# OrthoLine™ Proximal Femoral Fracture Plating System

Surgical Technique

Arthrex®
Vet Systems

# OrthoLine™ Proximal Femoral Fracture Plating System

## Introduction

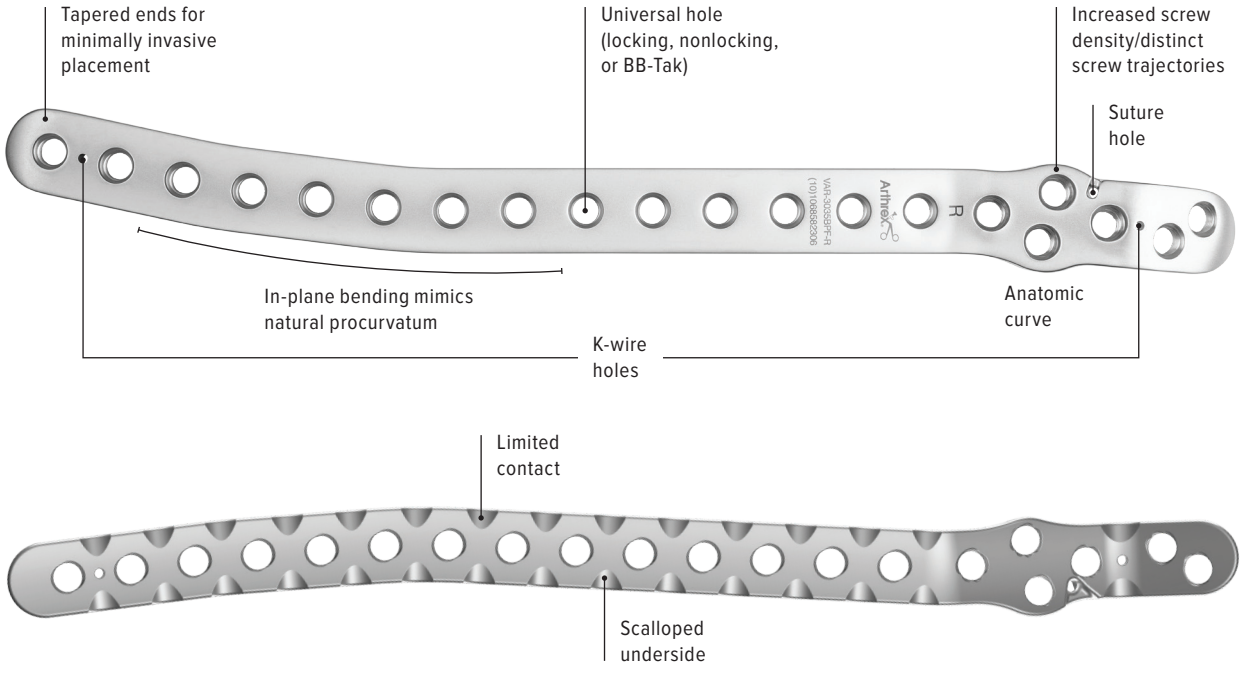
Arthrex has developed many innovations to assist in treating small animal fractures. These new and often unique solutions, combined with state-of-the-art surgeon training, research, and the most well-trained technology specialists in the industry, provide a comprehensive approach for our Arthrex veterinary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

The Arthrex OrthoLine proximal femoral fracture (PFF) 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 feature limits the need for contouring, saving OR time while improving plate placement, bone purchase, and overall screw density. This uniquely designed plate also includes a suture hole to aid in soft tissue closure.

## Features and Benefits

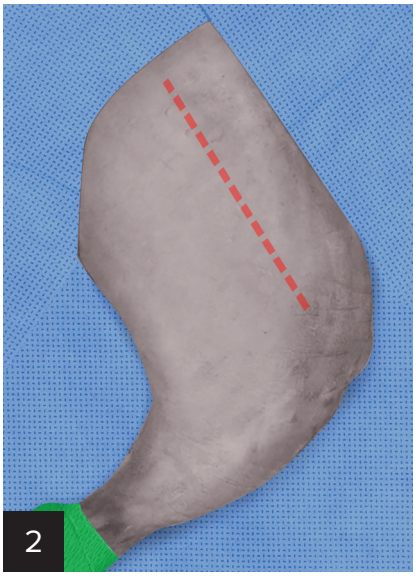
- Anatomic shape assists in repair with minimal contouring
- Ideal for subtrochanteric proximal femoral fractures
- Proximal screw trajectories align centrally in metaphyseal and diaphyseal bone
- Anatomic design features include a contour to follow the natural procurvatum of the femur, as well as a dual proximal curvature to follow the trochanter
- Hole spacing and location increase bone purchase options and overall density of screws in the proximal fragment
- Suture hole included on the proximal end of the plate to aid in soft tissue closure
- Locking K-wire guides may be used to estimate screw trajectory prior to drilling
- Scalloped underside to distribute stress and minimize contact
- Multiple K-wire holes and availability of cannulated bending plugs allow for temporary fixation prior to screw insertion

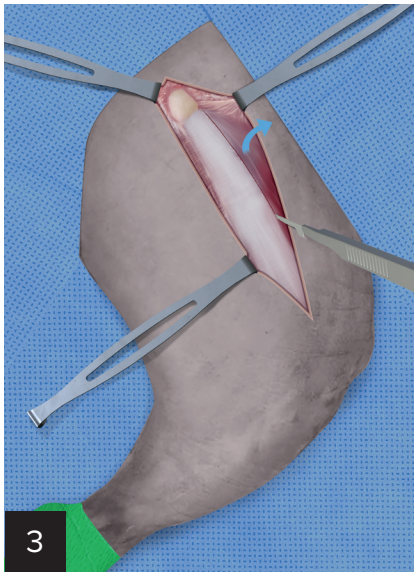
## Anatomic Design

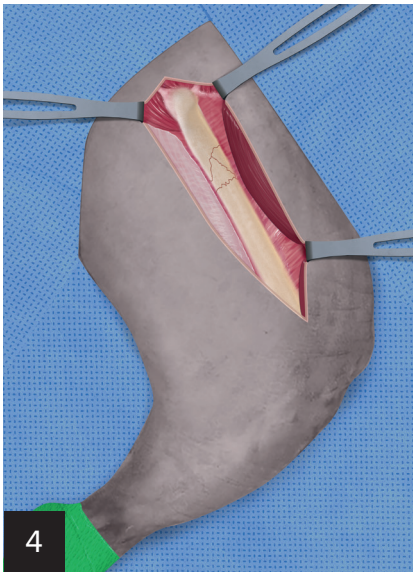


## Surgical Approach


A proximal metaphyseal fracture is shown with mild comminution.




Use a standard lateral approach to the femur, incise the vastus lateralis at its caudal lateral origin, and reflect cranially.

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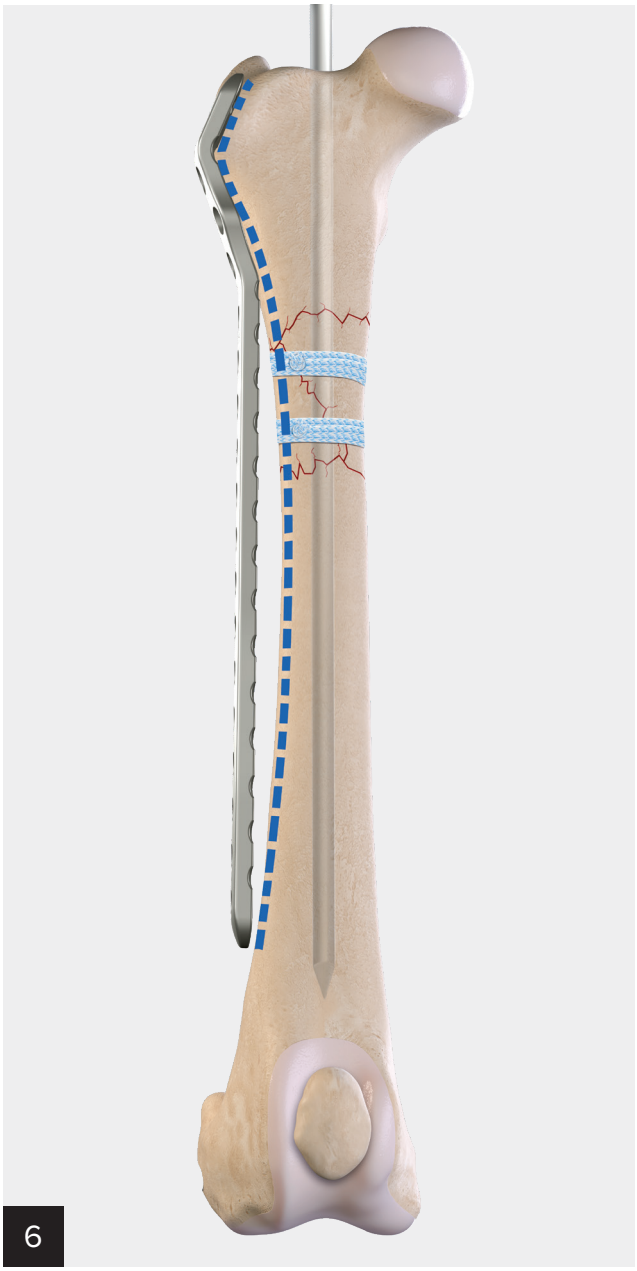
**Reduction**
An Intramedullary (IM) pin can be used for initial reduction. The fracture can be further stabilized using the FiberTape® cerclage tension band system. FiberTape cerclage is a strong, simple, reproducible, and effective solution for replacing metal cables and wires traditionally used for fracture management.



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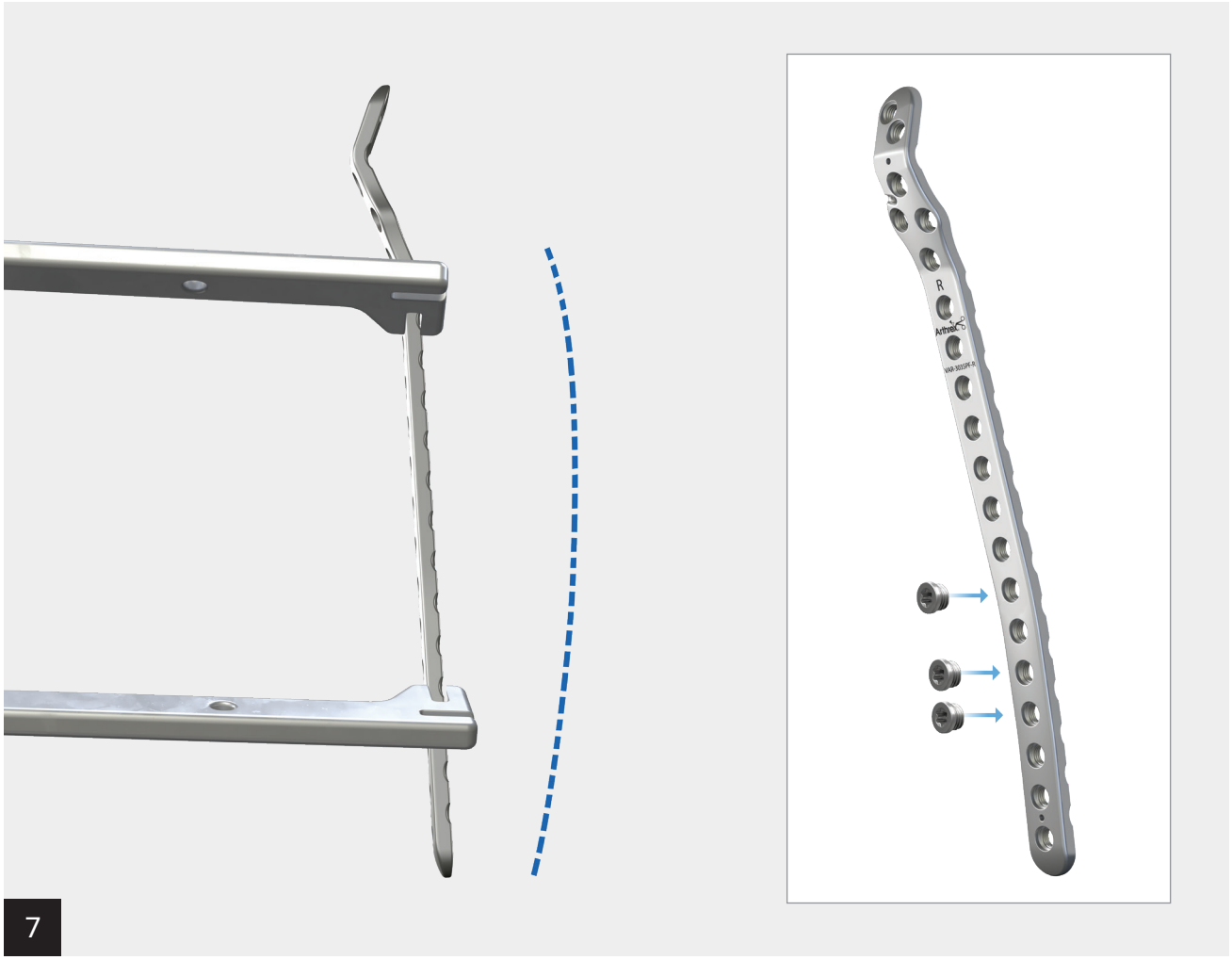
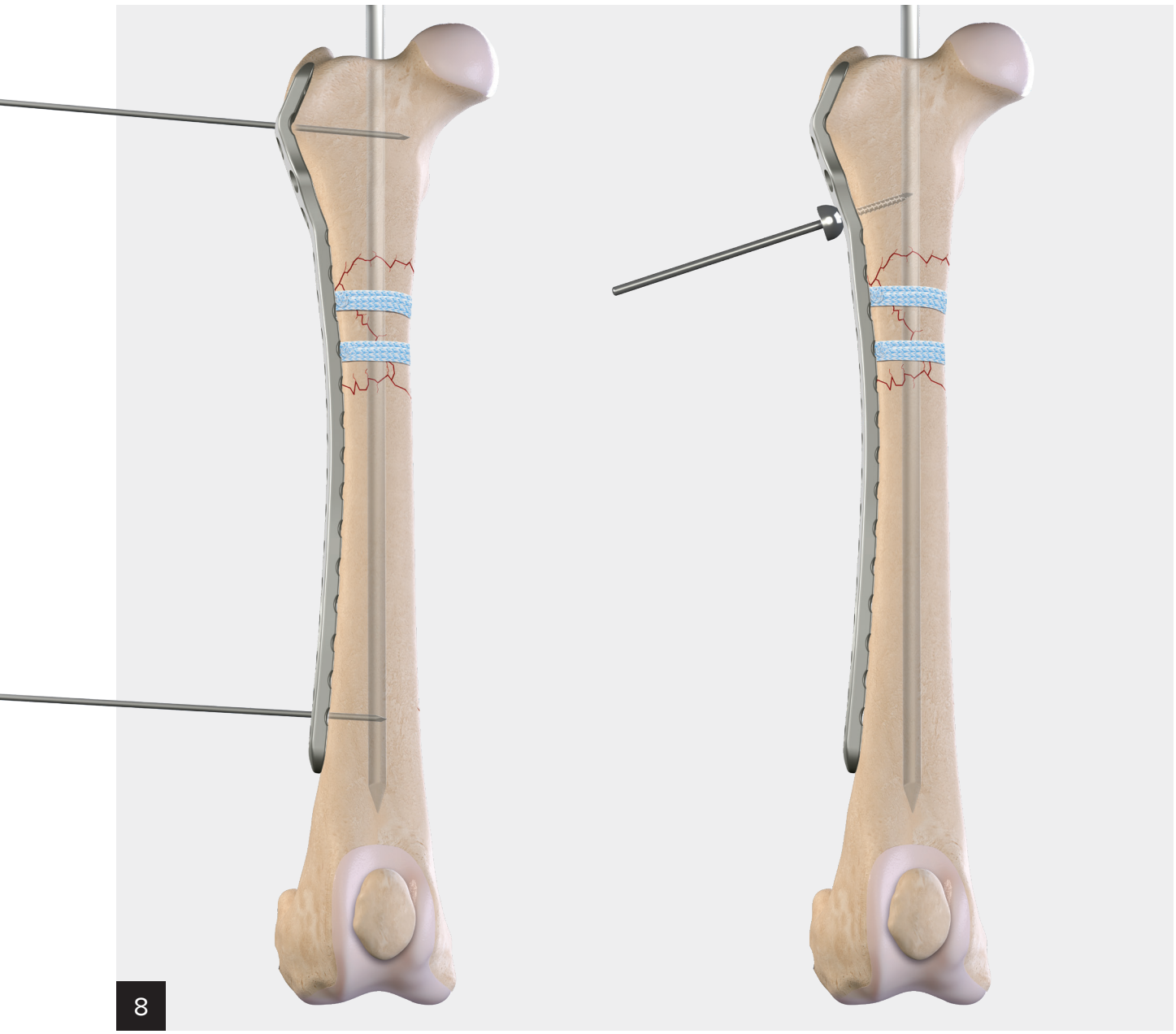
**Assess Plate**
Place the proximal flared portion of the plate against the lateral femur at the origin of the vastus lateralis. Minor contouring through the mid-diaphyseal portion of the plate is often needed.




**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 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 table-top 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.



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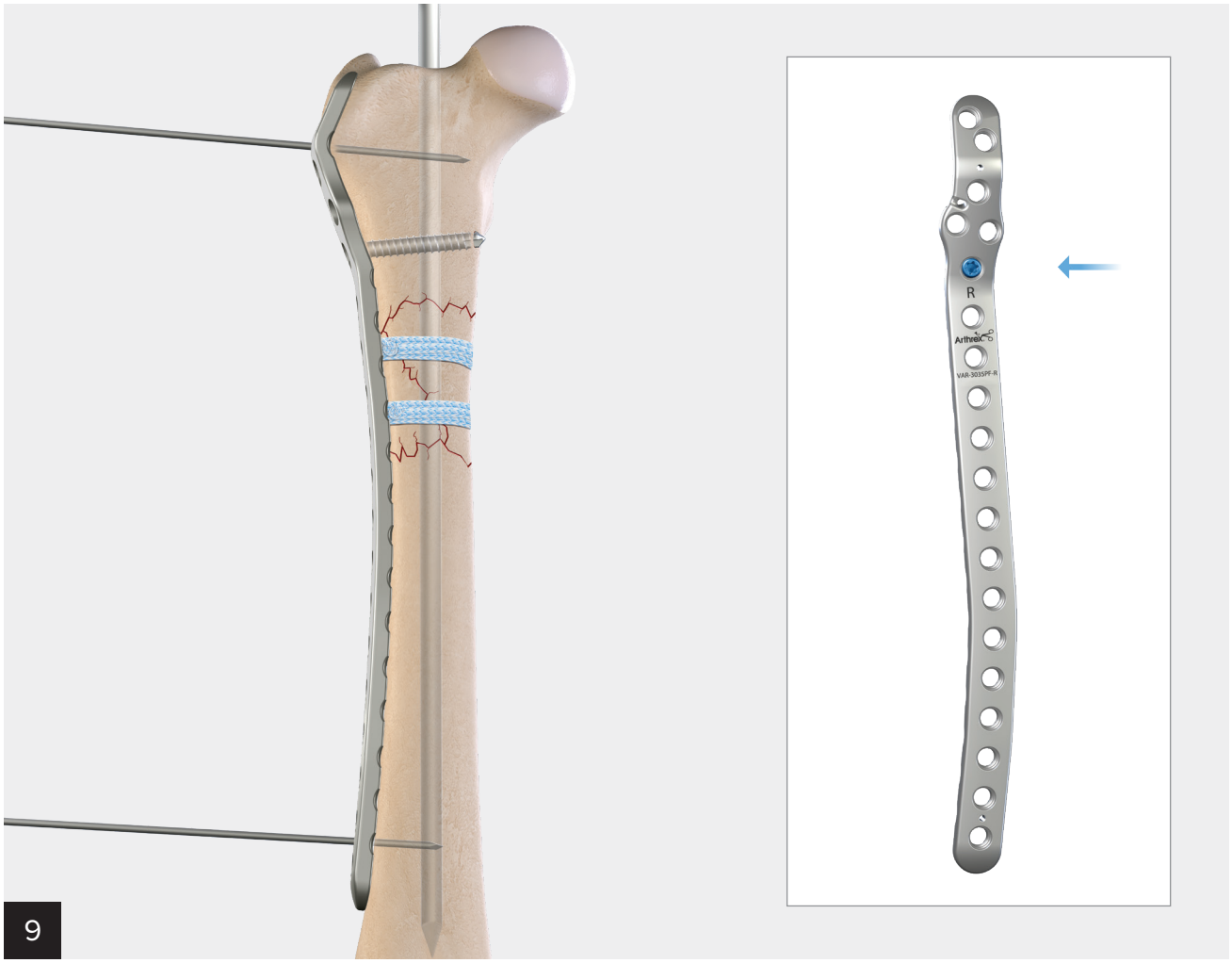
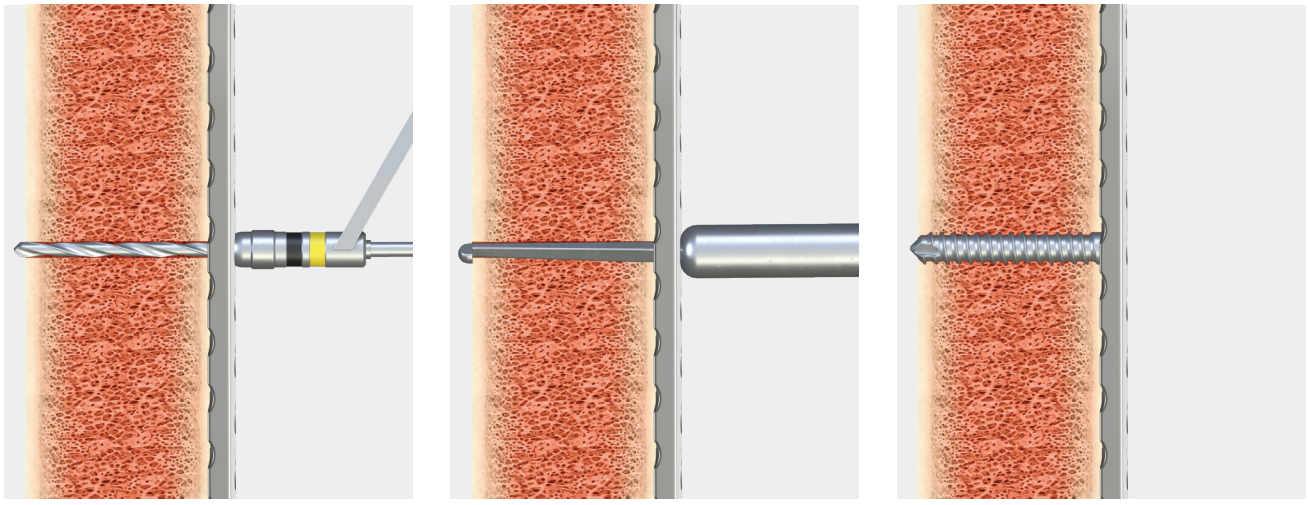
**Initial Fixation**

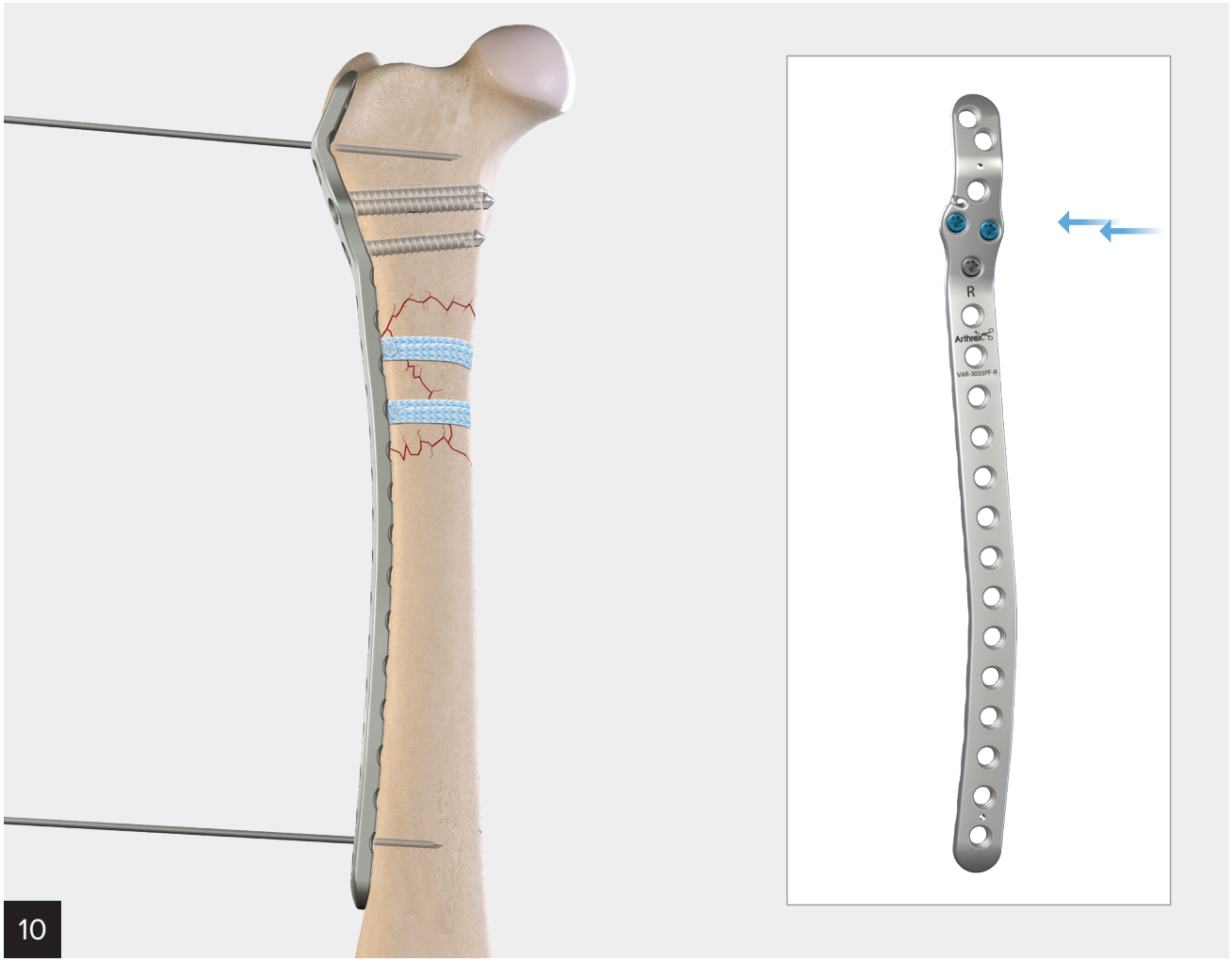
Once contouring is completed, the bending plugs can be removed or used with K-wires for temporary fixation. BB-Taks and K-wires may also be used in their respective holes.



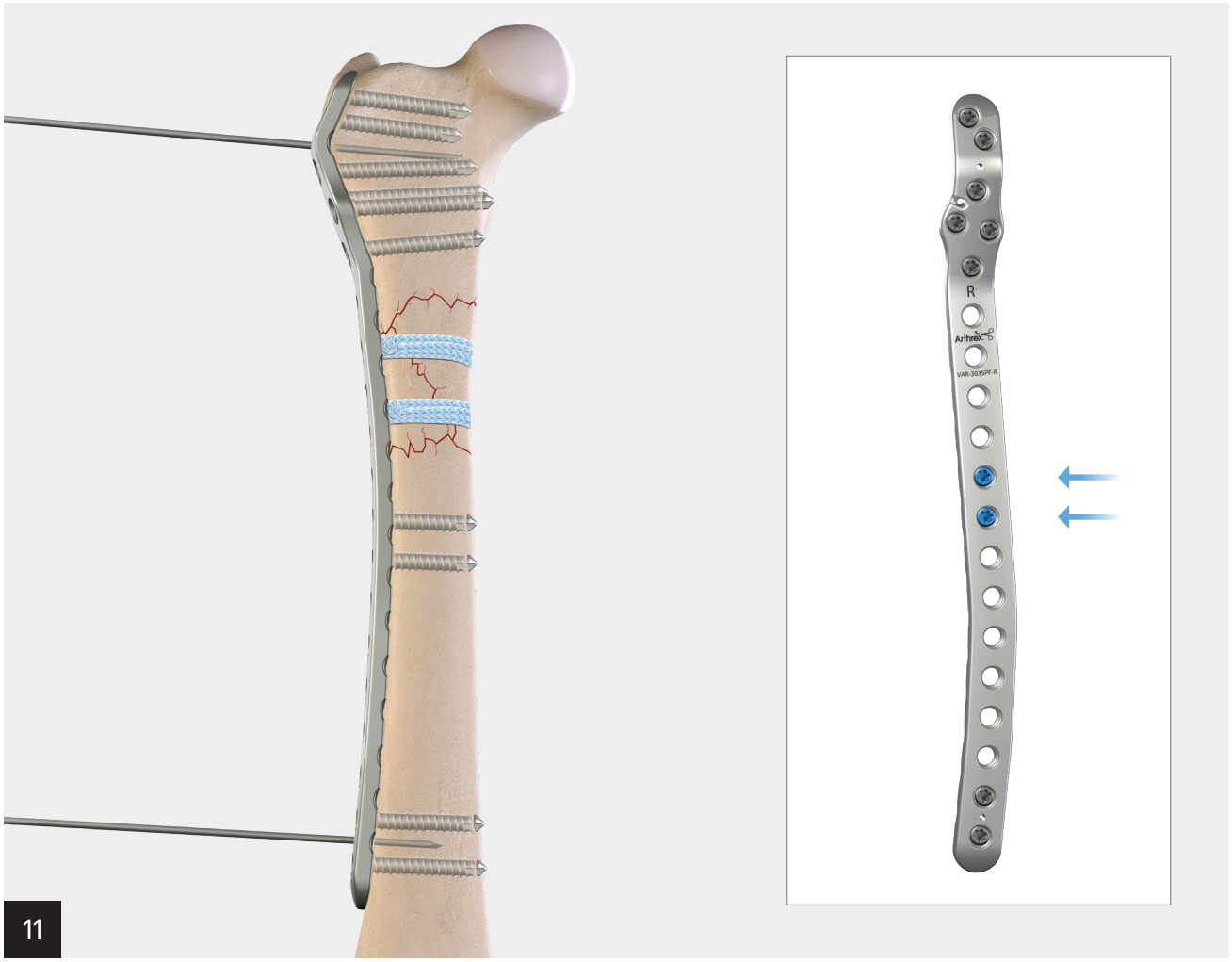

**Applying the Plate**
Place the first locking screw bicortically in the proximal segment (avoid the reduction IM pin) using the appropriate locking drill guide, drill bit, and depth gauge. Screws may be placed under power and can be brought into contact with the plate. The final turns, however, should be performed manually with the screwdriver.

**Note: Surgeon discretion will dictate whether the IM pin is left in place or removed. All screws should be placed to avoid the fracture. The proximal K-wire must be removed to place the third screw from the proximal screw to avoid interference. Final screw placement is at the discretion of the surgeon.**

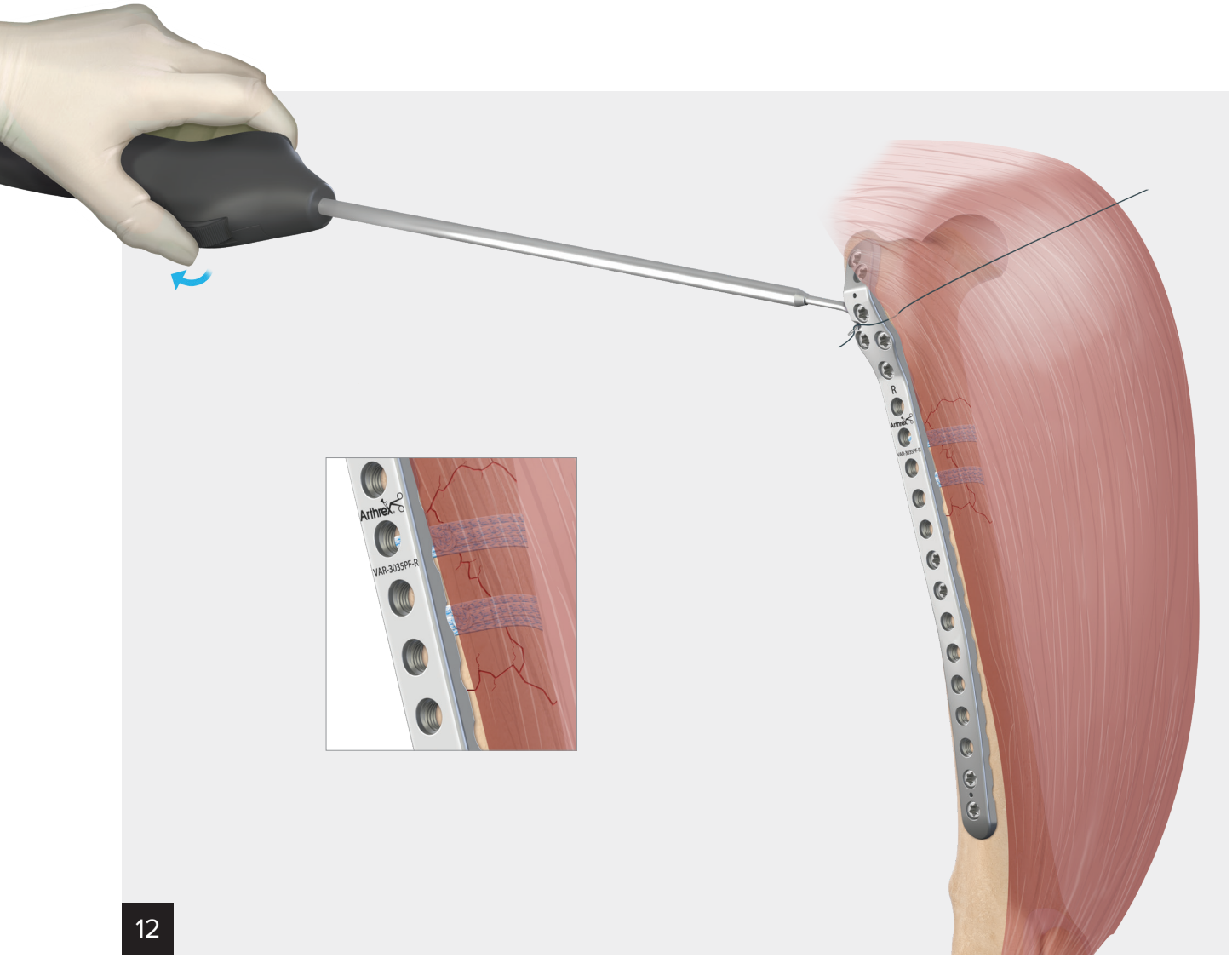





Place the second and third locking screws bicortically in the proximal segment (avoid the reduction IM pin, if present) using the appropriate locking drill guide, drill bit, and depth gauge.  It is desirable to capture 6-8 cortices on either side of the fracture.




Place the remaining screws using locking or cortical screws as required.

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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 the closure of the vastus lateralis over the plate.

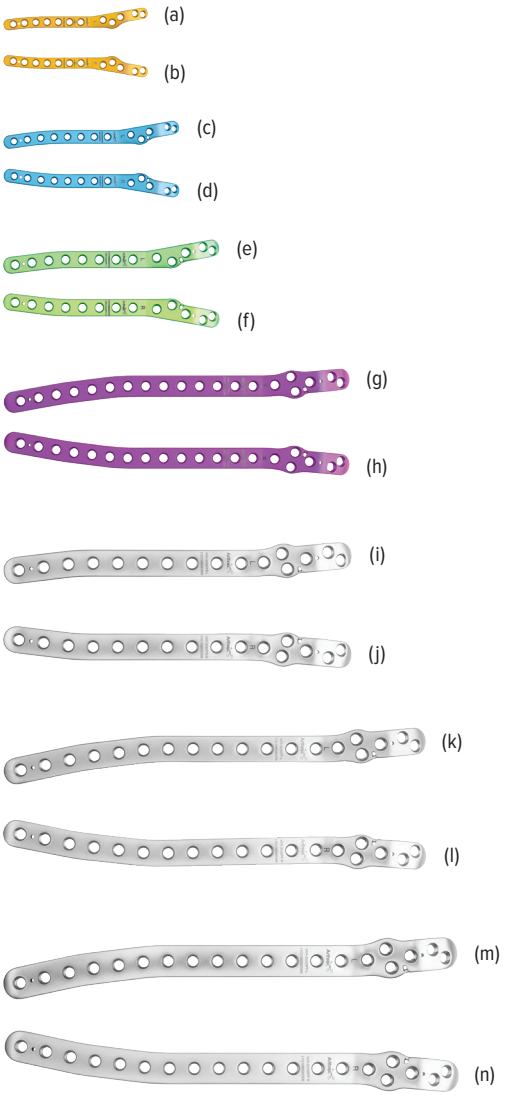
## Suture Reference Chart


| Plate Size | Plate | VetSuture | Product Description |
|---|---|---|---|
| 1.6 mm/2.0 mm |  | VAR-**R316** | Polydioxanone 3-0, SH, TP, ½ C |
| |  | VAR-**R317** | Polydioxanone 2-0, SH, TP, ½ C |
| 2.0 mm/2.4 mm |  | VAR-**R334** | Polydioxanone 0, CT-2, TP, ½ C |
| |  | VAR-**R340** | Polydioxanone 0, CT-1, TP, ½ C |
| 3.0 mm/3.5 mm |  | VAR-**R468** | Polydioxanone 1, CP-1, Rev Ctg, ½ C |
| |  | | |
| |  | VAR-**R468** | Polydioxanone 1, CP-1, Rev Ctg, ½ C |

# Ordering Information

## Proximal Femoral Fracture Plates

| Product Description | Item Number |
|---|---|
| 1.6 mm Proximal Femoral Broad Plates (Gold) | |
| Proximal femur plate broad, titanium, 1.6 mm, left **(a)** | VAR-**3116BPF-L** |
| Proximal femur plate broad, titanium, 1.6 mm, right **(b)** | VAR-**3116BPF-R** |
| 2.0 mm Proximal Femoral Plates (Blue) | |
| Proximal femur plate, titanium, 2.0 mm, left **(c)** | VAR-**3120PF-L** |
| Proximal femur plate, titanium, 2.0 mm, right **(d)** | VAR-**3120PF-R** |
| 2.4 mm Proximal Femur Plates (Green) | |
| Proximal femur plate, titanium, 2.4 mm, left **(e)** | VAR-**3124PF-L** |
| Proximal femur plate, titanium, 2.4 mm, right **(f)** | VAR-**3124PF-R** |
| 3.0 mm Proximal Femur Plates (Purple) | |
| Proximal femur plate, titanium, 3.0 mm, left **(g)** | VAR-**3130PF-L** |
| Proximal femur plate, titanium, 3.0 mm, right **(h)** | VAR-**3130PF-R** |
| 3.5 mm Proximal Femur Plates (Matte) | |
| Proximal femur plate, short, SS, 3.5 mm, left **(i)** | VAR-**3035PFS-L** |
| Proximal femur plate, short, SS, 3.5 mm, right **(j)** | VAR-**3035PFS-R** |
| Proximal femur plate, SS, 3.5 mm, left **(k)** | VAR-**3035PF-L** |
| Proximal femur plate, SS, 3.5 mm, right **(l)** | VAR-**3035PF-R** |
| Proximal femur plate broad, SS, 3.5 mm, left **(m)** | VAR-**3035BPF-L** |
| Proximal femur plate broad, SS, 3.5 mm, right **(n)** | VAR-**3035BPF-R** |




## Screws

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

## Screws cont.

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

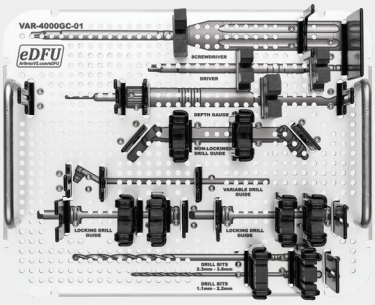
## Disposables and Limited Reusables

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

## Instruments

| Product Description | Item Number |
|---|---|
| Depth measuring device (1.6 mm/2.0 mm/2.4 mm) | VAR-**2024DD** |
| Depth measuring device,<br>(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 screwdriver (2.7 mm/3.0 mm) | VAR-**8944DH** |
| T15 driver (3.5 mm/4.0 mm) | VAR-**8941DH** |
| T6 screwdriver (1.6 mm/2.0 mm) | VAR-**4020-02** |
| T8 screwdriver (2.4 mm) | VAR-**4024-02** |
| Screw holding forceps (2.7 mm/3.0 mm) | VAR-**8943-08** |
| T15 screwdriver (3.5 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** |
| 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, 2.7 mm | VAR-**8950-07** |
| 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 (1.6 mm) | VAR-**4016TDG** |
| Tap/drill guide, 2.0 mm/1.5 mm (2.0 mm) | VAR-**4020TDG** |
| Tap/drill guide, 2.4 mm/1.8 mm (2.4 mm) | VAR-**4024TDG** |
| 2.0 mm/3.0 mm nonlocking drill guide | VAR-**8943-31** |
| Tap/drill guide, 3.0 mm/2.3 mm (3.0 mm) | VAR-**4030TDG** |
| Drill guide (3.5 mm) | VAR-**8943-14** |
| BB-Tak, small, threaded | VAR-**8933TBB** |
| BB-Tak, small | VAR-**8933BB** |
| BB-Tak, large | VAR-**8941BB** |
| BB-Tak, large, threaded | VAR-**8941TBB** |
| 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, 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 mm/2.0 mm | VAR-**4020-04** |
| Bending plug, cannulated, 2.4 mm | VAR-**4024-04** |
| 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/3.5 mm broad) | 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, needlenose | 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™ system 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** |

## Cases and Caddies

| 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** |

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 his or her 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 instructions 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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