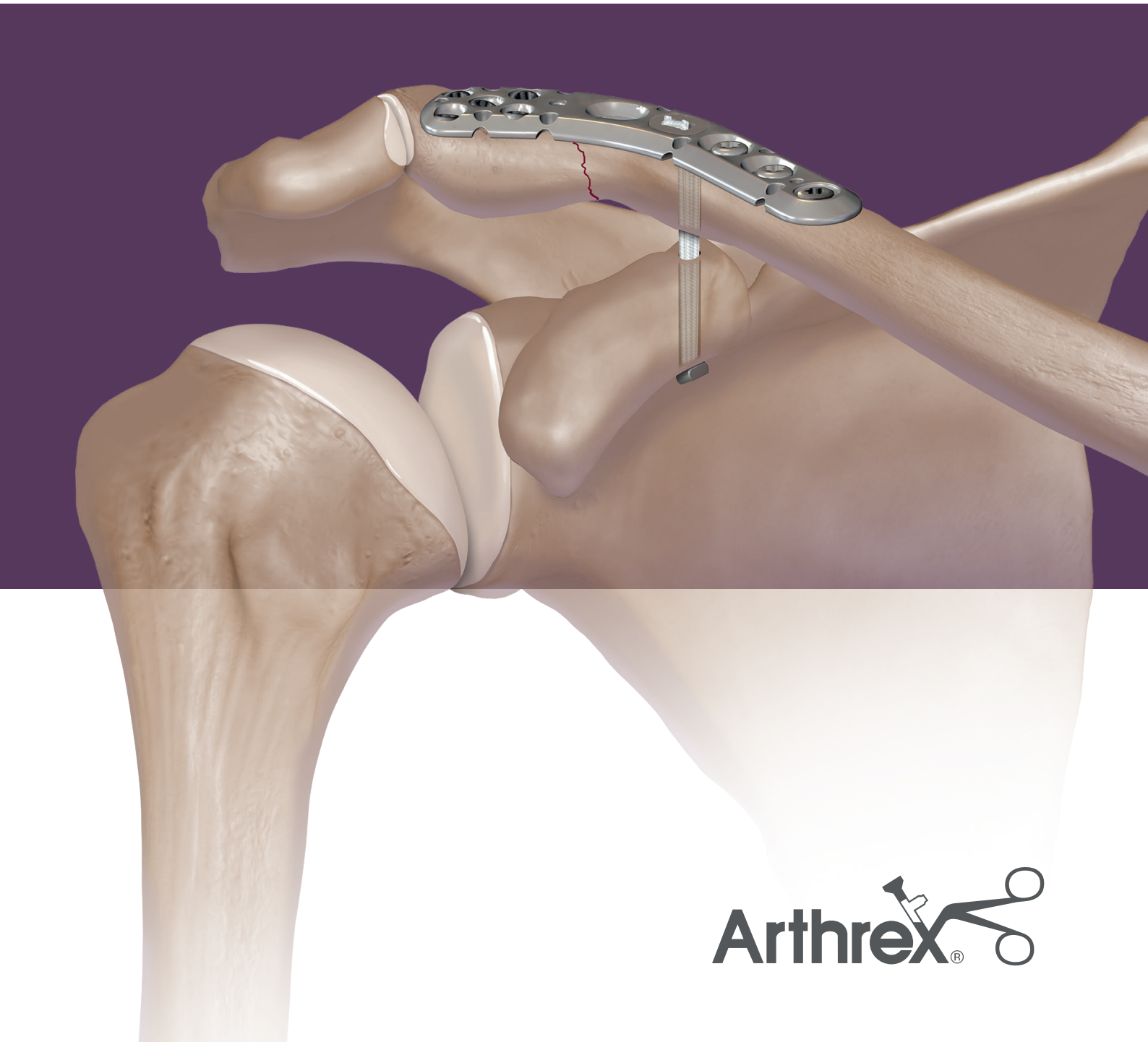
Clavicle Plate and Screw System

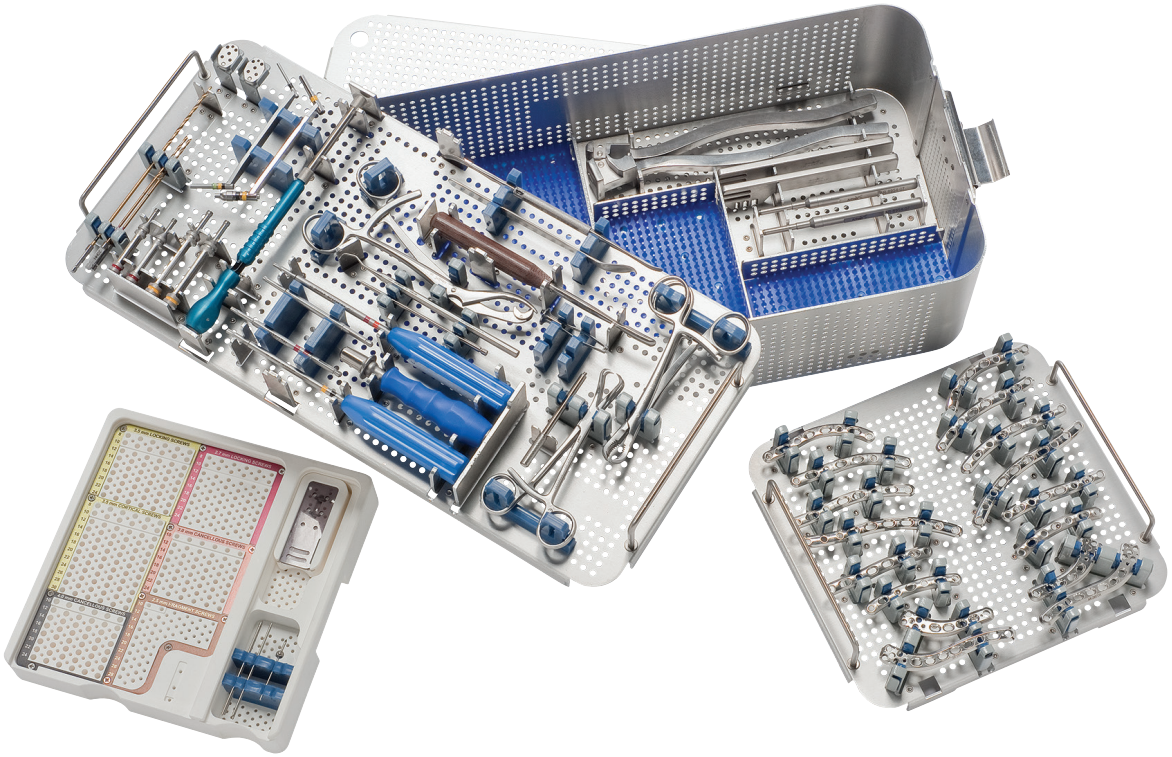
Surgical Technique



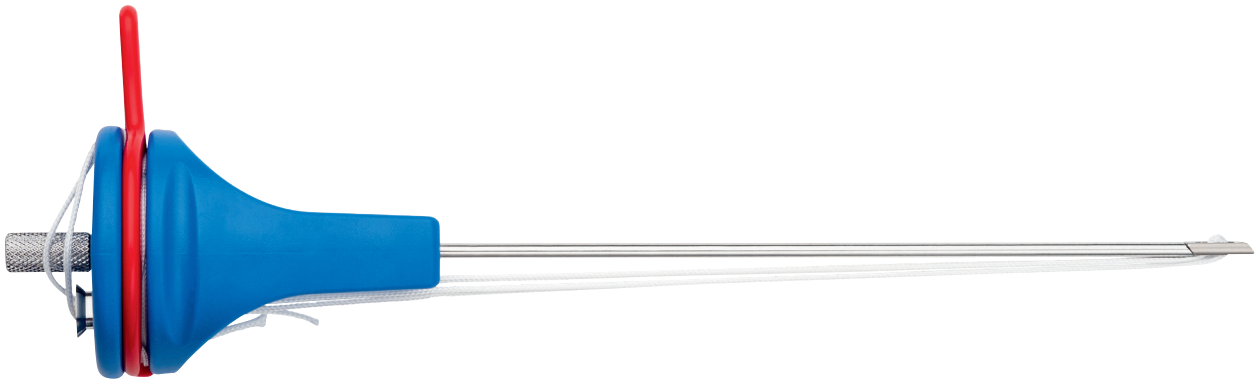
Arthrex®

Clavicle Plate and Screw System

The Clavicle Plate and Screw System is a comprehensive set of stainless steel plates and screws with instrumentation for treating central third and distal clavicle fractures. The plates are precontoured and anatomically designed to limit the need for bending, helping to ensure an optimal match with the patient's superior clavicle.



Achieve secondary fixation to the coracoid using the Knotless Distal Clavicle Plate Button TightRope® implant. The TightRope implant, consisting of a knotless clavicle plate button attached to a large pec button, is preloaded onto an inserter, allowing surgeons to perform an open, "push-through" technique without having to use a scope or access beneath the coracoid.



Clavicle Fracture Repair

Setup and Patient Positioning

Patient Positioning
Place the patient on the OR table. The beach chair position is recommended. Prep and drape the affected extremity in the normal sterile fashion. Place a roll or pad between the shoulder blades to allow retraction and aid in reduction. An arm holder, like the TRIMANO FORTIS arm holder, can also be very helpful in maintaining the position of the injured extremity.

TRIMANO FORTIS

Surgical Approach
Make a 3 cm to 5 cm horizontal incision over the superior clavicle. Subcutaneous dissection allows for identification of supraclavicular nerve branches.

Fracture Reduction
Reduce the fracture and use fluoroscopy to confirm reduction. Using reduction forceps can be very helpful in maintaining reduction. Apply interfragmentary (lag) screws as/if appropriate to help maintain fracture reduction. If necessary, smaller butterfly fragments may be reduced with 2.5 mm distal-tip fragment screws.

Fragment Screws
2.5 mm Herbert screw design aids in reducing comminuted bone fragments

Plate Selection
Select the appropriate clavicle plate to match the patient's anatomy. Aluminum clavicle plate sizing templates may be used to help determine the appropriate implant. The plates are precontoured to reduce the need to bend. If contouring the plate is necessary, use the appropriate plate benders. Do not bend the plate near the locking holes as this may distort the threads and inhibit proper screw insertion. Repeated bending of the plate at the same location or by creating excessive acute angles may potentially lead to plate fatigue, failure, and/or breakage in situ.

Clavicle Plate Sizing Template

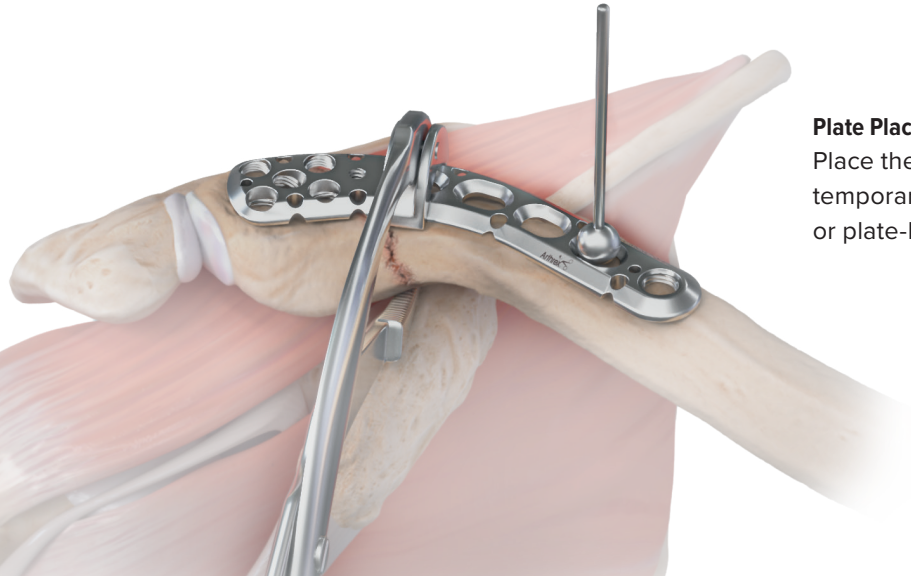
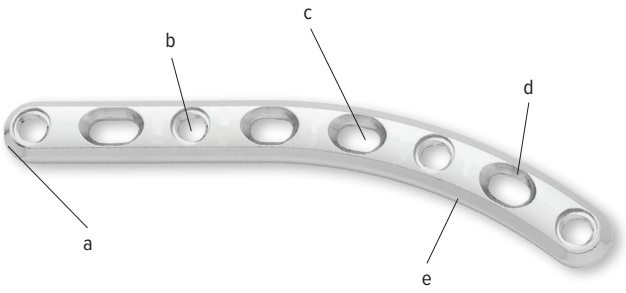


Plate Placement
Place the plate onto the reduced clavicle and temporarily attach it to the bone using BB-Taks, K-wires, or plate-holding forceps.

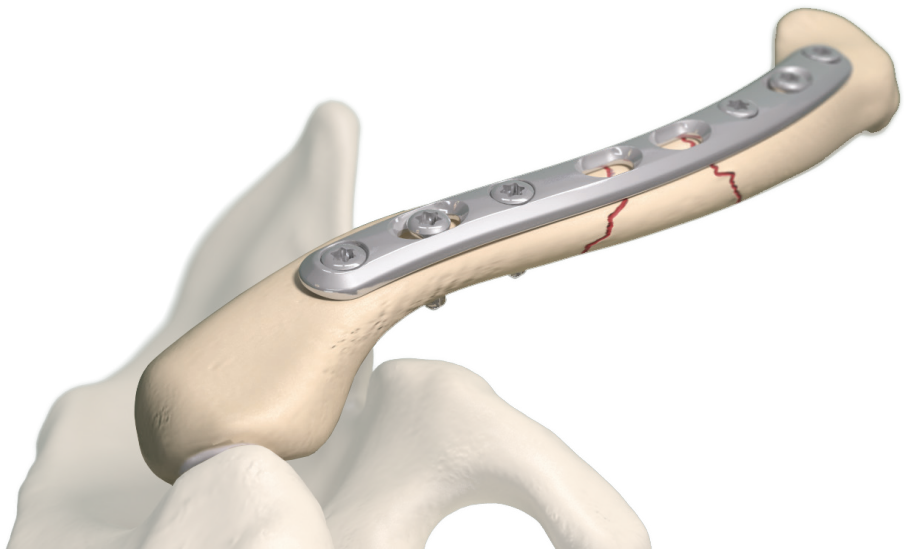
Central Third Plates

Product	Item Number
	AR-**2650CL** **Length** = 86 mm
	AR-**2651CL** **Length** = 93 mm
	AR-**2652CL** **Length** = 98 mm
	AR-**2653CL** **Length** = 120 mm
	AR-**2654CL** **Length** = 87 mm
	AR-**2655CL** **Length** = 76 mm

Product	Item Number
	AR-**2650CR** **Length** = 86 mm
	AR-**2651CR** **Length** = 93 mm
	AR-**2652CR** **Length** = 98 mm
	AR-**2653CR** **Length** = 120 mm
	AR-**2654CR** **Length** = 87 mm
	AR-**2655CR** **Length** = 76 mm
	AR-**2680ST** **Length** = 76 mm

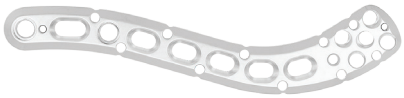


(a) Tapered end to minimize soft-tissue irritation
(b) Locking holes
(c) Compression slots that can accommodate plate buttons
(d) Recessed slots for screws to sit flush with plate, minimizing soft-tissue irritation
(e) Beveled edges to minimize soft-tissue irritation

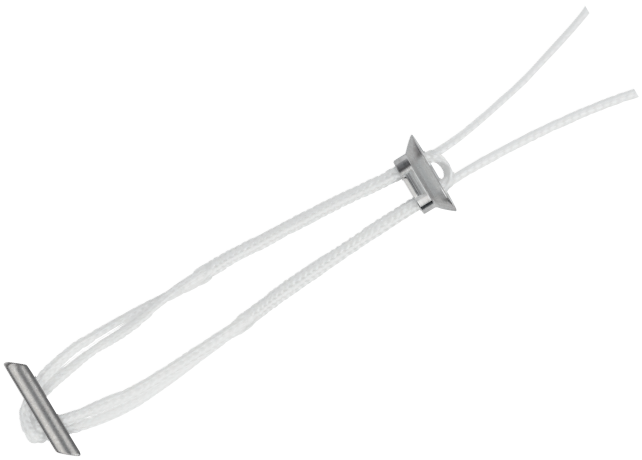


Distal Clavicle Plates

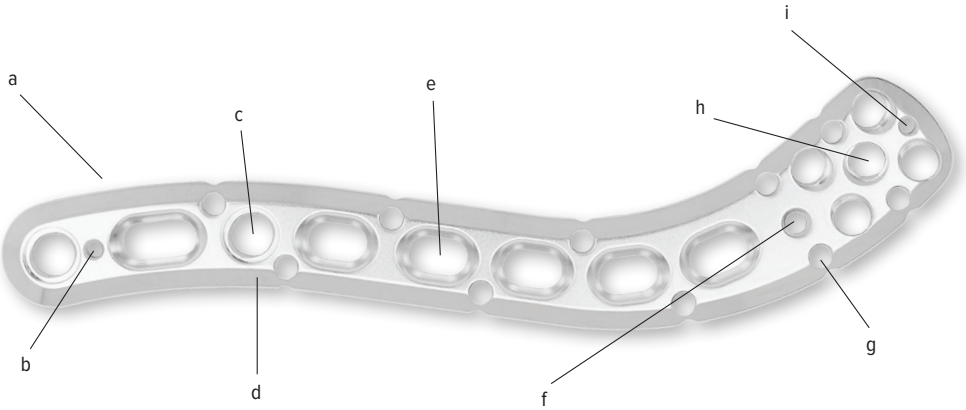
Product	Item Number
	AR-**2622DL** **Length** = 70 mm
	AR-**2656DL** **Length** = 70 mm
	AR-**2657DL** **Length** = 100 mm
	AR-**2685DL-10** **Length** = 126 mm

Product	Item Number
	AR-**2622DR** **Length** = 70 mm
	AR-**2656DR** **Length** = 70 mm
	AR-**2657DR** **Length** = 100 mm
	AR-**2685DR-10** **Length** = 126 mm

Product Description	Item Number
Knotless Distal Clavicle Plate Button TightRope® Implant	AR-**2658TR**
Compatible with any Arthrex distal clavicle plate stainless steel plate button; sits flush in any compression slot pec button; provides stable fixation beneath the coracoid	



15° Divergent Screw Pattern

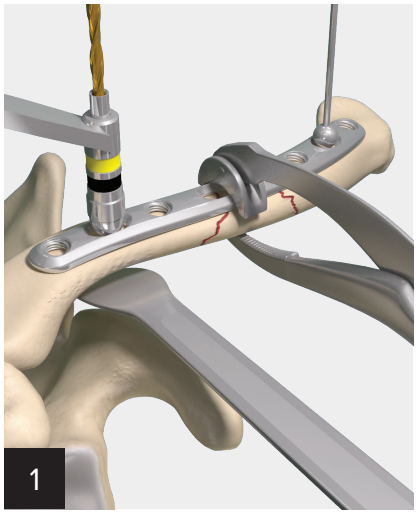


(a) Tapered end to minimize soft-tissue irritation
(b) K-wire hole for temporary plate fixation
(c) Locking holes
(d) Beveled edges to minimize soft-tissue irritation
(e) Compression slots that can accommodate plate buttons

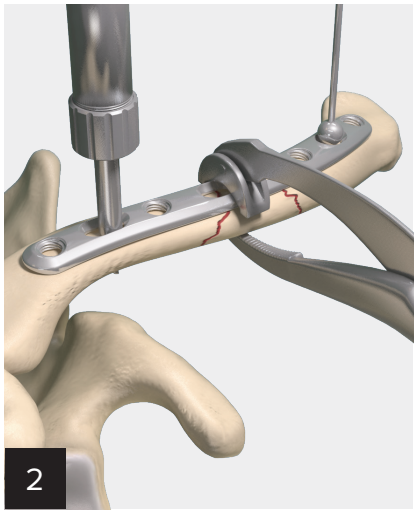
(f) Threaded hole for positioning handle and distal drill guide
(g) Chamfered suture eyelets to incorporate FiberWire® suture into the plate
(h) 2.7 mm divergent locking holes
(i) K-wire hole for temporary plate fixation

Central Third Plates

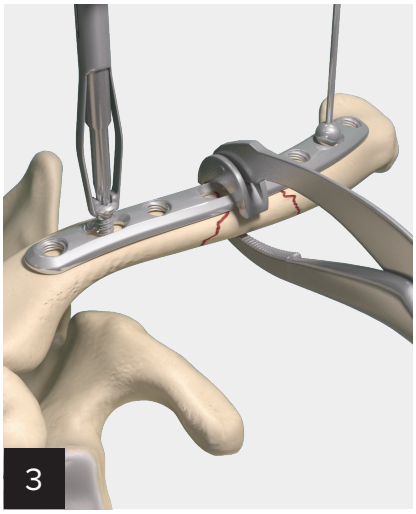
Nonlocking Screw Insertion



Place the 3.5 mm/2.5 mm drill guide into the appropriate plate slot and prepare a hole using the 2.5 mm drill bit. If drilling bicortically, place a retractor under the clavicle to help protect the neurovascular structures.

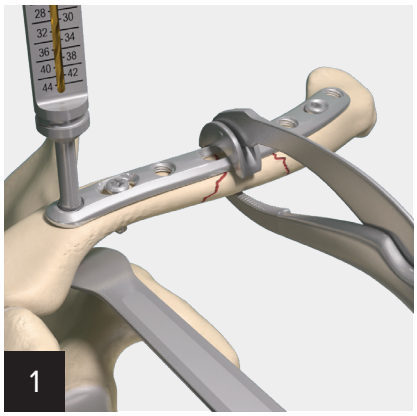


Measure for screw length using the screw depth device.

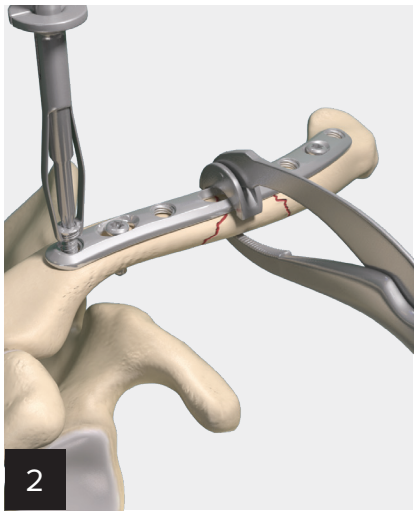


Select appropriate 3.5 mm or 4 mm screw and insert using the T15 hexalobe driver.

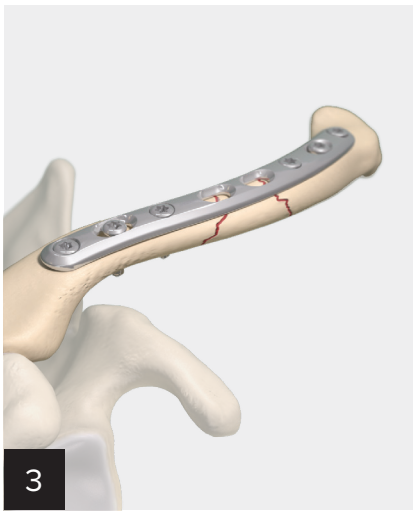
Locking Screw Insertion



Place the 3.5 mm threaded drill guide into the appropriate plate hole and prepare a hole using the 2.5 mm drill bit. If drilling bicortically, place a retractor under the clavicle to help protect the neurovascular structures. Read the corresponding screw length from the laser line on the drill. Alternatively, the screw depth device can be used to determine the screw length.



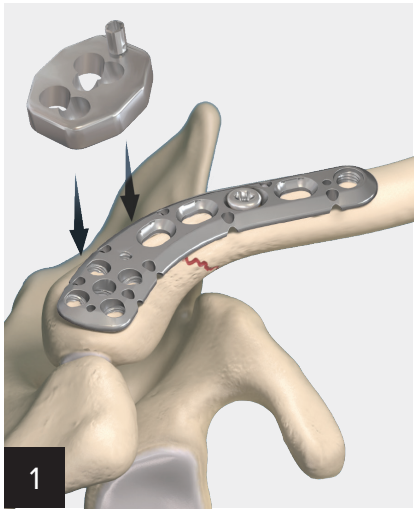
Select appropriate 3.5 mm locking screw and insert using the T15 hexalobe driver.



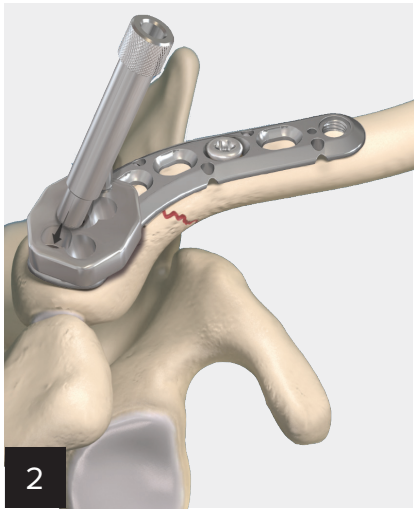
Insert remaining screws as needed to complete the repair. Arthrex BoneSync™ calcium phosphate cement or AlloSync™ Pure demineralized bone matrix can be used to help stabilize bone fragments within highly comminuted fractures and promote healing.

Distal Clavicle Plates

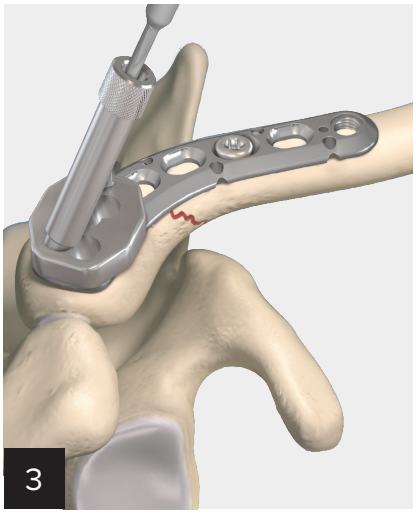
Locking Screw Insertion for 2.7 mm Screws



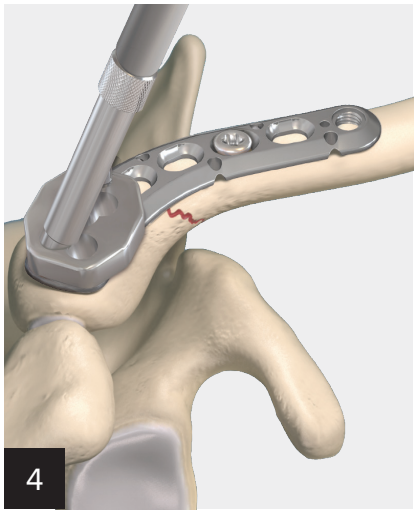
Place the drill guide onto the distal end of the plate so that the screw threads into the threaded plate hole and the pin seats into the K-wire hole.



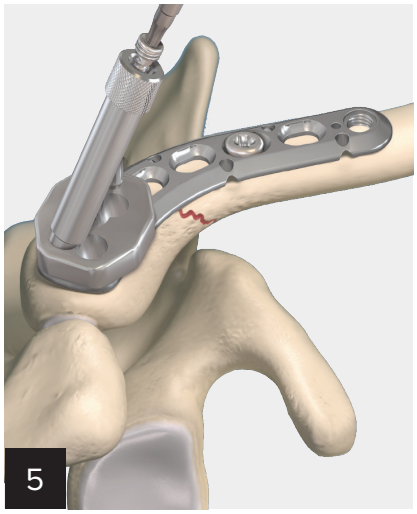
Insert the guide sleeve into the desired hole. Leave the sleeve in place until after the screw is inserted.



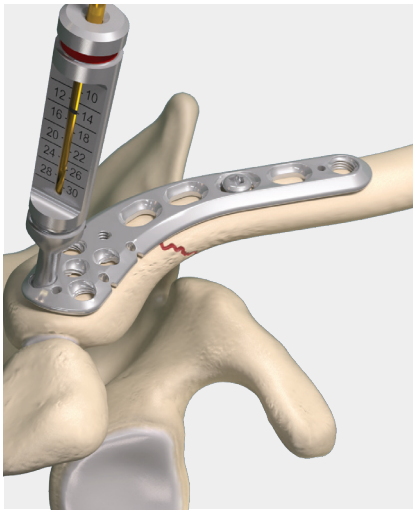
Drill through the sleeve to the desired depth using the 2 mm drill. If desired, read the screw length on the drill where the line is level with the top of the guide sleeve.



Insert the screw depth indicator into the sleeve to determine the screw length.



Insert the 2.7 mm locking screw through the guide sleeve using the T10 hexalobe driver.

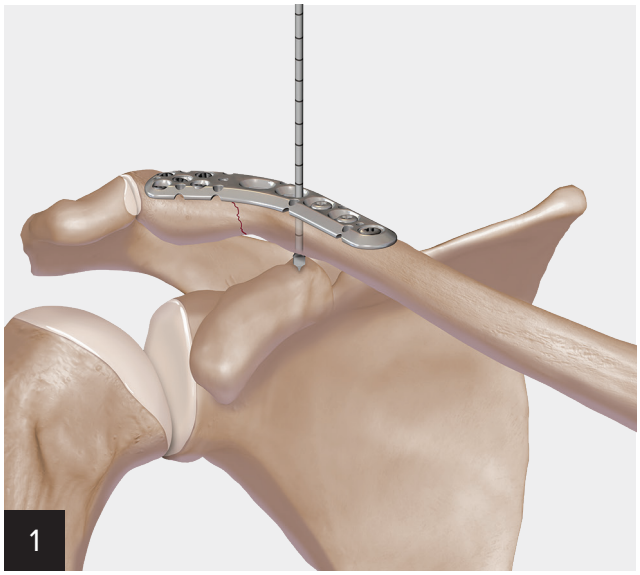


Alternate Method
Thread the 2.7 mm threaded drill guide into a 2.7 mm locking hole until fully seated. Using the 2 mm drill bit, drill to the desired depth and read the corresponding screw length from the laser line on the drill. Select the appropriate 2.7 mm screw and insert using the T10 hexalobe driver.

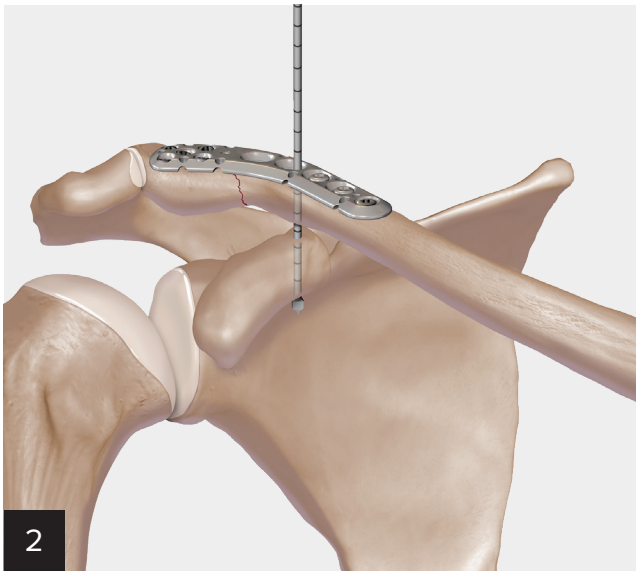
Coracoid Fixation

The clavicle and coracoid tunnels can be drilled either independently or fluoroscopy-assisted. A 10° to 15° cephalic Zanca view can optimize visualization of the coracoid and AC joint.

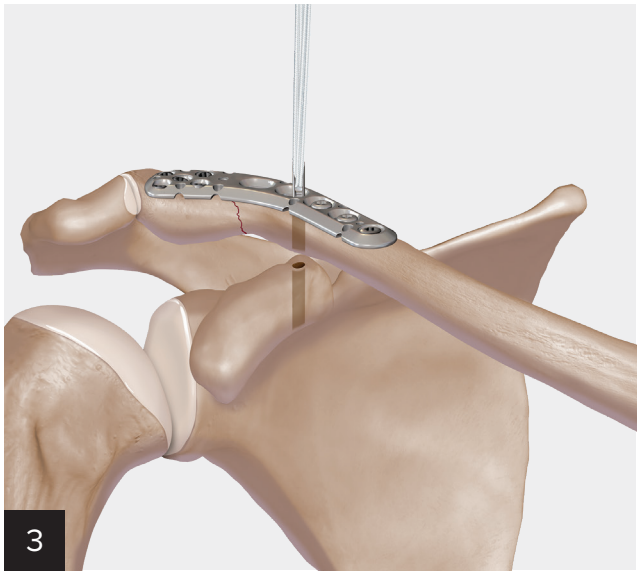
Plate the fracture using the appropriate distal clavicle plate. Identify the compression slot that allows the best anatomic placement for the Knotless Distal Clavicle Plate Button TightRope® implant. Do not place a screw in the designated compression slot.



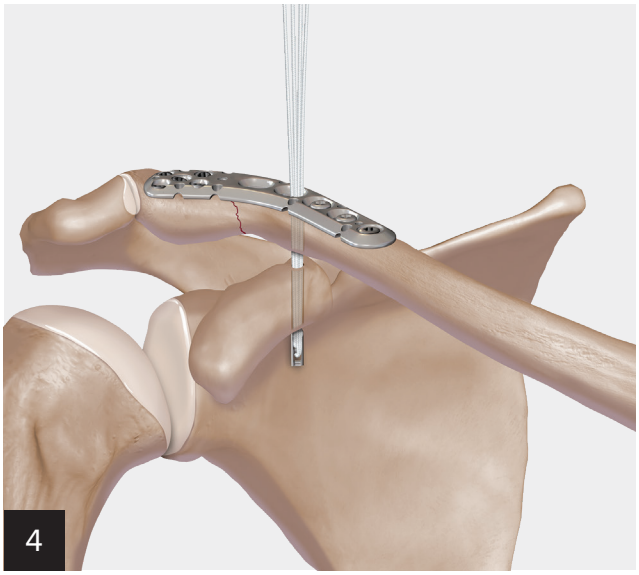
Drill the clavicle tunnel using the 3.7 mm spade-tip drill. Fluoroscopy may be used to verify pin trajectory.



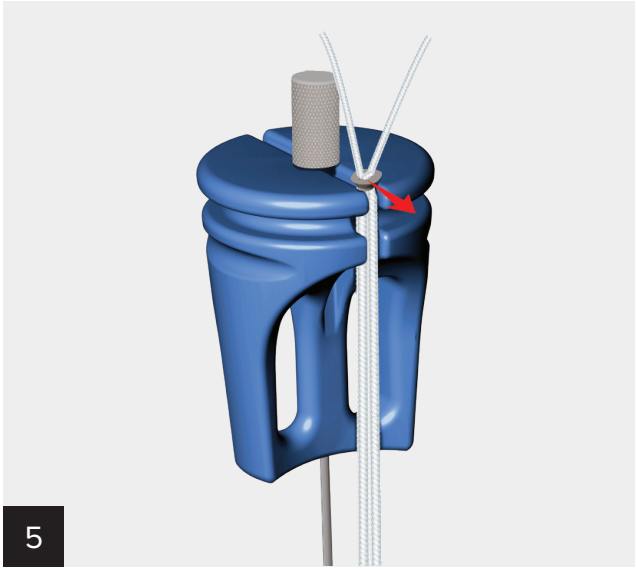
Drill the coracoid tunnel. Fluoroscopy may be used to confirm proper pin trajectory and drilling depth under the coracoid. A retractor can be placed under the coracoid to help prevent over-drilling the far cortex.



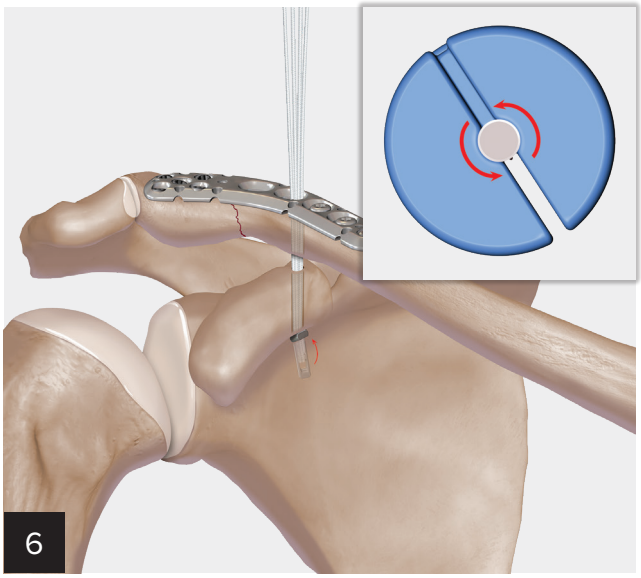
Insert the coracoid button into the clavicle tunnel. Light taps on the inserter handle can aid in advancing the button through the tunnels.



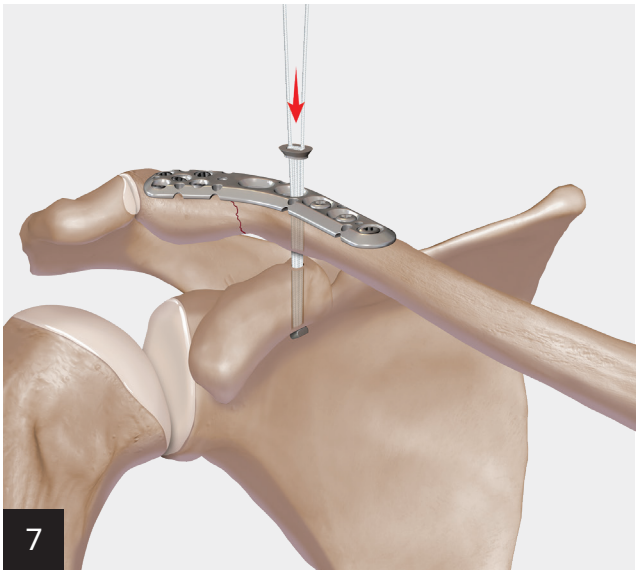
Insert the coracoid button through the clavicle and the coracoid tunnel. Fluoroscopy may be used to confirm proper button alignment and that it extends below the inferior cortex of the coracoid.



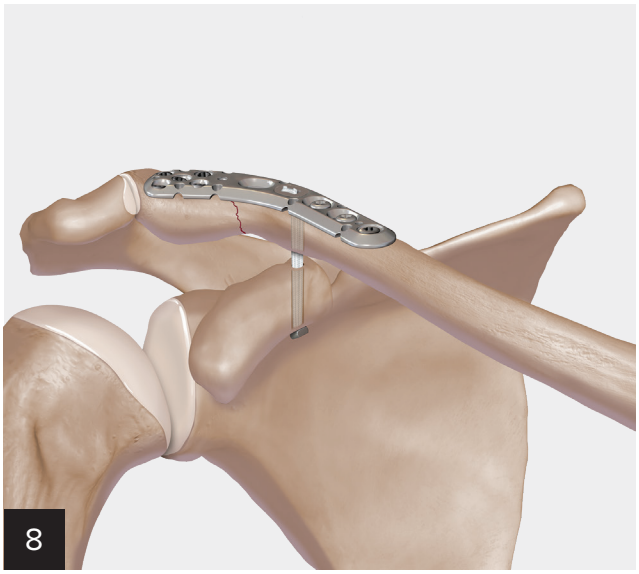
Remove the red pull tab from the handle to release the sutures and plate button from the inserter.



Turn the knurled stylet counterclockwise to release the coracoid button from the driver. With the inserter in the coracoid tunnel, grab the TightRope® implant sutures below the plate button and pull up to seat the button against the coracoid. Use fluoroscopy to verify that the button flipped properly. Remove the driver from the tunnels.



With the button firmly against the base of the coracoid, sequentially pull on the free suture limbs 1 cm to 2 cm at a time to reduce the button into the plate. A blunt hemostat may be placed under the plate button to aid in reduction.



Snap the button into the plate and use fluoroscopy to confirm reduction. Cut the free cinch limbs to complete the repair.

Confirm Reduction and Fixation

Confirm the final reduction and plate and screw fixation both visually and with fluoroscopy.

Plate and Screw Removal

If the plate and screws need to be removed, make an incision over the clavicle. Use the appropriate screwdriver to remove each screw. BoneSync™ calcium phosphate cement may be used to fill in the bone voids in the clavicle left from screw removal.

Post-op Protocol

Postoperatively, and until healing is complete, the fixation provided by this device should be considered temporary and it may not withstand weightbearing and/or other unsupported stress. To avoid adverse stress being applied to the device and help protect its fixation, the prescribed postoperative regimen should be followed strictly. Images should be obtained throughout the healing process to verify full bone healing before the patient is cleared for return to normal activities.

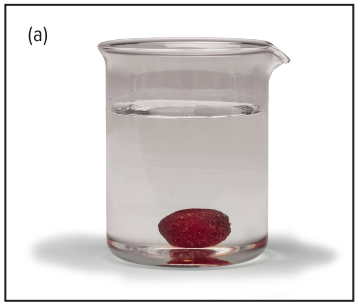
BONESYNC

Fast-Setting, Drillable Calcium Phosphate Cement

- BoneSync™ bone void filler is a fast-setting, drillable, resorbable cement composed of calcium phosphate and collagen.
- This synthetic bone graft sets within approximately 8 minutes and is a drillable solution for fracture repair.
- Once cured, BoneSync calcium phosphate cement can supplement hardware to support bone fixation and fill bony voids during surgical procedures.

ALLOSYNC PURE™

Demineralized Bone Matrix



- AlloSync™ Pure is a dehydrated osteoinductive demineralized bone matrix derived from 100% human allograft bone with no extrinsic carriers.
- AlloSync Pure bone matrix resists irrigation and can be used in a fluid environment (a).
- The proprietary rice-shape fiber technology used to process AlloSync Pure increases the osteoinduction and osteoconductive surface area to accelerate cellular ingrowth.

Ordering Information

Implants

Product Description	Item Number
Clavicle Fracture Plate, central third, left	AR-**2650CL**
Clavicle Fracture Plate, central third, right	AR-**2650CR**
Clavicle Fracture Plate, central third, left	AR-**2651CL**
Clavicle Fracture Plate, central third, right	AR-**2651CR**
Clavicle Fracture Plate, central third, left	AR-**2652CL**
Clavicle Fracture Plate, central third, right	AR-**2652CR**
Clavicle Fracture Plate, central third, left	AR-**2653CL**
Clavicle Fracture Plate, central third, right	AR-**2653CR**
Fracture Plate, central third, left	AR-**2654CL**
Clavicle Fracture Plate, central third, right	AR-**2654CR**
Clavicle Fracture Plate, central third, left	AR-**2655CL**
Fracture Plate, central third, right	AR-**2655CR**
Clavicle Fracture Plate, 7 hole, straight	AR-**2680ST**
Distal Clavicle Fracture Plate, short, left	AR-**2656DL**
Distal Clavicle Fracture Plate, short, right	AR-**2656DR**
Clavicle Fracture Plate, long, left	AR-**2657DL**
Distal Clavicle Fracture Plate, long, right	AR-**2657DR**
Distal Clavicle Plate, 22°, left	AR-**2622DL**
Distal Clavicle Plate, 22°, right	AR-**2622DR**
Distal Clavicle Plate, 10 hole, left	AR-**2685DL-10**
Distal Clavicle Plate, 10 hole, right	AR-**2685DR-10**

Coracoid Fixation

Product Description	Item Number
Distal Clavicle Plate Button	AR-**2658**
Acute AC Repair Kit	AR-**2271**
Dog Bone™ Button	AR-**2270**
Knotless Distal Clavicle Plate Button Assembly	AR-**2658T**
Knotless Distal Clavicle Plate Button TightRope	AR-**2658TR**
3.7 mm Drill Pin	AR-**2272**

Clavicle Plate Set (AR-2650S)

Product Description	Item Number
Cannulated Driver Handle	AR-**13221AOC**
BB-Tak	AR-**13226**
Distal Clavicle Plate Positioning Handle	AR-**2659**
Plate Bending Pliers	AR-**2660**
Verbrugge Forceps w/ Pivoting Jaw	AR-**2662**
K-wire, 0.062 in × 3 in	AR-**2663**
T15 Hexalobe Driver	AR-**8941DH**
T10 Hexalobe Driver	AR-**2665-T10**
Drill Guide, 2.6 mm/1.35 mm	AR-**8943-03**
Bone Reduction Forceps	AR-**8943-07**
Screwdriver, T10 Hexalobe	AR-**8943-08**
Screwdriver, T15 Hexalobe	AR-**8943-10**
Screw Holding Sleeve	AR-**8943-11**

Ordering Information

Clavicle Plate Set (Cont.)

Drill Bit, 2.5 mm	AR-**8943-13**
Drill Guide, 3.5 mm/2.5 mm	AR-**8943-14**
Depth Device	AR-**8943-15**
Drill Bit, 2 mm	AR-**8943-16**
Drill Guide, threaded, 2.7 mm	AR-**8943-17**
Plate Bending Iron	AR-**8943-18**
Freer Elevator	AR-**8943-19**
Periosteal Elevator, 6 mm, curved blade	AR-**8943-20**
Sharp Hook	AR-**8943-21**
Hohmann Retractor, 15 mm	AR-**8943-22**
Lobster Claw Forceps	AR-**8943-23**
Drill Guide, threaded, 3.5 mm	AR-**8943-26**
T15 Hexalobe Drive Shaft, long	AR-**2666-T15**
Distal Clavicle Plate Drill Guide, left	AR-**2664L**
Distal Clavicle Plate Drill Guide, right	AR-**2664R**
Drill/Screw Guide Sleeve	AR-**2668**
2 mm Drill	AR-**2669**
2.7 mm Screw Depth Indicator	AR-**2670**
3.5 mm Locking Bending Guide	AR-**8954-07**
Clavicle Plating System Instrument Case	AR-**2650C**

Clavicle Plate Sizing Templates

Product Description	**Item Number**
Sizing Template for AR-2650CL/CR	AR-**2650CT**
Sizing Template for AR-2651CL/CR	AR-**2651CT**
Sizing Template for AR-2652CL/CR	AR-**2652CT**
Sizing Template for AR-2653CL/CR	AR-**2653CT**
Sizing Template for AR-2654CL/CR	AR-**2654CT**
Sizing Template for AR-2655CL/CR	AR-**2655CT**
Sizing Template for AR-2656DL/DR	AR-**2656DT**
Sizing Template for AR-2657DL/DR	AR-**2657DT**
Sizing Template for AR-2685DL/DR-10	AR-**2685DT-10**
Sizing Template for AR-2622DL/DR	AR-**2622DT**
Sizing Template for AR-2680ST	AR-**2680STT**

2.7 mm Low-Profile Nonlocking Screws

Product Description	**Item Number**
2.7 mm Screw Caddy	AR-**8827C-10**
Low-Profile Screw, 2.7 mm × 10 mm	AR-**8827-10**
Low-Profile Screw, 2.7 mm × 12 mm	AR-**8827-12**
Low-Profile Screw, 2.7 mm × 14 mm	AR-**8827-14**
Low-Profile Screw, 2.7 mm × 16 mm	AR-**8827-16**
Low-Profile Screw, 2.7 mm × 18 mm	AR-**8827-18**
Low-Profile Screw, 2.7 mm × 20 mm	AR-**8827-20**
Low-Profile Screw, 2.7 mm × 22 mm	AR-**8827-22**
Low-Profile Screw, 2.7 mm × 24 mm	AR-**8827-24**

Ordering Information

2.7 mm Low-Profile Locking Screws

Product Description	Item Number
Low-Profile Locking Screw, 2.7 mm × 8 mm	AR-**8827L-08**
Low-Profile Locking Screw, 2.7 mm × 10 mm	AR-**8827L-10**
Low-Profile Locking Screw, 2.7 mm × 12 mm	AR-**8827L-12**
Low-Profile Locking Screw, 2.7 mm × 14 mm	AR-**8827L-14**
Low-Profile Locking Screw, 2.7 mm × 16 mm	AR-**8827L-16**
Low-Profile Locking Screw, 2.7 mm × 18 mm	AR-**8827L-18**
Low-Profile Locking Screw, 2.7 mm × 20 mm	AR-**8827L-20**
Low-Profile Locking Screw, 2.7 mm × 22 mm	AR-**8827L-22**
Low-Profile Locking Screw, 2.7 mm × 24 mm	AR-**8827L-24**

3 mm Low-Profile Nonlocking Screws, cancellous

Product Description	Item Number
Low-Profile Nonlocking Screw, 3 mm × 10 mm	AR-**8830-10**
Low-Profile Nonlocking Screw, 3 mm × 12 mm	AR-**8830-12**
Low-Profile Nonlocking Screw, 3 mm × 14 mm	AR-**8830-14**
Low-Profile Nonlocking Screw, 3 mm × 16 mm	AR-**8830-16**
Low-Profile Nonlocking Screw, 3 mm × 18 mm	AR-**8830-18**
Low-Profile Nonlocking Screw, 3 mm × 20 mm	AR-**8830-20**
Low-Profile Nonlocking Screw, 3 mm × 22 mm	AR-**8830-22**
Low-Profile Nonlocking Screw, 3 mm × 24 mm	AR-**8830-24**

3.5 mm Low-Profile Nonlocking Screws, cortical

Product Description	Item Number
Low-Profile Screw, SS, 3.5 mm × 8 mm	AR-**8835-08**
Low-Profile Screw, SS, 3.5 mm × 10 mm	AR-**8835-10**
Low-Profile Screw, SS, 3.5 mm × 12 mm	AR-**8835-12**
Low-Profile Screw, SS, 3.5 mm × 14 mm	AR-**8835-14**
Low-Profile Screw, SS, 3.5 mm × 16 mm	AR-**8835-16**
Low-Profile Screw, SS, 3.5 mm × 18 mm	AR-**8835-18**
Low-Profile Screw, SS, 3.5 mm × 20 mm	AR-**8835-20**
Low-Profile Screw, SS, 3.5 mm × 22 mm	AR-**8835-22**
Low-Profile Screw, SS, 3.5 mm × 24 mm	AR-**8835-24**
Low-Profile Screw, SS, 3.5 mm × 26 mm	AR-**8835-26**
Low-Profile Screw, SS, 3.5 mm × 28 mm	AR-**8835-28**
Low-Profile Screw, SS, 3.5 mm × 30 mm	AR-**8835-30**

3.5 mm Low-Profile Locking Screws

Product Description	Item Number
Low-Profile Locking Screw, 3.5 mm × 8 mm	AR-**8835L-08**
Low-Profile Locking Screw, 3.5 mm × 10 mm	AR-**8835L-10**
Low-Profile Locking Screw, 3.5 mm × 12 mm	AR-**8835L-12**
Low-Profile Locking Screw, 3.5 mm × 14 mm	AR-**8835L-14**
Low-Profile Locking Screw, 3.5 mm × 16 mm	AR-**8835L-16**
Low-Profile Locking Screw, 3.5 mm × 18 mm	AR-**8835L-18**
Low-Profile Locking Screw, 3.5 mm × 20 mm	AR-**8835L-20**
Low-Profile Locking Screw, 3.5 mm × 22 mm	AR-**8835L-22**
Low-Profile Locking Screw, 3.5 mm × 24 mm	AR-**8835L-24**

Ordering Information

4 mm Low-Profile Nonlocking Screws, cancellous

Product Description	Item Number
Low-Profile Nonlocking Screw, 4 mm × 10 mm	AR-**8840-10**
Low-Profile Nonlocking Screw, 4 mm × 12 mm	AR-**8840-12**
Low-Profile Nonlocking Screw, 4 mm × 14 mm	AR-**8840-14**
Low-Profile Nonlocking Screw, 4 mm × 16 mm	AR-**8840-16**
Low-Profile Nonlocking Screw, 4 mm × 18 mm	AR-**8840-18**
Low-Profile Nonlocking Screw, 4 mm × 20 mm	AR-**8840-20**
Low-Profile Nonlocking Screw, 4 mm × 22 mm	AR-**8840-22**
Low-Profile Nonlocking Screw, 4 mm × 24 mm	AR-**8840-24**

Fragment Screws

Product Description	Item Number
Fragment Screw, 2.5 mm × 10 mm, hexalobe	AR-**2665-10H**
Fragment Screw, 2.5 mm × 12 mm, hexalobe	AR-**2665-12H**
Fragment Screw, 2.5 mm × 14 mm, hexalobe	AR-**2665-14H**
Fragment Screw, 2.5 mm × 16 mm, hexalobe	AR-**2665-16H**
Fragment Screw, 2.5 mm × 18 mm, hexalobe	AR-**2665-18H**
Fragment Screw, 2.5 mm × 20 mm, hexalobe	AR-**2665-20H**
Fragment Screw, 2.5 mm × 22 mm, hexalobe	AR-**2665-22H**
Fragment Screw, 2.5 mm × 24 mm, hexalobe	AR-**2665-24H**

Required Fragment Screw Instruments

Product Description	Item Number
Step Drill	AR-**2752**
T8 Hexalobe Driver	AR-**2665-T8**
Small Holding Sleeve	AR-**8943-45**

TRIMANO FORTIS

Product Description	Item Number
TRIMANO FORTIS Support Arm	AR-**1740**
TRIMANO FORTIS Adapter	AR-**1741**
TRIMANO®* Arm Holder Beach Chair Kit	AR-**1644**

Orthobiologics

Product Description	Item Number
BoneSync™ Kit, 5 cc	ABS-**3105**
AlloSync™ Pure, 5 cc	ABS-**2010-05**

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