

# OrthoLine™ Distal Femoral Fracture Plating System

Surgical Technique



  
**Arthrex®**  
Vet Systems

# OrthoLine™ Distal Femoral Fracture Plating System

## Introduction

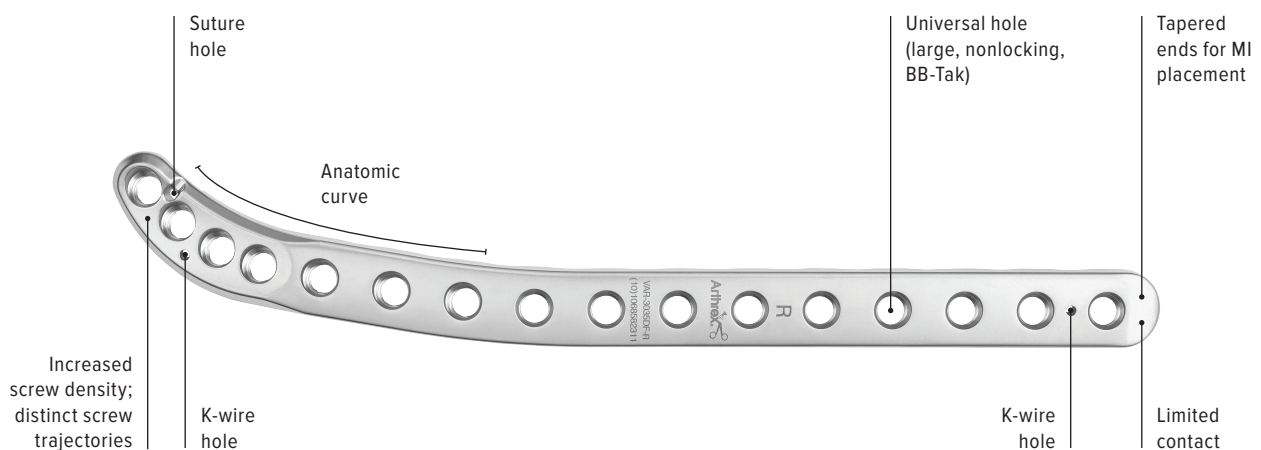
Arthrex has developed many innovations to assist in treating small animal fractures. These new and often unique solutions, combined with state-of-the-art surgeon training, research, and the most well-trained technology specialists in the industry, provide a comprehensive approach for our Arthrex veterinary customers.

The OrthoLine distal femoral fracture (DFF) plating system includes a range of sizes from broad 1.6 mm to broad 3.5 mm. Each plate size is anatomically contoured to mimic the anatomy of patients within a given size range. This plate is designed to minimize soft tissue irritation. Additionally, the DFF plate includes a suture hole. This unique feature can help to manage soft tissue during closure.

## Features and Benefits

- Anatomic shape assists in repair with minimal contouring
- Tight screw spacing increases density on the distal end
- Suture hole included on the distal end of the plate to aid in soft tissue management during closure
- Locking K-wire guides allow for screw trajectory expectations
- Scalloped underside to minimize contact
- Multiple K-wire holes and availability of cannulated bending plugs allow for temporary fixation prior to screw insertion

## Anatomic Design

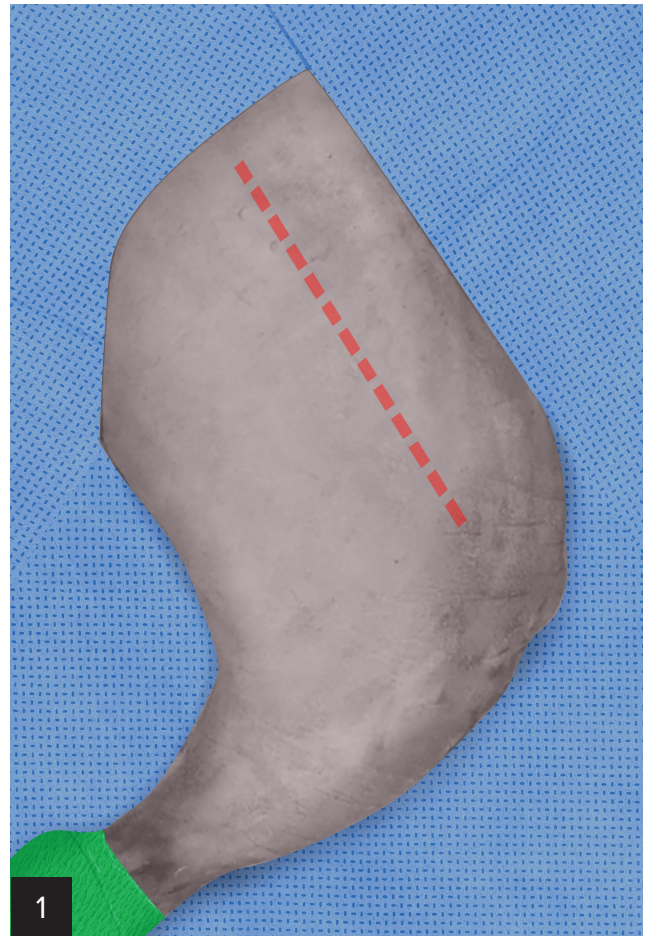


Note:  
No compression slots  
No slide holes





Distal femoral fracture



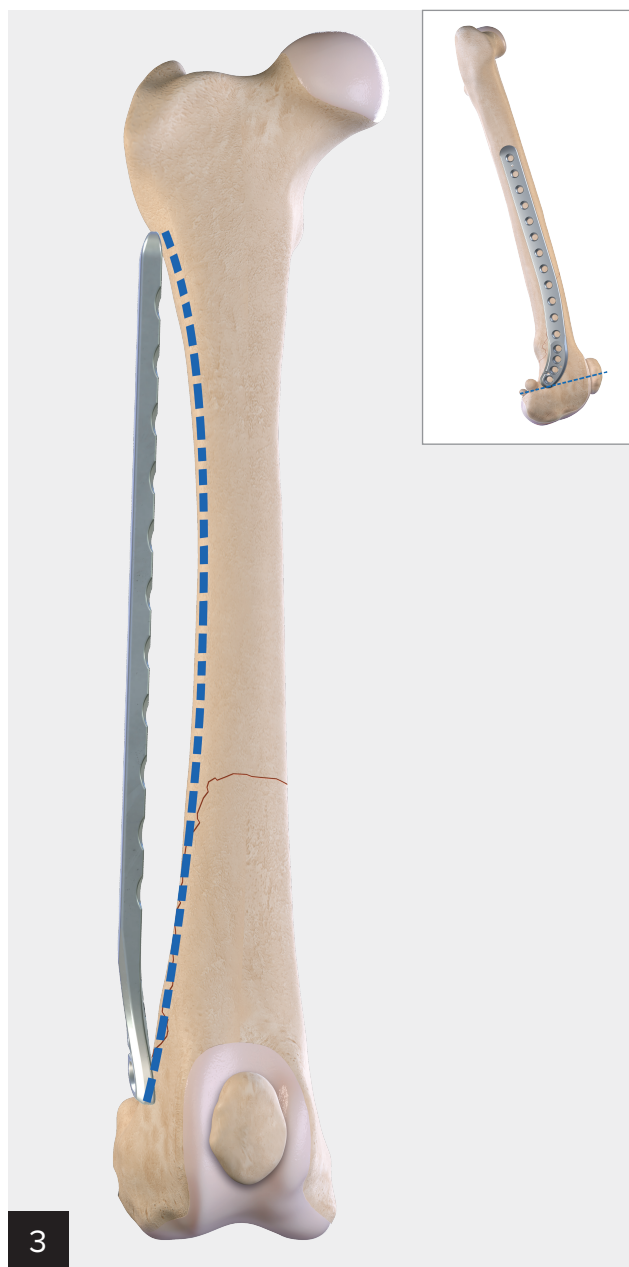
After palpation of the patella and lateral trochlear ridge, make a curved parapatellar skin incision extending from the tibial tuberosity to the level of the patella and then an equal distance proximally. The subcutaneous fascia is incised in the same line as the skin incision. The fascia lata and lateral fascia of the stifle joint are exposed by undermining the subcutaneous fat and fascia, which are then retracted with the skin.

Make another curved incision, similar to that in the skin, through the fascia lata along the cranial border of the biceps. Continue the incision distally into the lateral fascia of the stifle joint. As it crosses the trochlear ridge, curve it to parallel the lateral border of the patella and the patellar ligament. Enough fascia is left on the lateral edge of the patella to receive sutures when the joint is closed.



### Reduction

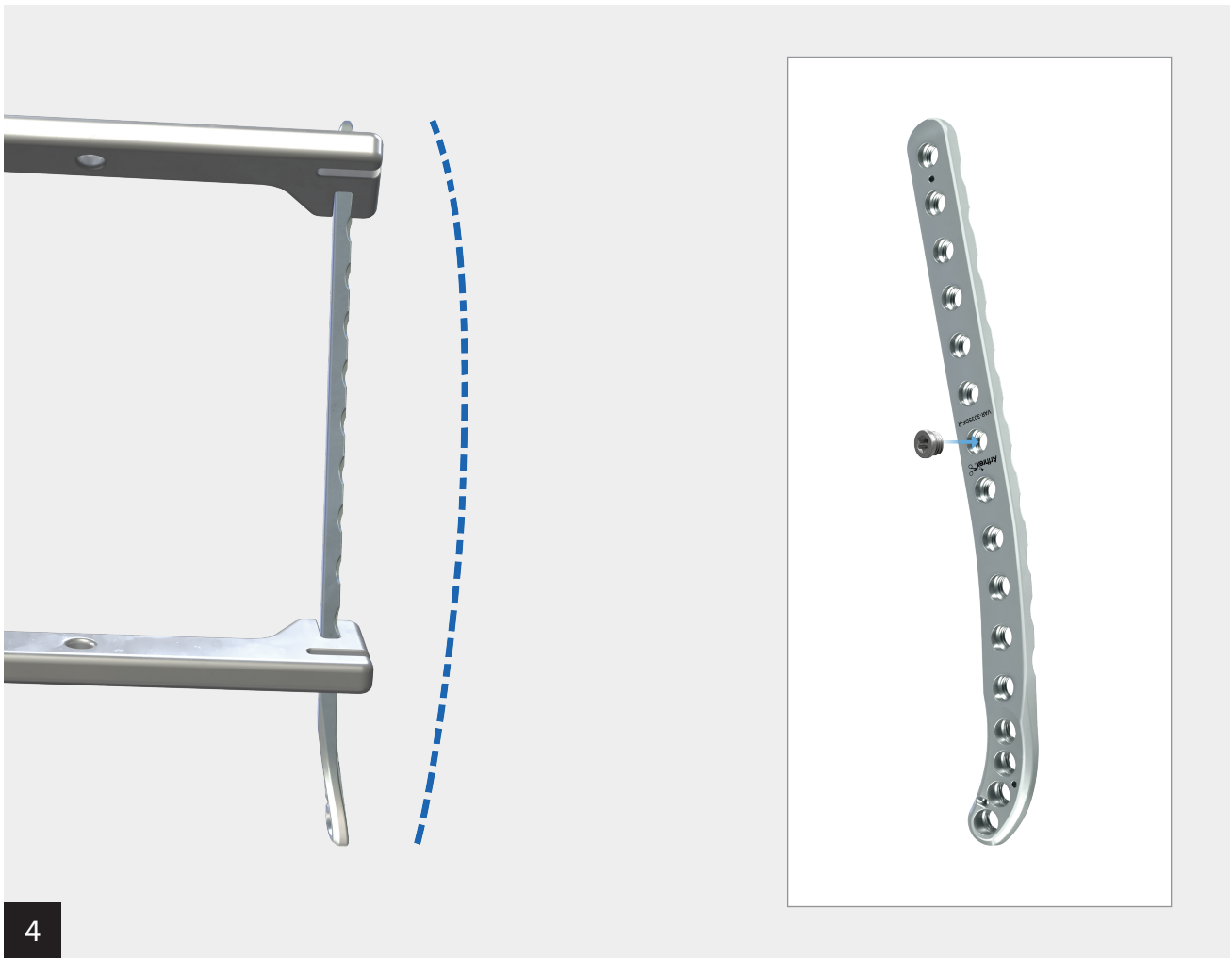
Initial anatomic reduction can be obtained with the use of traditional fracture instrumentation. Bone fragments can then be further secured using FiberTape® cerclage. FiberTape cerclage is a strong, simple, and reproducibly effective solution for replacing metal cables and wires traditionally used for fracture management.



### Assess Plate

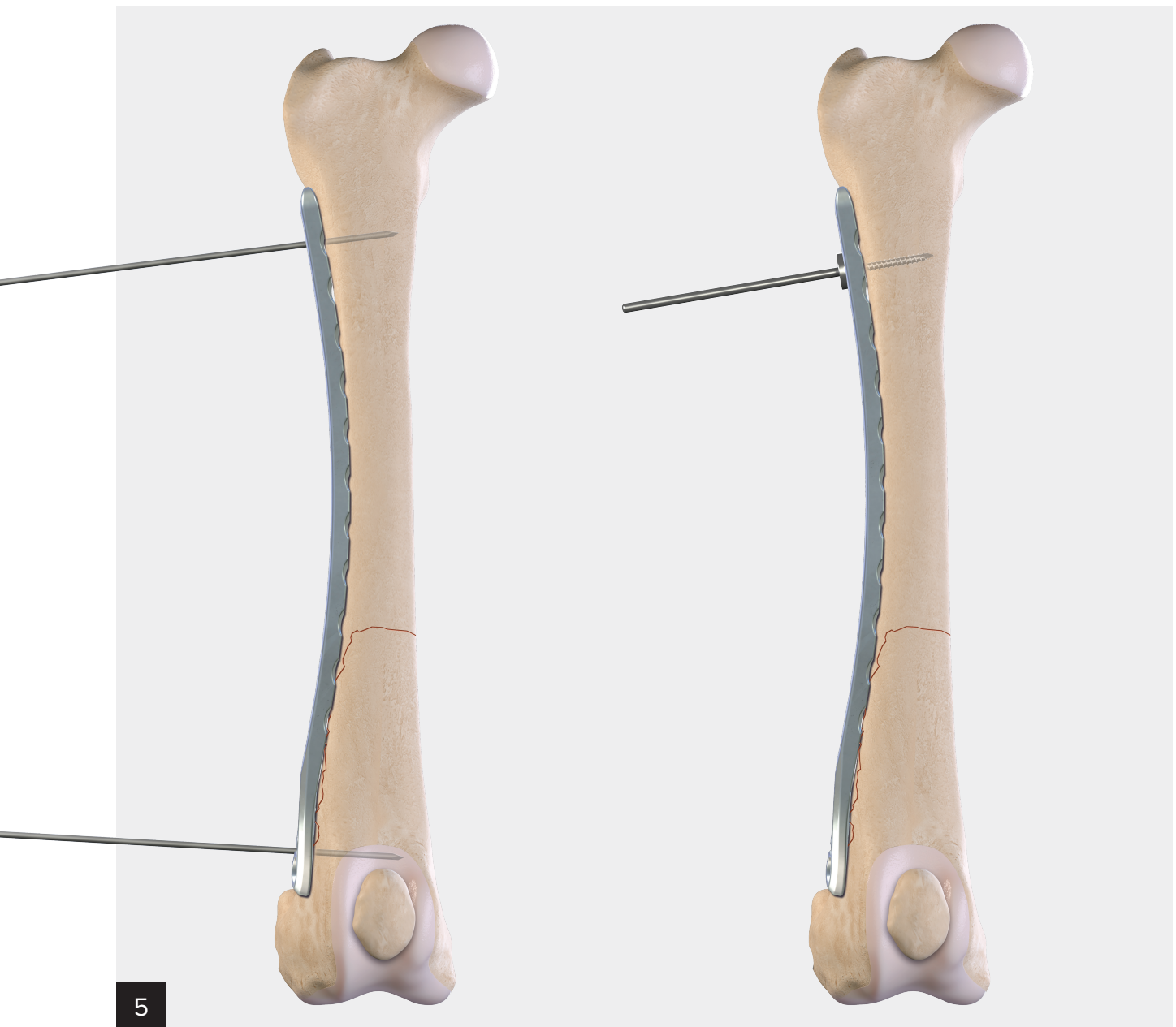
Place the implant on the surface of the femur to determine contour requirements. The distal aspect of the plate should align with the fabellar line. Minor contouring of the middle aspect of the plate may be needed, depending on patient anatomy.





#### Contour Plate

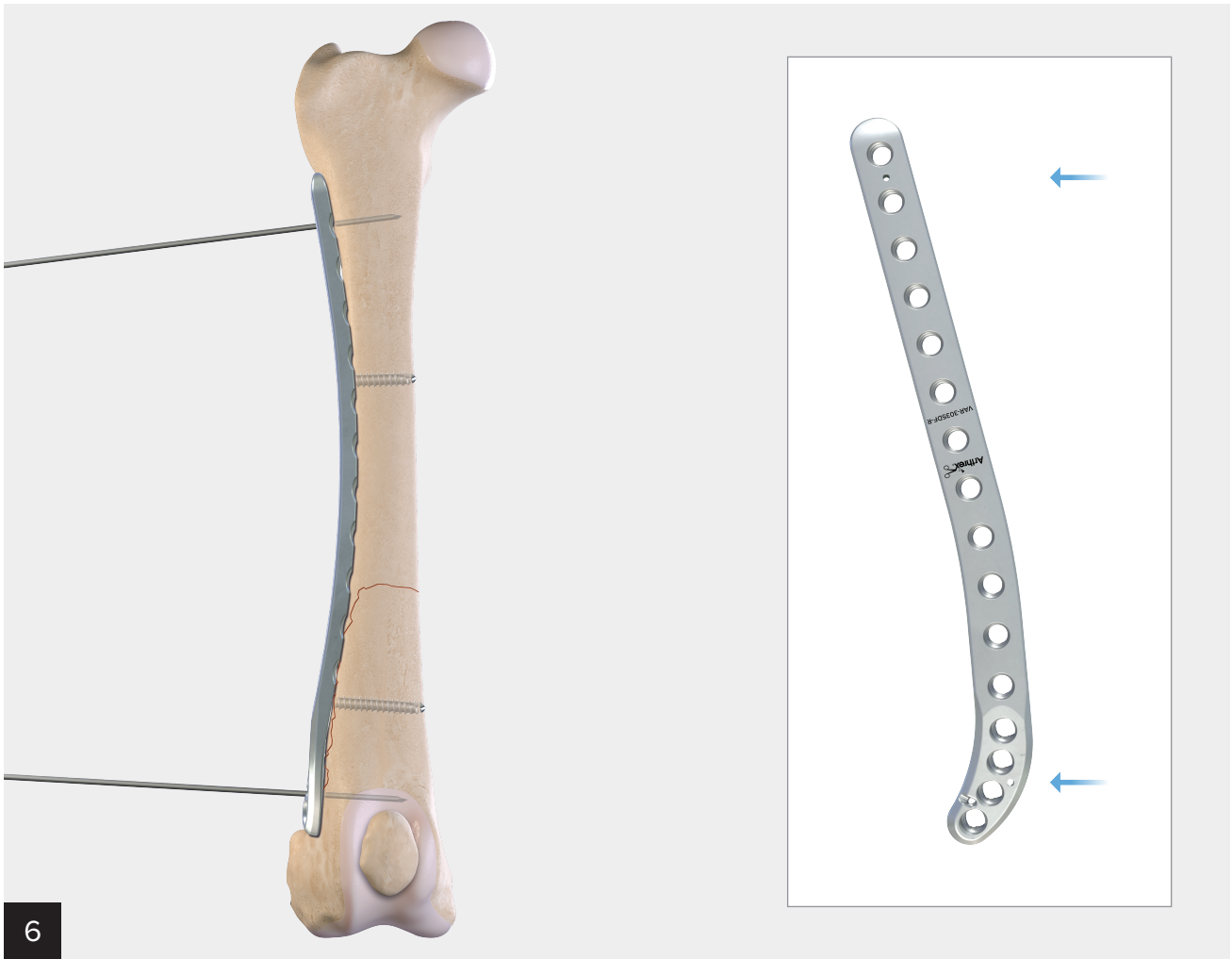
If contouring is required, place a threaded bending plug into the locking screw holes where the plate will be contoured. Contour the plate as necessary using bending irons. If large contours are made, take note that screw trajectories may change. If the plate length is excessive, the surgeon may cut the plate. Depending on plate size and thickness, this may be performed with either a hand or tabletop cutter. If the cutter is not adequate to cut through the plate, a score mark can be made with the cutter, and then bending irons can be used to carefully bend and fatigue the metal until it separates.



### Initial Fixation

Once contouring is complete, the bending plugs can be removed or used with K-wires for temporary fixation. BB-Taks and/or K-wires in their respective holes can also be used.



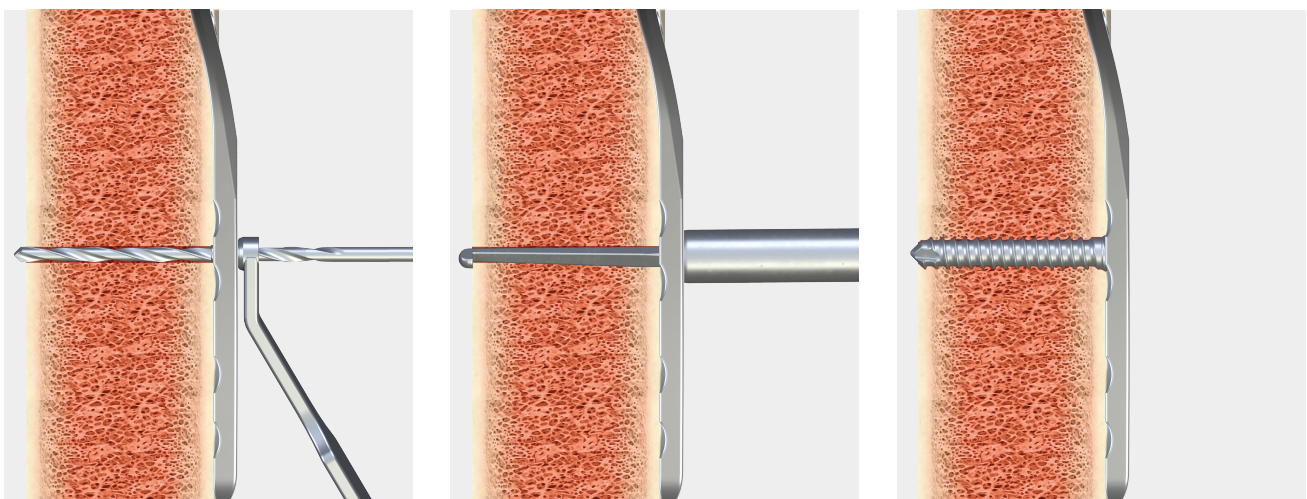


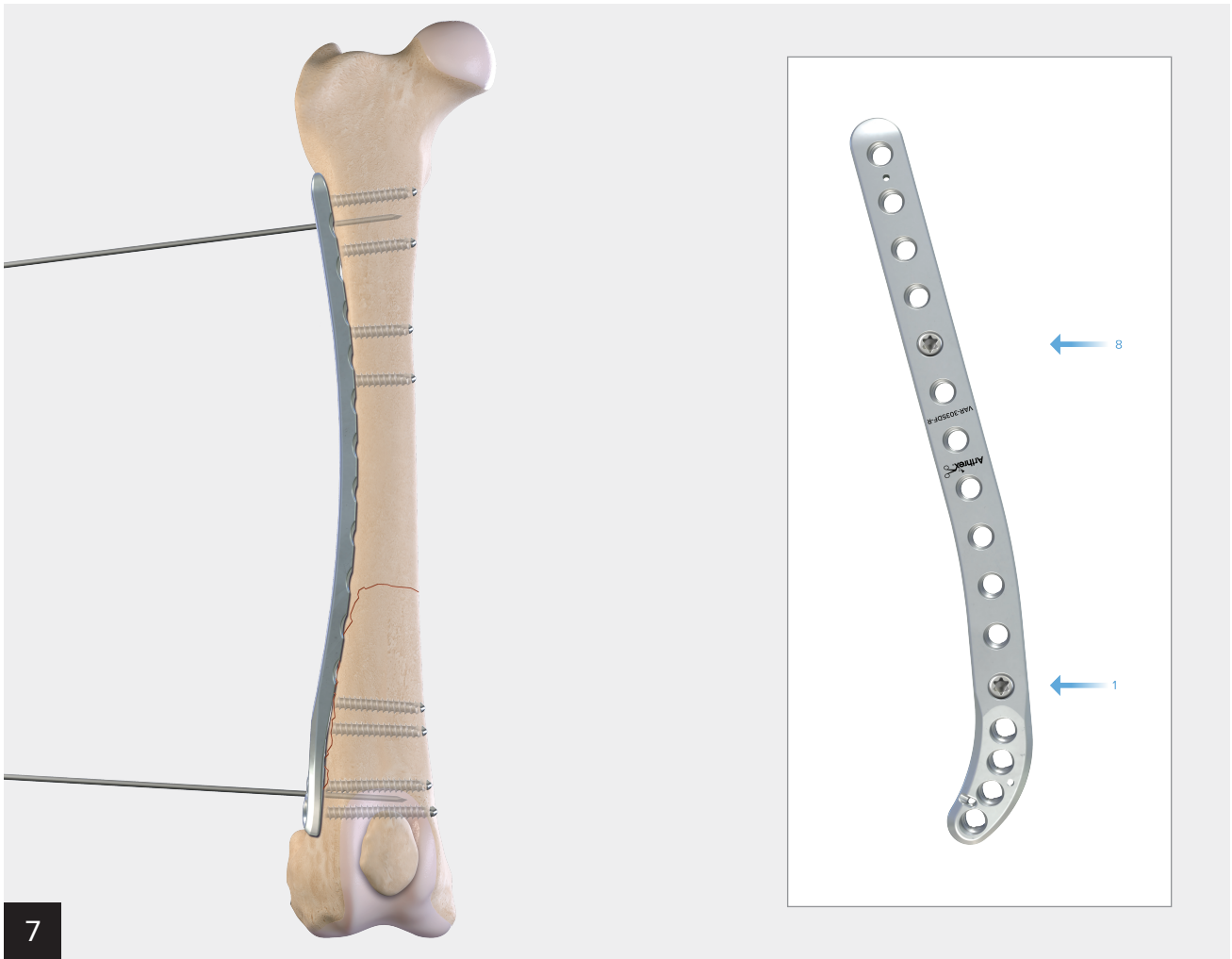
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### Applying the Plate

Place the first locking screw bicortically in the proximal segment using the appropriate locking drill guide, drill bit, and depth gauge. The second screw should be placed bicortically in the distal segment. Screws may be placed under power and should be brought into contact with the plate. The final turns, however, should be performed manually with the manual screwdriver.

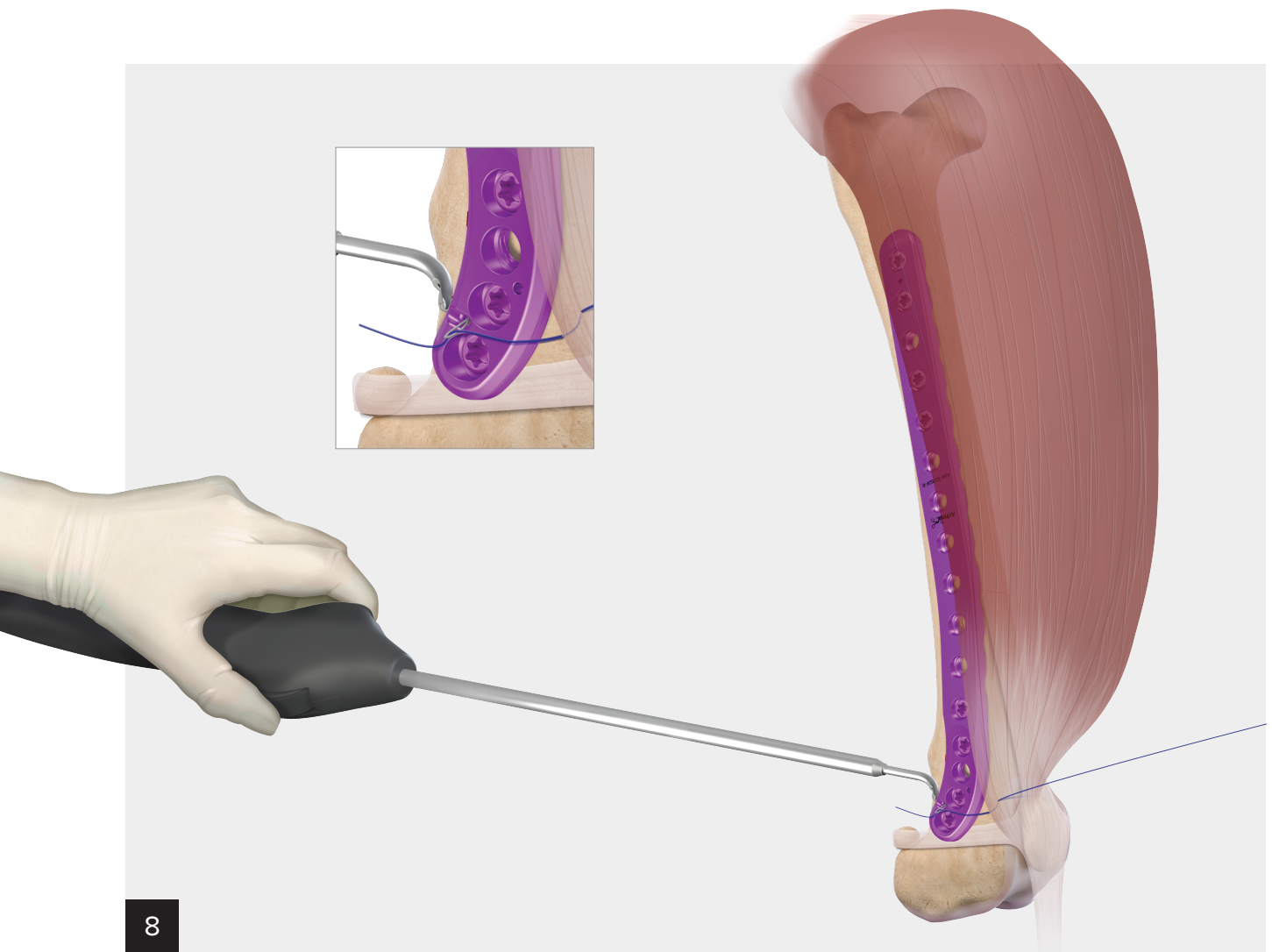
**Note: All screws should be placed to avoid the fracture. Screw guidance (above) assumes that placement through the indicated holes will not interfere with reduction. Final screw placement is at the discretion of the surgeon.**





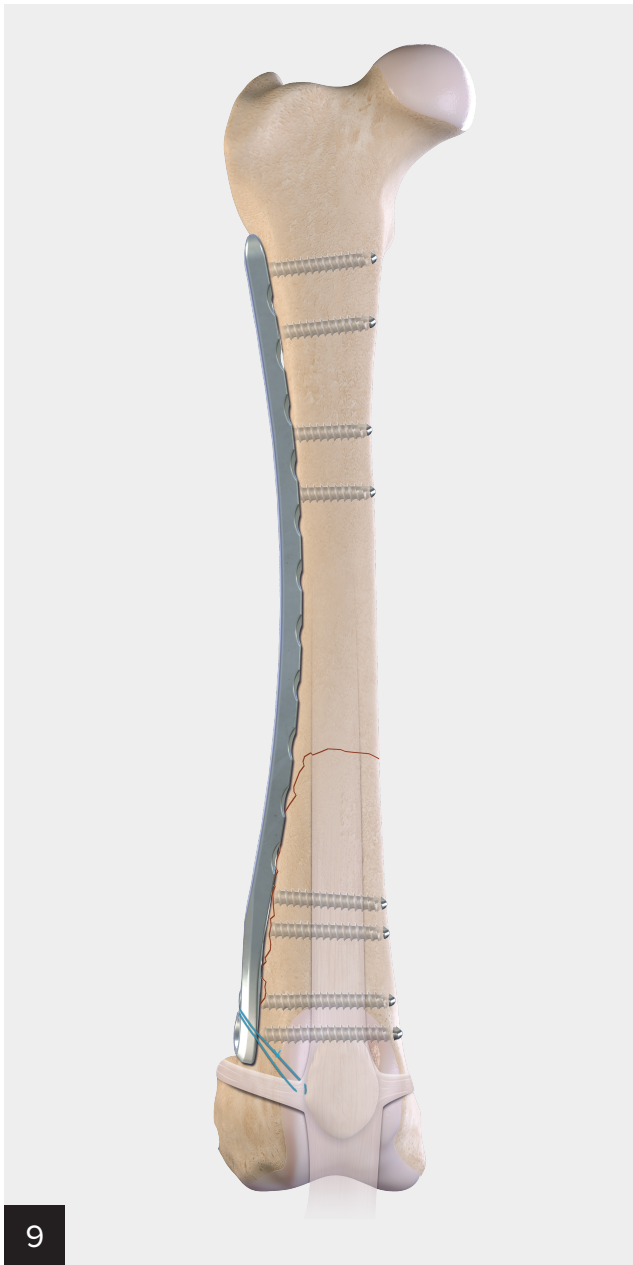
Place the remaining screws using locking or cortical screws as required using the appropriate locking drill guide, drill bit, and depth gauge. It is desirable to capture 6-8 cortices on either side of the fracture. Remove any initial fixation methods (K-wires, BB-Taks, etc).



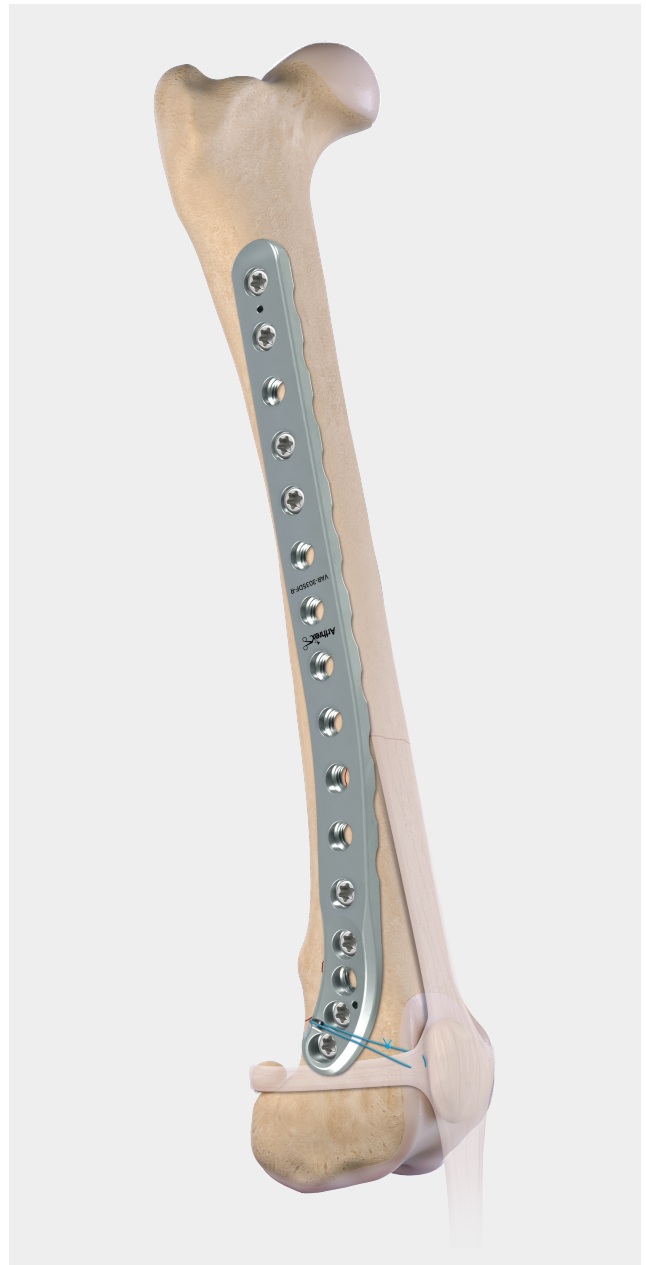


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If desired, the suture hole feature of the plate can be used in conjunction with the QuickPass™ SutureLasso™ suture passer to aid in soft tissue management/closure.



Final fixation (cranial view).



Lateral view.



## Suture Reference Chart

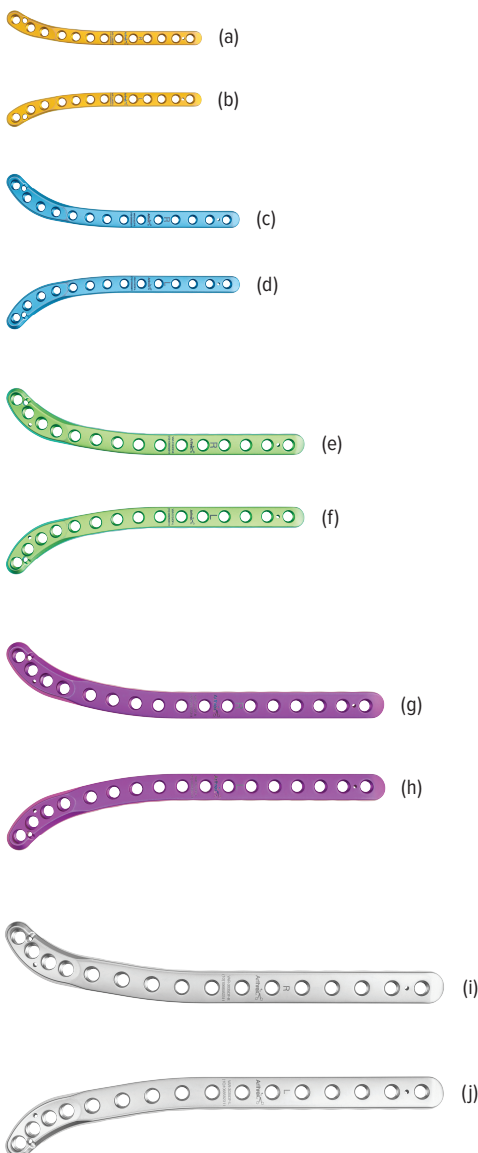


Plate Size	Plate	Item Number	VetSuture
1.6 mm/2.0 mm		VAR-3116BDF	Polydioxanone 3-0, SH, TP, ½ C
		VAR-3120DF	Polydioxanone 2-0, SH, TP, ½ C
2.0 mm/2.4 mm		VAR-3124DF	Polydioxanone 0, CT-2, TP, ½ C
3.0 mm/3.5 mm		VAR-3130DF	Polydioxanone 0, CT-1, TP, ½ C
		VAR-3135DF	Polydioxanone 1, CP-1, Rev Ctg, ½ C

## Ordering Information

### Distal Femoral Fracture Plates

Product Description	Item Number
<b>1.6 mm Distal Femoral Broad Plates (Gold)</b>	
Distal femoral plate broad, titanium, 1.6 mm, left <b>(a)</b>	<b>VAR-3116BDF-L</b>
Distal femoral plate broad, titanium, 1.6 mm, right <b>(b)</b>	<b>VAR-3116BDF-R</b>
<b>2.0 mm Distal Femoral Plates (Blue)</b>	
Distal femoral plate, titanium, 2.0 mm, left <b>(c)</b>	<b>VAR-3120DF-L</b>
Distal femoral plate, titanium, 2.0 mm, right <b>(d)</b>	<b>VAR-3120DF-R</b>
<b>2.4 mm Distal Femoral Plates (Green)</b>	
Distal femoral plate, titanium, 2.4 mm, left <b>(e)</b>	<b>VAR-3124DF-L</b>
Distal femoral plate, titanium, 2.4 mm, right <b>(f)</b>	<b>VAR-3124DF-R</b>
<b>3.0 mm Distal Femoral Plates (Purple)</b>	
Distal femoral plate, titanium, 3.0 mm, left <b>(g)</b>	<b>VAR-3130DF-L</b>
Distal femoral plate, titanium, 3.0 mm, right <b>(h)</b>	<b>VAR-3130DF-R</b>
<b>3.5 mm Distal Femoral Plates (Matte)</b>	
Distal femoral plate, stainless steel, 3.5 mm, left <b>(i)</b>	<b>VAR-3035DF-L</b>
Distal femoral plate, stainless steel, 3.5 mm, right <b>(j)</b>	<b>VAR-3035DF-R</b>



### Screws

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

## Screws cont.

Product Description	Item Number
<b>3.5 mm Low-Profile Cortical, Locking, Stainless Steel</b>	
Low-profile cortical screw 3.5 mm × 16-60 mm Sizes: 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60 mm	<b>VAR-8835-16</b> to <b>-60</b>
Low-profile locking screw 3.5 mm × 16-60 mm Sizes: 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60 mm	<b>VAR-8835L-16</b> to <b>-60</b>
<b>4.0 mm Low-Profile, Locking, Stainless Steel</b>	
Low-profile locking screw 4.0 mm × 18-60 mm Sizes: 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60 mm	<b>VAR-8840L-18</b> to <b>-60</b>

## Disposables and Limited Reusables

Product Description	Item Number
Drill bit, solid, AO, 1.1 mm (1.6 mm)	<b>VAR-4016D</b>
Drill bit, solid, AO, 1.5 mm (2.0 mm)	<b>VAR-4020D</b>
Drill bit, solid, AO, 1.8 mm (2.4 mm)	<b>VAR-4024D</b>
Drill bit, solid, AO, 2.3 mm (3.0 mm)	<b>VAR-4030D</b>
Drill bit, solid, AO, 2.5 mm (3.5 mm)	<b>VAR-8943-30</b>
Drill bit, solid, AO, 2.8 mm (3.5 mm)	<b>VAR-4035D</b>
Drill bit, solid, AO, 3.5 mm (4.0 mm)	<b>VAR-4040D</b>
Drill bit, solid, short, AO, 1.1 mm (1.6 mm)	<b>VAR-4016SD</b>
Drill bit, solid, short, AO, 1.5 mm (2.0 mm)	<b>VAR-4020SD</b>
Drill bit, solid, short, AO, 1.8 mm (2.4 mm)	<b>VAR-4024SD</b>
Drill bit, solid, short, AO, 2.3 mm (3.0 mm)	<b>VAR-4030SD</b>
Guidewire w/ trocar tip, 0.86 × 80 mm	<b>VAR-8929K</b>
Guidewire w/ trocar tip, 1.1 mm × 150 mm	<b>VAR-8933K</b>
Guidewire w/ trocar tip, 1.3 mm × 150 mm	<b>VAR-8937K</b>

## Instruments

Product Description	Item Number
Depth measuring device (1.6 mm/2.0 mm/2.4 mm)	<b>VAR-2024DD</b>
Depth measuring device (2.7 mm/3.0 mm/3.5 mm/4.0 mm)	<b>VAR-8943-15</b>
T6 driver (1.6 mm/2.0 mm)	<b>VAR-4020-01</b>
T8 driver (2.4 mm)	<b>VAR-4024-01</b>
T10 screwdriver (2.7 mm/3.0 mm)	<b>VAR-8944DH</b>
T15 driver (3.5 mm/4.0 mm)	<b>VAR-8941DH</b>
T6 screwdriver (1.6 mm/2.0 mm)	<b>VAR-4020-02</b>
T8 screwdriver (2.4 mm)	<b>VAR-4024-02</b>
Screw holding forceps (2.7 mm/3.0 mm)	<b>VAR-8943-08</b>
T15 screwdriver (3.5 mm)	<b>VAR-8943-10</b>
Locking plate holder, 2.0 mm	<b>VAR-4020-03</b>
Locking plate holder, 2.4 mm	<b>VAR-4024-03</b>
Locking plate holder, 2.7 mm/3.0 mm	<b>VAR-8950-09</b>


Product Description	Item Number
Locking plate holder, 3.5 mm	<b>VAR-8954-07</b>
Screw holding forceps	<b>VAR-8941F</b>
Drill/depth guide, locking, 1.6 mm	<b>VAR-4016DG</b>
Drill/depth guide, locking, 2.0 mm	<b>VAR-4020DG</b>
Drill/depth guide, locking, 2.4 mm	<b>VAR-4024DG</b>
Drill/depth guide, locking, 2.7 mm	<b>VAR-8950-07</b>
Drill/depth guide, locking, 3.0 mm	<b>VAR-4030DG</b>
Drill/depth guide, locking, 3.5 mm	<b>VAR-4035DG</b>
Drill/depth guide, locking, 4.0 mm	<b>VAR-4040DG</b>
Drill guide, 1.1 mm (1.6 mm)	<b>VAR-4016TDG</b>
Tap/drill guide, 2.0 mm/1.5 mm (2.0 mm)	<b>VAR-4020TDG</b>
Tap/drill guide, 2.4 mm/1.8 mm (2.4 mm)	<b>VAR-4024TDG</b>
2.0 mm/3.0 mm nonlocking drill guide	<b>VAR-8943-31</b>
Tap/drill guide, 3.0 mm/2.3 mm (3.0 mm)	<b>VAR-4030TDG</b>
Drill guide (3.5 mm)	<b>VAR-8943-14</b>
BB-Tak, small, threaded	<b>VAR-8933TBB</b>
BB-Tak, small	<b>VAR-8933BB</b>
BB-Tak, large	<b>VAR-8941BB</b>
BB-Tak, large, threaded	<b>VAR-8941TBB</b>
Drill guide, variable, 1.6 mm	<b>VAR-4016VDG</b>
Drill guide, variable, 2.0 mm	<b>VAR-4020VDG</b>
Drill guide, variable, 2.4 mm	<b>VAR-4024VDG</b>
Drill guide, variable, 3.0 mm	<b>VAR-4030VDG</b>
Bone tap, 2.0 mm	<b>VAR-4020T</b>
Bone tap, 2.4 mm	<b>VAR-4024T</b>
Bone tap, 3.0 mm	<b>VAR-4030T</b>
K-wire drill guide, 0.86 mm (1.6 mm/2.0 mm)	<b>VAR-4020KDG</b>
K-wire drill guide, 1.14 mm (2.4 mm)	<b>VAR-4024KDG</b>
K-wire drill guide, 1.14 mm (2.7 mm/3.0 mm)	<b>VAR-4030KDG</b>
K-wire drill guide, 1.3 mm (3.5 mm)	<b>VAR-4035KDG</b>
Bending plug, cannulated, 1.6 mm/2.0 mm	<b>VAR-4020-04</b>
Bending plug, cannulated, 2.4 mm	<b>VAR-4024-04</b>
Bending plug, cannulated, 3.0 mm	<b>VAR-4030-04</b>
Bending plug, cannulated, 3.5 mm	<b>VAR-4035-04</b>
Bending iron, small (1.6 mm/2.0 mm)	<b>VAR-4000-07</b>
Bending iron, medium (2.4 mm/3.0 mm)	<b>VAR-4000-08</b>
Bending iron, large (3.5 mm/3.5 mm broad)	<b>VAR-4000-09</b>
Freer elevator	<b>VAR-4000-10</b>
Hohmann retractor, double-ended, 6 mm/10 mm	<b>VAR-4000-11</b>
Ikuta clamp	<b>VAR-4000-12</b>
Lobster clamp, mini	<b>VAR-4000-13</b>
Lobster clamp, mini, radiolucent	<b>VAR-4000-14</b>
Periosteal elevator, 6 mm curved blade	<b>VAR-4000-15</b>
Pliers, needlenose	<b>VAR-4000-16</b>
Pointed reduction forceps	<b>VAR-4000-17</b>
Reduction forceps, guidewire	<b>VAR-4000-18</b>
Sharp hook	<b>VAR-4000-19</b>
Termite forceps	<b>VAR-4000-20</b>
Toothed reduction forceps, Kocher	<b>VAR-4000-21</b>

Cases and Caddies

Image	Product Description	Item Number
	<p>OrthoLine™ system case</p>	<p>VAR-4000GC</p>
	<p>Generic case insert</p>	<p>VAR-4000GC-01</p>
	<p>1.6 mm Screw caddy</p>	<p>VAR-3016SC-01</p>
	<p>2.0 mm Screw caddy</p>	<p>VAR-3020SC-01</p>
	<p>2.4 mm Screw caddy</p>	<p>VAR-3024SC-01</p>



## Cases and Caddies

Image	Product Description	Item Number
 <p>A black plastic screw caddy with a grid of 3.0 mm holes. A matching grey tray with a grid of 3.0 mm holes is shown next to it. The tray has 'Arthrex' and 'eDFU' logos.</p>	<p>3.0 mm Screw caddy</p>	<p>VAR-3030SC-01</p>
 <p>A black plastic screw caddy with a grid of 3.5 mm and 4.0 mm holes. A matching grey tray with a grid of 3.5 mm and 4.0 mm holes is shown next to it. The tray has 'Arthrex' and 'eDFU' logos.</p>	<p>3.5 mm/4.0 mm Screw caddy</p>	<p>VAR-4035SC-02</p>
 <p>A black plastic bending plug caddy with a grid of holes. A matching grey tray with a grid of holes is shown next to it. The tray has 'Arthrex' and 'eDFU' logos.</p>	<p>Bending plug caddy</p>	<p>VAR-4000BPC</p>



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US patent information