

# Humeral SuturePlate™

Surgical Technique



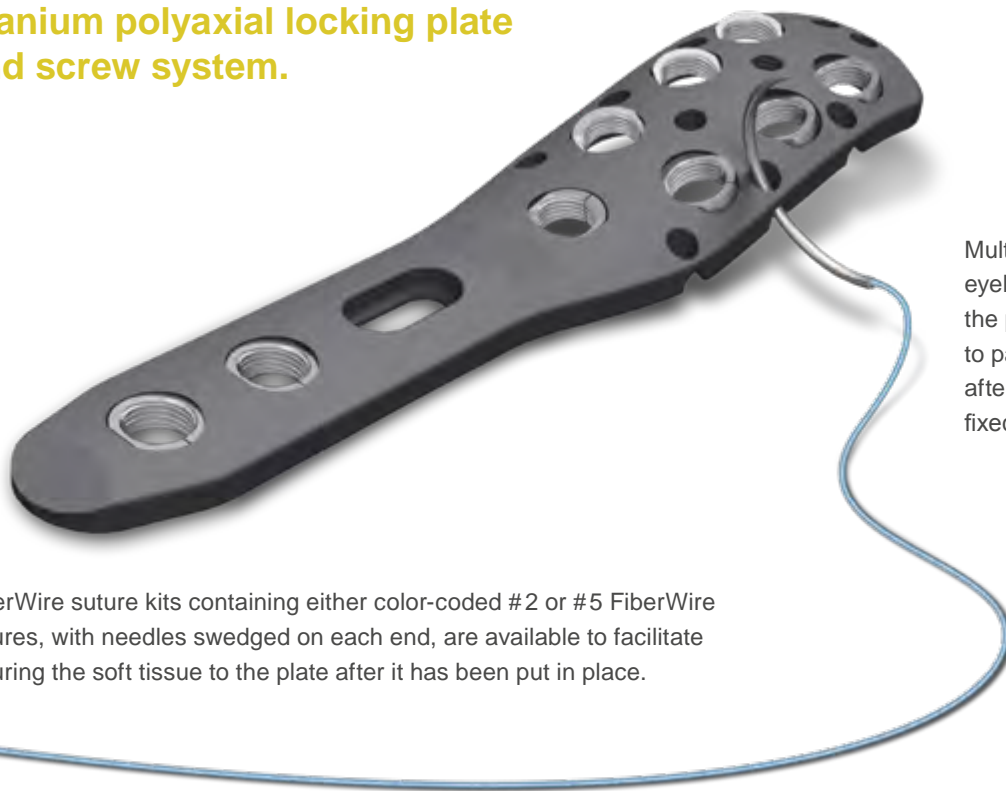
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**The Humeral SuturePlate is an anatomically designed, low profile, titanium polyaxial locking plate and screw system.**



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

FiberWire suture kits containing either color-coded #2 or #5 FiberWire sutures, with needles swaged on each end, are available to facilitate suturing the soft tissue to the plate after it has been put 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. Non-locking screws are provided and can be placed in any screw hole.



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.



## Surgical Technique

### 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. 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 screws 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.

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 5-8mm 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

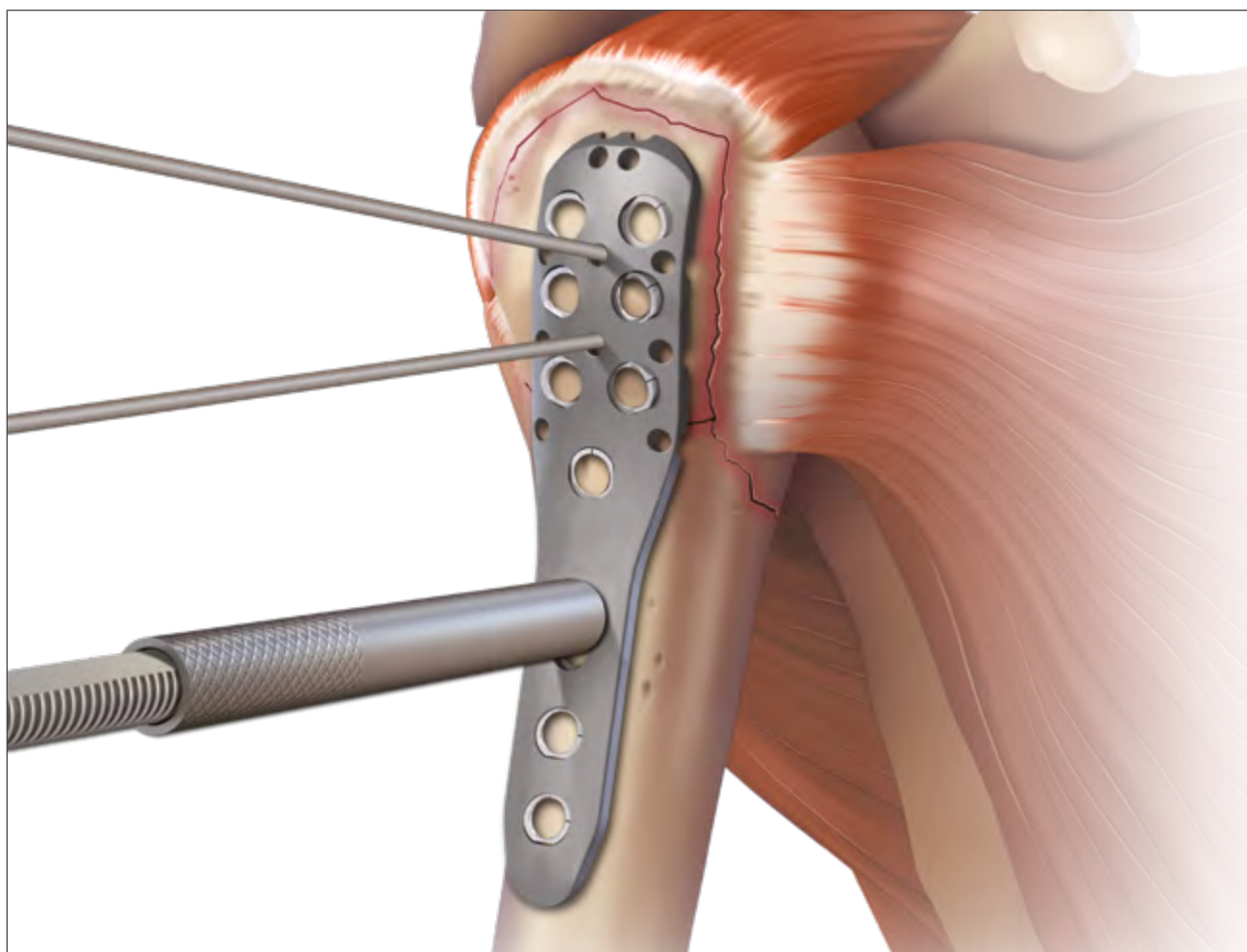
The plate is centered against the lateral aspect of the greater tuberosity, immediately lateral to the bicipital groove. The deltoid insertion may need to be elevated for optimal placement of the five-hole plate.



Preoperative



Postoperative



### **Reduction of the Fracture**

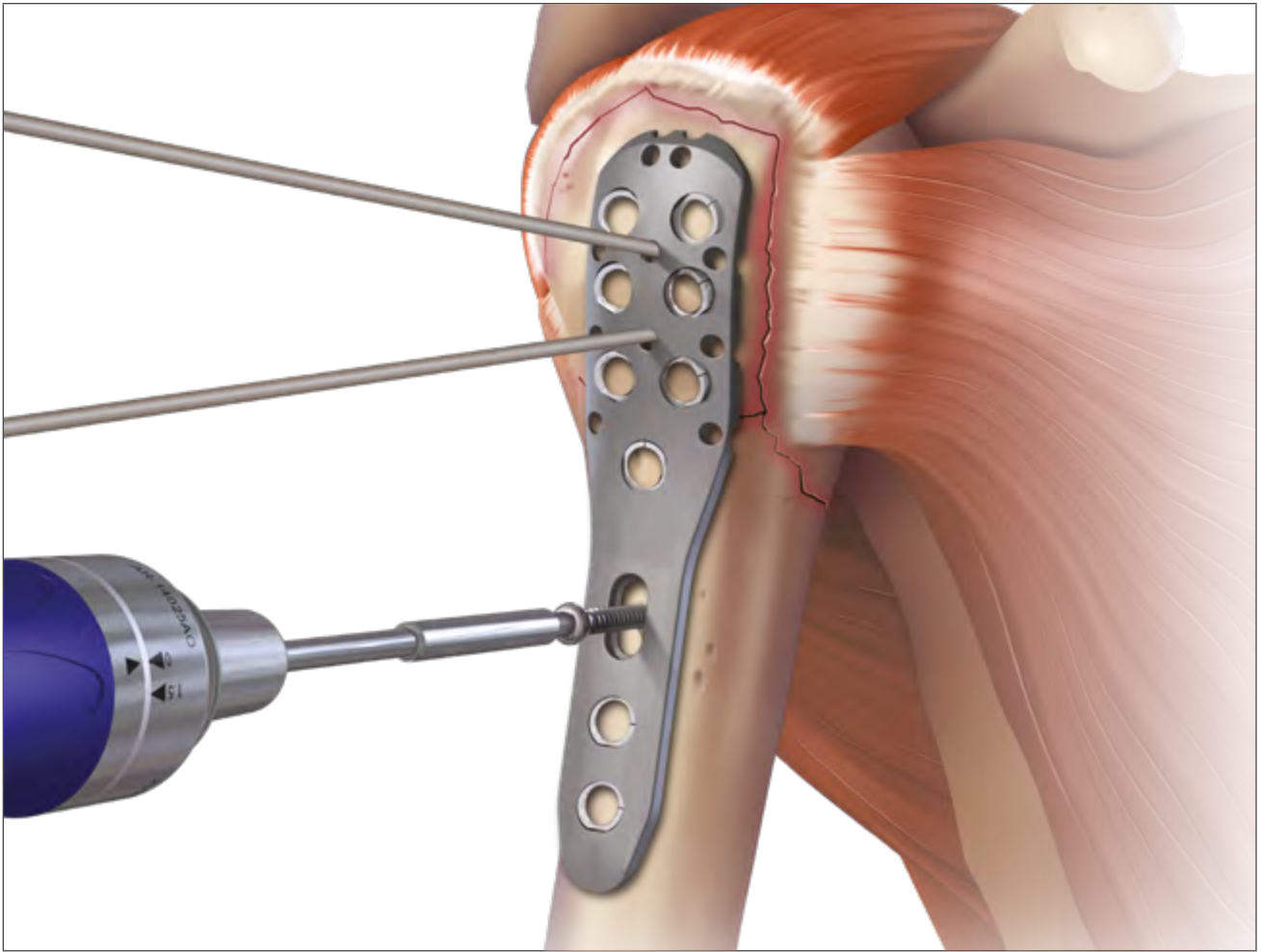
Reduce the fracture and use image intensification to confirm reduction. The fracture fragments can be provisionally fixed and manipulated with K-wires. Place the K-wires in a manner that will not interfere with the placement of the plate.

**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.

### **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

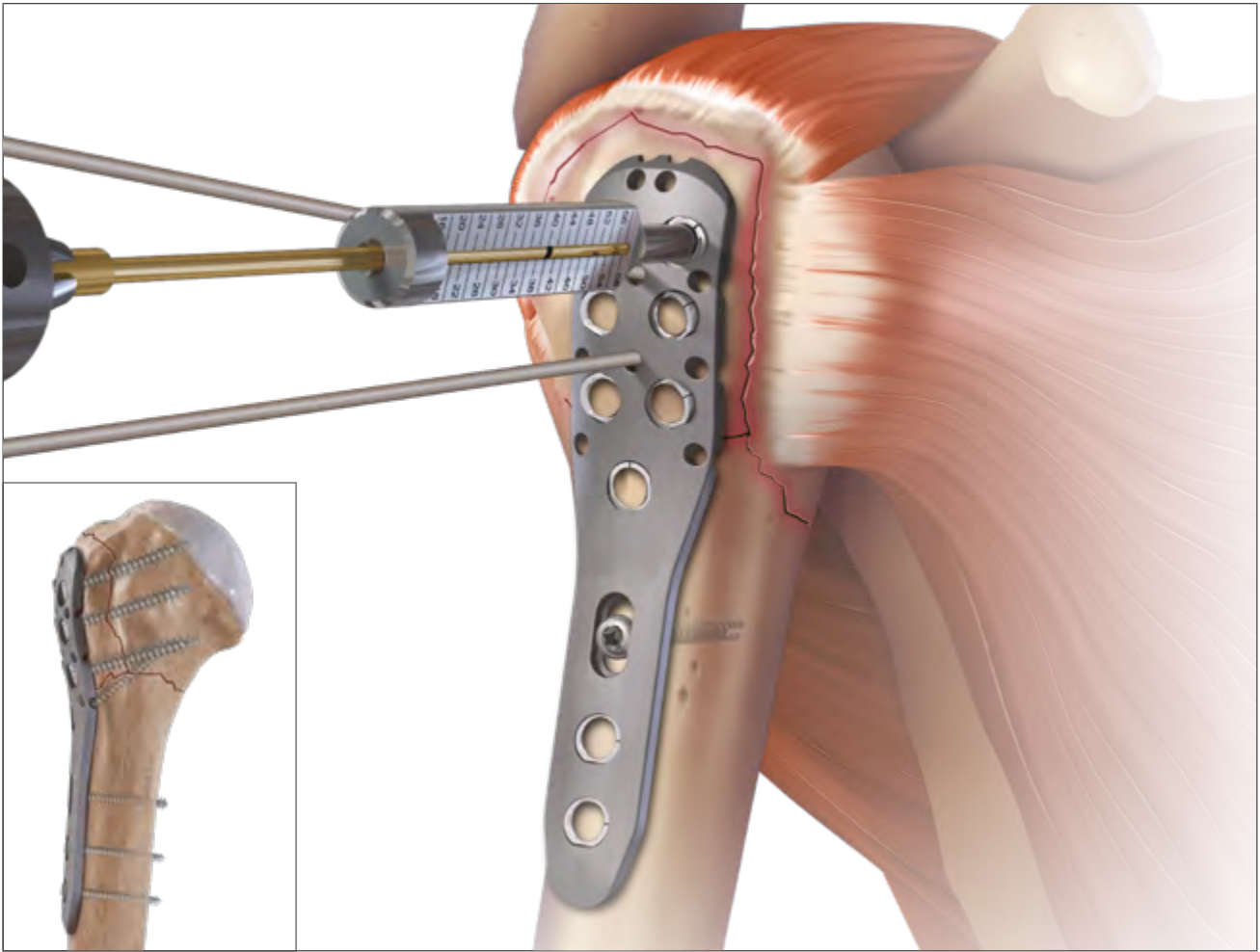


Initial screw placement depends on the fracture type and the reduction obtained. Most commonly, the distal aspect of the plate is fixed to the distal shaft fragment using the oblong hole and a 3.5 mm cortical screw to help control the height position of the plate. The use of image intensification is 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 from the instrument. Remove the device and insert the non-locking screw through the existing oblong hole.

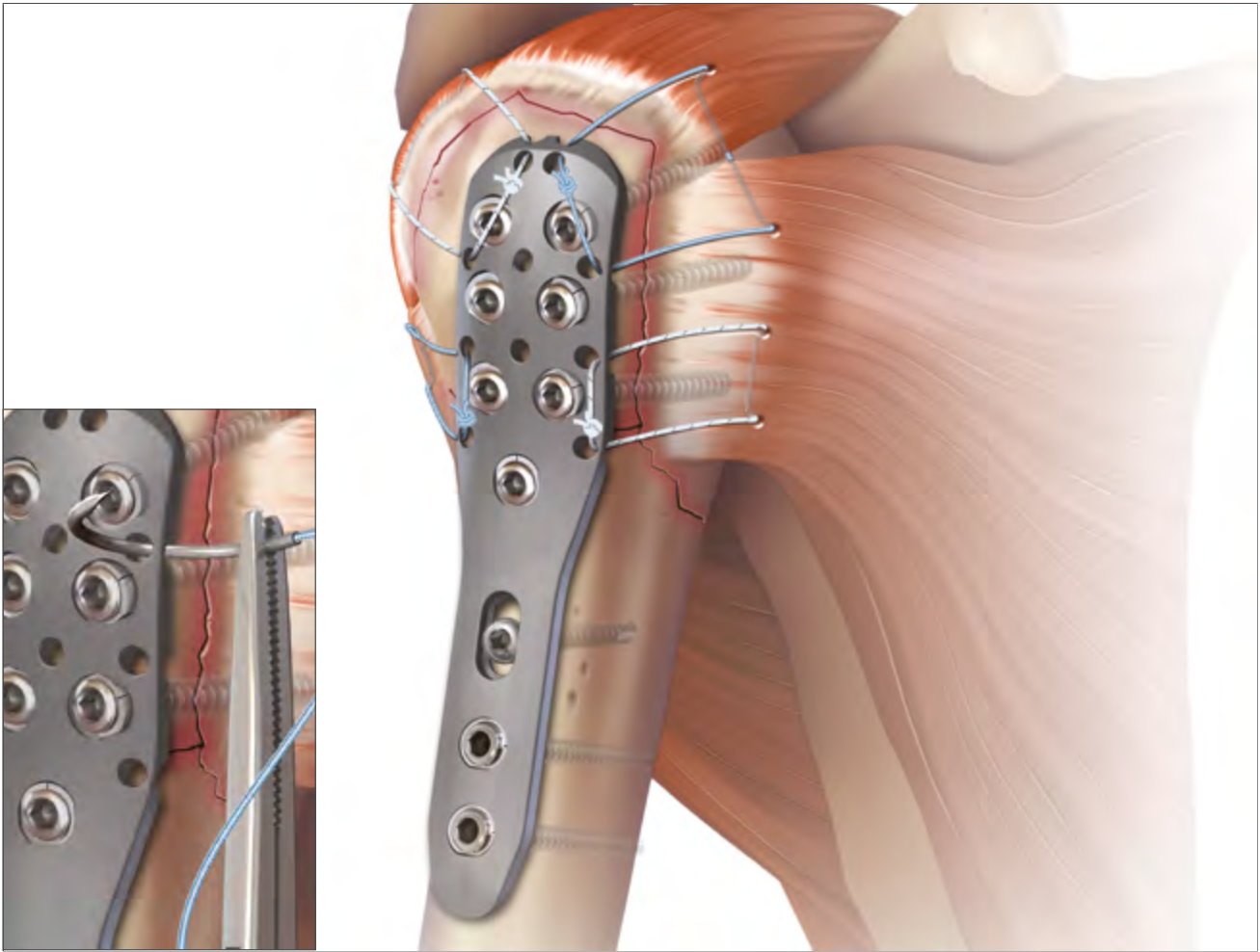
## Proximal Polyaxial Screw Placement



The polyaxial bushings in each hole provide multidirectional 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 locking or non-locking 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 for easy K-wire removal.



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 2.5mm hex driver. In case of screw hex stripping, a 2.5mm easy-out is provided with the set.



## Ordering Information

Product Description	Item Number
<b>Humeral SuturePlate™ II Set (AR-14003S)</b> Pin extractor Drill bit, 2.5 mm Hex screw driver shaft, 2.5 mm, AO connection Torque Driver Handle AO connection 1.5 Nm Tear drop handle with AO connection SuturePlate™ positioning handle Depth guide for distal cortical screws only Depth guide for proximal screws Threaded drill guide SuturePlate™ drill guide, 2.5 mm Temporary compression device Screw holding sleeve Humeral SuturePlate™ instrumentation case	AR-14016PE AR-8943-13 AR-14025 AR-14025AO AR-2001AO AR-14024 AR-14100G AR-14013 AR-14012 AR-14029 AR-14023TCD AR-8943-11 AR-14003C
<b>Plates, Screws and Disposables</b> Humeral SuturePlate™, 3-hole Humeral SuturePlate™, 5-hole Cortical locking screw, 3.5 mm x 16 - 40 mm (2 mm increments), 45 mm and 50 mm Cancellous locking screw 4 mm x 24 - 56 mm (2 mm increments) Cortical screw, 3.5 mm x 16 - 40 mm (2 mm increments), 45 mm and 50 mm Terminally threaded pin, 2.8 mm K-wire, 1.6 mm x 15 cm K-wire with ball, 1.6 mm x 15 cm Easy-out for 2.5 mm hex screw	AR-14003(-ST) AR-14005(-ST) AR-14116 to 50(S) AR-14224 to 56(S) AR-14116NL to 50NL(S) AR-2521 AR-14016 AR-14016B(S) AR-1994-25
<b>Compatible FiberWire® with Needles</b> FiberWire® suture kit for SuturePlate™ # 5 FiberWire®, 96.5 cm with cutting and tapered needles # 2 FiberWire®, blue, 96.5 cm with tapered needle # 2 FiberWire®, blue, 96.5 cm with two tapered needles # 2 TigerWire®, white/black, 96.5 cm with two tapered needles # 2 FiberWire® and TigerWire®, one blue, one white/black, 96.5 cm with tapered needle	AR-7214 AR-7213 AR-7200 AR-7205 AR-7205T AR-7208

(S) = sterile option available

(-ST) = sterile option available

Please note that not all products advertised in this brochure/surgical technique guide may be available in all countries. Please ask the Arthrex Customer Service or your local Arthrex Representative before ordering if the desired product is available for delivery. Thank you very much.



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