



OsteoMed® ExtremiLock™ Foot Plating System

Lisfranc Plating System

Surgical Technique



Acumed® is a global leader of innovative orthopaedic and medical solutions.



We are dedicated to developing products, service methods, and approaches that improve patient care.



OsteoMed® ExtremiLock™ Foot Plating System

Lisfranc Plating System

Designed in conjunction with Lawrence Fallat, DPM, J. Robert Faux, MD, and Nirmal Tejawani, MD, the Lisfranc plating system provides fixation for Lisfranc fractures-dislocations and fusions of the articulation between the first, second, and third metatarsal bones, and the cuneiform bones. This system offers the most complete selection of plates for a dorsal, dorsomedial and medial approach. The plate design allows for compression and stabilization of the TMT joint while allowing surgeons to visualize the affected area during the healing process.

The system offers a family of five plates that include 25 left and right specific plate options in several sizes to fit various patient anatomies. The plates are low profile and are anatomically contoured to fit the TMT joints. All plates offer universal plate holes accepting double lead 2.7 mm, 3.5 mm and/or 4.0 mm locking and nonlocking screws in any hole and up to 20° of variable angle locking in any direction (40° conical)

The system also provides a unique Lisfranc targeting guide that facilitates accurate Lisfranc screw fixation placement and trajectory for cases presenting with intermetatarsal instability. The guide is incredibly versatile, compatible with a wide range of screw sizes and types, making it the ideal instrument for any surgical situation.

The Lisfranc plating system is used with the ExtremiLock Foot Plating System screws and instrumentation. The instrumentation was designed to assist with soft tissue management, bone and plate manipulation as well as screw insertion.

Indications for Use:

Refer to the provided Instructions for Use for the complete Indications, Contraindications, Warnings, and Instructions for Use including cleaning and sterilization details.

	Definition
Warning	Indicates critical information about a potential serious outcome to the patient or the user.
Caution	Indicates instructions that must be followed in order to ensure the proper use of the device.
Note	Indicates information requiring special attention.



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Lisfranc Plating System Features

The Lisfranc plating system is used with the ExtremiLock Foot plating system screws and instrumentation. The instrumentation was designed to assist with soft tissue management, bone and plate manipulation as well as screw insertion. All threaded holes accept 2.7 mm, 3.5 mm and/or 4.0 mm locking and nonlocking screws for patient specific fixation.

Bridge Plating

Preserves joint surfaces



Multiple Fixation Points

Increased construct stability

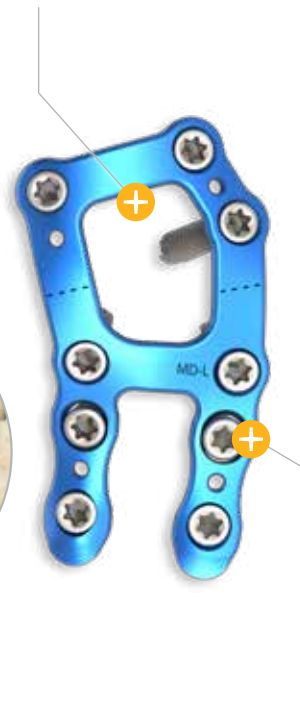


Offers a reduction of intraoperative bending



Visualization Window

Allows for visualization of the TMT joint during the healing process



Multiple Distal Fixation Points

Multiple points of fixation on the metatarsal provide larger load distribution, excellent screw purchase on diaphyseal bone and help minimize metatarsal stress fractures

Oblong Compression Slot

Distal compression hole options providing 1–2 mm of compression across the TMT joints



1st—2nd Dorsal Plates, Left & Right Specific

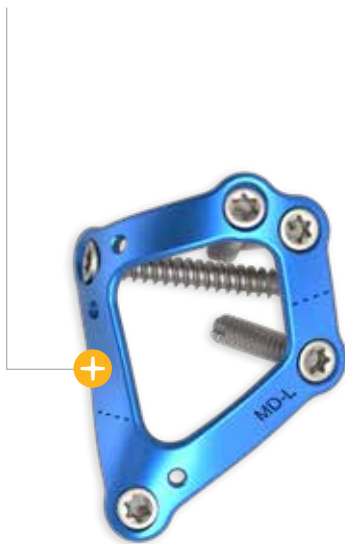


2nd—3rd Dorsal Plates, Left & Right Specific

Lisfranc Plating System Features [continued]

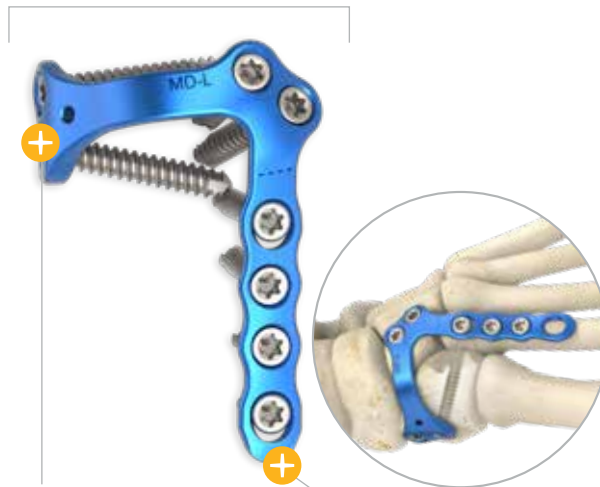
1st TMT Bridge

Allows room for interfragmentary screw placement and/or flexible fixation implant



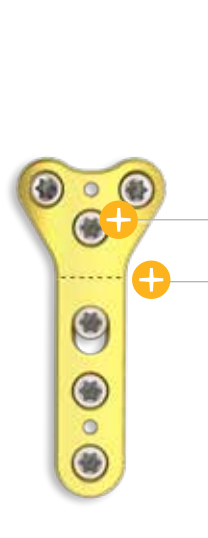
Dorsal Bridge

Provides stable fixation between the middle and medial column for isolated TMT joint injuries



Lisfranc Screw Fixation

Distal hole trajectory allows the use of interfragmentary screws and/or flexible fixation implant for intermetatarsal instability fixation



Medial Fixation
Distal hole trajectory allows the use of interfragmentary screws and/or flexible fixation implant for intermetatarsal instability fixation

Joint Alignment Laser Mark
Facilitates plate positioning

Low Profile

Tapered distal tip and anatomic low profile design eases percutaneous insertion and minimizes soft tissue irritation



Stabilization Plates, Left & Right Specific



Dorsomedial Plates, Left & Right Specific

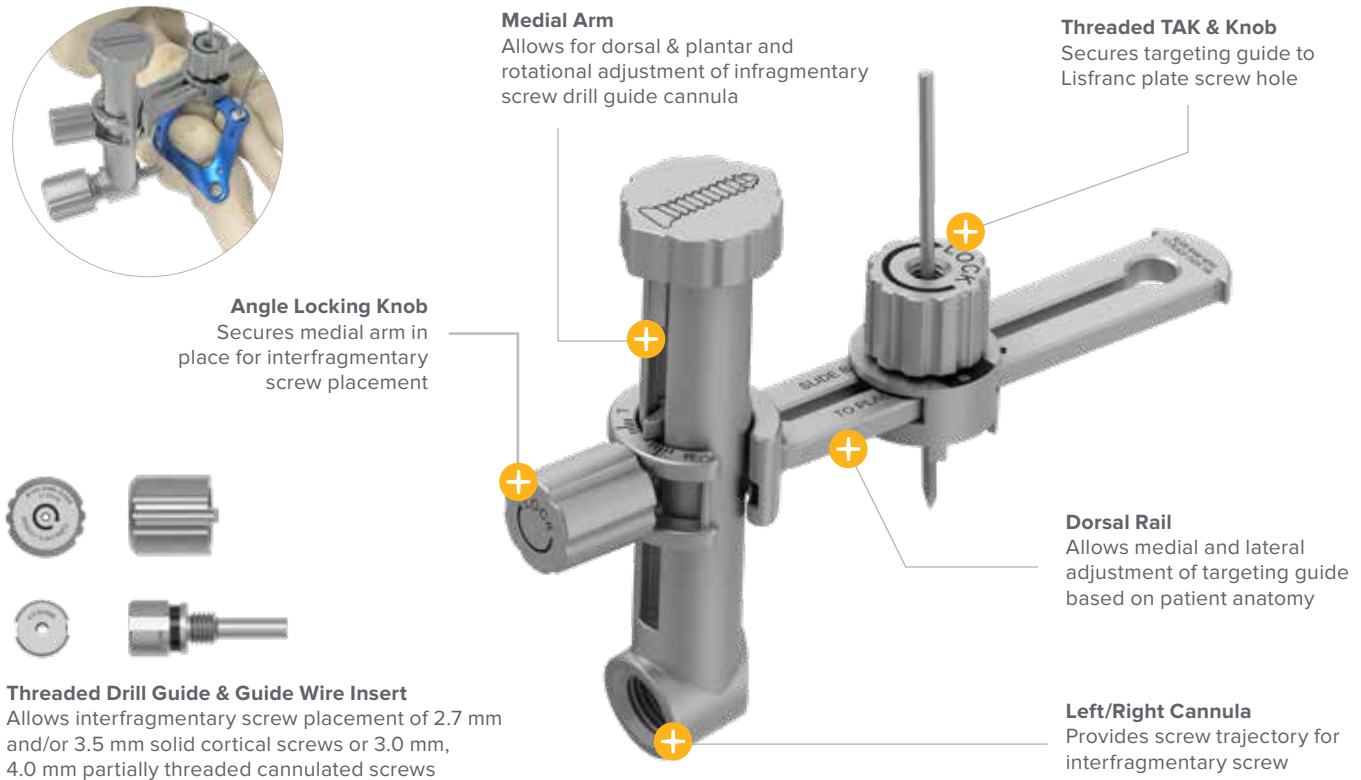


Universal Medial Plate

Lisfranc Plating System Features [continued]

Targeting Guide

The system provides a unique Lisfranc targeting guide that facilitates accurate Lisfranc screw fixation placement and trajectory for cases presenting with intermetatarsal instability. The guide is incredibly versatile, compatible with a wide range of screw sizes and types, making it the ideal instrument for any surgical situation.

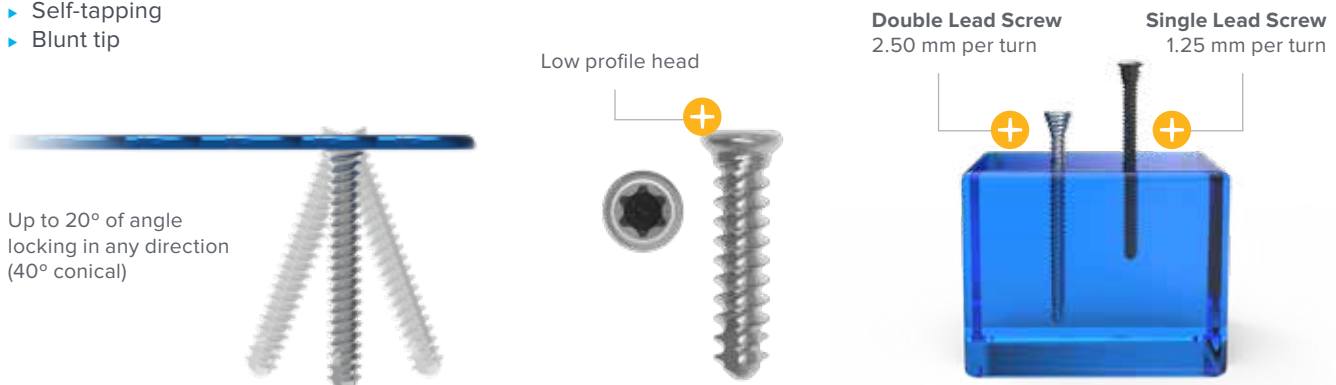


Screw Features

Variable Angle Locking & Nonlocking Screw

The ExtremiLock Foot Plating System features double lead screw technology and provides surgeons with a broad range of screw fixation options. All screws are made from titanium alloy and include 2.7 mm, 3.5 mm and 4.0 mm cortical locking and nonlocking screws.

- ▶ T15 Hexalobe drive
- ▶ Double lead threads
- ▶ Self-tapping
- ▶ Blunt tip



ExtremiLock Foot Plating System Features

The ExtremiLock Foot Plating System tray features a modular design. Offering eight plate modules, three screw caddies and general instrumentation. The Lisfranc plating modules are housed within the ExtremiLock Foot Plating System tray. One module contains the 1st-2nd, 2nd-3rd ray plates and dorsomedial plates. The second module contains the stabilization plates, medial plates, *2.7 mm locking and nonlocking screws, *3.5 mm nonlocking screws (32 mm—60 mm) and targeting guide. Instrumentation and the 3.5 mm and 4.0 mm screws required to implant the Lisfranc plates are housed within the ExtremiLock Foot Plating System tray.



*The 2.7 mm Screws and 3.5 mm screws (32 mm—60 mm) used with the Lisfranc plating system are included in the in the Lisfranc Screw Module. The 2.7 mm screws within the ExtremiLock Foot Plating System have a smaller head diameter and will not work with the Lisfranc Plate system.

Additional Acumed Solutions



go.acumed.net/Elock-FPS

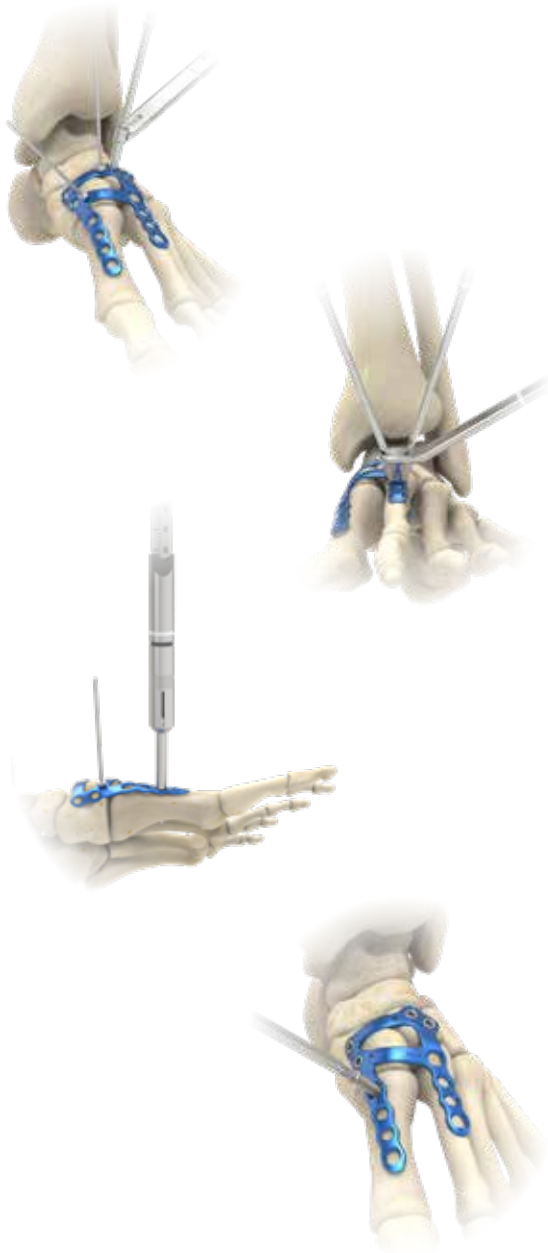
OsteoMed ExtremiLock Foot Plating System



go.acumed.net/Cann-Mini-Small

OsteoMed ExtremiFix Cannulated Screw System-Mini & Small

Screw Fixation Instructions



The Lisfranc plates can be used with either 2.7 mm Double Lead, 3.5 mm Double Lead and/ or 4.0 mm Double Lead locking and nonlocking screws. Select the appropriate size angled Locking Drill Guide or Pilot Drill Guide. Place the drill guide into the the locking screw hole ensuring the guide is firmly against the plate hole. Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Note: The angled locking drill guide will ensure the drill remains within 40° angled locking screw range (+/- 20 from center).

Note: Locking drill guides are available when on-axis drilling is preferred. When using locking drill guides ensure insertion and placement is concentric to the screw hole.

Use Depth Gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Note: Nonlocking screws can be placed prior to insertion of locking screws to bring the plate close to the bone surface.

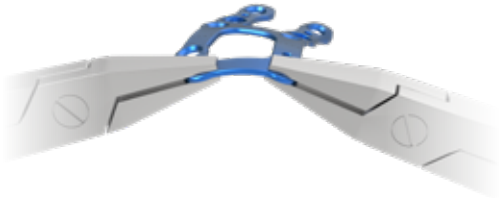
Caution: During screw insertion, the surgeon should avoid using excessive force which may result in stripping/ damaging screws or driver tip.

Caution: The 2.7 mm and 3.5 mm screws (32 mm—60 mm) used with the system are included in the Lisfranc Screw Module. The 2.7 mm screws within the ExtremiLock Foot Plating System have a smaller head diameter and will not work with the Lisfranc Plate system.

Optional: Implant Removal Technique

The ExtremiLock Lisfranc implants are designed to be removed when necessary. To extract the Lisfranc Plates and screws, use a T15 Hexalobe driver stem and ratcheting handle. Engage driver tip within the Hexalobe recess screw head and turn counterclockwise. It may be necessary to clean out screw head prior to removal. Use a surgical pick when required prior to inserting the driver stem.

Plate Bending Instructions

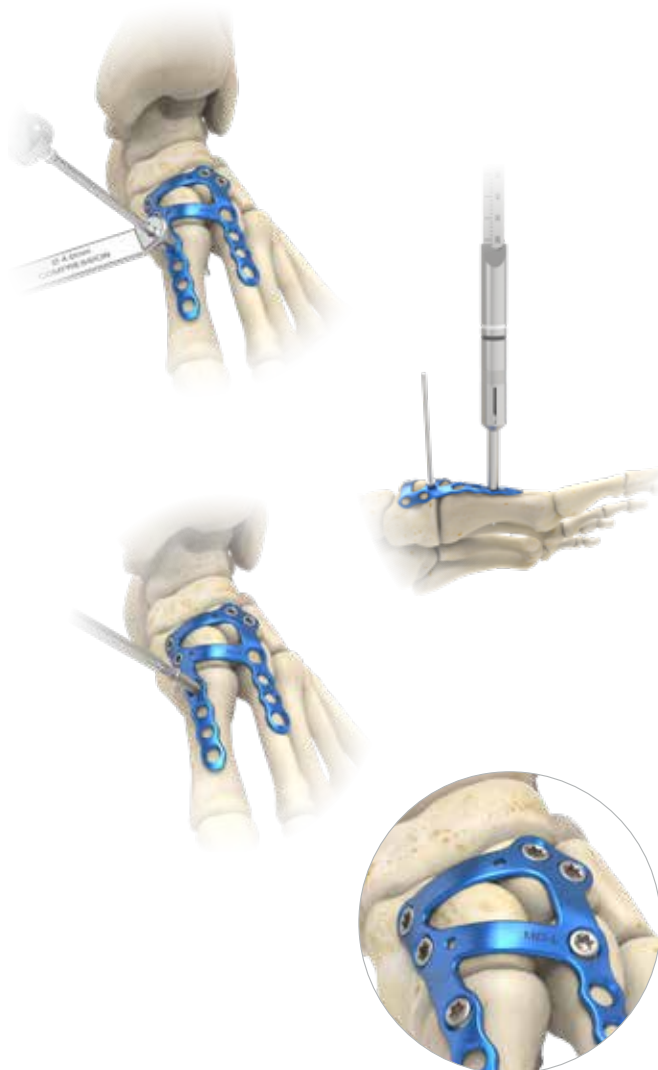


The Lisfranc Plates are anatomically contoured but may require additional bending and cutting depending on the patient anatomy. Plates should only be bent away from the locking holes and only in one direction. Reverse or over bending may weaken or cause the plate to break.

Caution: Avoid bending across locking and compression holes.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

Compression Hole Fixation-Eccentric Drilling Instructions



The Lisfranc plate compression holes can be used if compression is desired following proximal screw fixation. The compression holes accept 2.7 mm Double Lead, 3.5 mm Double Lead and/ or 4.0 mm Double Lead nonlocking screws.

Select the appropriate size compression drill guide and place into the compression screw hole. The arrow will be pointing towards the fusion site to drill eccentrically.

Drill with the appropriate diameter drill bit to desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the screw length.

Remove plate TAK before placing the nonlocking compression screw.

Insert measured length nonlocking variable angle screw. Confirm screw positioning and length prior to final tightening.

Caution: Nonlocking screw must be inserted before any locking screws in the metatarsal to obtain compression.

Caution: During screw insertion, the surgeon should avoid using excessive force which may result in stripping/damaging screws or driver tip.

1st-2nd Dorsal Plate Technique

Figure 1



1 Patient Positioning and Exposure

Position the patient supine and make a longitudinal dorsal surgical incision over the 2nd metatarso-cuneiform joint to expose the Lisfranc fracture/dislocation. Carry the incision down through the subcutaneous tissues, being mindful to identify, protect and retract the neurovascular bundle.

2 Optional Joint Preparation

Prepare all joints for fusion. Preparation can be performed with osteotomes, bone curettes, sagittal saw, rougeurs and a rotary burr if necessary.

Joint preparation is finalized with a wire, 2.0 mm drill bit or osteotomes to “fish scale” the fusion site to promote bone healing.

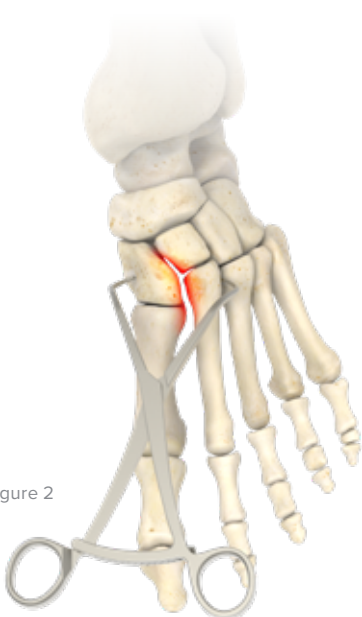
Note: To limit shortening and elevation of the metatarsals place autograft or allograft within the arthrodesis site.

3 Fracture Reduction and Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.

Figure 2



1st-2nd Dorsal Plate Technique [continued]

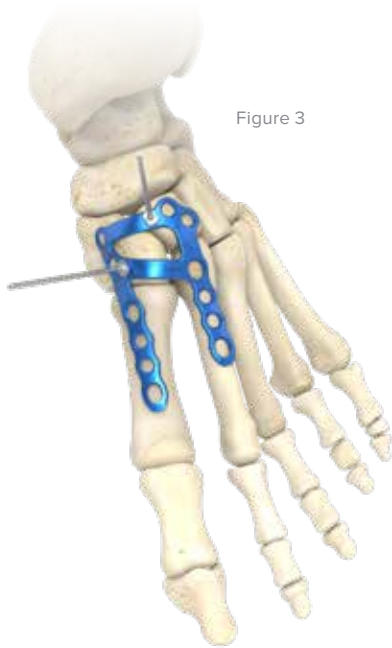


Figure 3

4 Plate Selection & Positioning

Acumed provides a wide range of Lisfranc plate options for fixation of fractures-dislocations and fusions of the tarsalmetatarsal joints. Select the appropriate left or right plate size based on indication and patient anatomy. Place selected 1st/2nd Dorsal plate dorsally over the TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning. Temporarily fix plate to the bone by using plate TAKs.

Caution: Plate TAKs should only be used in plate TAK holes and/or locking holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

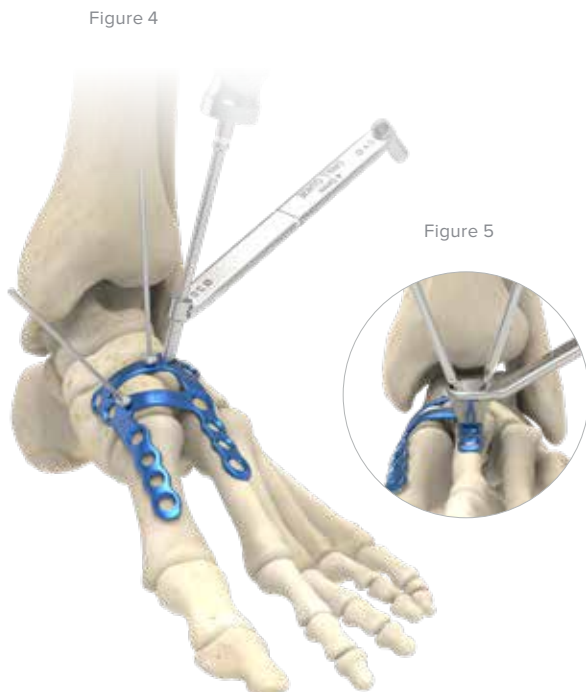


Figure 4

Figure 5

5 Proximal Screw Fixation: Intermediate Cuneiform Screw

Select the appropriate size angled Locking Drill Guide, Pilot Drill Guide or locking guide. Place the drill guide into the most proximal intermediate cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use Depth Gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining proximal intermediate cuneiform screw following the above technique.

1st-2nd Dorsal Plate Technique [continued]

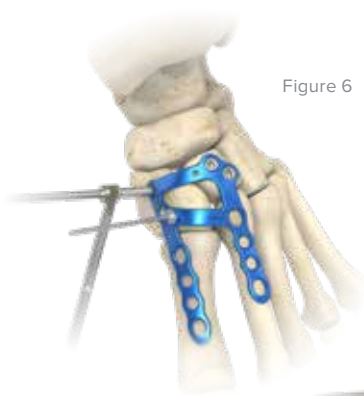


Figure 6

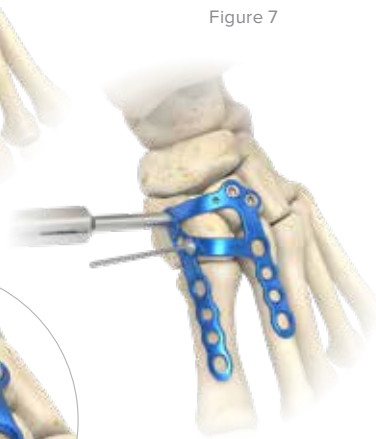


Figure 7



Figure 8

6 Proximal Screw Fixation: Medial Cuneiform Screw

Select the appropriate size angled locking drill guide or pilot drill guide. Place the drill guide into the most proximal medial cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining medial cuneiform screw following the above technique.

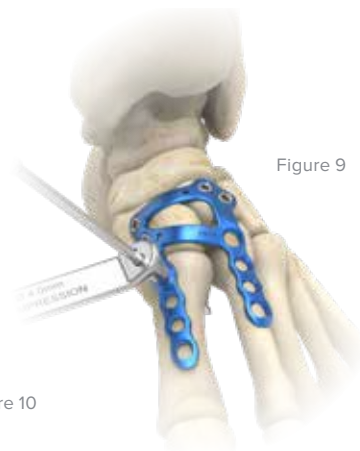


Figure 9

7 Screw Compression: Metatarsal Fixation-Eccentric Drilling Technique

The Compression holes can be used if compression is desired following the proximal screw fixation.

Select the appropriate size compression drill guide and place into the 1st or 2nd metatarsal compression screw hole. The arrow will be pointing towards the fusion site to drill eccentrically.

Drill with the appropriate diameter drill bit to desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the screw length.

Remove plate TAK before placing the nonlocking compression screw.

Insert measured length nonlocking variable angle screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining compression screw following the above technique.

Note: The 1st-2nd Dorsal plate offers four compression hole options. A selection of two out of the four available holes should be used, taking into consideration the patient's anatomy.



Figure 10



Figure 11

1st-2nd Dorsal Plate Technique [continued]

Figure 12



8 Distal Screw Fixation: Metatarsal Fixation

Select the appropriate size angled locking drill guide or pilot drill guide. Place the drill guide into the 1st or 2nd metatarsal locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining metatarsal screws following the above technique.

Closing and postoperative protocol are at the discretion of the surgeon.

Figure 13



Figure 14

2nd-3rd Dorsal Plate Technique

Figure 1



1 Patient Positioning & Exposure

Position the patient supine and make a longitudinal surgical incision over the 3rd metatarso-cuneiform joint to expose the Lisfranc fracture/dislocation. Carry the incision down through the subcutaneous tissues, being mindful to identify, protect and retract the neurovascular bundle.

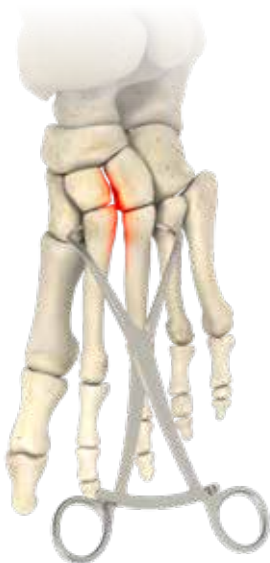
2 Optional Joint Preparation

Prepare all joints for fusion. Preparation can be performed with osteotomes, bone curettes, sagittal saw, rougeurs and a rotary burr if necessary.

Joint preparation is finalized with a wire, 2.0 mm drill bit or osteotomes to “fish scale” the fusion site to promote bone healing.

Note: To limit shortening and elevation of the metatarsals place autograft or allograft within the arthrodesis site.

Figure 2



3 Fracture Reduction and Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.

2nd-3rd Dorsal Plate Technique [continued]

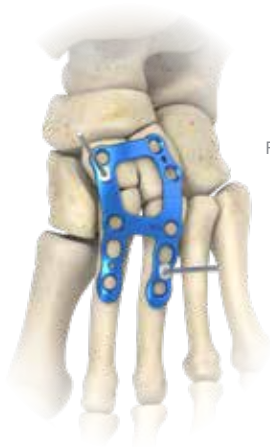


Figure 3

4 Plate Selection & Positioning

Acumed provides a wide range of Lisfranc plate options for fixation of fractures-dislocations and fusions of the tarsometatarsal joints. Select the appropriate left or right plate size based on indication and patient anatomy.

Place selected 2nd/3rd dorsal plate dorsally over the TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning. Laser marks should be located over the joint line to ensure screws are sufficiently clear of the joint prior to screw insertion.

Temporarily fix to the bone by using plate TAKs.

Caution: Plate TAKs should only be used in the locking and TAK holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.



Figure 4

5 Proximal Screw Fixation: Lateral Cuneiform Screw

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the most proximal lateral cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth.

Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining proximal intermediate cuneiform screw following the above technique.

Figure 5



2nd-3rd Dorsal Plate Technique [continued]



Figure 6

6 Screw Compression: Metatarsal Fixation

The Compression holes can be used if compression is desired following the proximal screw fixation.

Select the appropriate size compression drill guide and place into the 2nd or 3rd metatarsal compression screw hole. The arrow will be pointing towards the fusion site to drill eccentrically.

Drill to desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the screw length.

Remove plate TAK before placing the nonlocking compression screw.

Insert measured screw length nonlocking variable angle locking screw. Confirm screw positioning and length prior to final tightening.

Note: Compression screw must be inserted before any locking screws in the 2nd or 3rd metatarsal.

Drill and insert remaining compression screw following the above technique.

Figure 7



Figure 8

7 Distal Screw Fixation: Metatarsal Fixation

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the 2nd or 3rd metatarsal locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining metatarsal screws following the above technique.

Closing and postoperative protocol are at the discretion of the surgeon.

Figure 9



Figure 10

Dorsomedial Plate Technique

Figure 1



1 Patient Positioning and Exposure

Position the patient supine and make a longitudinal surgical incision over the 2nd metatarsocuneiform joint and medial incision over the 1st metatarsocuneiform joint to expose the Lisfranc fracture/dislocation. Carry the incision down through the subcutaneous tissues, being mindful to identify, protect and retract the neurovascular bundle.

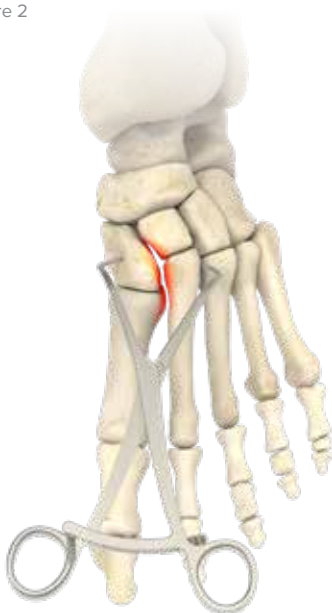
2 Optional Joint Preparation

Prepare all joints for fusion. Preparation can be performed with osteotomes, bone curettes, sagittal saw, rougeurs and a rotary burr if necessary.

Joint preparation is finalized with a wire, 2.0 mm drill bit or osteotomes to “fish scale” the fusion site to promote bone healing.

Note: To limit shortening and elevation of the metatarsals place autograft or allograft within the arthrodesis site.

Figure 2



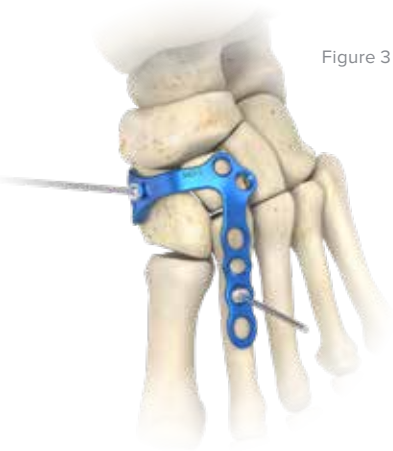
3 Fracture Reduction and Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.

Dorsomedial Plate Technique [continued]

Figure 3



4 Plate Selection & Positioning

Acumed provides a wide range of Lisfranc plate options for fixation of fractures-dislocations and fusions of the tarsalmetatarsal joints. Select the appropriate left or right plate size based on indication and patient anatomy.

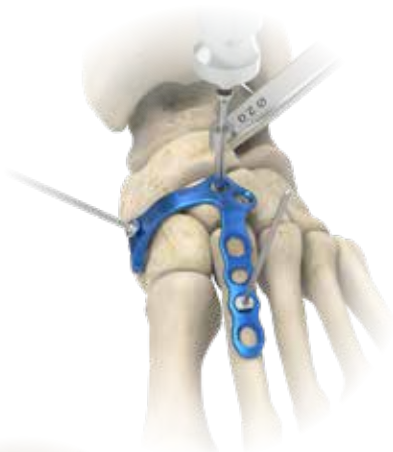
Place selected Dorsomedial plate dorsally over the TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning.

Temporarily fix to the bone by using plate TAKs.

Caution: Plate TAKs should only be used in the locking and TAK holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

Figure 4



5 Proximal Screw Fixation: Intermediate Cuneiform Screw

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the most proximal intermediate cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

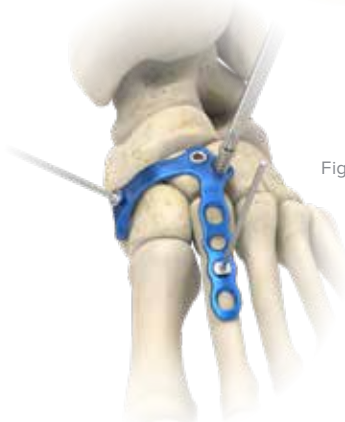
Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining intermediate cuneiform screw following the above technique.

Figure 5



Dorsomedial Plate Technique [continued]

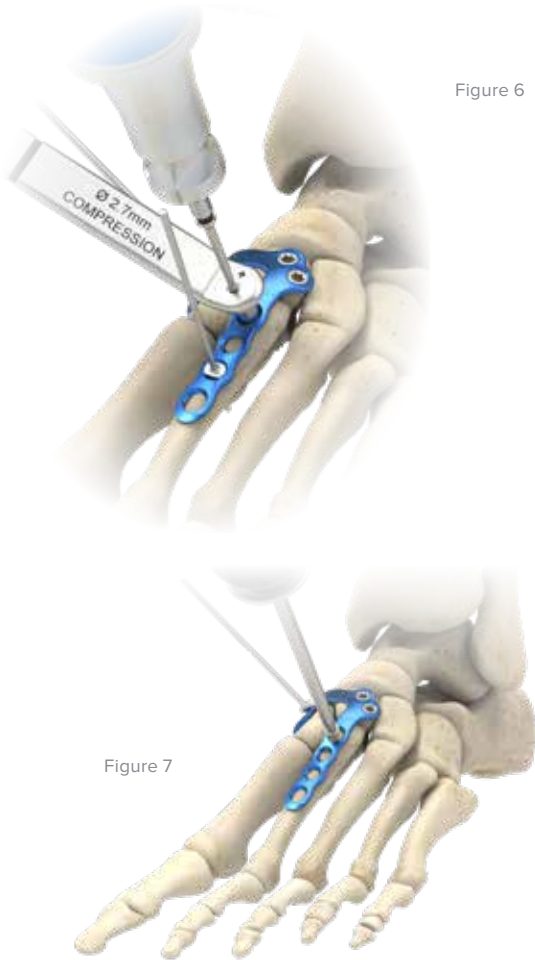


Figure 6

Figure 7

6 Screw Compression: Metatarsal Fixation

The Compression holes can be used if compression is desired following the proximal screw fixation.

Select the appropriate size compression drill guide and place into the 2nd metatarsal compression screw hole. The arrow will be pointing towards the fusion site to drill eccentrically.

Drill with the appropriate diameter drill bit to desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the screw length.

Remove plate TAK before placing the nonlocking compression screw.

Insert measured screw length nonlocking variable angle locking screw. Confirm screw positioning and length prior to final tightening.

Note: The dorsomedial plate offers two compression hole options. Only one should be used, taking into consideration the patient's anatomy.

Figure 8



Opt 1

Figure 9



Opt 2

Dorsomedial Plate Technique [continued]



Figure 10

7 Distal Screw Fixation: Metatarsal Fixation

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the 2nd metatarsal locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining metatarsal screws following the above technique.



Figure 11

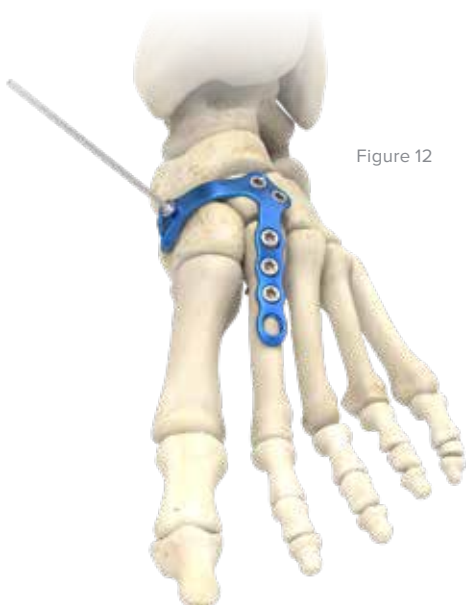


Figure 12

Dorsomedial Plate Technique [continued]



Figure 13

8 Proximal Screw Fixation: Medial Cuneiform Screw

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the most proximal medial cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

The most distal medial cuneiform screw hole can be used to stabilize the medial and middle column.

Drill with the appropriate diameter drill bit to the base of the 2nd metatarsal. Verify drill bit depth under radiographic imaging

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Closing and postoperative protocol are at the discretion of the surgeon.

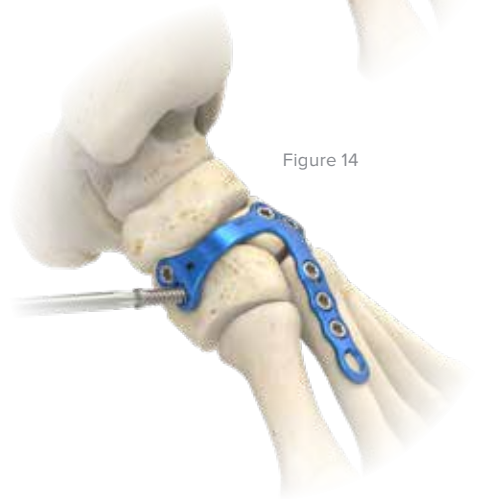


Figure 14

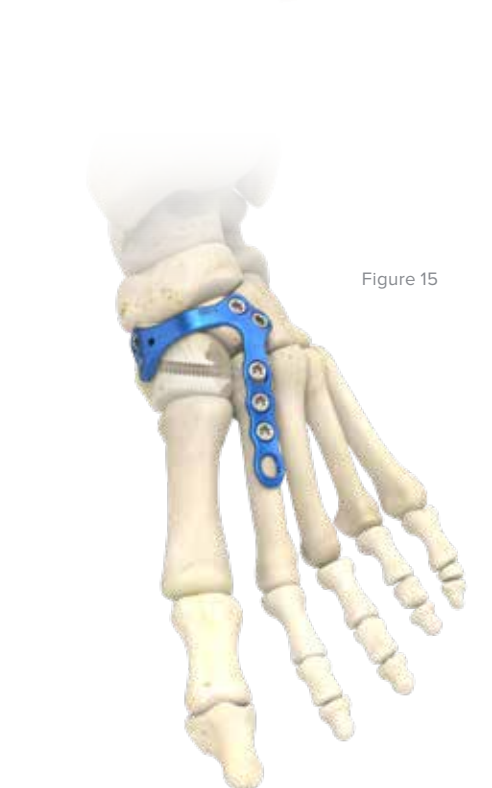


Figure 15

Stabilization Plate Technique



Figure 1

1 Patient Positioning & Exposure

Position the patient supine and make a longitudinal surgical incision over the 2nd metatarso-cuneiform joint to expose the Lisfranc fracture/dislocation. Carry the incision down through the subcutaneous tissues, being mindful to identify, protect and retract the neurovascular bundle.

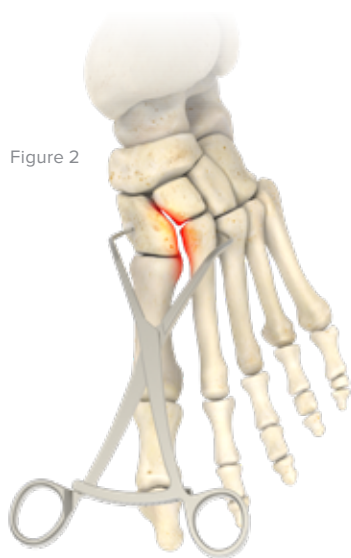


Figure 2

2 Fracture Reduction & Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.



Figure 3

3 Plate Positioning

Acumed provides a wide range of Lisfranc plate options for fixation of fractures/dislocations and fusions of the tarsometatarsal joints. Select the appropriate left or right plate size based on indication and patient anatomy.

Place selected Stabilization plate dorsally over the TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning. Laser marks should be located over the joint line to ensure screws are sufficiently clear of the joint prior to screw insertion.

Temporarily fix to the bone by using plate TAKs.

Caution: Plate TAKs should only be used in the locking and TAK holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

Stabilization Plate Technique [continued]

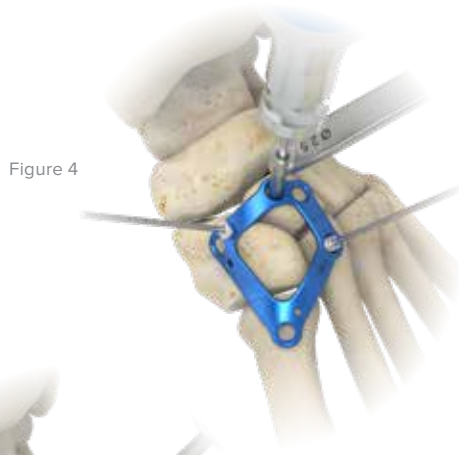


Figure 4



Figure 5



Figure 6

4A Proximal Screw Fixation: Intermediate Cuneiform Screw

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the most proximal intermediate cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining intermediate cuneiform screw following the above technique.

4B Proximal Screw Fixation: Medial Cuneiform Screw

Select the appropriate size angled locking drill guide or pilot drill guide. Place the drill guide into the medial cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Stabilization Plate Technique [continued]

5 Distal Screw Fixation: Metatarsal Fixation

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the 1st or 2nd metatarsal locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining metatarsal screws following the above technique.

Closing and postoperative protocol are at the discretion of the surgeon.



Figure 7



Figure 8



Figure 9

Stabilization Plate with Target Guide Technique

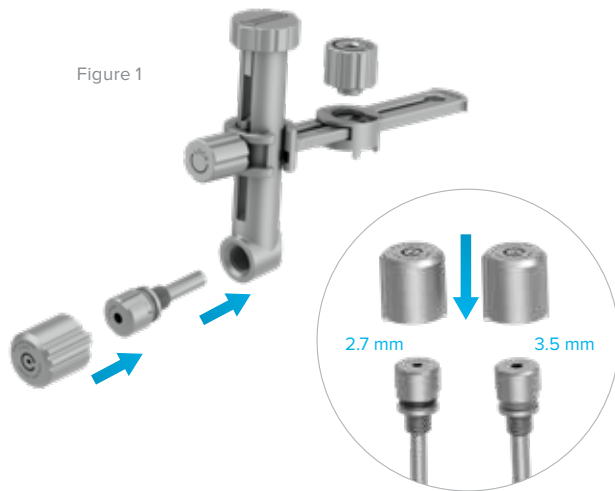


Figure 1

Figure 2

1 Targeting Guide Assembly

The targeting guide can be used with 2.7 mm, 3.5 mm solid cortical screws and/or 3.0 mm/4.0 mm partially threaded cannulated screws.

Select the appropriate threaded drill guide insert and thread into the cannula.

Select the guide wire cover and place over the threaded drill guide insert. Rotate guide wire cover clockwise to lock in place.



Figure 3

2 Patient Positioning & Exposure

Position the patient supine and make a longitudinal surgical incision over the 2nd metatarso-cuneiform joint to expose the Lisfranc fracture/dislocation. Carry the incision down through the subcutaneous tissues, being mindful to identify, protect and retract the neurovascular bundle.

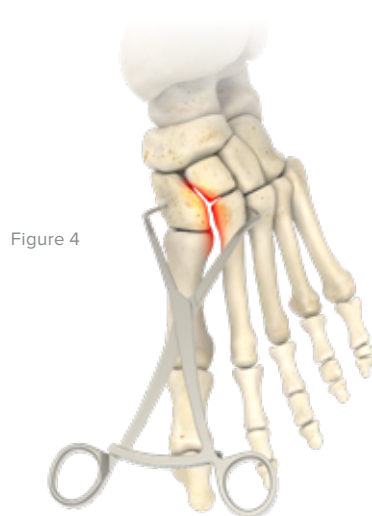


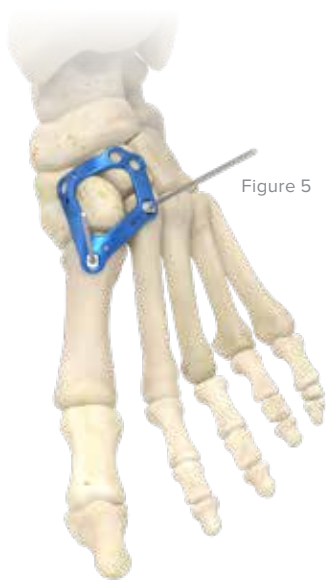
Figure 4

3 Fracture Reduction & Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.

Stabilization Plate with Target Guide Technique [continued]



4 Plate Positioning

Acumed provides a wide range of Lisfranc plate options for fixation of fractures-dislocations and fusions of the tarsalmetatarsal joints. Select the appropriate left or right plate size based on indication and patient anatomy.

Place selected Stabilization plate dorsally over the TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning. Laser marks should be located over the joint line to ensure screws are sufficiently clear of the joint prior to screw insertion.

Temporarily fix to the bone by using plate TAKs on the two most distal screw holes to avoid interference with the Lisfranc targeting guide

Caution: Plate TAKs should only be used in plate TAK holes and/or locking holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

Figure 6



5 Targeting Guide Fixation

Insert targeting guide locking TAK into the distal intermediate cuneiform screw hole until the distal threads and laser mark fully inserted.

Slide targeting guide locking base over the locking TAK. The locking base is designed to fit over the intermediate cuneiform screw holes and TMT arm.

Note: Locking base laser marking indicates both left and right plate orientation.

Caution: The locking base is designed to fit only over the stabilization and 2nd and 3rd dorsal plates. The following Technique demonstrates the use of the targeting guide with the stabilization plate.



Figure 7



Figure 8

Stabilization Plate with Target Guide Technique [continued]



Figure 9



Figure 10

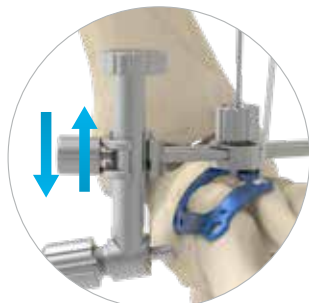


Figure 11

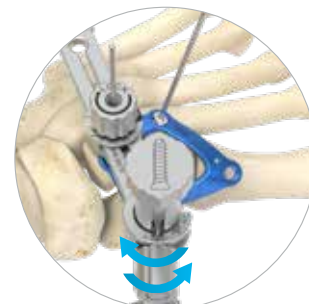


Figure 12



Figure 13

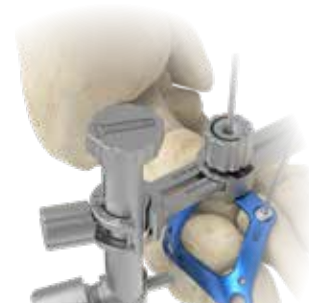


Figure 14

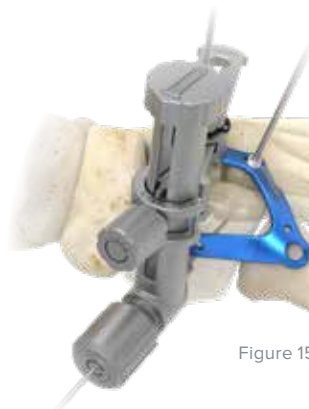


Figure 15

6 Targeting Guide Positioning

Adjust the medial or lateral translation until the cannula tip is positioned directly against the medial cuneiform bone.

Place the locking base knob over the locking TAK and rotate clockwise until the locking base is fully secured to the plate.

Caution: Excessive torque may compromise the strength and fixation of locking TAK. Locking base knob should be secured using two finger tightness.

Adjust the medial arm by sliding the arm dorsally or plantarly to desired screw height trajectory.

Adjust the screw angle by rotating medial arm. Screw image on top of handle shows the angle of trajectory with rotation.

Note: Medial arm can be rotated 40° in either direction. Cannula is fixed at a 15° upward angle. The angle location for the average anatomy is marked with a long line for easy placement for both left and right plates. 2° increments marks are placed off these markers for smaller or larger anatomy adjustments.

Turn medial arm knob clockwise to fix desired screw trajectory and angle.

Insert a .045" guide wire into the guide wire cover hole.

Confirm position of the guide wire and angle using fluoroscopy.

Make a stab incision medially in the location of the guide wire to allow Lisfranc screw insertion

Stabilization Plate with Target Guide Technique [continued]

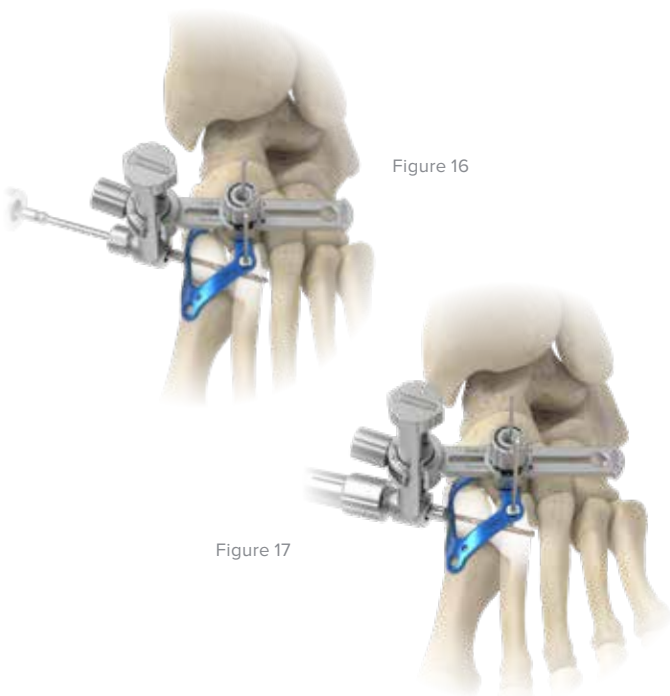


Figure 16

Figure 17

7A Screw Fixation: 2.7 & 3.5 mm Solid Cortical Screw

Remove guide wire cover and .045" guide wire.

Select the appropriate size pilot drill and drill to the desired depth. Verify drill bit depth under radiographic imaging.

Remove threaded drill guide.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle nonlocking screw. Confirm screw position and length prior to final tightening.

Please refer to stabilization plate or the 2nd-3rd dorsal plate surgical technique guide for plate fixation.

7B Screw Fixation: 3.0 & 4.0 mm Cannulated Screw

Remove guide wire cover hole and threaded drill guide insert.

Slide depth gauge over the guide wire until the depth gauge tip is positioned directly against the bone. The proximal end of the guide wire will indicate the screw length required.

Place drill over the guide wire and drill to desired depth. Drilling should not go beyond the tip of the guide wire.

Pre-drilling (Optional): The ExtremiFix Cannulated Screws are self-drilling and self-tapping. In dense cortical bone, pre-drilling is recommended. Place the drill bit over the guide wire and drill to desired depth. Drilling should not go beyond the tip of the guide wire.

Countersink (Optional): Countersink and Proximal Cortex (optional) Countersinks and proximal cortex are available for headed and headless screws. Countersinking should be performed manually. Place the cannulated countersink or proximal cortex over the guide wire to create a recess on the proximal cortex.

Caution: Overall screw length is measured from the top of the screw head to the tip of the screw. The head height should be considered when countersinking.

Select the appropriate screw length and insert screw over the guide wire, advance screw head until fully seated into the bone for compression.

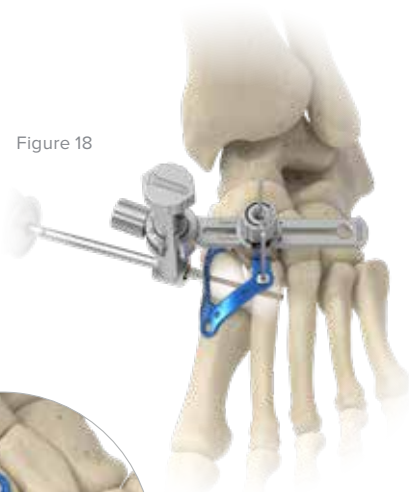


Figure 18



Figure 19

Medial Plate Technique



Figure 1

1 Patient Positioning & Exposure

Position the patient supine and make a longitudinal surgical incision medially over the 1st metatarsal-cuneiform joint to expose the Lisfranc fracture/dislocation. After attaining appropriate exposure, care should be taken with vital soft tissue structures.

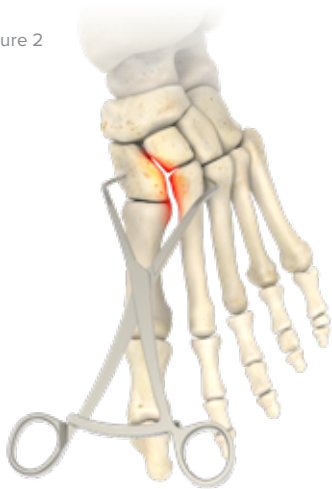
2 Optional Joint Preparation

Prepare all joints for fusion. Preparation can be performed with osteotomes, bone curettes, sagittal saw, rongeurs and a rotary burr if necessary.

Joint preparation is finalized with a wire, 2.0 mm drill bit or osteotomes to “fish scale” the fusion site to promote bone healing.

Note: To limit shortening and elevation of the metatarsals place autograft or allograft within the arthrodesis site.

Figure 2



3 Fracture Reduction & Alignment

Reduce fracture/dislocation using a bone reduction clamp. Provisional stability/fixation can be achieved utilizing guide wires.

Confirm alignment using fluoroscopy.

4 Plate Selection & Positioning

Select the medial Lisfranc plate and place dorsomedially over the 1st TMT joint. Use joint alignment laser marks on the plate to facilitate plate positioning. Laser marks should be located over the joint line to ensure screws are sufficiently clear of the joint prior to screw insertion.

Temporarily fix to the bone by using plate TAKs.

Caution: Plate TAKs should only be used in the locking and TAK holes. Avoid placing in compression holes. Excessive force may compromise the strength and fixation of plate TAKs.

Evaluation under fluoroscopy can be used to confirm satisfactory placement of the plate.

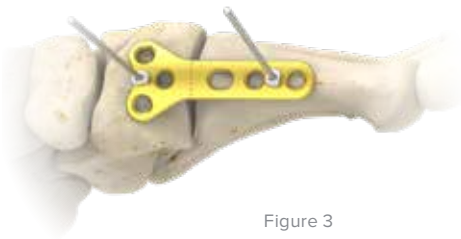


Figure 3

Medial Plate Technique [continued]



Figure 4

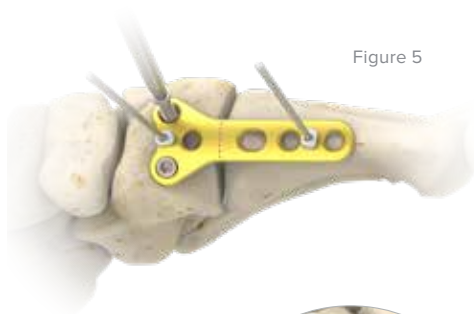


Figure 5



Figure 6



Figure 7

5A Proximal Screw Fixation: Medial Cuneiform Screw

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the plantar medial cuneiform locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert the dorsal medial cuneiform screw following the above technique.

5B Proximal Screw Fixation: Medial/Middle Column Screw Fixation

The most distal medial cuneiform screw hole can be used to stabilize the medial and middle column.

Drill with the appropriate diameter drill bit to the base of the 2nd metatarsal

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

6 Screw Compression: Metatarsal Fixation

The Compression hole can be used if compression is desired following the proximal screw fixation.

Select the appropriate size compression drill guide and place into the 1st metatarsal compression screw hole. The arrow will be pointing towards the fusion site to drill eccentrically.

Drill to desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the screw length.

Medial Plate Technique [continued]



Figure 8



Figure 9

Remove plate TAK before placing the nonlocking compression screw.

Insert measured screw length nonlocking variable angle locking screw. Confirm screw positioning and length prior to final tightening.

Caution: It is important to ensure proper plate bending and adequate fracture reduction to prevent any gap formation between the 1st and 2nd metatarsal during compression (Figure 11).



Figure 10

7 Distal Screw Fixation: Metatarsal Fixation

Select the appropriate size angled locking drill guide, pilot drill guide or locking guide. Place the drill guide into the distal 1st metatarsal locking screw hole ensuring the guide is firmly against the plate hole.

Drill with the appropriate diameter drill bit to the desired depth. Verify drill bit depth under radiographic imaging.

Use depth gauge to measure the correct screw length.

Insert the measured screw length variable angle locking or nonlocking screw. Confirm screw positioning and length prior to final tightening.

Drill and insert remaining metatarsal screws following the above technique.

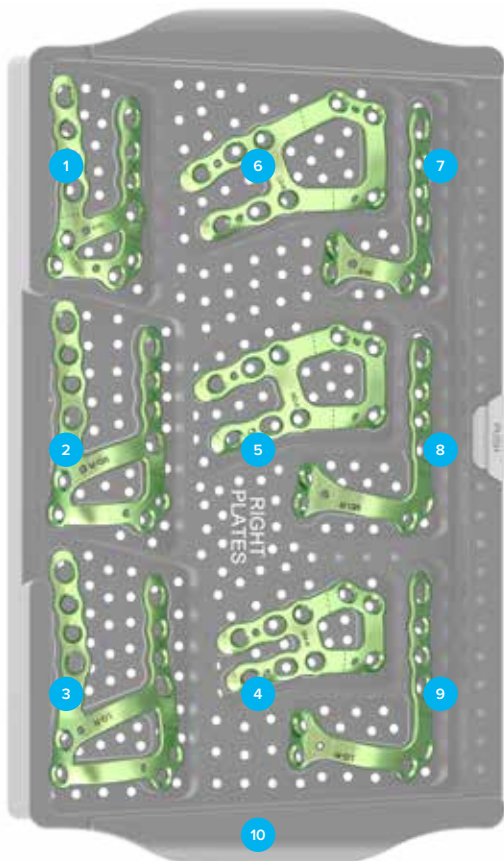
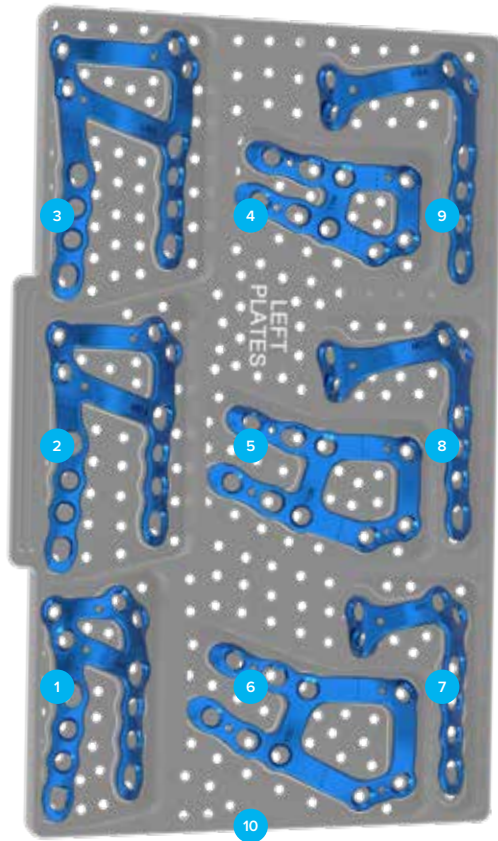
Closing and postoperative protocol are at the discretion of the surgeon.

Figure 11



Figure 12

Ordering Information



Tray Components

Implants

1	Lisfranc 1st-2nd Dorsal Plate, Small, Left	336-9101
2	Lisfranc 1st-2nd Dorsal Plate, Medium, Left	336-9102
3	Lisfranc 1st-2nd Dorsal Plate, Large, Left	336-9103
4	Lisfranc 2nd-3rd Dorsal Plate, Small, Left	336-9104
5	Lisfranc 2nd-3rd Dorsal Plate, Medium, Left	336-9105
6	Lisfranc 2nd-3rd Dorsal Plate, Large, Left	336-9106
7	Lisfranc 1st-2nd Dorsomedial Plate, Small, Left	336-9107
8	Lisfranc 1st-2nd Dorsomedial Plate, Medium, Left	336-9108
9	Lisfranc 1st-2nd Dorsomedial Plate, Large, Left	336-9109
10	ExtremiLock Foot Lisfranc Plate Module	320-2914

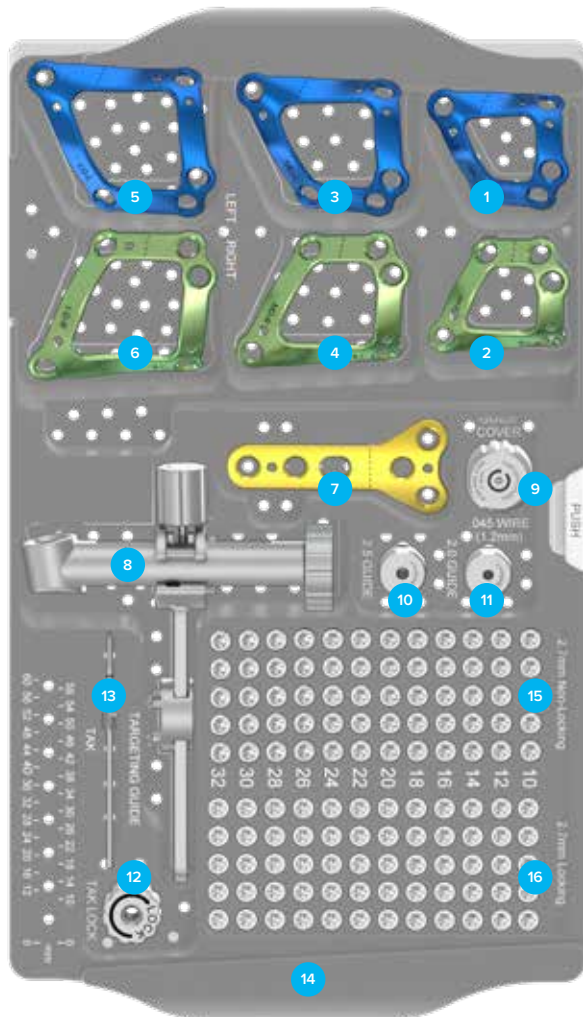
Tray Components

Implants

1	Lisfranc 1st-2nd Dorsal Plate, Small, Right	336-9201
2	Lisfranc 1st-2nd Dorsal Plate, Medium, Right	336-9202
3	Lisfranc 1st-2nd Dorsal Plate, Large, Right	336-9203
4	Lisfranc 2nd-3rd Dorsal Plate, Small, Right	336-9204
5	Lisfranc 2nd-3rd Dorsal Plate, Medium, Right	336-9205
6	Lisfranc 2nd-3rd Dorsal Plate, Large, Right	336-9206
7	Lisfranc 1st-2nd Dorsomedial Plate, Small, Right	336-9207
8	Lisfranc 1st-2nd Dorsomedial Plate, Medium, Right	336-9208
9	Lisfranc 1st-2nd Dorsomedial Plate, Large, Right	336-9209
10	ExtremiLock Foot Lisfranc Plate Module	320-2914

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Ordering Information [continued]



Tray Components

Implants & Instruments

1	Lisfranc Stabilization Plate, Small, Left	336-9110
2	Lisfranc Stabilization Plate, Small, Right	336-9210
3	Lisfranc Stabilization Plate, Medium, Left	336-9111
4	Lisfranc Stabilization Plate, Medium, Right	336-9211
5	Lisfranc Stabilization Plate, Large, Left	336-9112
6	Lisfranc Stabilization Plate, Large, Right	336-9212
7	Lisfranc Medial Plate, Universal	336-9301
8	Lisfranc Targeting Guide	320-2916
9	0.045" Guide Wire Insert, Lisfranc Guide	320-2916-14
10	2.5 mm Drill Guide Insert, Lisfranc Guide	320-2916-13
11	2.0 mm Drill Guide Insert, Lisfranc Guide	320-2916-12
12	Locking Base Knob, Lisfranc Guide	320-2916-05
13	1.2 mm Locking Plate TAK, Lisfranc Guide	320-2916-04
14	ExtremiLock Foot Lisfranc Screw Module	320-2915
	*8" Bone Reduction Forceps	MS-1280

*Additional Instruments are housed in the ExtremiLock™ Foot Plating System tray.

Tray Components

15 2.7 mm Nonlocking Screws

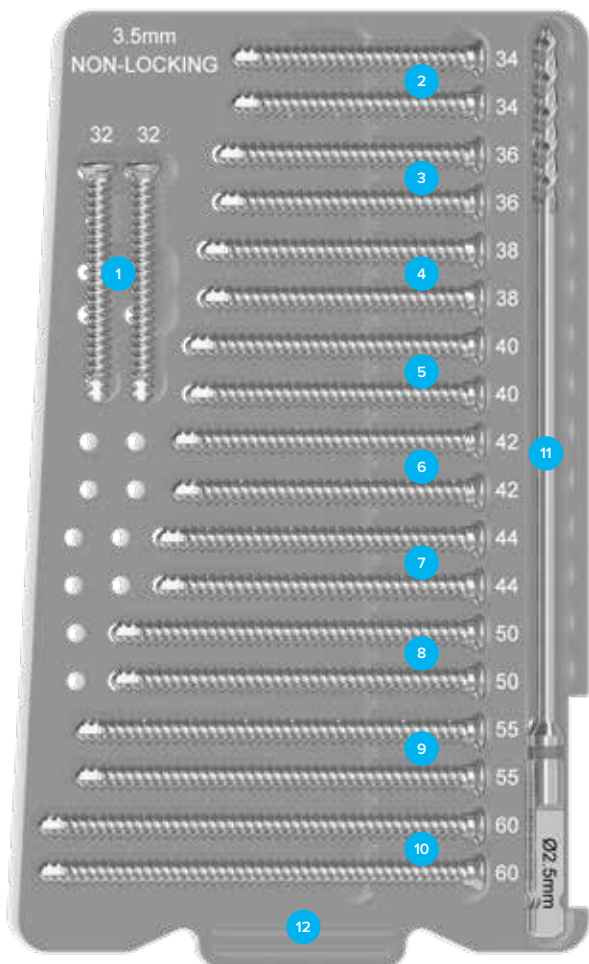
2.7 mm x 10 mm, Double Lead, Nonlocking Screw, T15	342-2710	2.7 mm x 22 mm, Double Lead, Nonlocking Screw, T15	342-2722
2.7 mm x 12 mm, Double Lead, Nonlocking Screw, T15	342-2712	2.7 mm x 24 mm, Double Lead, Nonlocking Screw, T15	342-2724
2.7 mm x 14 mm, Double Lead, Nonlocking Screw, T15	342-2714	2.7 mm x 26 mm, Double Lead, Nonlocking Screw, T15	342-2726
2.7 mm x 16 mm, Double Lead, Nonlocking Screw, T15	342-2716	2.7 mm x 28 mm, Double Lead, Nonlocking Screw, T15	342-2728
2.7 mm x 18 mm, Double Lead, Nonlocking Screw, T15	342-2718	2.7 mm x 30 mm, Double Lead, Nonlocking Screw, T15	342-2730
2.7 mm x 20 mm, Double Lead, Nonlocking Screw, T15	342-2720	2.7 mm x 32 mm, Double Lead, Nonlocking Screw, T15	342-2732

Ordering Information [continued]

Tray Components

16 2.7 mm Locking Screws

2.7 mm x 10 mm, Double Lead, Locking Screw, T15	343-2710	2.7 mm x 22 mm, Double Lead, Locking Screw, T15	343-2722
2.7 mm x 12 mm, Double Lead, Locking Screw, T15	343-2712	2.7 mm x 24 mm, Double Lead, Locking Screw, T15	343-2724
2.7 mm x 14 mm, Double Lead, Locking Screw, T15	343-2714	2.7 mm x 26 mm, Double Lead, Locking Screw, T15	343-2726
2.7 mm x 16 mm, Double Lead, Locking Screw, T15	343-2716	2.7 mm x 28 mm, Double Lead, Locking Screw, T15	343-2728
2.7 mm x 18 mm, Double Lead, Locking Screw, T15	343-2718	2.7 mm x 30 mm, Double Lead, Locking Screw, T15	343-2730
2.7 mm x 20 mm, Double Lead, Locking Screw, T15	343-2720	2.7 mm x 32 mm, Double Lead, Locking Screw, T15	343-2732



Tray Components

3.5 mm Nonlocking Screws

1 3.5 mm x 32 mm Double Lead Nonlocking Screw	337-3532
2 3.5 mm x 34 mm Double Lead Nonlocking Screw	337-3534
3 3.5 mm x 36 mm Double Lead Nonlocking Screw	337-3536
4 3.5 mm x 38 mm Double Lead Nonlocking Screw	337-3538
5 3.5 mm x 40 mm Double Lead Nonlocking Screw	337-3540
6 3.5 mm x 42 mm Double Lead Nonlocking Screw	337-3542
7 3.5 mm x 44 mm Double Lead Nonlocking Screw	337-3544
8 3.5 mm x 50 mm Double Lead Nonlocking Screw	337-3550
9 3.5 mm x 55 mm Double Lead Nonlocking Screw	337-3555
10 3.5 mm x 60 mm Double Lead Nonlocking Screw	337-3560
11 2.5 mm Long Pilot Drill, Quick Release	320-2125
12 ExtremiLock Foot Lisfranc Screw Module	320-2915

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