OrthoLine™ Distal Humeral Fracture System

Surgical Technique

Arthrex®
Vet Systems

OrthoLine™ Distal Humeral Fracture System

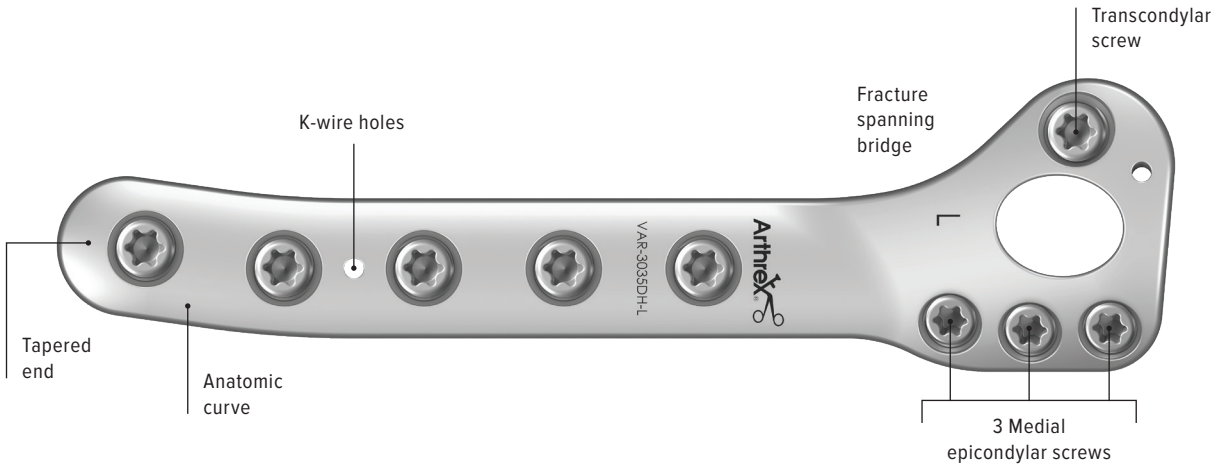
Introduction

The first anatomic medial distal humeral fracture plate to address medial, supracondylar, T, and Y fractures with a single plate is available in sizes ranging from 2.0 mm to 3.5 mm. OrthoLine plates were thoughtfully engineered by incorporating surgeon feedback and designed for a range of patients.

Features and Benefits

- Plate incorporates the transcondylar screw
- Optimized trajectory for the transcondylar screw
- 4 screws in the distal aspect
- Anatomic plate design with left and right options
- Strong single-bridging plate design
- Epicondylar relief
- Designed for medial, supracondylar, T, and Y fractures[1]

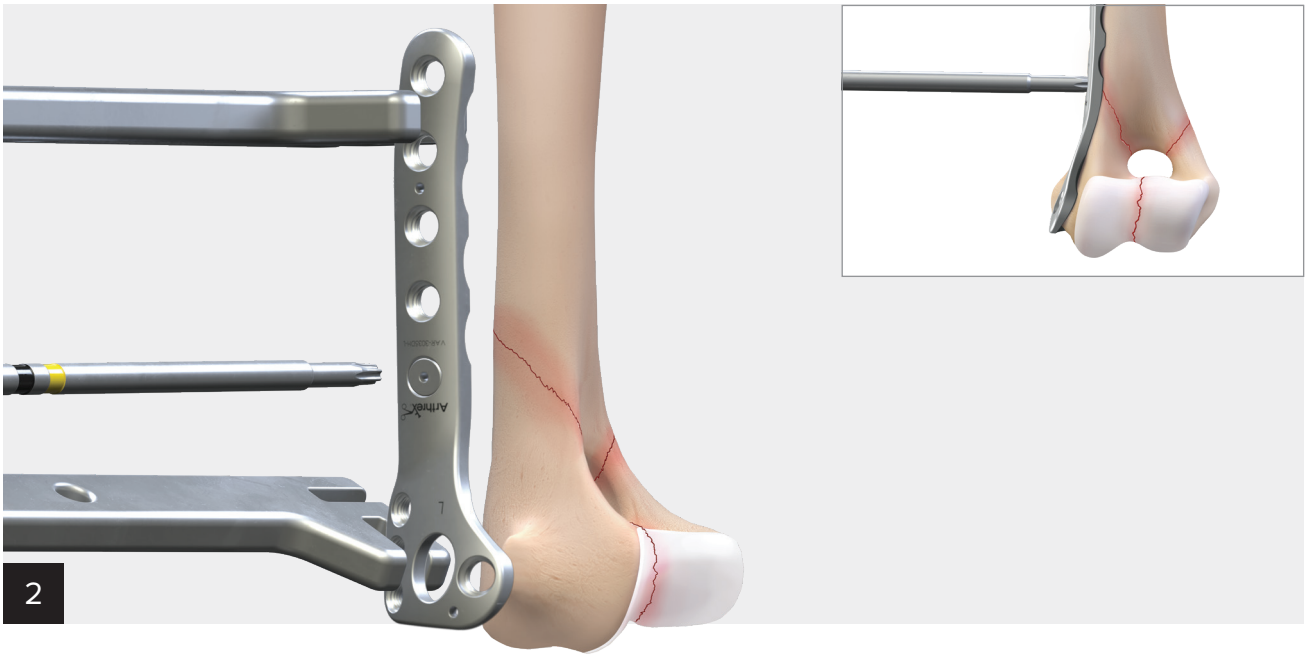
Anatomic Design



1

Use a standard bilateral approach to the distal humerus.

Note: Reduce the fracture and hold with a temporary reduction pin placed through the point of the epicondyle. The plate may be used as a guide for the placement of the K-wire. When using the plate as a guide, it is important to place the pin proximal and caudal to allow movement of the plate in this direction for best transcondylar screw placement. If the temporary reduction pin is used, the pin should stay in place until application of the transcondylar screw is complete.

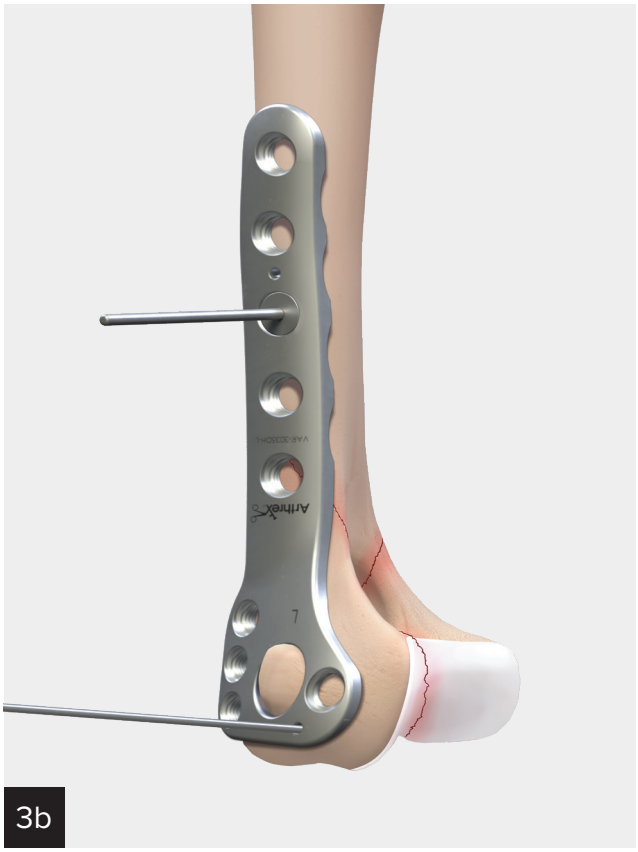


2

Place the plate on the medial surface of the bone with the point of the epicondyle and the temporary reduction pin (if used) through the large central aperture. It is important that the plate is generally placed as far caudal as the epicondyle will allow and slightly proximal. This placement should facilitate alignment of the transcondylar screw. Minimal contouring may be required to fit the anatomy, but this may alter desired screw trajectory and thus should be kept to a minimum. During contouring, place cannulated bending plug inserts into the locking screw holes where applicable.

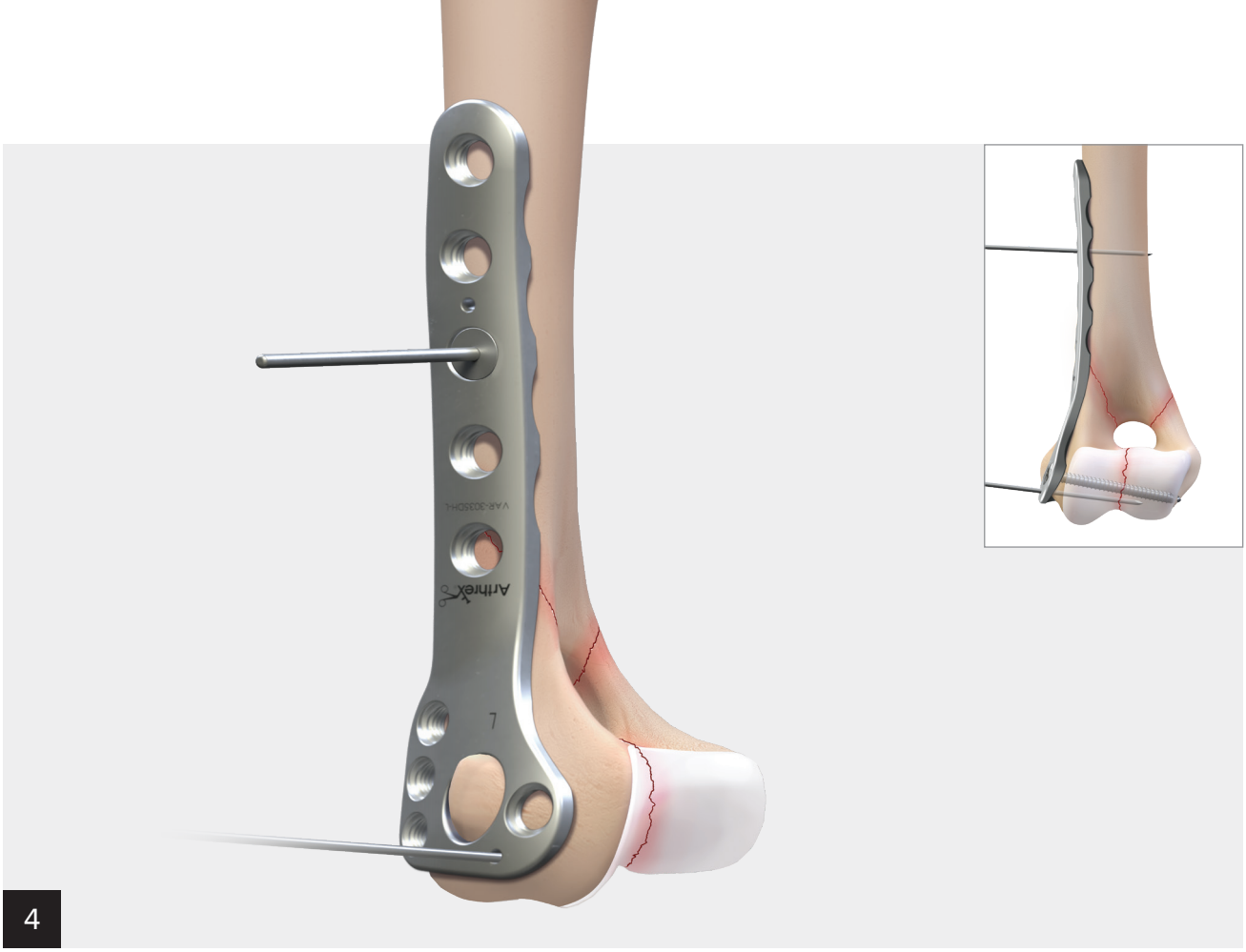
Note: It is likely that a large degree of contouring is required, screw trajectories will be altered.

3a



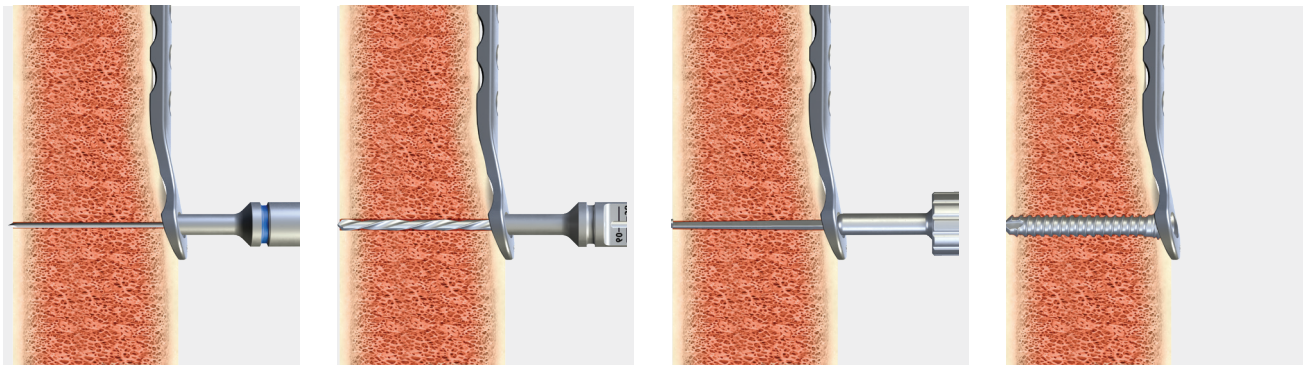
3b

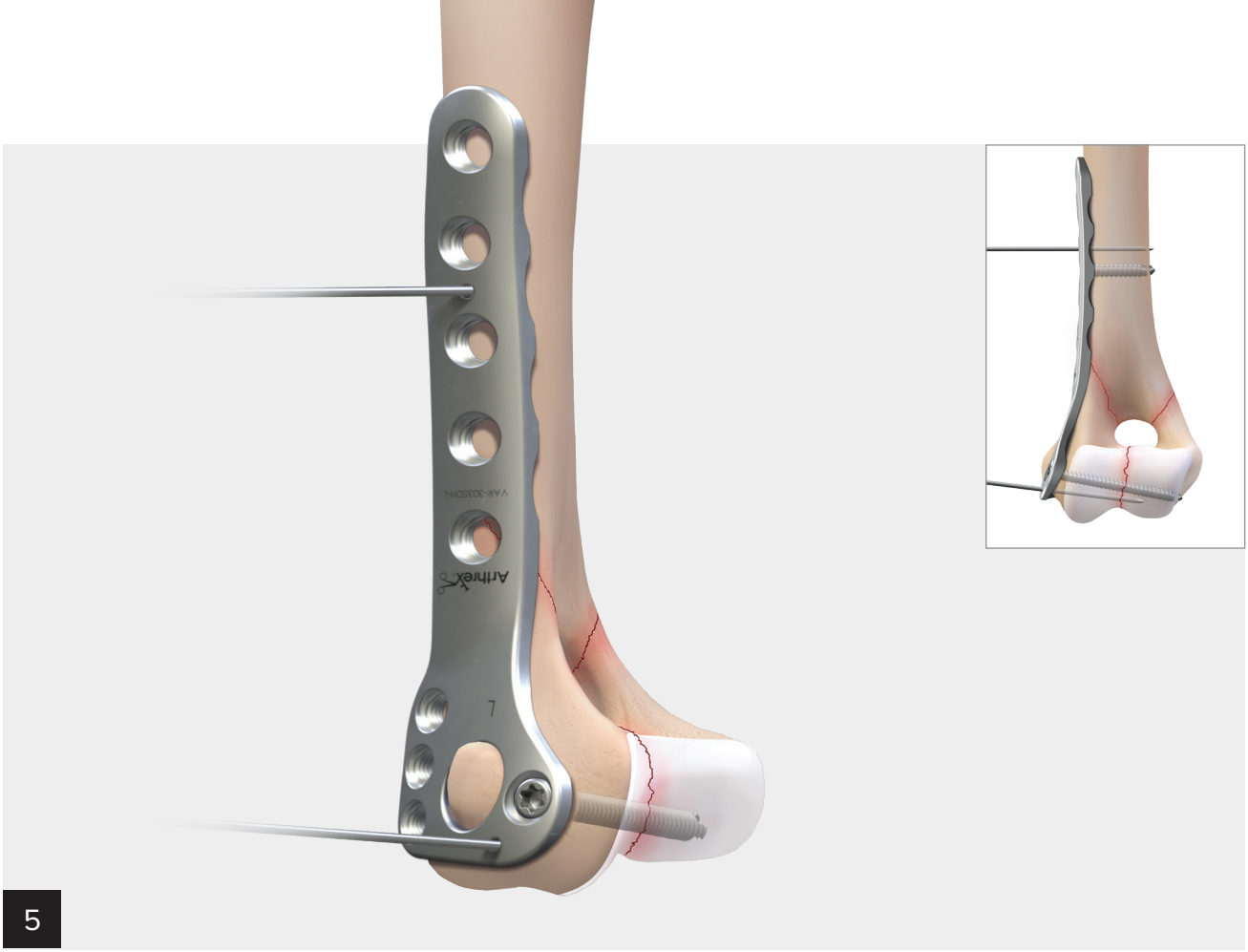
The plate may be temporarily affixed to the bone using a K-wire, cannulated bending plug, or threaded BB-Tak (the BB-Tak should only be used on the proximal aspect). It is important to note the distal K-wire hole has the same trajectory as the transcondylar screw and thus may be used as a reference guide. To achieve appropriate trajectory, hand place the K-wire to rest in the hole prior to driving with the pin driver.



Place the K-wire through the locking K-wire guide and confirm placement by palpation or with a fluoroscopic image. If the trajectory is acceptable, a cannulated drill bit can be placed over the K-Wire, or a locking drill guide may be placed to create an appropriate pilot hole for the locking screw. Prior to screw insertion, place a Vusellum or point-to-point forceps to aid in fracture compression. If the K-wire placement is not acceptable, redirect the placement and use the drill bit to drill a pilot hole for a nonlocking cortical screw or, alternatively, on titanium plates (3.0 mm and below), if the deviation is 12° or less, use a variable-angle locking screw.

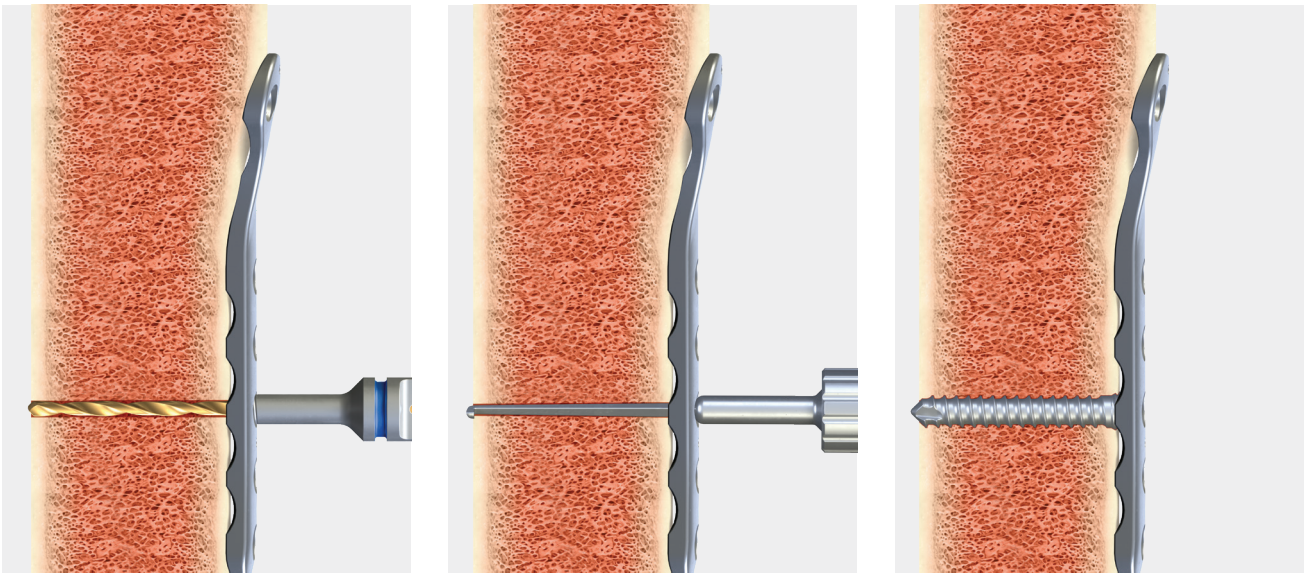
Note: A KreuLock™ locking compression screw can be used to help with compression across the condyles.

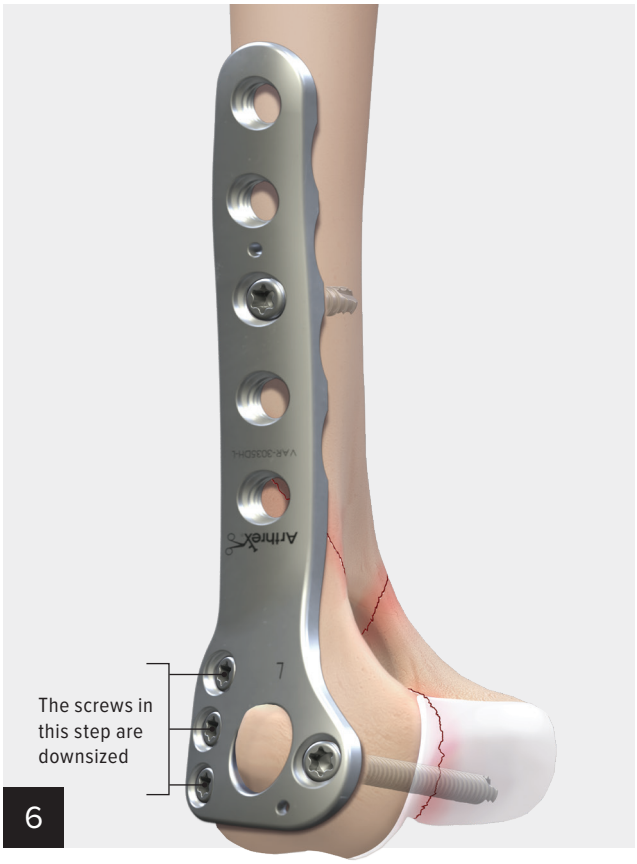




Place a proximal screw to secure the proximal fragment. Then, lock in the locking drill guide, drill using the appropriate drill bit, measure, and place the screw. Screws may be placed under power. The final turns, however, should be performed manually with the screwdriver.

Note: The variable-angle guide can also be used for (VAL) titanium screws sizes 3.0 mm and below.

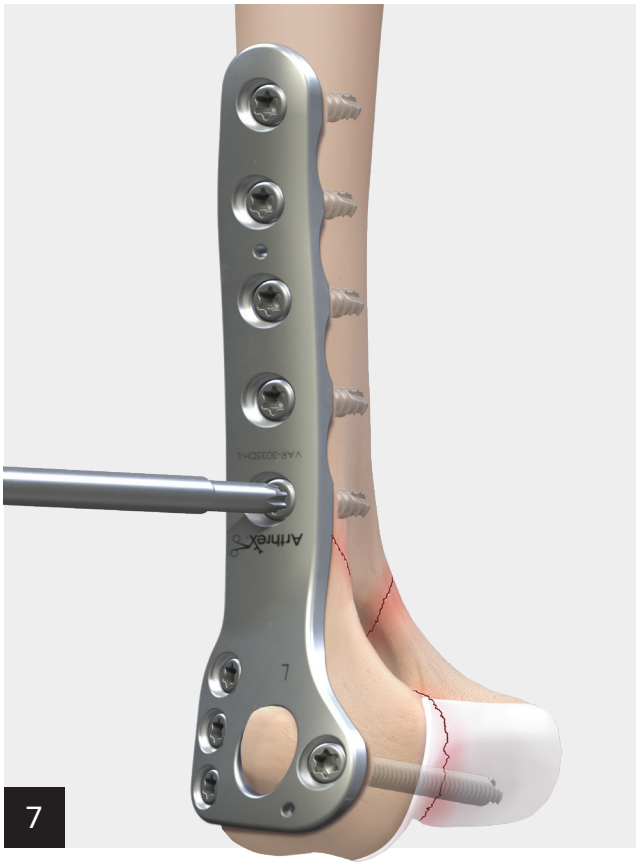




Care should be taken as the caudal screws of the plate may enter the joint surface and should not extend past the transcortex as they may interfere with the anconeal process and articular cartilage. For each screw, lock the locking drill guide in the screw hole, drill using the appropriate drill, measure, and place the screw. Screws may be placed under power. The final turns, however, should be performed manually with the screwdriver. If the fracture site is below a screw hole, do not place a screw in this location, a bending plug can be used to fill the hole. K-wires can be removed at this point.

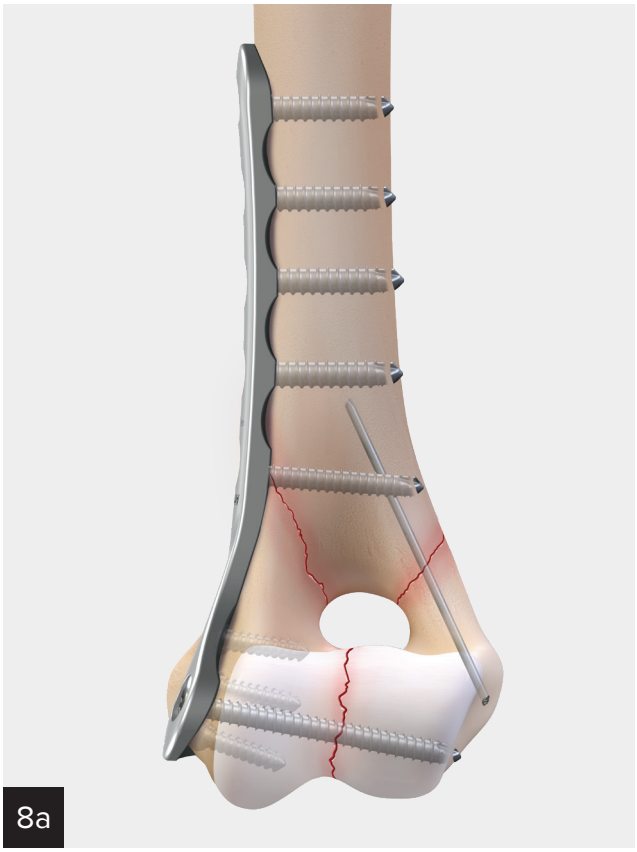
Note: The variable-angle guide can also be used for variable-angle locking titanium screws sizes 3.0 mm and below.

Note: The screws in this step are downsized. For example, the 3.5 mm plate uses 2.7 mm screws, the 3.0 mm plate uses 2.4 mm screws, the 2.4 mm plate uses 2.0 mm screws, and the 2.0 mm plate uses either 2.0 mm or 1.6 mm screws.



Apply the proximal screws. First, lock in the locking drill guide, drill using the appropriate drill bit, measure, and place the screw. Screws may be placed under power. The final turns, however, should be performed manually with the screwdriver.

Note: The variable-angle guide can also be used for variable-angle locking titanium screws sizes 3.0 mm and below.



A lateral pin may be placed in the lateral epicondylar crest for additional fixation. Caudal view.

A second lateral plate should be considered in cases with minimal load sharing or where the surgeon feels appropriate. Medial view.

Surgical Pearls

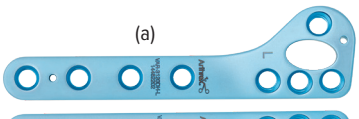
- OrthoLine™ distal humeral plates use 2 screw sizes per implant:
  - 3.5 mm = 3.5 mm/2.7 mm
  - 3.0 mm = 3.0 mm/2.4 mm
  - 2.4 mm = 2.4 mm/2.0 mm
  - 2.0 mm = 2.0 mm/2.0 mm or 1.6 mm
- If the K-wire interferes with the locking guide, cut K-wire less than 10 mm to properly place the locking drill guide in the threads of the locking screw hole
- A K-wire guide can be placed in a locking screw hole to check the trajectory with or without fluoroscopic guidance
- Bending plugs match the material of the plate to avoid galvanic corrosion
- The distal humeral plates are designed to be placed medial for medial, Y-, and T- fractures
- VAL screws, if not carefully handled, can converge with another screw; this can happen based on the angle, length, and other screw orientation
- The plate should be placed as far caudal and proximal as possible, using the epicondylar relief hole as guidance
- The option exists to use a cannulated bit to overdrill the K-wire guide
- Common screw sizes should be put in a peel pack; the screw sizes for this plate will use many of the same size

Ordering Information

Distal Humeral Plates

Product Description	Item Number
Distal humeral plate, Ti, 2.0 mm, left **(a)**	VAR-**3120DH-L**
Distal humeral plate, Ti, 2.0 mm, right **(b)**	VAR-**3120DH-R**
Distal humeral plate, Ti, 2.4 mm, left **(c)**	VAR-**3124DH-L**
Distal humeral plate, Ti, 2.4 mm, right **(d)**	VAR-**3124DH-R**
Distal humeral plate, Ti, 3.0 mm, left **(e)**	VAR-**3130DH-L**
Distal humeral plate, Ti, 3.0 mm, right **(f)**	VAR-**3130DH-R**
Distal humeral plate, SS, 3.5 mm, left **(g)**	VAR-**3035DH-L**
Distal humeral plate, SS, 3.5 mm, right **(h)**	VAR-**3035DH-R**

(a)



(b)

(c)

(d)

(e)

(f)

(g)

(h)

Screws

Product Description	Item Number
1.6 mm Low-Profile Cortical, Variable Angle	
Low-profile cortical screw 1.6 mm × 6 mm-20 mm Sizes: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20 mm	VAR-**8916-06** to -**20**
Low-profile variable-angle screw 1.6 mm × 6 mm-20 mm Sizes: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20 mm	VAR-**8916V-06** to -**20**
2.0 mm Low-Profile Cortical, Variable Angle, Locking	
Low-profile cortical screw 2.0 mm × 6 mm-30 mm Sizes: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8920-06** to -**30**
Low-profile variable-angle screw 2.0 mm × 6 mm-30 mm Sizes: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8920V-06** to -**30**
Low-profile locking screw 2.0 mm × 6 mm-30 mm Sizes: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8920L-06** to -**30**
2.4 mm Low-Profile Cortical, Variable Angle, Locking	
Low-profile cortical screw 2.4 mm × 8 mm-30 mm Sizes: 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8924-08** to -**30**
Low-profile variable-angle screw 2.4 mm × 8 mm-30 mm Sizes: 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8924V-08** to -**30**
Low-profile locking screw 2.4 mm × 8 mm-30 mm Sizes: 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30 mm	VAR-**8924L-08** to -**30**
2.7 mm Low-Profile Cortical, Locking	
Low-profile cortical screw 2.7 mm × 10 mm-34 mm Sizes: 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34 mm	VAR-**8827-10** to -**34**
Low-profile locking screw 2.7 mm × 10 mm-34 mm Sizes: 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34 mm	VAR-**8827L-10** to -**34**
3.0 mm Low-Profile Cortical, Variable Angle, Locking	
Low-profile cortical screw 3.0 mm × 8 mm-40 mm Sizes: 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40 mm	VAR-**8930-08** to -**40**
Low-profile variable-angle screw 3.0 mm × 8 mm-40 mm Sizes: 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40 mm	VAR-**8930V-08** to -**40**
Low-profile locking screw 3.0 mm × 8 mm-40 mm Sizes: 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38 40 mm	VAR-**8930L-08** to -**40**

Screws cont.

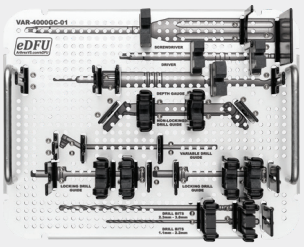
Product Description	Item Number
3.5 mm Low-Profile Cortical, Locking	
Low-profile cortical screw 3.5 mm × 8 mm-65 mm Sizes: 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 65 mm	VAR-**8835-08** to -**65**
Low-profile locking screw 3.5 mm × 10 mm-60 mm Sizes: 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60 mm	VAR-**8835L-10** to -**60**
4.0 mm Low-Profile Cortical, Locking	
Low-profile locking screw 4.0 mm × 18 mm-65 mm Sizes: 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 65 mm	VAR-**8840L-18** to -**65**

Equipment Part List

Product Description	Item Number
Disposable/Limited Reusable	
Drill bit, solid, AO, 1.1 mm	VAR-**4016D**
Drill bit, solid, AO, 1.5 mm	VAR-**4020D**
Drill bit, solid, AO, 1.8 mm	VAR-**4024D**
Drill bit, solid, AO, 2.3 mm	VAR-**4030D**
Drill bit, solid, short, AO, 2.5 mm	VAR-**8943-30**
Drill bit, solid, 2.7 mm	VAR-**8944-22**
Drill bit, solid, AO, 2.8 mm	VAR-**4035D**
Drill bit, solid, AO, 3.5 mm	VAR-**4040D**
Drill bit, solid, short, AO, 1.1 mm	VAR-**4016SD**
Drill bit, solid, short, AO, 1.5 mm	VAR-**4020SD**
Drill bit, solid, short, AO, 1.8 mm	VAR-**4024SD**
Drill bit, solid, short, AO, 2.3 mm	VAR-**4030SD**
Guidewire w/ trocar, 0.86 mm × 80 mm	VAR-**8929K**
Guidewire w/ trocar, 1.1 mm × 150 mm	VAR-**8933K**
Guidewire w/ trocar, 1.3 mm × 150 mm	VAR-**8937K**
Instruments	
Depth measuring device, 1.6 mm/2.0 mm/2.4 mm	VAR-**2024DD**
Depth measuring device, 2.7 mm/3.0 mm/3.5 mm/4.0 mm	VAR-**8943-15**
T6 Driver, 1.6 mm/2.0 mm	VAR-**4020-01**
T8 Driver, 2.4 mm	VAR-**4024-01**
T10 Driver, 3.0 mm	VAR-**8944DH**
T15 Driver, 3.5 mm	VAR-**8941DH**
T6 Screwdriver, 1.6 mm/2.0 mm	VAR-**4020-02**
T8 Screwdriver, 2.4 mm	VAR-**4024-02**
T10 Screwdriver, 2.7 mm/3.0 mm	VAR-**8943-08**
T15 Screwdriver, 3.5 mm/4.0 mm	VAR-**8943-10**
Locking plate holder, 2.0 mm	VAR-**4020-03**
Locking plate holder, 2.4 mm	VAR-**4024-03**
Locking plate holder, 2.7 mm/3.0 mm	VAR-**8950-09**
Locking plate holder, 3.5 mm	VAR-**8954-07**
Screw holding forceps	VAR-**8941F**

Product Description	Item Number
Drill/depth guide, locking, 1.6 mm	VAR-**4016DG**
Drill/depth guide, locking, 2.0 mm	VAR-**4020DG**
Drill/depth guide, locking, 2.4 mm	VAR-**4024DG**
Drill/depth guide, locking, 3.0 mm	VAR-**4030DG**
Drill/depth guide, locking, 3.5 mm	VAR-**4035DG**
Drill/depth guide, locking, 4.0 mm	VAR-**4040DG**
Drill guide, 1.1 mm	VAR-**4016TDG**
Tap/drill guide, 1.5 mm	VAR-**4020TDG**
Tap/drill guide, 1.8 mm	VAR-**4024TDG**
Tap/drill guide, 2.0 mm	VAR-**8943-31**
Tap/drill guide, 2.3 mm	VAR-**4030TDG**
Tap/drill guide, 2.4 mm	VAR-**8943-14**
BB-Tak, small, threaded	VAR-**8933TBB**
BB-Tak, small	VAR-**8933BB**
BB-Tak, large, threaded	VAR-**8941TBB**
BB-Tak, large	VAR-**8941BB**
Drill guide, variable, 1.6 mm	VAR-**4016VDG**
Drill guide, variable, 2.0 mm	VAR-**4020VDG**
Drill guide, variable, 2.4 mm	VAR-**4024VDG**
Drill guide, variable, 3.0 mm	VAR-**4030VDG**
Bone tap, 2.0 mm	VAR-**4020T**
Bone tap, 2.4 mm	VAR-**4024T**
Bone tap, 2.7 mm	VAR-**4027T**
Bone tap, 3.0 mm	VAR-**4030T**
K-Wire drill guide, 0.86 mm (1.6 mm/2.0 mm)	VAR-**4020KDG**
K-Wire drill guide, 1.14 mm (2.4 mm)	VAR-**4024KDG**
K-Wire drill guide, 1.14 mm (2.7 mm/3.0 mm)	VAR-**4030KDG**
K-Wire drill guide, 1.3 mm (3.5 mm)	VAR-**4035KDG**
Bending plug, cannulated, 1.6/2.0 mm	VAR-**4020-04**
Bending plug, cannulated, 2.4 mm	VAR-**4024-04**
Bending plug, cannulated, 2.7 mm	VAR-**4027-04**
Bending plug, cannulated, 3.0 mm	VAR-**4030-04**
Bending plug, cannulated, 3.5 mm	VAR-**4035-04**
Bending iron, small, 1.6 mm/2.0 mm	VAR-**4000-07**
Bending iron, medium, 2.4 mm/3.0 mm	VAR-**4000-08**
Bending iron, large 3.5 mm/broad 3.5 mm	VAR-**4000-09**
Freer elevator	VAR-**4000-10**
Hohmann retractor, double ended, 6 mm/10 mm	VAR-**4000-11**
Ikuta clamp	VAR-**4000-12**
Lobster clamp, mini	VAR-**4000-13**
Lobster clamp, mini, radiolucent	VAR-**4000-14**
Periosteal elevator, 6 mm curved blade	VAR-**4000-15**
Pliers, needle nose	VAR-**4000-16**
Pointed reduction forceps	VAR-**4000-17**
Reduction forceps, guidewire	VAR-**4000-18**
Sharp hook	VAR-**4000-19**
Termite forceps	VAR-**4000-20**
Toothed reduction forceps, Kocher	VAR-**4000-21**

Cases and Caddies

Image	Product Description	Item Number
	OrthoLine™ case	VAR-**4000GC**
	Generic case insert	VAR-**4000GC-01**
	1.6 mm Screw caddy	VAR-**3016SC-01**
	2.0 mm Screw caddy	VAR-**3020SC-01**
	2.4 mm Screw caddy	VAR-**3024SC-01**
	2.7 mm Screw caddy	VAR-**4027SC-01**

Cases and Caddies cont.

Image	Product Description	Item Number
	3.0 mm Screw caddy	VAR-**3030SC-01**
	3.5 mm/4.0 mm Screw caddy	VAR-**4035SC-02**
	Bending plug caddy	VAR-**4000BPC**

Reference

1. Arthrex, Inc. Data on file (APT 05162). Naples, FL; 2021.

Notes

Notes

Arthrex®
Vet Systems

This is not veterinary advice and Arthrex recommends that veterinarians be trained in the use of any particular product before using it in surgery. A veterinarian must always rely on their own professional clinical judgment when deciding whether to use a particular product. A veterinarian must always refer to the package insert, product label, and/or directions for use before using any Arthrex product. Products may not be available in all markets because product availability is subject to the regulatory or veterinary practices in individual markets. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes. Please contact your Arthrex representative if you have questions about availability of products in your area.

Arthrex manufacturer, authorized representative, and importer information (Arthrex eIFUs)

US patent information

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