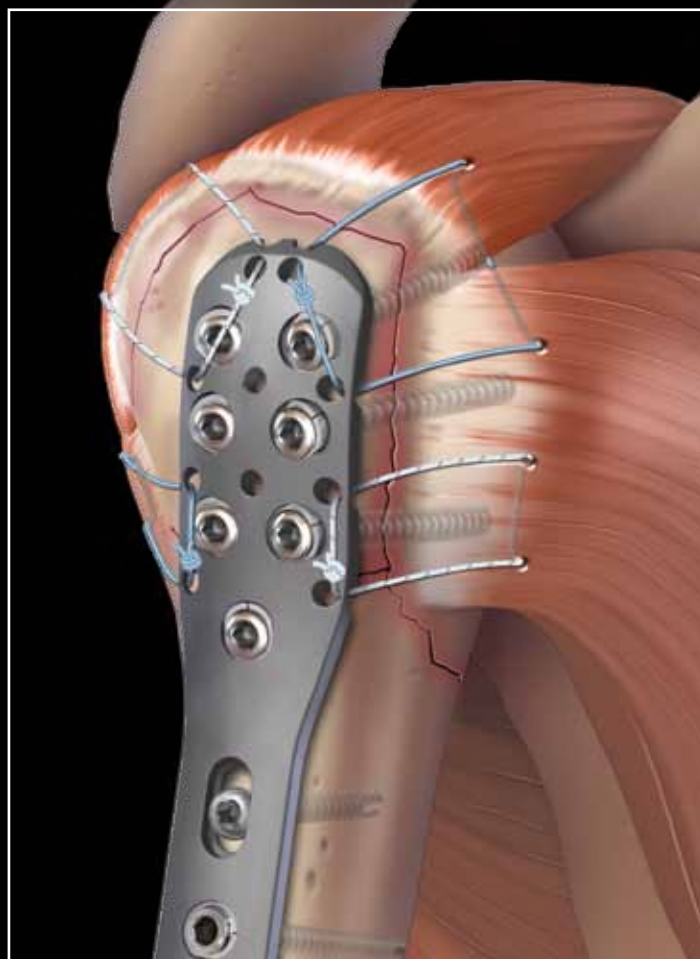


Humeral SuturePlate™



Proximal Humeral Fracture Management System



Arthrex® 

The Humeral SuturePlate is an anatomically designed, low profile, titanium polyaxial locking plate and screw system.

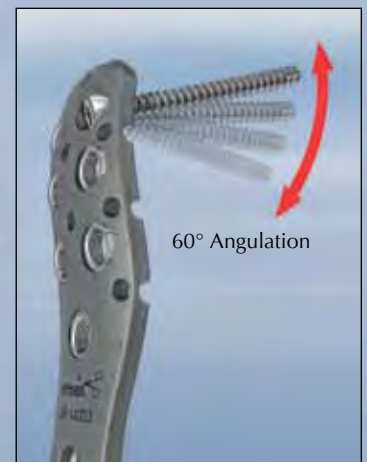


Multiple chamfered suture eyelets along the margin of the plate allow the surgeon to pass FiberWire® suture after the plate is fixed to bone.

FiberWire Suture Kits containing either color-coded #2 or #5 FiberWire sutures, with needles swedged-on each end, are available to facilitate suturing the soft tissue to the plate after it is in place.



Variable angle-locking is achieved by threading the tapered locking screws into the spherical bushings. The tapered head will expand the bushing, locking the screw to the plate. Nonlocking screws are provided and can be placed in any screw hole.



60° Angulation

The polyaxial bushings offer the surgeon the freedom to direct the screws within the anatomical template, based on the fracture pattern and bone quality for better fixation.

Proximal Humeral Fracture Repair

Fractures of the proximal humerus are a common fracture type. These fractures are classified based on anatomic location, mechanism of injury, displacement of the fracture fragments and vascular supply. While some fractures of the proximal humerus are treated nonoperatively, many need operative treatment including displaced Two, Three and Four-part Fractures. Type Three and Four-part Fractures commonly occur in the elderly who typically have very poor bone quality. Locking plates provide improved stability, even in patients with poor bone quality, while nearly eliminating the issue of screw-loosening. Loss of screw purchase in the bone can result in loss of fracture reduction. Locking plates and screws may also help to reduce the risk of avascular necrosis because the locking plate does not need compressive contact with the bone in order to maintain fracture reduction.

Setup and Patient Positioning

Indications

The SuturePlate is indicated for fractures of the proximal humerus.

Patient Positioning

The patient is placed on the OR table. The beach chair position is recommended. The affected extremity is prepped and draped free in the normal sterile fashion. An arm holder can also be very helpful to maintain the position of the injured extremity.

Surgical Approach

The deltopectoral or deltoid-splitting lateral approach are both recommended.

Reduction of Fracture

Reduce the fracture and use image intensification to confirm reduction. The fracture fragments can be provisionally fixed and manipulated with K-wires. Place the K-wires in a manner that will not interfere with the placement of the plate. *Note: Care must be taken not to damage the vascularity of the fracture. The anterohumeral circumflex vessel provides the majority of the blood supply to the articular segment.*



Preoperative

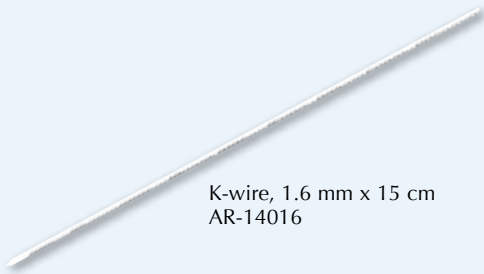


Postoperative

Positioning the Plate



SuturePlate Handle
AR-14024



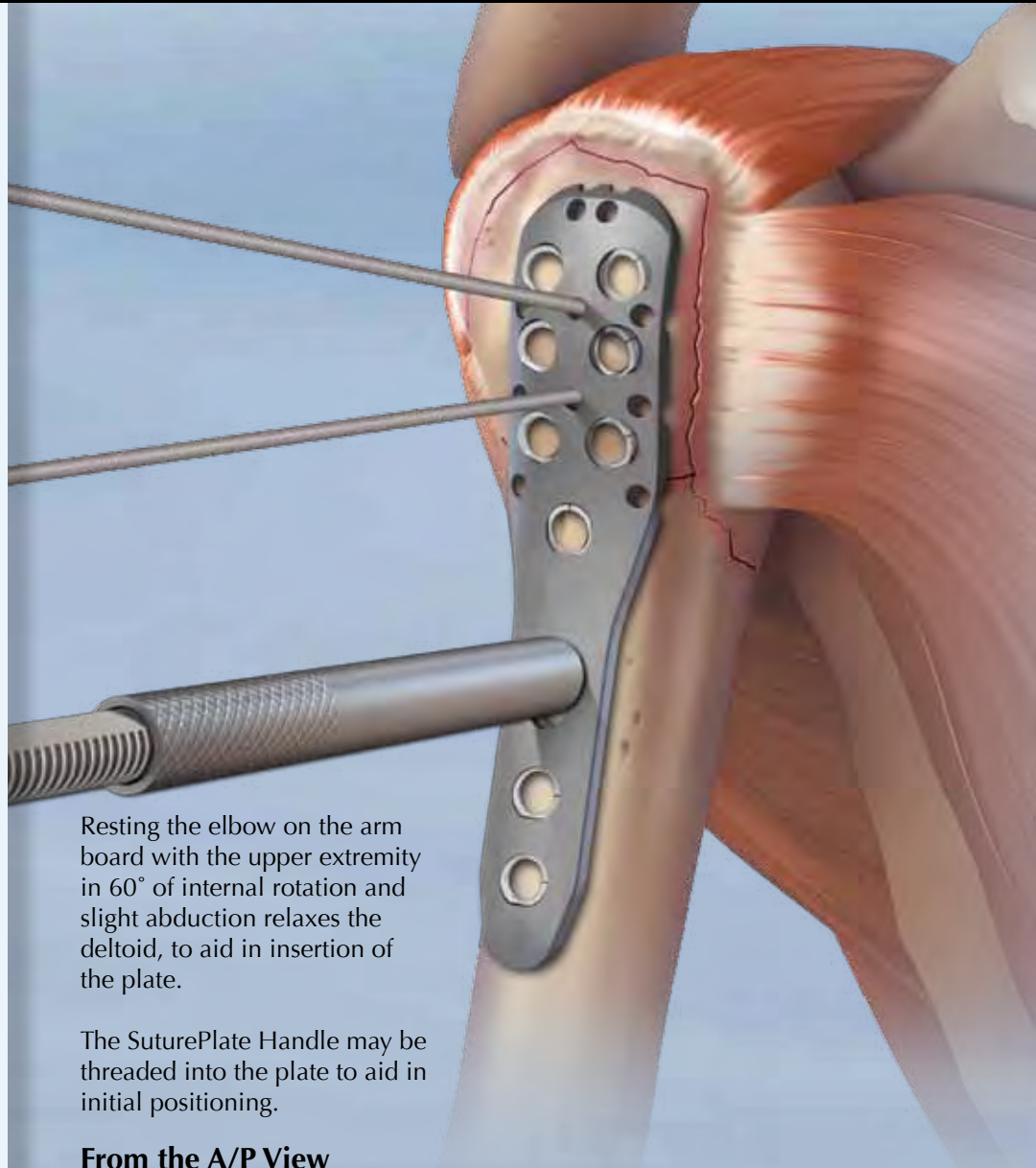
K-wire, 1.6 mm x 15 cm
AR-14016



Ball Wire, 1.6 mm x 15 cm
AR-14016B



Temporary
Compression Device
AR-14023TCD



Resting the elbow on the arm board with the upper extremity in 60° of internal rotation and slight abduction relaxes the deltoid, to aid in insertion of the plate.

The SuturePlate Handle may be threaded into the plate to aid in initial positioning.

From the A/P View

The plate is placed 5-8 mm distal to the upper edge of the greater tuberosity at the rotator cuff insertion. *Note: Care must be taken to avoid placing the plate too high because this will increase the risk of subacromial impingement. Conversely, care must be taken not to place the plate too low. Placing the plate too low could prevent optimal screw placement in the proximal fracture fragment(s).*

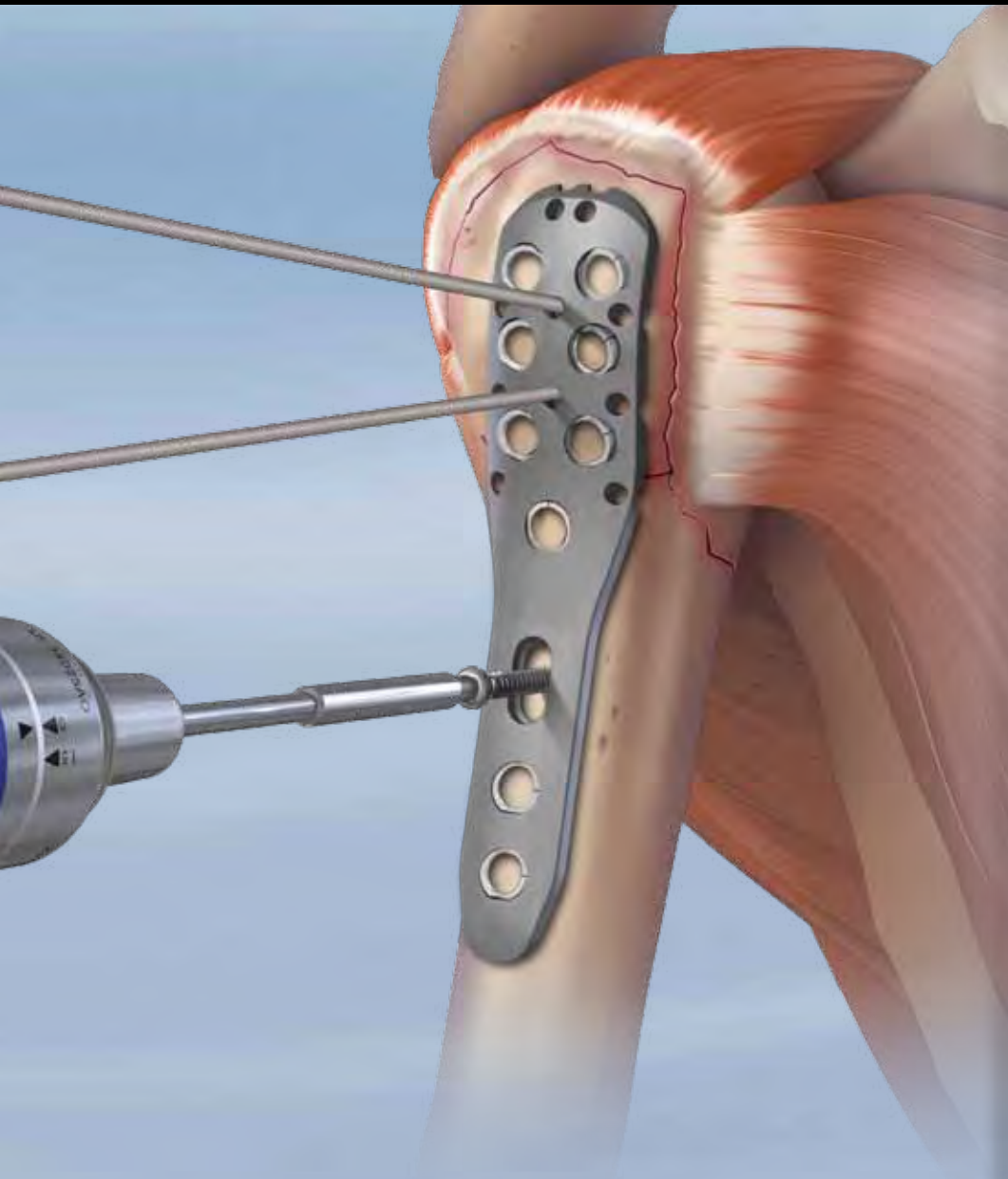
From the Lateral View

The plate is centered against the lateral aspect of the greater tuberosity, immediately lateral to the bicipital groove. The deltoid insertion may need to be elevated for optimal placement of the 5-hole plate.

Temporary Fixation

1.6 mm K-wires and Ball Wires are provided to temporarily fixate the plate to the bone, while maintaining reduction. The self-drilling Temporary Compression Device can be used through the oblong hole to easily manipulate the position of the plate, while compressing the shaft to the bone.

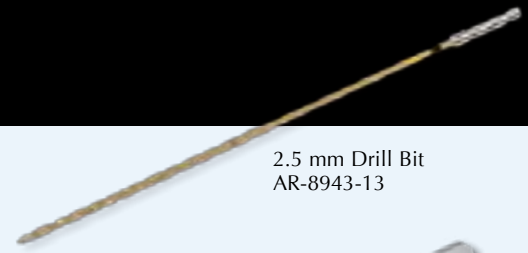
Distal Screw Fixation



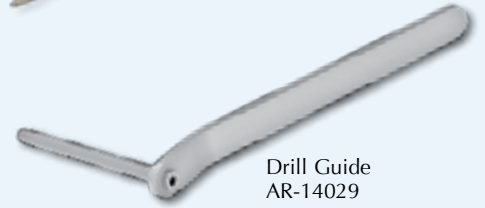
Initial screw placement depends on the fracture type and the reduction obtained. Most commonly, the distal aspect of the plate is fixed to the distal shaft fragment using the elongated slot and a 3.5 mm Cortical Screw to help control the height position of the plate. The use of image intensification is recommended during plate and screw placement.

For all distal screw holes, prepare a bi-cortical hole with the Drill Guide and 2.5 mm drill. The Screw Depth Gauge is used to determine the correct length of the screw. The screw is installed with the Hex Screw Driver Shaft and Tear Drop Handle or Torque Driver. The Cortical Screws will compress the plate to the bone and maintain the desired position. The locking screws should be inserted flush with the bushing.

When using the Temporary Compression Device, the screw length can be read directly off the instrument. Remove the device and insert the nonlocking screw through the existing 2 mm hole.



2.5 mm Drill Bit
AR-8943-13



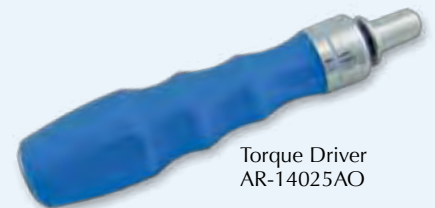
Drill Guide
AR-14029



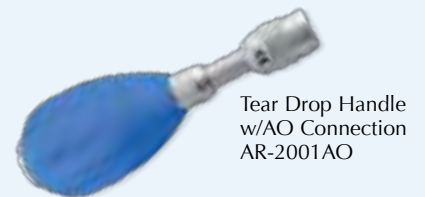
Screw Depth Gauge
AR-14100G



Hex Screw
Driver Shaft
AR-14025



Torque Driver
AR-14025AO



Tear Drop Handle
w/AO Connection
AR-2001AO



3.5 mm
Cortical Screw
AR-141XXNL



3.5 mm Cortical
Locking Screw
AR-141XX

Proximal Polyaxial Screw Placement



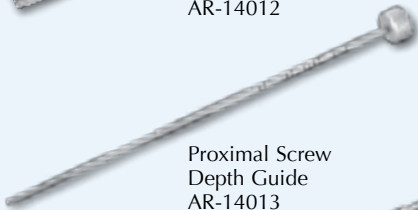
2.5 mm Drill Bit
AR-8943-13



Drill Guide
AR-14029



Threaded Drill Guide
AR-14012



Proximal Screw
Depth Guide
AR-14013



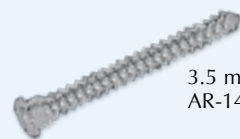
Hex Screw Driver Shaft
AR-14025



Torque Driver
AR-14025AO



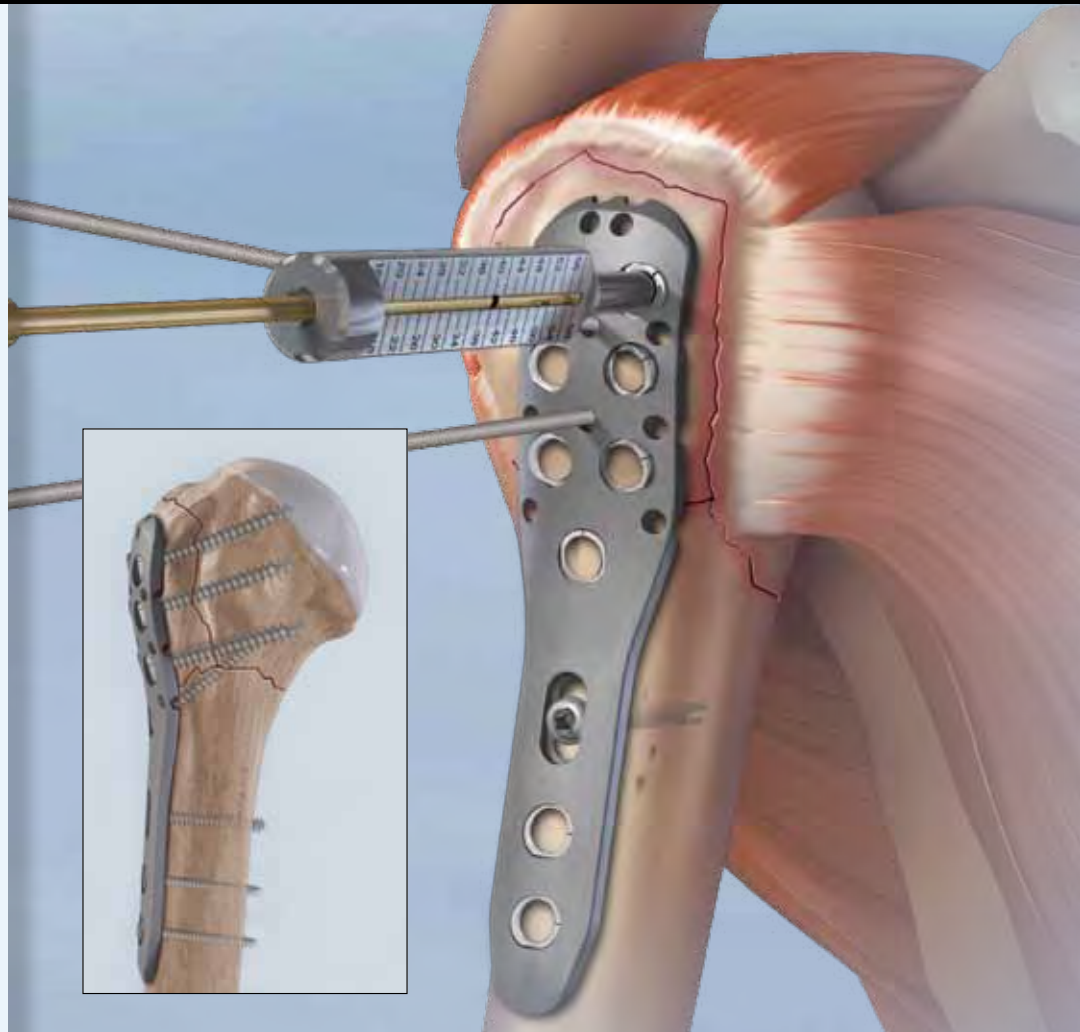
Tear Drop Handle
w/AO Connection
AR-2001AO



3.5 mm Cortical Screw
AR-141XXNL



4 mm Cancellous
Locking Screw
AR-142XX



The polyaxial bushings in each hole provide multi-directional locking or non-locking capability of the plate/screw construct to the bone. The drill guides can angulate the bushing to the desired screw trajectory. Ideally, the proximal screws should create a scaffold within the humeral head alongside and around the subchondral bone.

Prepare the hole with the 2.5 mm drill. The drill tip should not pass the subchondral bone. **Pearl: Drill the lateral cortex under power and reengage the drill with the Tear Drop Handle. Manually advance the drill to the desired depth.**

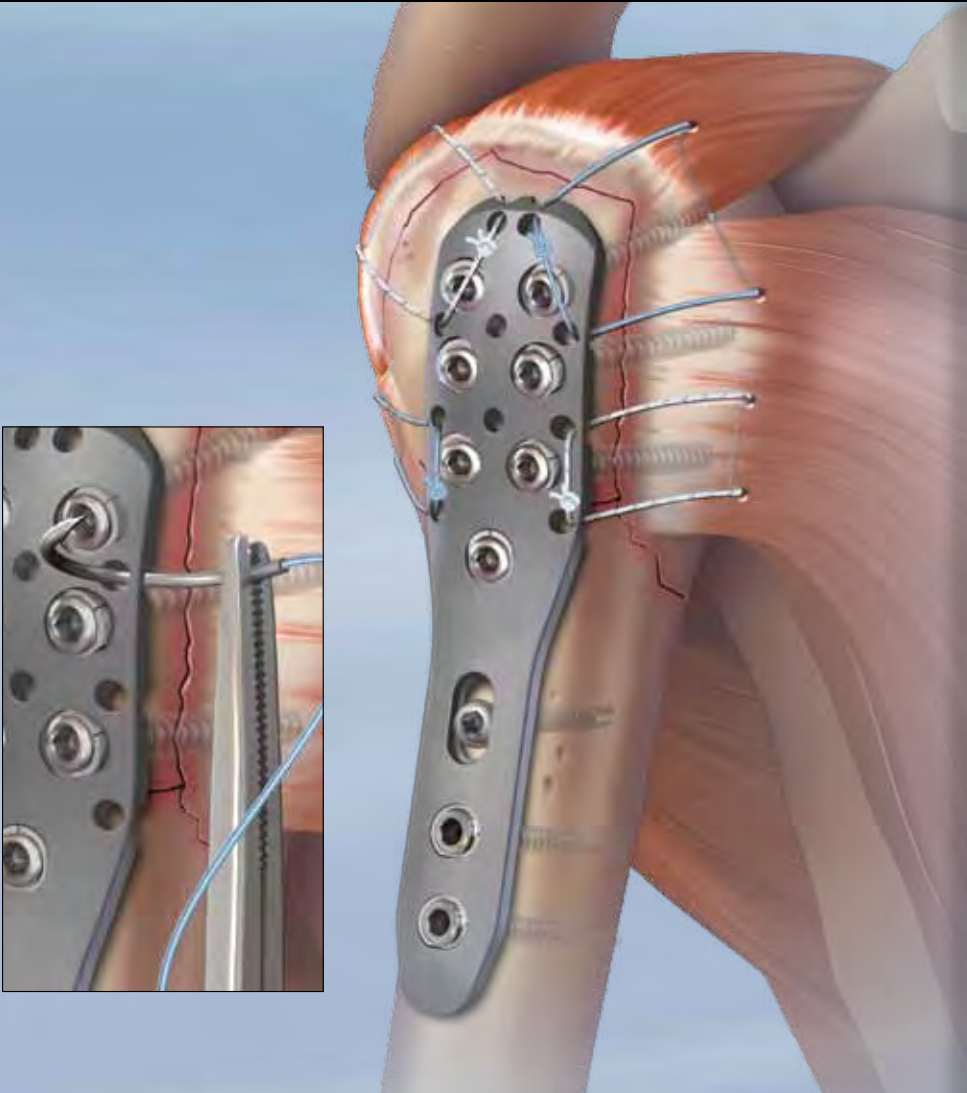
Screw length is determined from referencing the laser line on the drill with the graduations on the threaded drill guide or from using the Proximal Screw Depth Gauge referencing off the back of the drill guides.

The nonlocking 3.5 mm Cortical Screws or 4 mm Cancellous Locking Screws can be used through the bushing holes. The locking screws are installed with the Torque Driver and should be inserted flush with the bushing.

The K-wires are removed once secure fixation of the plate is achieved. A Pin Extractor is provided to ease K-wire removal.

Reinforce The Repair

FiberWire Suture Kit



There are multiple FiberWire options available to facilitate suturing the soft tissue to the plate. The FiberWire Suture Kit is available with color-coded #2 FiberWire sutures with needles. The needles are size-matched to the multiple chamfered holes along the margin of the plate, allowing the sutures to be passed after the plate is securely fixed to the bone.

A #5 FiberWire is also available for use with the SuturePlate. It has a large cutting needle on one end for tissue passage and a smaller needle on the other end for passage through the plate.

For fractures of the greater tuberosity, FiberWire is passed through one of the upper lateral suture holes and then through the supra and/or infraspinatus tendons adjacent to the bone/tendon junction. The FiberWire is passed back through one of the suture holes on the plate and tied. For fractures of the lesser tuberosity, FiberWire is passed through the subscapularis tendon at the tendon bone interface in a similar fashion.

Plate Removal

The sutures are detached from the construct and the screws are removed using a 2.5 mm hex driver. In case of screw hex stripping, a 2.5 mm Easy-Out is provided with the set.



FiberWire Suture Kit AR-7214 includes:

Three #2 FiberWire, (blue) 38"
w/Tapered Needle

One #2 TigerWire, (white/black) 38"
w/Tapered Needle

One #2 FiberWire, (white) 38"
w/Tapered Needle



#5 FiberWire
w/Needles
AR-7213

Other Compatible FiberWire

#2 FiberWire, (blue) 38"
w/Cutting and Tapered Needle
AR-7200

2 FiberWire, (blue) 38"
w/two Tapered Needles
AR-7205

#2 TigerWire, (white/black) 38"
w/two Tapered Needles
AR-7205T

#2 FiberWire and TigerWire,
(one blue, one white/black) 38"
w/Tapered Needle
AR-7208

Ordering Information

SuturePlate Set:	AR-14003S
Pin Extractor	AR-14016PE
2.5 mm Drill Bit	AR-8943-13
Hex Screw Driver Shaft, 2.5 mm, AO	AR-14025
Torque Driver	AR-14025AO
Tear Drop Handle with AO Connection	AR-2001AO
SuturePlate Handle	AR-14024
Screw Depth Gauge	AR-14100G
Proximal Screw Depth Guide	AR-14013
Threaded Drill Guide	AR-14012
SuturePlate Drill Guide, 2.5 mm	AR-14029
Temporary Compression Device	AR-14023TCD
Screw Holding Sleeve	AR-8943-11
Humeral SuturePlate Instrumentation Case	AR-14003C

Plates, Screws, and Disposables:

Humeral SuturePlate, 3-hole	AR-14003
Humeral SuturePlate, 5-hole	AR-14005
3.5 mm Cortical Locking Screws XX = 16-40, 2 mm increments, 45 and 50 mm	AR-141XX
4 mm Cancellous Locking Screws XX = 24-56 mm, 2 mm increments	AR-142XX
3.5 mm Cortical Screws XX = 16-40, 2 mm increments, 45 and 50 mm	AR-141XXNL
2.8 mm Terminally Threaded Pin	AR-2521
K-wire, 1.6 mm x 15 cm	AR-14016
Ball Wire, 1.6 mm x 15 cm	AR-14016B
Easy-Out	AR-1994-25

Compatible FiberWire with Needles:

FiberWire Suture Kit for SuturePlate	AR-7214
#5 FiberWire, 38" w/Cutting and Tapered Needles	AR-7213
#2 FiberWire, (blue) 38" w/Tapered Needle	AR-7200
#2 FiberWire, (blue) 38" w/two Tapered Needles	AR-7205
#2 TigerWire, (white/black) 38" w/two Tapered Needles	AR-7205T
#2 FiberWire and TigerWire, (one blue, one white/black) 38" w/Tapered Needle	AR-7208



This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's directions for use.

U.S. PATENT NOS. 6,716,234; 7,029,490 and PATENTS PENDING
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