045" x 6" ST Guide Wire
(WS-1106ST)
Also used as a K-wire

3.5 mm Cortical Screw
(CO-3XX0)

Distal Humerus Plates Surgical Technique [continued]

7 Tap Distal Plate Hole

If using a 3.5 mm Tap-Loc Screw (FA-CO35XX), use the 2.8 mm Long Quick Release Drill (MS-LDC28) or 2.8 mm Quick Release Steinman Pin (MS-PIN28) in the path of the wire. If using a 2.7 mm Cortical Screw (CO-27XX), the 2.0 mm K-wire has already created the appropriate-size hole for the screw. Measure drill depth with the 6 mm–70 mm Depth Gauge (MS-9022) to determine screw size. After drilling, connect the 2.7 mm Tap Screw Tap (PL-ELT1027) or the 3.5 mm Tap Screw Tap (PL-ELT1035) to the Quick Release 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 Quick Release T-Handle should only be used with the plate taps and not for locking or nonlocking screw insertion.

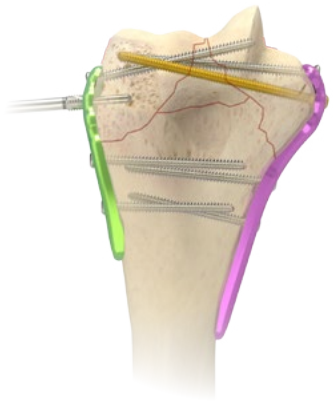


Figure 9

Use of Plate Taps

The taps are single-surgery use and should be discarded after each surgery or if the tap becomes dull or unusable during surgery.

Caution:

- Tapping a plate using a plate tap will generate titanium debris that should be removed. Failure to remove the plate debris can cause, among other complications, inflammation, cartilage damage, and patient discomfort
- Do not tap a slot
- Do not re-tap a hole (use a nonlocking screw)
- Tap by hand, not under power
- The angle of the tapped hole must not exceed 20 degrees
- If resistance increases while using a tap, discard the tap immediately. The tap may break due to excessive torque or levering and care should be taken to avoid such conditions. If the tap breaks, carefully remove all tap pieces

Note:

- Irrigate hole prior to tapping
- Do not tap deeper than the start of the laser line
- Clean debris from tap after tapping each hole

3.5 mm Tap-Loc Screw (FA-CO35XX)

2.8 mm Long Quick Release Drill (MS-LDC28)

2.8 mm Quick Release Steinman Pin (MS-PIN28)

2.7 mm Cortical Screw (CO-27XX)

6 mm–70 mm Depth Gauge (MS-9022)

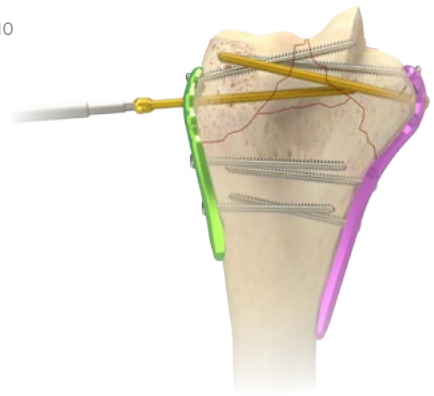
2.7 mm Tap Screw Tap (PL-ELT1027)

3.5 mm Tap Screw Tap (PL-ELT1035)

Quick Release T-Handle (MS-T1212)

Distal Humerus Plates Surgical Technique [continued]

Figure 10



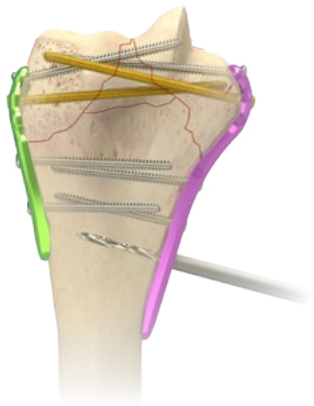
8 Insert Distal Locking Screw

Insert the appropriate size Tap-Loc Screw (FA-COXXXX).

Note: Care should be taken not to overtighten the screw.

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

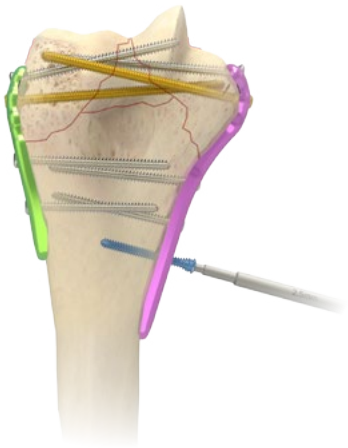
Figure 11



9A Drill for Proximal Locking Screw

The remaining locking screws may be inserted at the surgeon's discretion. To insert the 2.7 mm or 3.5 mm Locking Cortical Screws (COL-XXX0), thread the 2.7 mm Locking Drill Guide (MS-LDG27) or the 3.5 mm Locking Drill Guide (MS-LDG35) into the locking hole in the plate. Drill with the 2.0 mm x 5" Quick Release Drill (MS-DC5020) or the 2.8 mm x 5" Quick Release Drill (MS-DC28).

Figure 12



9B Insert Proximal Locking Screw

Insert the appropriate size 2.7 mm or 3.5 mm Locking Cortical Screw (COL-XXXX). Note that the plate holes in the humeral shaft are pre-threaded, fixed angle screws.

Tap-Loc Screw
(FA-COXXXX)

2.7 mm or 3.5 mm Locking Cortical Screw
(COL-XXX0)

2.7 mm Locking Drill Guide
(MS-LDG27)

3.5 mm Locking Drill Guide
(MS-LDG35)

2.0 mm x 5" Quick Release Drill
(MS-DC5020)

2.8 mm x 5" Quick Release Drill
(MS-DC28)

Distal Humerus Plates Surgical Technique [continued]

10 Final Screw Placement

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

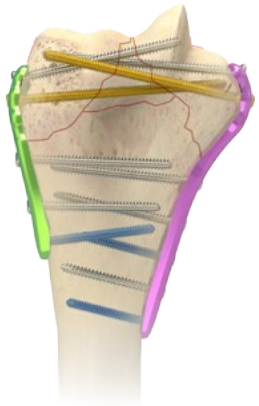


Figure 13

11 Postoperative Protocol

Postoperative care is at the discretion of the surgeon. The following protocol is provided as an example:

Immediately after closure, the elbow is placed in a bulky noncompressive 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 2 days and an elastic nonconstrictive sleeve is applied over an absorbent dressing placed on the wound. A physical therapy program including active and passive motion is then initiated.

12 Optional: Implant Removal Instructions

To remove a medial or lateral plate, use a 2.5 mm Hex Driver (HPC-0025) and a Large Cannulated Quick Release Driver Handle (MS-3200) to remove all screws before extracting the plate. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant extraction if difficulty is experienced.

2.5 mm Hex Driver
(HPC-0025)

Large Cannulated Quick Release Driver Handle
(MS-3200)

Olecranon Plate Surgical Technique

Figure 1

1 Fracture Reduction and Plate Placement

Flex the elbow 90 degrees, reduce the fracture, and apply the selected Locking Olecranon Plate (PL-LEOXX). 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.

Figure 2

2 Provisional Wire Placement

A 2.0 mm x 9" ST K-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 2.7 mm 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" x 5.75 STT K-wires, Titanium (WT-1606STT) can be placed across the fracture, one on each side of the plate.

Locking Olecranon Plate
(PL-LEOXX)

2.0 mm x 9" ST Guide Wire
(WS-2009ST)
Also used as a K-wire

2.7 mm Locking Drill Guide
(MS-LDG27)

.062 x 5.75 STT Guide Wire, Titanium
(WT-1606STT)
Also used as a K-wire

Olecranon Plate Surgical Technique [continued]

3 Nonlocking Distal Screw Placement

With provisional reduction confirmed, drill with the 2.8 mm x 5" Quick Release Drill (MS-DC28) and insert a 3.5 mm Cortical Screw (CO-3XX0) through the slotted hole distal to the fracture site and into the ulnar shaft. Connect the 2.5 mm Quick Release Hex Driver (HPC-0025) to the Large Cannulated Quick Release Driver Handle (MS-3200) or the Quick Release Handle (MS-1210) and tighten the screw partially to allow for later compression.

Note: The 2.7 mm Cortical Screw Bone Tap (MS-LTT27) or 3.5 mm Cortical Screw Bone Tap (MS-LTT35) is recommended for patients with dense bone.

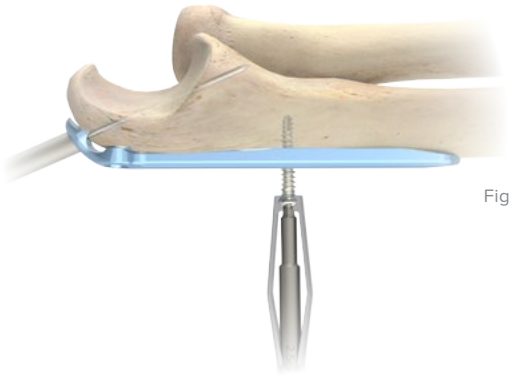


Figure 3

4 Fracture Site Compression

Insert a 3.5 mm Cortical 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 nonlocking screw into a distal slot in dynamic compression mode, loosening the first two screws to allow for plate movement.

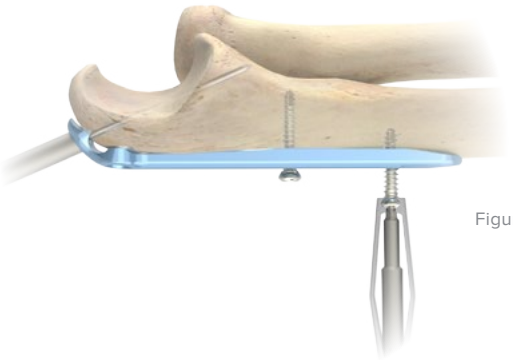


Figure 4

2.8 mm x 5" Quick Release Drill
(MS-DC28)

3.5 mm Cortical Screw
(CO-3XX0)

2.5 mm Quick Release Hex Driver
(HPC-0025)

Large Cannulated Quick Release Driver Handle
(MS-3200)

Quick Release Handle
(MS-1210)

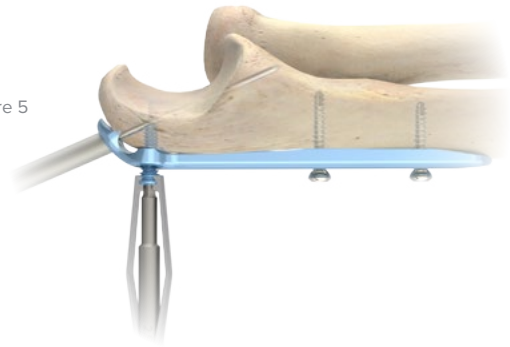
2.7 mm Cortical Screw Bone Tap
(MS-LTT27)

3.5 mm Cortical Screw Bone Tap
(MS-LTT35)

Offset Drill Guide
(PL-2095)

Olecranon Plate Surgical Technique [continued]

Figure 5

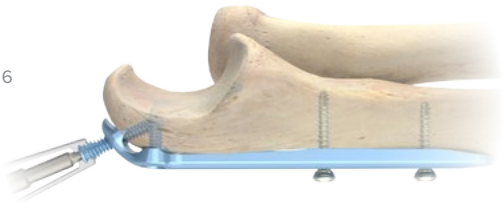


5 Proximal Locking Screw Placement

Use the 2.0 mm x 5" Quick Release Drill (MS-DC5020) with the 2.7 mm Locking Drill Guide (MS-LDG27). Insert two 2.7 mm Locking Cortical Screws (COL-2XX0) into the proximal holes on either side of the 2.0 mm x 9" ST K-wire (WS-2009ST). The fixed-angle locking screw trajectory is meant to create desired fixation in the small proximal fragments.

Note: When drilling, be careful not to exit the bone.

Figure 6



6 "Home Run" Screw Placement

Attach the 3.5 mm Locking Drill Guide (MS-LDG35) and use the 2.8 mm Long Quick Release Drill (MS-LDC28) in the path of the wire. Measure depth and insert the screw. Remove the 2.0 mm x 9" ST K-wire (WS-2009ST) and insert a 3.5 mm Locking Cortical Screw (COL-3XX0) as a "home run" screw.

If using a nonlocking 2.7 mm Locking Screw (COL-2XX0) as a "home run" screw, the 2.0 mm wire has already created the appropriate-size hole and trajectory for the locking screw.

2.7 mm Locking Cortical Screw (COL-2XX0)

2.0 mm x 9" ST Guide Wire (WS-2009ST)
Also used as a K-wire

2.7 mm Locking Drill Guide (MS-LDG27)

2.0 mm x 5" Quick Release Drill (MS-DC5020)

3.5 mm Locking Cortical Screw (COL-3XX0)

3.5 mm Locking Drill Guide (MS-LDG35)

2.8 mm Long Quick Release Drill (MS-LDC28)

Olecranon Plate Surgical Technique [continued]

7 Final Screw Placement

The remaining screws are inserted at the surgeon's discretion.

Caution: If a locking screw is used in the most-proximal of the distal plate holes, the screw must be short enough (max. 16 mm) to avoid contact with the locking "home run" screw. If a longer screw is necessary, use a nonlocking screw and angle it slightly to avoid contact with the locking "home run" screw. A nonlocking screw must be used in the most-distal of the proximal cluster of holes to avoid contacting the locking "home run" screw.

Figure 7

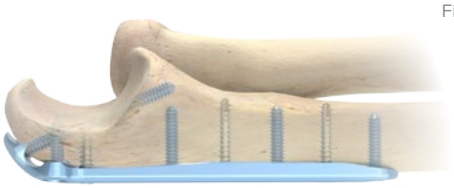


Figure 8

8 Postoperative Protocol

Postoperative care is at the discretion of the surgeon. The following protocol is provided as an example:

Immediately after closure, the elbow is placed in a bulky noncompressive 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 2 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.

9 Optional: Implant Removal Instructions

To remove an olecranon plate, use a 2.5 mm Hex Driver (HPC-0025) and a Large Cannulated Quick Release Driver Handle (MS-3200) to remove all screws before extracting the plate. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant extraction if difficulty is experienced.

2.5 mm Hex Driver
(HPC-0025)

Large Cannulated Quick Release Driver Handle
(MS-3200)

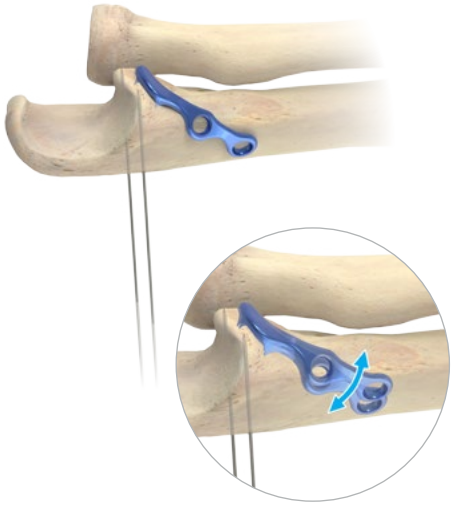
Coronoid Plate Surgical Technique

Figure 1

1 Fracture Fragment Fixation

Expose the coronoid through an anteromedial approach. Reduce and provisionally hold the fragments with threaded titanium K-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 through 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.

Figure 2



2 Plate Placement

Apply the selected Coronoid Plate (PL-ELCXXX) 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 medial collateral ligament (MCL) inserts. The plate should wrap around the brachialis tendon insertion onto the medial side of the ulna distally.

Figure 3

STT Guide Wire, Titanium
(WT-XX0XSTT)
Also used as a K-wire

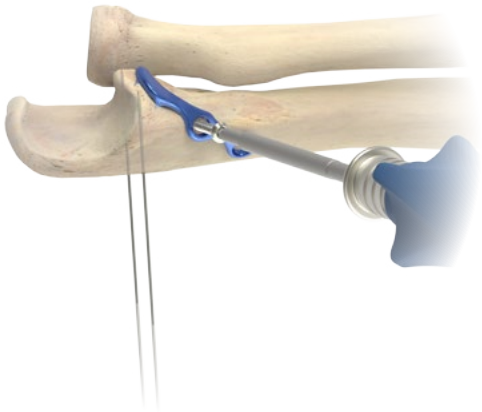
Coronoid Plate
(PL-ELCXXX)

Coronoid Plate Surgical Technique [continued]

3 Initial Screw Placement

While holding the plate reduced, drill the middle hole with the 2.0 mm x 5" Quick Release Drill (MS-DC5020) and insert a 2.7 mm Cortical Screw (CO-27XX). Do not tighten the screw.

Figure 4



4 Buttress Fragments with Plate

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

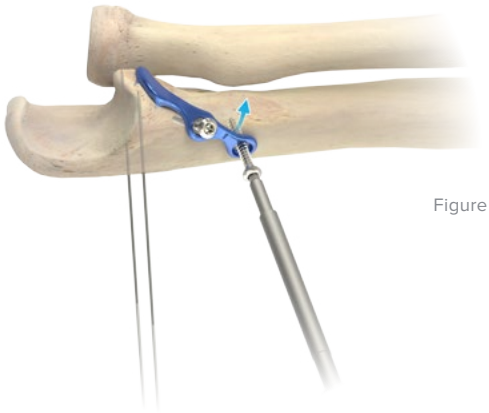


Figure 5

2.0 mm x 5" Quick Release Drill
(MS-DC5020)

2.7 mm Cortical Screw
(CO-27XX)

Coronoid Plate Surgical Technique [continued]

Figure 6

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.

Figure 7

6 Cut Threaded Wires

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

Note: If buttressing is satisfactory, the wires can be removed. If they are to be left in, they must be titanium and threaded, not smooth.

Figure 8

Coronoid Plate Surgical Technique [continued]

7 Postoperative Protocol

Postoperative care is at the discretion of the surgeon. The following protocol is provided as an example:

Immediately after closure, the elbow is placed in a bulky noncompressive 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 2 days and an elastic nonconstrictive 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. Postoperative edema control is important, 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. 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.

8 Optional: Implant Removal Instructions

To remove a coronoid plate, use a 2.5 mm Hex Driver (HPC-0025) and Large Cannulated Quick Release Driver Handle (MS-3200) to remove all screws before extracting the plate. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant extraction if difficulty is experienced.

2.5 mm Hex Driver
(HPC-0025)

Large Cannulated Quick Release Driver Handle
(MS-3200)

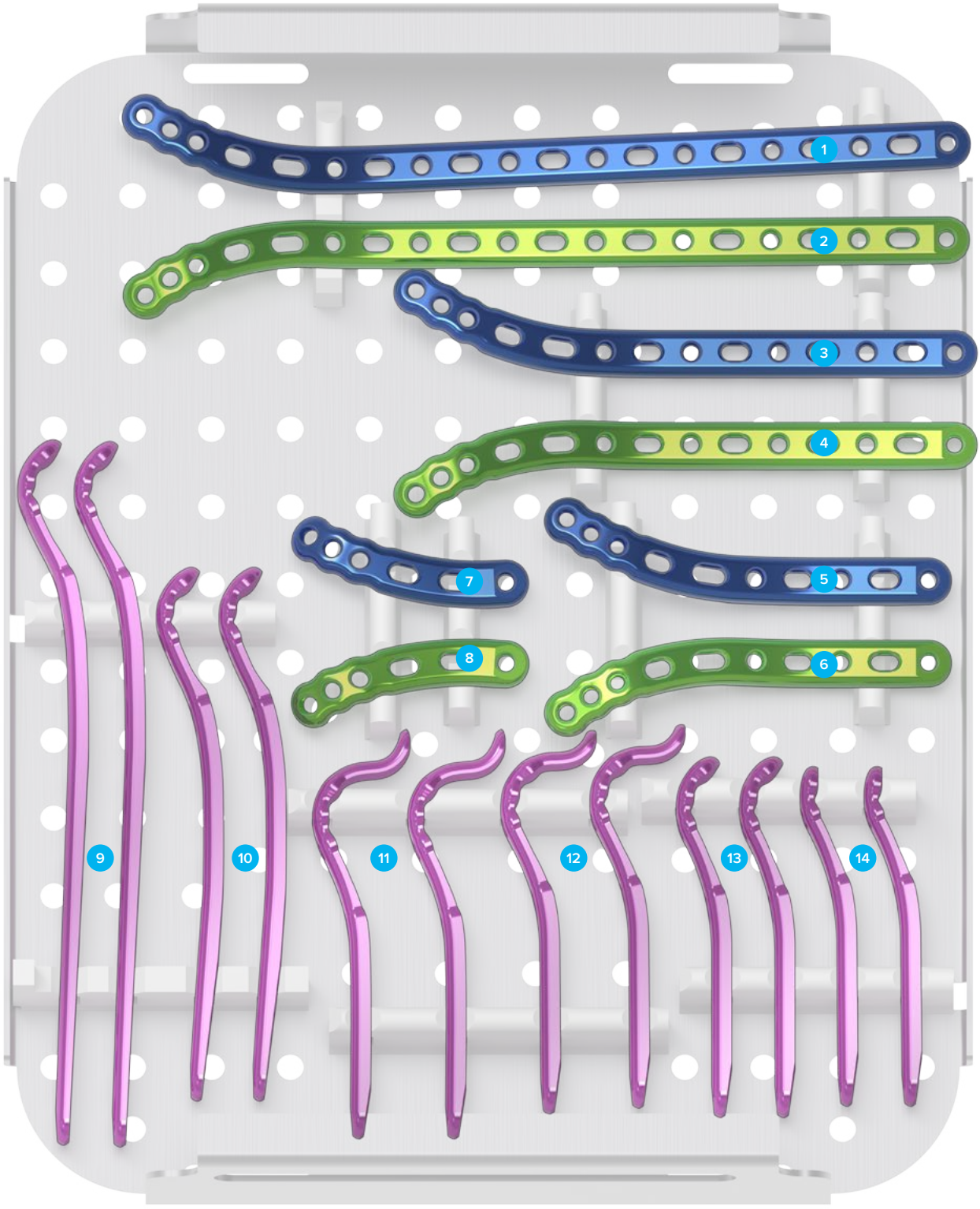
Ordering Information

Tray Components

Medial and Lateral Column Plates

1	Locking Lateral Plate, 20-hole, Left	PL-LEL20L
2	Locking Lateral Plate, 20-hole, Right	PL-LEL20R
3	Locking Lateral Plate, 14-hole, Left	PL-LEL14L
4	Locking Lateral Plate, 14-hole, Right	PL-LEL14R
5	Locking Lateral Plate, 10-hole, Left	PL-LEL10L
6	Locking Lateral Plate, 10-hole, Right	PL-LEL10R
7	Locking Lateral Plate, 6-hole, Left	PL-LEL6L
8	Locking Lateral Plate, 6-hole, Right	PL-LEL6R
9	Locking Medial Plate, 16-hole	PL-LEM16
10	Locking Medial Plate, 12-hole	PL-LEM12
11	Locking Medial Plate, 9-hole, Long	PL-LEM9L
12	Locking Medial Plate, 9-hole, Short	PL-LEM9S
13	Locking Medial Plate, 8-hole	PL-LEM8
14	Locking Medial Plate, 7-hole	PL-LEM7

Implants are also available sterile-packed. Add an “-S” at end of product number for sterile product. For more details on sterile products, including pricing, contact our Business Department at 888.627.9957.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Ordering Information [continued]

Tray Components

Olecranon Plates

1	Locking Olecranon Plate, 9-hole	PL-LEO9
2	Locking Olecranon Plate, 11-hole	PL-LEO11
3	Locking Olecranon Plate, 13-hole, Extended	PL-LEO13E
4	Locking Olecranon Plate, 13-hole	PL-LEO13
5	Locking Olecranon Plate, 17-hole, Right	PL-LEO17R
6	Locking Olecranon Plate, 17-hole, Left	PL-LEO17L

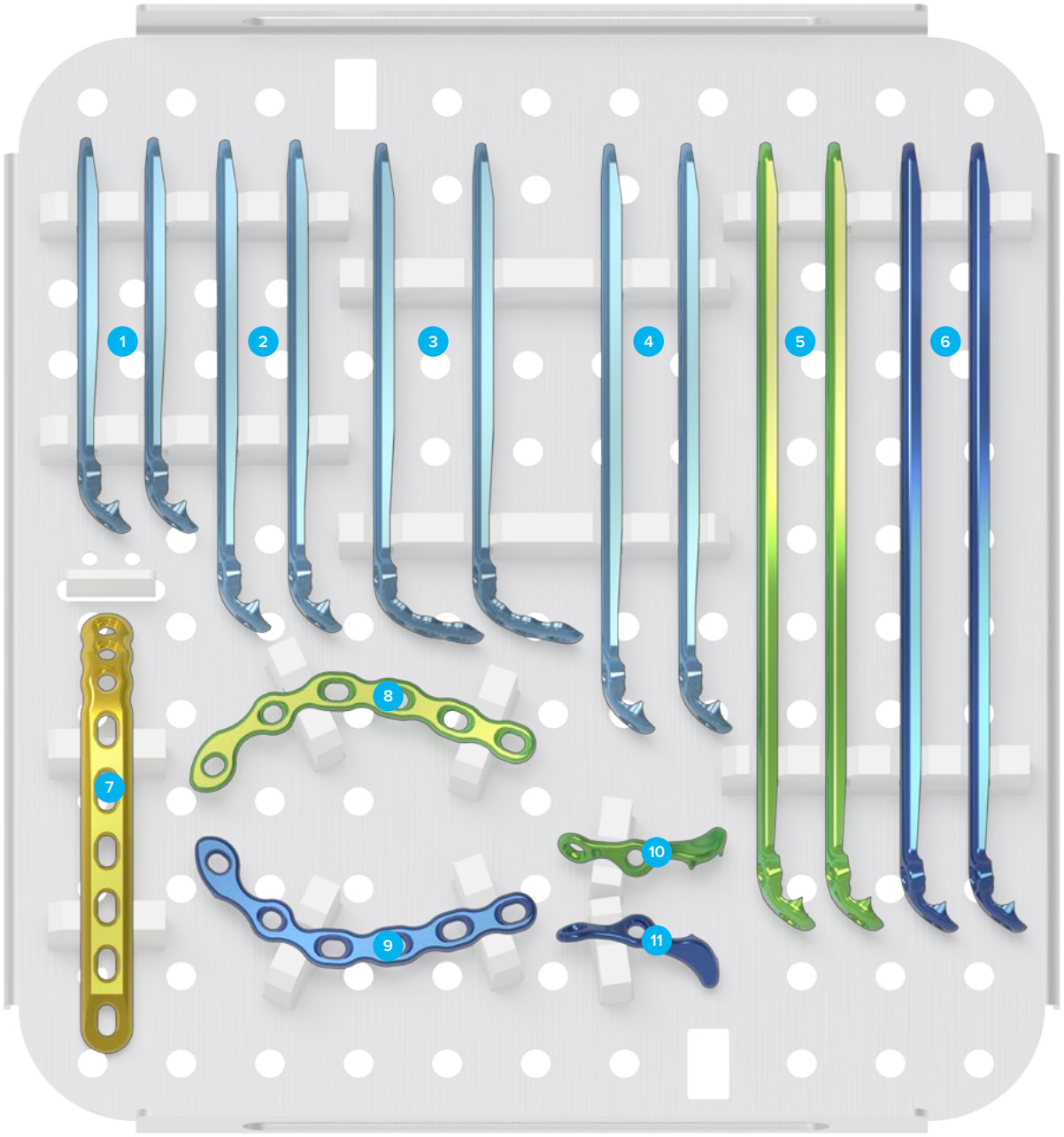
Posterior Plate

7	Elbow, Posterior Plate	PL-ELPO

Coronoid Plates

8	Coronoid Plate, Right, Extended	PL-ELCLR
9	Coronoid Plate, Left, Extended	PL-ELCLL
10	Coronoid Plate, Right	PL-ELCOR
11	Coronoid Plate, Left	PL-ELCOL

Implants are also available sterile-packed. Add an “-S” at end of product number for sterile product. For more details on sterile products, including pricing, contact our Business Department at 888.627.9957.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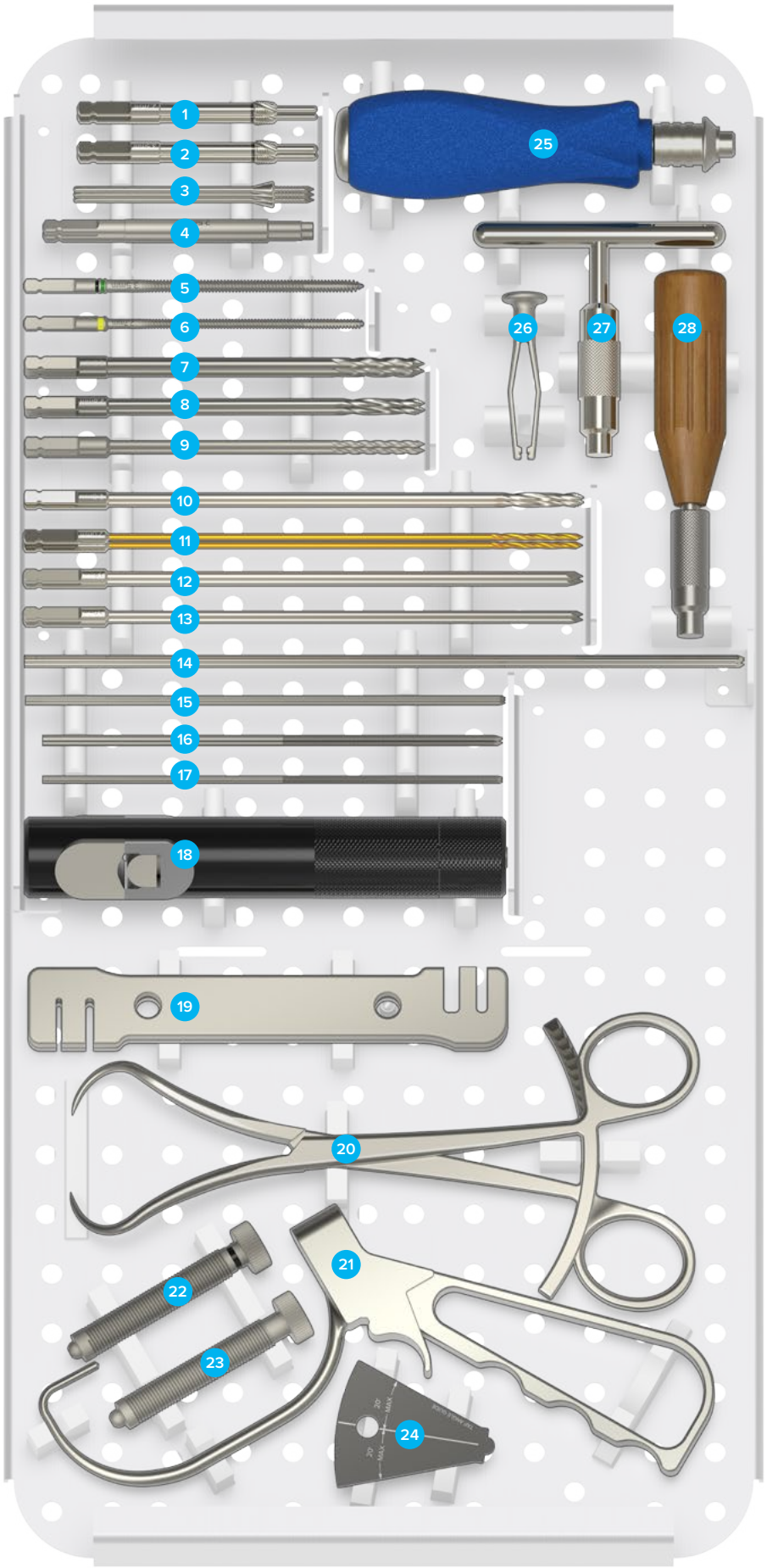
Ordering Information [continued]

Tray Components

Instruments

1	2.7 mm Tap Screw Tap	PL-ELT1027
2	3.5 mm Tap Screw Tap	PL-ELT1035
3	Plate Tack	PL-PTACK
4	2.5 mm Quick Release Hex Driver	HPC-0025
5	3.5 mm Cortical Screw Bone Tap	MS-LTT35
6	2.7 mm Cortical Screw Bone Tap	MS-LTT27
7	3.5 mm x 5" Quick Release Drill	MS-DC35
8	2.8 mm x 5" Quick Release Drill	MS-DC28
9	2.0 mm x 5" Quick Release Drill	MS-DC5020
10	2.8 mm Long Quick Release Drill	MS-LDC28
11	2.0 mm Long Quick Release Drill	MS-LDC20
12	2.8 mm Quick Release Steinman Pin	MS-PIN28
13	2.0 mm Quick Release Steinman Pin	MS-PIN20
14	2.0 mm x 9" ST Guide Wire*	WS-2009ST
15	.045" x 6" ST Guide Wire*	WS-1106ST
16	.062 x 5.75 STT Guide Wire, Titanium*	WT-1606STT
17	.035 x 5.75 STT Guide Wire, Titanium*	WT-0906STT
18	Plate Holder Assembly	PL-2030
19	Plate Bender, Large	PL-2045
20	8" Bone Reduction Forceps	MS-1280
21	Targeted Drill Guide	PL-CLAMP
22	2.8 mm Drill Guide Cannula	PL-28CLAMP
23	2.0 mm Drill Guide Cannula	PL-20CLAMP
24	Tap Screw Angle Guide (20 degree)	MS-TAG20
25	Large Cannulated Quick Release Driver Handle	MS-3200
26	3.5 mm Screw Driver Sleeve	MS-SS35
27	Quick Release T-Handle	MS-T1212
28	Quick Release Handle	MS-1210

*Also used as a K-wire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Ordering Information [continued]

Tray Components

Instruments

1	Periosteal Elevator	MS-46212
2	6 mm–70 mm Depth Gauge, 2 mm Increments	MS-9022
3	15 mm Hohmann Retractor	MS-46827
4	Sharp Hook	PL-CL06
5	2.0 mm/2.8 mm Thin Drill Guide	PL-2118
6	2.8 mm/3.5 mm Thin Drill Guide	PL-2196
7	3.5 mm Locking Drill Guide	MS-LDG35
8	2.7 mm Locking Drill Guide	MS-LDG27
9	Offset Drill Guide	PL-2095


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Ordering Information [continued]

Screws

2.7 mm Locking Cortical (Hex) Screws

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

2.7 mm (Nonlocking) Cortical (Hex) Screws

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

2.7 mm Tap-Loc® Screws

2.7 mm x 36 mm Tap-Loc Screw	FA-CO2736
2.7 mm x 38 mm Tap-Loc Screw	FA-CO2738
2.7 mm x 40 mm Tap-Loc Screw	FA-CO2740
2.7 mm x 45 mm Tap-Loc Screw	FA-CO2745
2.7 mm x 50 mm Tap-Loc Screw	FA-CO2750
2.7 mm x 55 mm Tap-Loc Screw	FA-CO2755
2.7 mm x 60 mm Tap-Loc Screw	FA-CO2760

3.5 mm Locking Cortical Screws

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

Ordering Information [continued]

Screws

3.5 mm Tap-Loc® Screws

3.5 mm x 36 mm Tap-Loc Screw	FA-CO3536
3.5 mm x 38 mm Tap-Loc Screw	FA-CO3538
3.5 mm x 40 mm Tap-Loc Screw	FA-CO3540
3.5 mm x 45 mm Tap-Loc Screw	FA-CO3545
3.5 mm x 50 mm Tap-Loc Screw	FA-CO3550
3.5 mm x 55 mm Tap-Loc Screw	FA-CO3555
3.5 mm x 60 mm Tap-Loc Screw	FA-CO3560

3.5 mm (Nonlocking) Cortical (Hex) Screws

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

4.0 mm Cancellous Screws

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

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3. Data on file at Acumed (TR00352).

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