VariAx® 2
Plating Systems

Operative technique
Anchorage® 2 CP
This publication sets forth detailed recommended procedures for using Stryker devices and instruments. It offers guidance that you should heed, but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required.

A workshop training is recommended prior to performing your first surgery. All non-sterile devices must be cleaned and sterilized before use. Follow the instructions provided in our reprocessing guide (L24002000). Multi-component instruments must be disassembled for cleaning. Please refer to the corresponding assembly/disassembly instructions.

Please remember that the compatibility of different product systems have not been tested unless specified otherwise in the product labeling. See package insert (Instruction for Use) [V15011, V15013] for a complete list of potential adverse effects, contraindications, warnings and precautions. The surgeon must discuss all relevant risks including the finite lifetime of the device with the patient when necessary.

Acknowledgments:
Stryker acknowledges the following surgeons for their support in the development of this technique guide:
Keith L. Wapner, M.D.
Indications, precautions and contraindications

**Indications for use**

The Anchorage 2 CP System is intended for use in internal fixation, reconstruction and treatment of fractures in the foot and ankle in adult and adolescent patients (12-21 years).

Indications include:

- Replantation
- Joint fusions
- Corrective osteotomies
- Osteopenic bone

**Note:** Circular holes in plate are compatible with VariAx 2 T10 3.5/2.7mm and T8 2.7/2.4mm screws only.

**Precautions**

The Anchorage 2 CP System has not been evaluated for safety and compatibility in the MR environment and has not been evaluated for safety and compatibility in Magnetic Resonance (MR) environment and has not been tested for heating or migration in the MR environment, unless specified otherwise in the product labeling.

**Contraindications**

The physician’s education, training and professional judgement must be relied upon to choose the most appropriate device and treatment. Conditions presenting an increased risk of failure include:

- Any active or suspected latent infection or marked local inflammation in or about the affected area.
- Compromised vascularity that would inhibit adequate blood supply to the fracture or the operative site.
- Bone stock compromised by disease, infection or prior implantation that can not provide adequate support and/or fixation of the devices.
- Material sensitivity, documented or suspected.
- Obesity. An overweight or obese patient can produce loads on the implant that can lead to failure of the fixation of the device or to failure of the device itself.
- Patients having inadequate tissue coverage over the operative site.
- Implant utilization that would interfere with anatomical structures or physiological performance.
- Any mental or neuromuscular disorder which would create an unacceptable risk of fixation failure or complications in postoperative care.
- Other medical or surgical conditions which would preclude the potential benefit of surgery.
Screw racks
All VariAx 2 screws can be stored in an easy-to-use storage rack. Our screw rack assembly can be stored independently on the operative room (OR) table and features a sloped design for easy access. Each screw rack can either clip into the tray, or sit individually on a flat surface with a rotating standing aid on the bottom of the rack for stabilization. The storage rack’s transparent lid allows for identification of the content. All four screw racks combined can hold up to 680 locking and non-locking screws – 3.5mm T10, 2.7mm T8 and 2.4mm T8. Each rack features a spot for up to four washers.

Comprehensive locking and non-locking system
Our color-coded polyaxial screws offer a wide array of both locking and non-locking screw options and incorporates a color code for easy identification for screw diameters. Each VariAx 2 foot plate screw hole incorporates patented SmartLock™ technology. As the locking screw is inserted into the screw hole, the Ti6Al4V titanium alloy screw forms its own thread into the pure titanium plate. Each hole also accepts non-locking screws. With a single plate comes more options. The genius of SmartLock is its simplicity.

Compression and locking in one step
Compression can be achieved when a screw is inserted and tightened into an oval compression hole. If a locking screw is used, the screw can then be locked into the plate in a single step.

Polyaxial locking
SmartLock technology goes one step further. Every screw hole in the VariAx 2 foot plate (except the compression slots) permits polyaxial screw placement. Locking screws can be angled up to 15° in each direction for a total range of 30°. Simply place the polyaxial drill guide in the screw hole to select the appropriate angle. Each plate allows a surgeon to insert locking or non-locking screws at a variable angle of their choice.
Color coding

The VariAx 2 screws and instruments follow a comprehensive color-coding scheme whereby the screw anodization color matches the corresponding instrument’s color.

This allows for easy handling in the OR environment. Overdrills and drill guides for interfragmentary lagging technique are available for all screw sizes. The drill bits, lagging drill guides and screws are also color coded to facilitate ease of use. Drill guides and screwdrivers are also identified with a T10 or T8 symbol for quick reference.

Locking or non-locking screws

Locking and non-locking screws are available in 3.5mm, 2.7mm and 2.4mm diameters. The circular holes in the locking plates provide an option for locking and non-locking screws.

Note: Locking screws are laser marked with a ‘dot’ and ‘ring’ marking on the screw head to differentiate them from non-locking screws.

One-size-fits-all washer

A 7.0mm washer is available that works with all screw sizes (T8 or T10) when non-locking screws are used independently from the plate.
**Plating instrumentation**

VariAx 2 offers three standard types of drill guides: a 2.0mm for use with all T8 screws, a 2.0mm for use with T10 2.7mm screws and a 2.6mm for use with T10 3.5mm screws.

The 2.0mm drill guide for T8 screws facilitates drilling a 2.0mm pilot hole for a 2.4 or 2.7mm T8 screw centrically for locking or non-locking screws. Additionally, the opposite side of the guide facilitates eccentric drilling for use in a compression hole when compression is desired.

The 2.0mm drill guide for T10 screws facilitates drilling a 2.0mm pilot hole for a 2.7mm T10 screw centrically for locking or non-locking screws. Additionally, the opposite side of the guide facilitates eccentric drilling for use in a compression hole when compression is desired.

The 2.6mm drill guide facilitates drilling a 2.6mm pilot hole for a 3.5mm screw centrically for locking or non-locking screws. Additionally, the opposite side of the guide facilitates eccentric drilling for use in a compression hole when compression is desired.

**Note:** When drilling eccentrically, the arrow marked on the compression side of the drill guide should be pointing toward the fracture line/osteotomy site. The compression drill guide must be inserted perpendicularly into the compression hole and can not be angulated. When angulating the drill guide or using the wrong instrument, there is a risk that the screw will not properly sit in the plate or slip through the hole.

Additionally, there are a variety of drills offered in the system. The 2.0mm drill for T8 (purple and blue color rings) is used to drill the pilot hole for 2.4 and 2.7mm T8 screws. The 2.0mm drill for T10 screws (double turquoise color rings) is used to drill the pilot hole for the optional 2.7mm T10 screws. Lastly, the 2.6mm drill (double orange color rings) is used to drill the pilot hole for the 3.5mm T10 screws.

All drills are scaled and designed so as to correctly evaluate the appropriate screw length.
Overdrills and drill guides for interfragmentary lagging technique are available for all screw sizes. The drill bits, lagging drill guides and screws are also color coded to facilitate ease of use.

**Note:** Always match the color ring marking on the drill bit with the color marking on the drill guide. Additionally, always match the screw anodization color with at least one of the color ring markings.

**Note:** The VariAx Foot Calcaneus Standard Plate oblong holes (see figure to right) are intended to be used for prepositioning of plate only. Applying high torque during final tightening of screw in oblong holes may create potential for T10 screws to not sit properly or slip through the hole.
**Joystick for plate positioning and temporary fixation**

The joystick for T10 holes can be used in any large VariAx circular hole and the joystick for T8 holes can be used in any small VariAx circular hole to aid in plate positioning. Additionally, they can also be used to temporarily fix the plate to the bone by inserting a K-wire with a diameter up to 1.4mm through a joystick that is already engaged in the plate hole.

Note: Do not insert a K-wire through a joystick on the compression side of the fracture if compression is needed.

After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it in the hole. To remove the joystick, simply remove any K-wire and turn the knob counter-clockwise to disengage the tip from the hole.

Note: Do not use the engaged joystick to apply bending to the plate as this may damage the plate or joystick.

**Joint distraction forceps**

VariAx 2 offers joint distraction forceps with a ratcheting function for aid in achieving and holding a reduction.

**Depth measurement options**

VariAx 2 offers various options to evaluate the screw length. As previously mentioned, all drills are scaled so that the surgeon may quickly evaluate the screw length when using the drill through the dedicated drill guides.

A SpeedGuide is also offered that allows the surgeon to drill and measure the hole depth in one step with a single instrument. For further information on the SpeedGuide, please refer to the SpeedGuide Operative Technique.

Lastly, a standard depth gauge may be used either independently or through a plate hole.
**Taps and countersink**

2.4, 2.7 and 3.5mm taps are available in the system. Although all screws are self-tapping, it is recommended to use a tap if excessive resistance is felt during insertion or if the bone is dense.

A countersink is also available for reducing the screw head prominence when the screw is used independently of a plate.

**Modular handle**

VariAx 2 offers a fully modular handle system. This is composed of two handle grip sizes (medium and large) that can be interchanged with either a bi-directional ratcheting AO-coupling insert or a standard AO-coupling insert.

Both handle sizes are equipped with a spin-cap to allow insertion using a two-finger technique. In order to disengage the insert from the handle, push down on the button on the distal part of the handle and pull the insert away from the handle.

**Note:** The inserts must be removed from the handles before cleaning.

The ratcheting insert can work in three modes: clockwise ratcheting, counter-clockwise ratcheting or neutral. To switch between the different modes, simply twist the distal part of the insert to the desired driving direction.

**Note:** To ensure appropriate ratcheting function, perform appropriate maintenance on the insert by applying medical-grade lubricant oil through the marked cut-outs.
**Modular system design**

The trays for the Foot & Ankle Plating systems utilize interchangeable modules to allow you to customize the contents of your tray to better meet your specific needs. Select the appropriate interchangeable modules to build in extra inventory of frequently used parts or to seamlessly integrate other components of the Foot & Ankle portfolio.

Foot & Ankle plating system trays feature swing clip locks to create additional modularity and ease of use.

Tray configuration specific to Foot & Ankle, other configurations may exist.
Anchorage 2 CP two-level add-on tray

The combination of the VariAx SmartLock and Anchorage 2 CP technology offers a plate design that advances the standard of care when treating your forefoot and midfoot reconstruction cases. The VariAx SmartLock allows the option of T10 3.5/2.7mm or T8 2.7/2.4mm locking screws capable of locking at up to 15° off axis to the plate. Additionally, the indication-specific Anchorage 2 CP plates merge the advantages of rigid plate fixation and incorporates compression generated through the plate with either a T10 4.1mm or T8 3.6mm partially threaded screw across the fusion site at variable angle (varies on CP plate).

Drawer 1

- Four plate modules: MTP/universal module, midfoot module, lapidus, left module, lapidus, right module (two CP plates each)

**Note:** Templates do not have a module on their own. They are found within the corresponding plate module, and are to be used with the VariAx 2 T10 or T8 cannulated joysticks.

- CP instrument inlay: K-wire 1.4mm x 100mm (5), T10 and T8 CP drill guides (1 of each), CP reamers (2)
- CP screw rack (1)

Drawer 2

- F&A reduction instruments 3: K-wire cutter (1), pointed reduction clamp (1)
- Reamer inlay: cup & cone reamers 14mm-22mm (one of each)

**Note:** The CP screw rack can either clip into the drawer or sit individually on a flat surface with a rotating standing aid on the bottom of the rack for stabilization.
Anchorage 2 CP screws

<table>
<thead>
<tr>
<th>CP lag screw</th>
<th>Lengths</th>
<th>Hole size</th>
<th>Corresponding plates</th>
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<td>3.6mm screws</td>
<td>20-44mm</td>
<td>Universal CP and MTP CP plates</td>
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</tr>
<tr>
<td>4.1mm screws</td>
<td>20-70mm</td>
<td>Lapidus CP and midfoot CP plates</td>
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VariAx 2 screws

<table>
<thead>
<tr>
<th>Screw type</th>
<th>Lengths</th>
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<th>Corresponding plates</th>
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<td>2.4mm screws</td>
<td>8-38mm</td>
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<td>2.7mm screws</td>
<td>8-50mm</td>
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<tr>
<td>3.5mm screws</td>
<td>8-70mm</td>
<td>Lapidus CP and midfoot CP plates</td>
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</tbody>
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Anchorage 2 CP was created in order to provide a complete, modular system which contains various plates – each with their own specific indications – for reconstructive and trauma procedures for the foot and ankle. The addition of the four new plates is intended to fill procedure gaps in the VariAx and VariAx 2 Foot Systems. The Anchorage 2 CP System features a two-level tray that is compatible with the VariAx 2 four-level tray.

Anchorage 2 CP plates feature a CP hole that allows for a variable screw angle. All other holes feature VariAx SmartLock™ technology, which allows for +/- 15° screw insertion.

The Anchorage 2 CP Plating System contains pre-contoured, anatomic locking plates. Screw locations have been designed to maximize bone purchase for each respective fusion without violating joint lines.

- Plate thickness: 1.5mm
- Plates are either T10 or T8 plates. T10 plates accept 4.1mm CP screws. T8 plates accept 3.6mm CP screws.
- Screws and instruments are color coded for ease of identification
- Screw material: Ti6Al4V ELI
- Plate material: Titanium grade 2

Anchorage 2 CP foot plates are designed to have a low profile. Additionally the VariAx 2 screws have minimal screw head prominence and therefore may reduce the risk of soft tissue irritation. The Anchorage 2 CP screws have no screw head prominence when inserted through CP hole.
T8 cross plates

Only VariAx 2 screws (locking/non-locking, T8 2.7/2.4mm) must be used in circular holes, and only T8 3.6mm partially threaded CP screws must be used in the MTP and universal CP holes. VariAx 2 T8 drill bit and screwdriver blades are compatible with both VariAx 2 and Anchorage 2 CP screws. The Anchorage 2 CP specific drill guide (T8) is needed for the CP screw holes of the MTP and universal CP plates.

T10 cross plates

Only VariAx 2 screws (locking/non-locking, T10 3.5/2.7mm) must be used in circular holes, and only T10 4.1mm partially threaded CP screws must be used in the midfoot and lapidus CP holes. VariAx 2 T10 drill bit and screwdriver blades are compatible with both VariAx 2 and Anchorage 2 CP screws. The Anchorage 2 CP specific drill guide (T10) is needed for the CP screw holes of the midfoot and lapidus CP plates.

Cup & cone reamers

The Anchorage 2 CP System contains cannulated cup and cone reamers for accurate joint preparation designed to promote fusion of the first metatarsophalangeal (MTP) joint. Color coded to assist identifying proper sizes.
Anchorage 2 CP plate templates

The Anchorage 2 CP plate templates allow for proper plate placement on the bone and accurately targets the correct bone area to accommodate the cannulated CP reamer.

- VariAx 2 joystick snaps into the large hole.
- Template lays on the bone in the desired position.
- The raised edge on the template indicates the joint line.
- The laser-etched lines on the template show possible variable angles when using CP screws.

Cannulated CP reamer

The cannulated CP reamer is advanced over the 1.4mm x 100mm K-wire to the appropriate depth limit. This reamer is sharp with new aggressive cutting flutes. Please apply light pressure on the bone and always use caution when operating.
Introduction to cross plate (CP) technology

**CP screws**
The Anchorage 2 CP System uses an inset diagonal, partially threaded screw to develop mechanical compression across the fusion site. This approach minimizes the need for separate, independent stabilization and is designed to create compression. The Anchorage 2 CP screws are self-tapping and self-drilling and feature an advanced new conical pitch thread and cutting flute that catches the far cortex faster and allows for maximum compression across the joint, resulting in successful unions.

**Cross joint compression**
The Anchorage 2 CP system uses an inset diagonal, cross-joint screw to develop mechanical compression across the fusion site. This approach minimizes the need for separate, independent stabilization and is designed to create compression.

All Anchorage CP plates include:
- Oblique screw design, which offers an immediate stable construct
- Low profile design
- Cannulated instrumentation, which helps promote surgical efficiency

The CP plate concept was designed to allow maximum transmission of compression force across the joint, without the risk of the head of the screw fracturing the cortex and thus losing stability. By creating a recess for the counterbore in the plate, it allows positioning of a compression screw through the plate. By first fixing the plate to the bone, the force of compression is borne by the plate and screw as the compression screw is set. This allows maximum compression and plate fixation to be accomplished in one step. This combination affords the compression of lag screw fixation combined with the stability of plate fixation.

The Anchorage 2 CP plates feature the patented VariAx SmartLock technology. The T10 and T8 locking screw heads are designed with threads on the underside, which upon insertion, engage the circular “lip” within any hole on the plate. The locking mechanism allows free angulation in all directions through a 30° cone.

**Quick tip**
Do not apply VariAx 2 plate benders on Anchorage 2 CP plates. Bending of the plates will weaken the plate and compromise the CP technology.
Anchorage 2 CP system technology

CP screw angulation

**Anchorage 2 CP plates**

*Note:* CP screws are to be used within a CP plate hole ONLY and not as an independent lag screw.

- **Midfoot CP plate**
  - Variable angle: +/- 15° angle
  - Fixed angle: 35° angle

- **Lapidus CP plate**
  - Variable angle: 25° angle
  - Fixed angle: 35° angle

- **Universal CP plate**
  - Variable angle: +/- 15° angle
  - Fixed angle: 50° angle

- **MTP CP plate**
  - Variable angle: +/- 7.5° angle
  - Fixed angle: 35° angle
Option 1: flat cuts
Perform a dorsal approach to expose the metatarsal head and the base of the proximal phalanx. Remove the articular surface of metatarsal head perpendicularly to the shaft. Hold the phalanx in position (15° valgus; 10-15° dorsiflexion). Make a parallel cut on proximal phalanx and proceed to the medial eminence Removal. Place a guidewire into the middle of the base of the proximal phalanx and drive it out distal medial. Reduce the joint and then drive the pin back in a retrograde fashion into the metatarsal shaft for provisional fixation.

Option 2: cup and cone technique

Metatarsal preparation
Displace the phalanx plantarly or laterally, according to the approach chosen to expose the metatarsal head. Using a powered drill, place a 1.4mm × 100mm K-wire (45-80200) proximally through the center of the metatarsal head and into the diaphysis. The largest diameter concave reamer (22mm) (XFR004222) is inserted over the K-wire. Reaming is performed until bleeding subchondral bone becomes visible on the joint surface. To ensure proper sizing, begin by using the largest size concave reamer, and then downsizing to match the diameter of the metatarsal head.

Note: Check the progress of the reamer frequently to prevent excessive shortening of the metatarsal. Take note of the last reamer size used.

Once metatarsal reaming is complete, the K-wire can be used to elevate the metatarsal head to enable the removal of bone on the plantar aspect.

Phalangeal preparation
The proximal phalanx is plantarflexed using a Hohmann retractor (700664, 700665, 700667). A 1.4mm × 100mm K-wire is inserted into the center of the articular cartilage and directed through the diaphysis. Care should be taken not to penetrate the interphalangeal joint. Reaming is initiated using the smallest size convex reamer (14mm) (XFR004214) inserted over the K-wire. Progressively increase the diameter of reamer used until the proximal phalanx is prepared with the same diameter utilized to prepare the metatarsal.

If the metatarsal reaming stopped at 18mm, the last and largest reamer used on the phalanx will be 18mm (XFR004218).
MTP CP - operative technique

Incision/exposure
A dorsal longitudinal incision is commonly used for MTP joint exposure. A medial approach may also be considered according to surgeon experience and patient indication. The incision is deepened and the EHL tendon retracted laterally. The joint capsule is released medial to the EHB tendon and retractors are placed to expose the base of the proximal phalanx and metatarsal head. An exostosectomy can be performed if necessary. A simulation of correction (metatarsus varus and pronation) is performed.

Preparation of metatarsophalangeal joint
The first MTP joint is prepared using flat cuts technique or the provided cup and cone reamers within the Anchorage 2 CP set (Refer to page 15 for detailed MTP exposure). Once prepared, the cup and cone surfaces can be aligned into desired position and temporarily stabilized using either a 1.4 × 100mm guidewire or a 1.6 × 200mm fully threaded wire.

Stabilization
Proper positioning can be evaluated by placing a support against the plantar surface of the foot. Once the desired position has been achieved, drive a K-wire 1.6mm × 200mm from the mid portion of the base of the proximal phalanx distally out the medial side. Then reduce the joint and drive it back in a retrograde fashion into the metatarsal for provisional fixation.

MTP CP preparation
The MTP CP template is oriented either R (705178) or L (705177). Loosen and insert the VariAx joystick for T8 screw holes (703927) into the large hole of the MTP template. After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper template position is achieved when the raised edge on the MTP CP template is directly over the metatarsophalangeal joint line. A 1.4mm × 100mm K-wire (45-80200) is inserted through the canulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed.
MTP CP preparation (continued)

The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface. The plate is positioned and temporarily fixated on the distal aspect of plate with a 1.4mm × 100mm K-wire. Once fixated, the proximal holes are drilled with T8 drill bits and filled with appropriate T8 screws.

**Note:** All circular holes accommodate both locking and non-locking T8 VariAx 2 screws (2.7mm and 2.4mm) with the exception of the CP hole.

Proximal screw insertion

A 2.0mm drill bit (703896) for T8 VariAx 2 screws can be used in conjunction with the appropriate T8 drill guide to prepare the circular proximal holes for screw insertion. Insert distal screws on metatarsal after determining screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length T8 screw to be inserted.

CP screw

After proximal fixation is achieved, the T8 CP drill guide (705173) is positioned in the CP plate hole. A drill bit (703896) for T8 screws is used to drill to the plantar cortex of the proximal phalanx. Use the VariAx 2/CP depth gauge (705170) to measure the appropriate length T8 CP screw to be inserted. Once appropriate screw is measured, place through the CP hole. As CP screw seats in plate, all temporary fixation is removed. Final tightening of T8 CP screw develops compression across the joint with lag effect.

Distal screw insertion

Once compressed, the remaining distal screws can be inserted and verified with X-Ray.

**Note:** To avoid any risk of conflict with the cross joint screw, a maximum 12mm size screw is recommended. VariAx 2 screws can also be angulated to avoid the CP screw.

**Instruments**

- K-wire 45-80200
- CP reamer 705172
- Drill guide for T8 cross-plates 705173
- VariAx 2 joystick for T8 screw holes 703927
- Template for MTP cross-plate, left 705177
- Drill bit, AO, Dia 2.0mm × 135mm, scaled 703896
- Convex/concave surface reamers
Triple arthrodesis procedure

The triple arthrodesis is a surgical procedure that relieves pain in the rear part of the foot by fusing the three main joints of the hindfoot: the subtalar joint, talonavicular joint, and the calcaneocuboid joint. This procedure improves the stability of the foot and in some cases corrects the deformity of the foot. After the foot is properly aligned and the fusion of subtalar joint is performed, fixation of the talonavicular joint is next.

Incision/exposure

Incision for the talonavicular joint is made dorsomedially, beginning at the tip of the medial malleolus and in line with the medial border of the foot, extending 6-7cm toward the great toe longitudinally and ending between the anterior and posterior tibial tendons. Once exposed, all of the remaining cartilage from the joints is removed and prepared for fusion.

Preparation of talonavicular joint

The midfoot CP template comes in either short (705176) or long (705183) depending on the anatomy. The correct template size is chosen based on the length of the plate that spans the fusion site and leaves an adequate bony bridge between the plate screws. Loosen and insert the VariAx joystick for T10 screw holes (703928) into the appropriate midfoot CP template hole.
Midfoot CP preparation

After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper position is achieved when the raised edge on the midfoot CP template is directly over the talonavicular joint line. A 1.4mm × 100mm K-wire (45-80200) is inserted through the cannulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed. The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface.

Note: All circular holes accommodate both locking and non-locking T10 VariAx 2 screws (3.5mm and 2.7mm) with the exception of the CP hole.

Distal screw insertion

A 2.6mm drill bit (703691) for T10 VariAx 2 screws can be used in conjunction with the appropriate T10 drill guide to prepare the hole for screw insertion. Insert distal screws on navicular after determining the screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length T10 screw to be inserted.

CP screw

The T10 CP drill guide (705173) is positioned inside the CP hole. Use the 2.6mm drill bit to accommodate the 4.1mm CP screw. Once drilled, use the VariAx 2/CP depth gauge to measure the appropriate length for the T10 CP screw to be inserted. When the appropriate screw length is measured, place the 4.1mm CP screw through the CP hole. As the CP screw is seated in the plate, all the temporary fixation is removed. Final tightening of the T10 CP screw develops compression across the joint with lag effect. Insert remaining proximal screws on the talus side of the joint and position under fluoroscopy.
**Midfoot NC - operative technique**

**Incision/exposure**
The incision can be extended distally for access to the cuneiforms, first metatarsal base and naviculocuneiform and intertarsal joints. Remove cartilage in the naviculocuneiform joint. If there is significant damage to tissue in the joints between the navicular and cuneiform, the remaining cartilage is removed. If the foot is misaligned, the bones need to be positioned correctly using a K-wire.

**Midfoot CP preparation**
The midfoot CP template comes in either short (705176) or long (705183) depending on the anatomy. The correct template size is chosen based on the length of plate that spans the fusion site and leaves an adequate bony bridge between the plate screws. Loosen and insert the VariAx joystick for T10 screw holes (703928) into the appropriate midfoot CP template hole. After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper position is achieved when the raised edge on the midfoot CP template is directly over the naviculocuneiform joint line. A 1.4mm x 100mm K-wire (45-80200) is inserted through the cannulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed. The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface.

*Note:* All circular holes accommodate both locking and non-locking T10 VariAx 2 screws (3.5mm and 2.7mm) with the exception of the CP hole.

**Distal screw insertion**
A 2.6mm drill bit (703691) for T10 VariAx 2 screws can be used in conjunction with the appropriate T0 drill guide to prepare the hole for screw insertion. Insert distal screws on cuneiform after determining screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length T10 screw to be inserted.

**CP screw**
The T10 CP drill guide (705173) is positioned inside the CP hole. Use the 2.6mm drill bit to accommodate the 4.1mm CP screw. Once drilled, use the VariAx 2/CP depth gauge to measure the appropriate length for the T10 CP screw to be inserted. When the appropriate screw length is measured, place 4.1mm CP screw through the CP hole. As the CP screw sits in the plate, all temporary fixation is removed. Final tightening of T10 CP screw develops compression across the joint with lag effect. Insert remaining proximal screws on the navicular side of the joint and position under fluoroscopy.
Midfoot CC-operative technique

**Incision/exposure**
Expose the calcaneocuboid joint through a lateral (Ollier) incision. Distract the joint with a lamina spreader, and sharply debride the articular cartilage to expose the bleeding subchondral bone. Completely remove the cartilage from the calcaneocuboid joint.

**Midfoot CP preparation**
The midfoot CP template comes in either short (705176) or long (705183) depending on the anatomy. The correct template size is chosen based on the length of plate that spans the fusion site and leaves an adequate bony bridge between the plate screws. Loosen and insert the VariAx joystick for T10 screw holes (703928) into the appropriate midfoot CP template hole. After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper position is achieved when the raised edge on the midfoot CP template is directly over the calcaneocuboid joint line. A 1.4mm x 100mm K-wire (45-80200) is inserted through the cannulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed. The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface.

**Note:** All circular holes accommodate both locking and non-locking T10 VariAx 2 screws (3.5mm and 2.7mm) with the exception of the CP hole.

**Distal screw insertion**
A 2.6mm drill bit (703691) for T10 VariAx 2 screws can be used in conjunction with the appropriate T10 drill guide to prepare the hole for screw insertion. Insert distal screws on cuboid after determining screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length T10 screw to be inserted.

**CP screw**
The T10 CP drill guide (705173) is positioned inside the CP hole. Use the 2.6mm drill bit to accommodate the 4.1mm CP screw. Once drilled, use VariAx 2/CP depth gauge to measure the appropriate length for the T10 CP screw to be inserted. When appropriate screw length is measured, place the 4.1mm CP screw through the CP hole. As the CP screw sits in the plate, all temporary fixation is removed. Final tightening of the T10 CP screw develops compression across the joint with lag effect. Insert remaining proximal screws on calcaneus side of the joint and position under fluoroscopy.

**Quick tip**
*Dr. Keith Wapner*
Extend CP screw across the length of the joint so to reach the plantar side of the bones. CP orientation can be applied in either direction so that the CP screw can go from cuboid to calcaneus or from calcaneus to cuboid. In post traumatic cases, this will often be dictated by the shape of the bone.
Incision & preparation of tarsometatarsal joint

An incision is made over the dorsal medial aspect of the first tarsometatarsal joint. Dissection is carried down through the subcutaneous tissues with care to identify and protect the anterior tibial tendon as it passes along the medial side of the medial cuneiform to insert on the plantar base of the first metatarsal. A dorsal capsulotomy is performed and the joint surfaces are debrided back to bleeding bone. After the joint preparation, reduce the fragments and temporarily fixate using 1.6mm × 200mm K-wires.

Lapidus CP preparation

The lapidus CP template is oriented either R or L (705180, 705179). Loosen and insert the VariAx joystick for the T10 screw holes (703928) into the appropriate lapidus CP template hole. After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper position is achieved when the raised edge on the lapidus CP template is directly over the tarsometatarsal joint line. A 1.4mm × 100mm K-wire (45-80200) is inserted through the cannulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed. The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface.

Note: All circular holes accommodate both locking and non-locking T10 VariAx 2 screws (3.5mm and 2.7mm) with the exception of the CP hole.

Distal screw insertion

A 2.6mm drill bit (703691) for the T10 VariAx 2 screws can be used in conjunction with the appropriate T10 drill guide to prepare the hole for screw insertion. Insert distal screws into first metatarsal after determining screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length of T10 screw inserted.
**CP screw**

The T10 CP drill guide (705171) is positioned inside the CP hole.

**Note:** The Anchorage 2 CP lapidus CP plate can be angulated in one direction only.

Use the 2.6mm drill bit to accommodate the 4.1mm CP screw. Once drilled, use the VariAx 2/CP depth gauge to measure the appropriate length for the T10 CP screw to be inserted. When the appropriate screw length is measured, place the 4.1 CP screw through the CP hole. As the CP screw sits in the plate, all temporary fixation is removed. Final tightening of the T10 CP screw develops compression across the joint with lag effect. Insert remaining proximal screws and position under fluoroscopy.
Universal CP - operative technique

Universal CP preparation
Insert the VariAx joystick for the T8 screw holes (703927) into the universal CP template hole (705182). After inserting the joystick tip in the circular hole, turn the knob on the upper part of the joystick clockwise to fix it. Proper position is achieved when the raised edge on the universal CP template is directly over the joint line. A 1.4mm × 100mm K-wire (45-80200) is inserted through the cannulated VariAx joystick. Once the K-wire is positioned, the template and joystick are removed. The CP reamer (705172) is advanced over the same K-wire until the upper edge of the reamer is flush with the bone surface.

**Note:** All circular holes accommodate both locking and non-locking T8 VariAx 2 screws (2.7mm and 2.4mm) with the exception of the CP hole.

Distal screw insertion
A 2.0mm drill bit (703896) for the T8 VariAx 2 screws can be used in conjunction with the appropriate T8 drill guide (703684) to prepare the hole for screw insertion. Insert the distal screws into metatarsal after determining the screw length with the VariAx 2/CP depth gauge (705170) to measure the appropriate length of the T8 screw inserted.
**CP screw**

After the T8 distal screws are fixated, the T8 CP drill guide (705171) is positioned in the CP plate hole. A 2.0mm drill bit (703896) for the T8 screws is used to drill to the proximal cortex. Use the VariAx 2/CP depth gauge (705170) to measure the appropriate length T8 CP screw to be inserted. When appropriate screw length is measured, place the 3.6mm CP screw through the CP hole. As the CP screw sits in the plate, all temporary fixation is removed. Final tightening of the T8 CP screw develops compression across the joint with lag effect. Insert remaining proximal screws and position under fluoroscopy.

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**Proximal screw insertion**

Once compressed, the remaining proximal screws can be inserted into the cuneiform and verified with x-ray.
Foot & Ankle

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References

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