Clavicle Plate and Screw System

Surgical Technique
Clavicle Plate and Screw System

The Clavicle Plate and Screw System is a comprehensive set of plates, screws and instrumentation designed to treat central third and distal clavicle fractures. The clavicle plates are low profile, precontoured, stainless steel central third and distal plates that combine locking and nonlocking options in each plate.

Secondary fixation to the coracoid is achieved through the plate using AC TightRope® technology, particularly the AC Dog Bone Button, making the system ideal for treating Type IIb distal clavicle fractures or fractures that have poor bone quality laterally, which can be difficult to achieve adequate screw fixation. Suture holes in the plates allow incorporation of FiberWire® or FiberTape® onto the plate to capture butterfly fragments or to cerclage severely comminuted distal fragments.

Indications

The fracture system is intended to be used for internal bone fixation for bone fractures, fusions, osteotomies and non-unions in the ankle, foot, hand, wrist, clavicle, scapula, olecranon, humerus, radius, ulna, tibia, calcaneus, femur and fibula. The fracture plates are to be used with the 2.7 mm–4.0 mm Low Profile Screws.

The Clavicle Plate Button is intended for use with the clavicle plates for clavicle indications such as for the treatment of syndesmotic trauma, such as acromioclavicular and/or coracoclavicular ligament disruption, and this button may not be used alone. The button is intended to be used with #5 FiberWire or FiberTape.

Features:

- 316L stainless steel plates and screws
- Low profile, precontoured, left and right central third and distal plates
- Superior placement on the clavicle
- Locking and compression slots in all plates
- Integrated coracoid fixation using TightRope technology
Distal Clavicle Plates

Stainless steel plate button is designed to seat flush in any compression slot.

Dog Bone Button provides stable fixation underneath the coracoid.

K-wire hole for temporary plate fixation

2.7 mm divergent locking holes

Chamfered suture eyelets to incorporate FiberWire suture to the plate.

Threaded hole for Positioning Handle and Distal Drill Guide

Compression slots that can accommodate plate buttons

Tapered end to minimize soft tissue irritation

Beveled edges to minimize soft tissue irritation

K-wire hole for temporary plate fixation

15° divergent screw pattern

AR-2658
Stainless steel plate button is designed to seat flush in any compression slot

AR-2270
Dog Bone Button provides stable fixation underneath the coracoid

AR-2657DL

AR-2656DL

AR-2656DL

AR-2657DL

AR-2656DR

AR-2657DR
Central Third Plates

- Compression slots that can accommodate plate buttons
- Locking holes
- Recessed slots for screws to sit flush with plate to minimize soft tissue irritation
- Tapered end to minimize soft tissue irritation
- Beveled edges to minimize soft tissue irritation
Clavicle Fracture Repair

Set-up and Patient Positioning

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. A roll or pad placed between the shoulder blades allows retraction to aid in reduction. An arm holder, like the Arthrex TRIMANO, can also be very helpful to maintain the position of the injured extremity.

Surgical Approach
Make a 3–5 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.

Plate Selection
Select the appropriate plate to match the patient anatomy. The plates are precontoured to reduce the need to bend. If contouring the plate is necessary, use the appropriate plate benders.

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

Nonlocking Screw Insertion

1. Place the 3.5/2.5 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 protect the neurovascular structures.

2. Measure for screw length using the screw Depth Device.

3. Select appropriate 3.5 mm or 4 mm screw and insert using the T15 Hexalobe Screwdriver.

Locking Screw Insertion

1. Place the 3.5 mm Threaded Drill Guide into the appropriate plate hole and prepare a hole using the 2.5 mm Drill Bit. Read the corresponding screw length from the laser line on the drill. Alternately, the screw Depth Device can be used to determine the screw length. If drilling bicortically, place a retractor under the clavicle to protect the neurovascular structures.

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

3. Insert remaining screws as needed to complete the repair. Arthrex Quickset™ can be used to help stabilize bone fragments within highly comminuted fractures.
Distal Clavicle Plates

Locking Screw Insertion for 2.7 mm Screws

1. Place a K-wire in the distal end of the plate. Slide the appropriate Drill Guide over the K-wire and thread it into the plate.

2. Drill to the desired depth using the 2 mm Drill Bit. Repeat for all five holes, if desired.

3. Remove the Drill Guide and use the Depth Device to determine the screw length.

4. Select the appropriate 2.7 mm screw and insert using the T10 Hexalobe Screwdriver.

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 Screwdriver.
The clavicle and coracoid tunnels may be drilled arthroscopically. To do so, introduce a 30° arthroscope into the glenohumeral joint via a standard posterior portal. Create an ASL portal slightly more anterior and inferior than normal, coming in at a slight angle in both the coronal and axial plane. Insert an 8.25 mm cannula through the ASL portal. Utilize a shaver and/or OPES® RF electrocautery probe through the ASL portal to open the rotator interval and expose the coracoid. Complete the coracoid exposure along the inferior border of the coracoid all the way to the base. A 70° arthroscope in the posterior portal will enhance arthroscopic visualization of the base of the coracoid. Alternately, you can use a 30° scope through the ASL portal to visualize the entire coracoid base. Create a low anterior portal as the primary working portal lateral to the coracoid and insert a 10 mm PassPort Button Cannula.

Coracoid Tunnel Preparation – Arthroscopic

Insert screws as previously described. Determine which plate slot will be used for the Clavicle Plate Button. This slot should be left vacant of any screws. Place the appropriate AC Guide underneath the coracoid, seating it as close to the base of the coracoid as possible. The AC Guide can be used both open or arthroscopically.

Independent Tunnel Drilling

If the AC Guide is not utilized, place blunt retractors medially and laterally under the coracoid process to protect the neurovascular structures. A hemostat or other blunt instrument can be placed on the lateral side underneath the coracoid process to feel the transition to the neck of the glenoid and the anterior scapula. Drill the clavicle and coracoid tunnels independently using the 3 mm Cannulated Drill. The drill should exit underneath the coracoid at the identified transition zone.

Coracoid Tunnel Preparation – Open

Remove the guide arm or retractors from under the coracoid. Remove the trocar from the Cannulated Drill. Pass a Nitinol wire through the cannulation and using a hemostat or other grasping instrument, retrieve the wire from under the coracoid.

If the tunnels were drilled arthroscopically, retrieve the wire through the anterior portal. If the tunnels were drilled independently, pass a Nitinol wire through the tunnels using a SutureLasso® or Micro SutureLasso® and retrieve the wire from under the coracoid.
Attach a Dog Bone Button to two strands of FiberTape, FiberTape Loop or #5 FiberWire, making sure that the concavity of the button will seat against the base of the coracoid. Shuttle the suture limbs retrograde through the coracoid and clavicle so the button sits at the base of the coracoid. Confirm placement under the coracoid using fluoroscopy.

Insert suture limbs through the Distal Clavicle Plate Button and reduce the button to the plate. The button should seat flush with the plate.

Tie like suture limbs over the button with four alternating half-hitches. Cut the excess limbs, making sure to leave a sufficient tail.
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. To remove the Distal Clavicle Plate Button, cut the sutures and remove the button from the plate slot. Reach under the coracoid with a hemostat or other grasping instrument to remove the Dog Bone Button. Arthrex Quickset may be used to fill in the bone voids in the clavicle left from screw removal.

Arthrex Quickset is a macroporous, injectable, hardening, resorbable bone cement provided in an easy-to-use, closed mixing system.

- The mixing system is a dual-chambered syringe containing a mixture of calcium phosphates and an organic polysaccharide polymer
- Global porosity of 70%
  - Macroporosity (>100 µm): 10%
- Mechanical compressive strength of 24 MPa (24 hours after implantation)
- Excellent cohesiveness, which prevents wash-out by biological fluids

Refer to the Quickset brochure LB-0840 for additional information and instructions for use.
Implants

Low Profile Locking Screw, 2.7 mm x 24 mm  AR-8827L-24
Low Profile Locking Screw, 2.7 mm x 22 mm  AR-8827L-22
Low Profile Locking Screw, 2.7 mm x 20 mm  AR-8827L-20
Low Profile Locking Screw, 2.7 mm x 18 mm  AR-8827L-18
Low Profile Locking Screw, 2.7 mm x 16 mm  AR-8827L-16
Low Profile Locking Screw, 2.7 mm x 14 mm  AR-8827L-14
Low Profile Locking Screw, 2.7 mm x 12 mm  AR-8827L-12
Low Profile Locking Screw, 2.7 mm x 10 mm  AR-8827L-10
Low Profile Locking Screw, 2.7 mm x 8 mm AR-8827L-08

2.7 mm Low Profile Locking Screws

Drill Sleeve, 3 mm    AR-2255CG-05
ACL Guide Frame Handle Assembly         AR-1510H
AC Guide, Left           AR-2254L
AC Guide, Right           AR-2254R
Cannulated Drill, 3 mm          AR-2257D-30
Additional Instruments

Clavicle Plate Set

Cannulated Driver Handle
BB-Tak
Distal Clavicle Plate Positioning Handle
Plate Bending Pliers
Distal Clavicle Plate Drill Guide, left
Distal Clavicle Plate Drill Guide, right
Verbrugge Forceps with Pivoting Jaw
K-wire, .062" x 3
T15 Hexalobe Driver
T10 Hexalobe Driver
Drill Guide, 2.6/1.35 mm
Bone Reduction Forceps
ScrewDriver, T10 Hexalobe
ScrewDriver, T15 Hexalobe
Screw Holding Sleeve
Drill Bit, 2.5 mm
Drill Guide, 3.5/2.5 mm
Depth Device
Drill Bit, 2 mm
Drill Guide, threaded, 2.7 mm
Plate Bending Iron
Freer Elevator
Periosteal Elevator, 6 mm Curved Blade
Sharp Hook
Hohmann Retractor, 15 mm
Lobster Claw Forceps
Drill Guide, threaded, 3.5 mm
Clavicle Plating System Instrument Case

Ordering Information

3 mm Low Profile Nonlocking Screws, cancellous
Low Profile Nonlocking Screw, 3 mm x 10 mm AR-8830-10
Low Profile Nonlocking Screw, 3 mm x 12 mm AR-8830-12
Low Profile Nonlocking Screw, 3 mm x 14 mm AR-8830-14
Low Profile Nonlocking Screw, 3 mm x 16 mm AR-8830-16
Low Profile Nonlocking Screw, 3 mm x 18 mm AR-8830-18
Low Profile Nonlocking Screw, 3 mm x 20 mm AR-8830-20
Low Profile Nonlocking Screw, 3 mm x 22 mm AR-8830-22
Low Profile Nonlocking Screw, 3 mm x 24 mm AR-8830-24

3.5 mm Low Profile Nonlocking Screws, cortical
Low Profile Screw, SS, 3.5 mm x 8 mm AR-8835-08
Low Profile Screw, SS, 3.5 mm x 10 mm AR-8835-10
Low Profile Screw, SS, 3.5 mm x 12 mm AR-8835-12
Low Profile Screw, SS, 3.5 mm x 14 mm AR-8835-14
Low Profile Screw, SS, 3.5 mm x 16 mm AR-8835-16
Low Profile Screw, SS, 3.5 mm x 18 mm AR-8835-18
Low Profile Screw, SS, 3.5 mm x 20 mm AR-8835-20
Low Profile Screw, SS, 3.5 mm x 22 mm AR-8835-22
Low Profile Screw, SS, 3.5 mm x 24 mm AR-8835-24
Low Profile Screw, SS, 3.5 mm x 26 mm AR-8835-26
Low Profile Screw, SS, 3.5 mm x 28 mm AR-8835-28
Low Profile Screw, SS, 3.5 mm x 30 mm AR-8835-30

4 mm Low Profile Nonlocking Screws, cancellous
Low Profile Nonlocking Screw, 4 mm x 10 mm AR-8840-10
Low Profile Nonlocking Screw, 4 mm x 12 mm AR-8840-12
Low Profile Nonlocking Screw, 4 mm x 14 mm AR-8840-14
Low Profile Nonlocking Screw, 4 mm x 16 mm AR-8840-16
Low Profile Nonlocking Screw, 4 mm x 18 mm AR-8840-18
Low Profile Nonlocking Screw, 4 mm x 20 mm AR-8840-20
Low Profile Nonlocking Screw, 4 mm x 22 mm AR-8840-22
Low Profile Nonlocking Screw, 4 mm x 24 mm AR-8840-24
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 PATENT PENDING
©2012, Arthrex Inc. All rights reserved. LTI-0255-EN_A