medartis®

PRECISION IN FIXATION

SURGICAL TECHNIQUE – STEP BY STEP

Foot System 2.0–3.5

APTUS® Foot

Contents

For further information regarding the APTUS product line visit www.medartis.com

Introduction

Product Materials

APTUS implants, plates and screws, are made of pure titanium (ASTM F67, ISO 5832-2) or titanium alloy (ASTM F136, ISO 5832-3). All of the titanium materials used are biocompatible, corrosion-resistant and non-toxic in a biological environment.
K-wires and staples are made of stainless steel (ASTM F138, ASTM F139); instruments are made of stainless steel, PEEK, aluminum or titanium.

Indications

- Fractures, osteotomies and arthrodesis of small bones, in particular of the tarsals, metatarsals and phalanges
- Fractures and osteotomies of the calcaneus

Contraindications

- Pre-existing or suspected infection at or near the implantation site
- Known allergies and/or hypersensitivity to implant materials
- Inferior or insufficient bone quality to securely anchor the implant
- Patients who are incapacitated and/or uncooperative during the treatment phase
- Growth plates are not to be blocked with plates and screws

Color Coding

System	Color Code
APTUS 2.0	Blue
APTUS 2.3	Brown
APTUS 2.8	Orange
APTUS 3.5	Green

Plates and Screws
Special implant plates and screws have their own color:

Implant plates gold	Fixation plates
Implant plates blue	TriLock plates (locking)
Implant screws gold	Cortical screws (fixation)
Implant screws blue	TriLock screws (locking)
Implant screws green	SpeedTip screws (self-drilling)
Implant screws silver	Transfixation screws

Possible Combination of Plates and Screws

Plates and screws can be combined within one system size:

2.0/2.3 TriLock Plates
2.0 TriLock Screws, HexaDrive 6
2.3 Cortical Screws, HexaDrive 6

2.8 TriLock Plates
2.8 TriLock Screws, HexaDrive 7
2.8 Cortical Screws, HexaDrive 7

2.8 TriLock Grid Plates/TriLock Wing Plates
2.8 TriLock Screws, HexaDrive 7
2.8 Cortical Screws, HexaDrive 7

2.8 TriLock MTP Fusion and Revision Plates
2.8 TriLock Screws, HexaDrive 7
2.8 Cortical Screws, HexaDrive 7

2.8 TriLock TMT-1 Fusion Plates
2.8 TriLock Screws, HexaDrive 7
2.8 Cortical Screws, HexaDrive 7

3.5 TriLock Plates
3.5 TriLock Screws, HexaDrive 15
3.5 Cortical Screws, HexaDrive 15

Caution
4.0 transfixation screws may only be combined with 2.8 TriLock TMT-1 medial fusion plates.

Symbols


HexaDrive


TriLock screw hole on sizing template


TriLock^{PLUS} screw hole on sizing template

Treatment Concept

The table below lists typical clinical conditions which can be treated with the implants of the APTUS Foot System 2.0–3.5.

Implants / Examples of Use	SpeedTip C 2.0 A-5417.xx and A-5411.xx	SpeedTip C 2.8 A-5811.xx	Straight Plate 2.0/2.3 A-4655.01/03/08	T Plate 2.0/2.3 A-4655.12/13	Grid Plate 2.0/2.3 A-4655.67/68/69	Straight Plate 2.8 A-4850.01/03/08	T Plate 2.8 A-4850.12/13	Grid Plate 2.8 A-4850.67/68/69	Wing Plate 2.8 A-4850.70/71	MTP Fusion Plate 2.8 A-4860.10–15	MTP Revision Plate 2.8 A-4860.16–19	TMT-1 Medial Fusion Plate 2.8 A-4860.30/31	TMT-1 Plantar Fusion Plate 2.8 A-4860.36/37	Calcaneus Plate 3.5 A-4950.71–76	Staple All-in-One A-4090.01S–04S
Fractures MT1						●	●	●							
Fractures MT2–5			●	●											
MTP Fusion								●		●					
MTP Revision with Bone Graft										●	●				
TMT-1 (Lapidus) Fusion							●	●				●	●		
Lisfranc Arthrodesis							●	●	●			●			
Distal Osteotomy MT1		●					●								
Distal Osteotomy MT2–5	●		●												
Proximal Osteotomy MT1								●							
Proximal Osteotomy MT2–5			●	●	●										
Talo-navicular-Arthrodesis								●	●						
Calcaneo-cuboid Arthrodesis								●	●						
Cuboid Fractures					●			●	●						
Navicular Fractures				●			●	●							
Talus Fractures						●	●	●							
Lateral Column Lengthening (Evans)								●							
Calcaneus Fractures														●	
Akin Osteotomy															●

Instrument Application

General Instrument Application

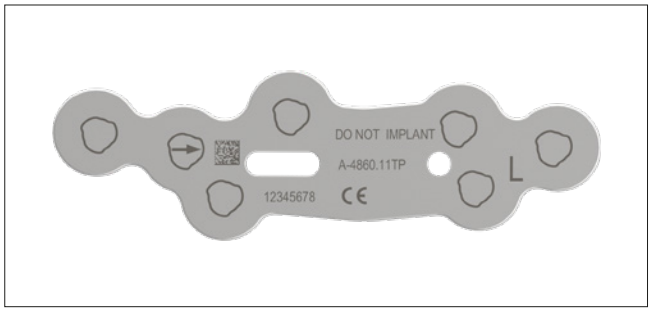
Sizing Templates

Sizing templates facilitate the intraoperative selection of the appropriate implant.
Sizing templates for the Foot System 2.0 – 3.5 are available according to the Appendix Implants and Instruments.

The sizing templates feature symbols that indicate the type of the screw hole and its position on the respective implant:

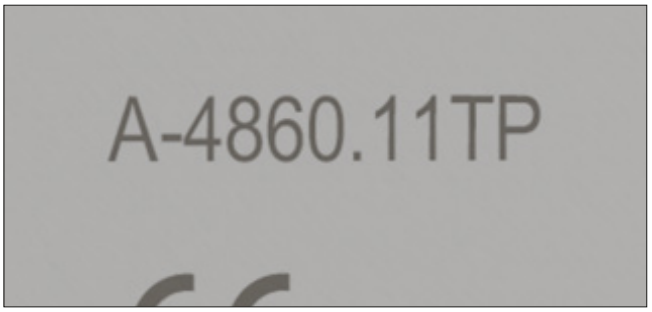
for a TriLock screw hole (locking) using a TriLock or cortical screw

for a TriLock^{PLUS} screw hole (locking/compression) using a TriLock or cortical screw



Sizing template with TriLock and TriLock^{PLUS} screw hole symbols

The article number of the sizing template (e.g. A-4860.11TP) corresponds to the article number of the sterile implant (e.g. A-4860.11S). The suffix TP stands for template.



A-4860.11TP
Template for A-4860.11S

Use appropriate K-wires to temporarily fix the sizing template to the bone, if necessary.

Caution
Do not implant sizing templates.
Do not bend or cut sizing templates.

Plate Pick-Up

The plates can be manually removed from the implant container or with the help of the plate holding forceps (A-2050). These forceps have a crossed end and will open when pressure is applied. The plates are kept force-free in the holding channel of the forceps tip.

A-2050
2.0 – 3.5 Plate Holding Forceps

Bending

If required, the TriLock foot plates can be bent with the plate bending pliers.
Depending on the associated system size of the plate there are two different plate bending pliers for the APTUS Foot System, including:

Type 1 for 2.0 – 2.8 TriLock plates
2.0 – 2.8 plate bending pliers with pins (A-2047)
for Foot systems 2.0/2.3, 2.8.

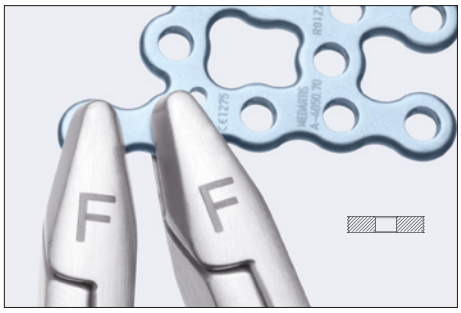
A-2047
2.0 – 2.8 Plate Bending Pliers, with Pins

Type 2 for 3.5 TriLock plates
3.5/4.0 plate bending pliers (A-2940) for Foot system 3.5.

A-2940
3.5/4.0 Plate Bending Pliers

Plate bending pliers for 2.0/2.3, 2.8 TriLock plates
The labeled side of the plate must always face upwards when inserting the plate into the bending pliers (A-2047).

When bending flat plates (wing plates), the plate bending pliers must be held so that the letters “F – FLAT PLATE THIS SIDE UP” are legible from above.



When bending a curved plate, the letters “C – CURVED PLATE THIS SIDE UP“ must be legible from above. This ensures that the plate holes are not damaged.

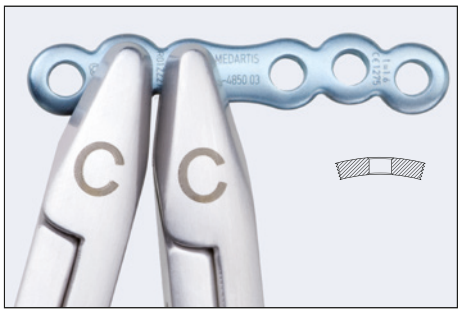
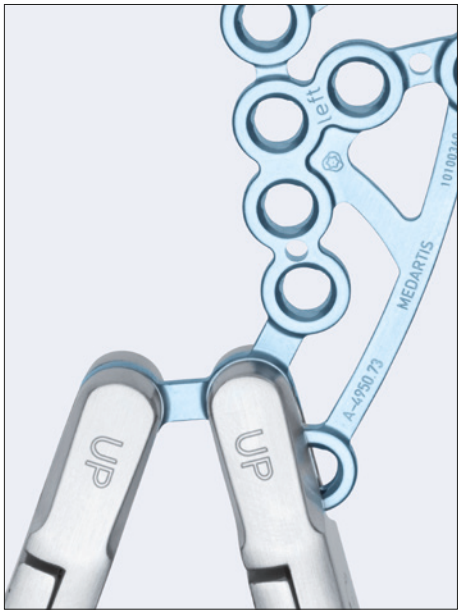
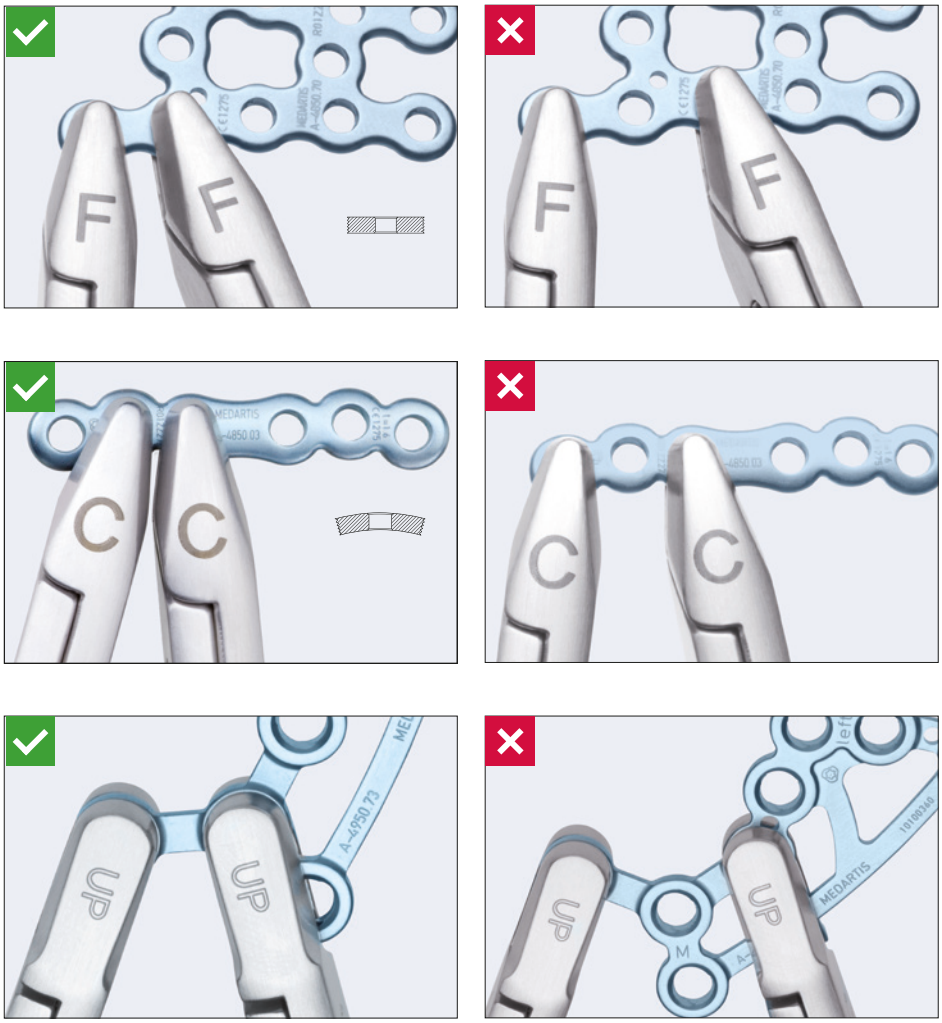


Plate bending pliers for 3.5 TriLock plates
The labeled side of the plate must always face upward when inserting the plate into the bending pliers (A-2940).

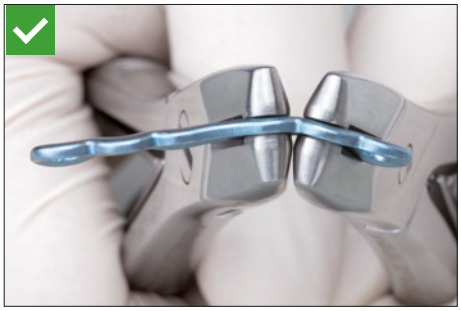
When bending 3.5 TriLock plates, the letters “UP” must be legible from above.



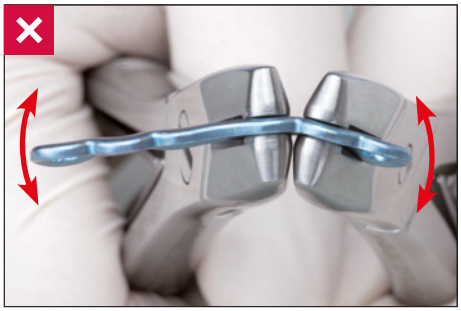
Notice
While bending, the plate must always be held at two adjacent holes to prevent contour deformation of the intermediate plate hole.



Caution
Do not bend the plate by more than 30°. Bending the plate further may deform the plate holes and may cause the plate to break postoperatively.

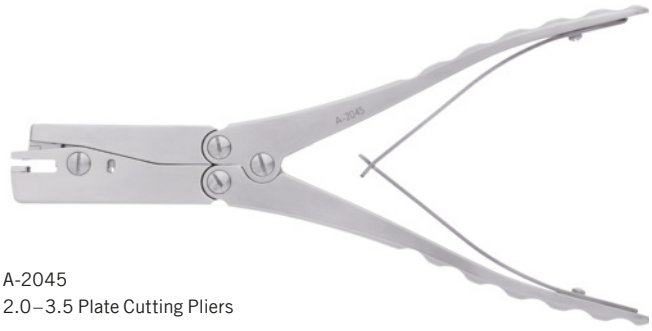


Caution
Repeatedly bending the plate in opposite directions may cause the plate to break postoperatively.
Always use the provided plate bending pliers to avoid damaging the plate holes. Damaged plate holes prevent correct and secure seating of the screw in the plate and increase the risk of system failure.



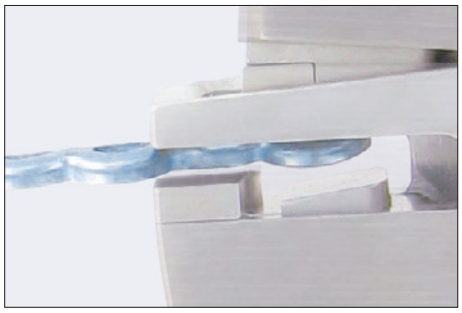
Cutting

If required, the plate cutting pliers (A-2045) can be used to cut all plates and K-wires up to a diameter of 2.0 mm.



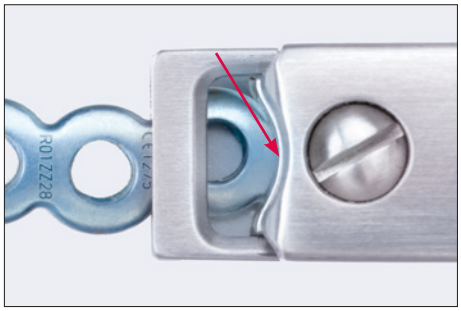
A-2045
2.0 – 3.5 Plate Cutting Pliers

Ensure that there are no remaining plate segments in the cutting pliers (visual check). Insert the plate from the front into the open cutting pliers. Always ensure that the labeled side of the plate is facing upwards. Hold the implantable plate segment with your hand during and after cutting.



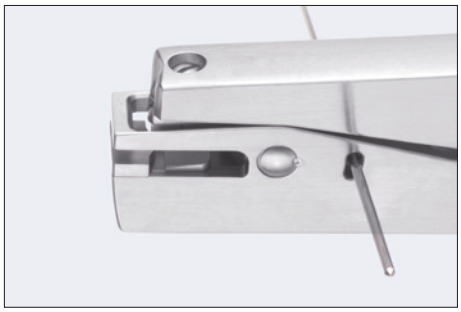
Recommendation
To facilitate the insertion of the plate, support the cutting pliers slightly with your middle finger

You can visually check the desired cutting line through the cutting window in the head of the pliers (see figure). Always leave enough material on the rest of the plate to keep the adjacent hole intact.



Notice
Always cut the plate holes individually — if you want to shorten the plate by two holes, cut them in two cutting procedures.

Shorten the K-wires by inserting the wire through the opening located on the side of the plate cutting pliers. Cut the wire by pressing the pliers.



Drilling

Color-coded twist drills are available for every APTUS system size. All twist drills are color-coded via a ring system.

System	Color Code
APTUS 2.0	Blue
APTUS 2.3	Brown
APTUS 2.8	Orange
APTUS 3.5	Green

The core hole drills are characterized by one colored ring, the gliding hole drills (for lag screw technique) are characterized by two colored rings.

Screw Size	Screw Type	Color Code on Instrument	Twist Drill for Core Hole (one colored ring)	Twist Drill for Gliding Hole (two colored rings)	Drill Guide
2.0	TriLock	Blue	 A-3414, A-3424, A-3434 Twist Drills Ø 1.6 mm		 A-2021 2.0/2.3, 2.8 Drill Guide
2.3	Cortical	Brown	 A-3510, A-3512, A-3520, A-3530 Twist Drills Ø 1.9 mm	 A-3513, A-3521, A-3531 Twist Drills Ø 2.35 mm (for Gliding Hole)	 A-2022 2.0/2.3, 2.8 Drill Guide for Lag Screws
2.8	Cortical + TriLock	Orange	 A-3832 Twist Drill Ø 2.35 mm	 A-3834 Twist Drill Ø 2.9 mm (for Gliding Hole)	 A-2026 2.5/2.8 Drill Guide TriLock[PLUS]  A-2820 2.8 Drill Guide
3.5 Calcaneus System	Cortical TriLock	Green	**3.5 Calcaneus System** A-3931 Twist Drill Ø 3.0 mm	 A-3933 Twist Drill Ø 3.6 mm (for Gliding Hole)	**3.5 Calcaneus System**  A-2920 3.5 Drill Guide for the Calcaneus System

The twist drill must always be guided through the corresponding drill guide (A-2021, A-2022, A-2026, A-2820, A-2920) or the self-holding drill sleeve (A-2826, A-2921). This prevents damage to the plate hole and protects the surrounding tissue from direct contact with the drill. The drill guide also serves to limit the drilling angle.

The double-ended drill guide (A-2022) can be used for all cortical screw holes and for the use of independent screws (fragment fixation with screws alone), as described in chapter Lag Screw Technique.

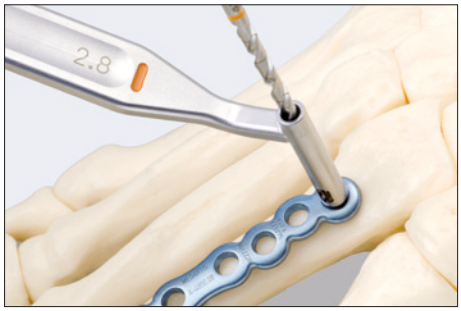
The double-ended drill guide for TriLock^{PLUS} (A-2026) is applied as normal to perform the compression technique. The end marked with the arrow sign is used for the TriLock^{PLUS} holes only (see chapter TriLock^{PLUS}).

The self-holding drill sleeve (A-2826, A-2921) can be locked with a clockwise turn (no more than ± 15°) in the TriLock holes of the plate. It thus performs all of the functions of a drill guide without the need to be held.

A-2826
2.5/2.8 Drill Sleeve, Self-Holding

A-2921
3.5 Drill Sleeve, Self-Holding

After positioning the plate, insert the drill guide and the appropriately color-coded twist drill into the screw hole.



Caution
For TriLock plates ensure that the screw holes are pre-drilled with a pivoting angle of no more than ± 15°. For this purpose, the drill guides show a limit stop of ± 15°. A pre-drilled pivoting angle of > 15° no longer allows the TriLock screws to correctly lock in the plate.

Assigning the Screw Length

The depth gauges are used to assign the ideal screw length for use in monocortical or bicortical screw fixation.

System	Corresponding Depth Gauge
Fore- and Midfoot System 2.0/2.3, 2.8	A-2031
Hallux System 2.8	A-2837
Calcaneus System 3.5	A-2930

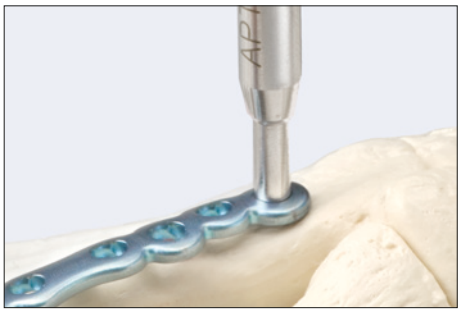
A-2031
2.0 – 2.8 Depth Gauge

A-2837
2.8 Depth Gauge

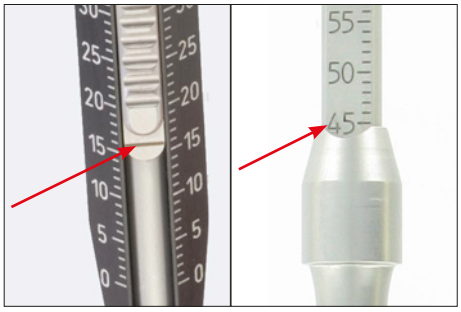
A-2930
3.5/4.0 Depth Gauge

Retract the slider of the depth gauge.
The depth gauge caliper has a hooked tip that is either inserted to the bottom of the hole or is used to catch the far cortex of the bone. When using the depth gauge, the caliper stays static, only the slider is adjusted.

To assign the screw length, place the distal end of the slider onto the implant plate or directly onto the bone (e.g. for fracture fixation with lag screws).

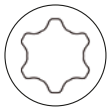


The ideal screw length for the assigned drill hole can be read on the scale of the depth gauge.



Screw Pick-Up

The screwdrivers (A-2610 and A-2810) and the screwdriver blades (A-2611, A-2013 and A-2911) feature the patented HexaDrive self-holding system.



A-2611
2.0/2.3 Screwdriver Blade, HD6, AO

A-2013
2.5/2.8 Screwdriver Blade, HD7, AO

A-2911
3.5/4.0 Screwdriver Blade, HD15, AO

A-2610
2.0/2.3 Screwdriver, HD6, Self-Holding

A-2810
2.8 Screwdriver, HD7, Self-Holding

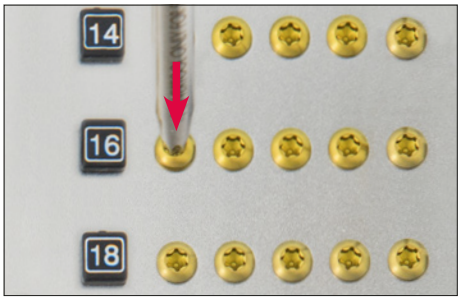
A-2073
Cannulated Handle with Quick Connector, AO

A-2074
Cannulated Handle with Quick Connector, AO

Notice

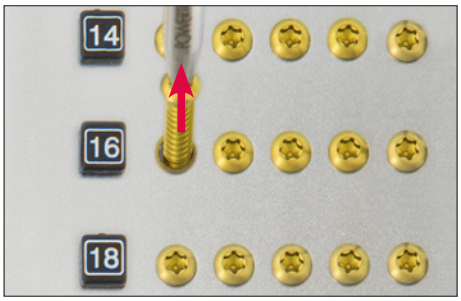
Do not use the 2.0/2.3 screwdriver blade (A-2611) and the 2.5/2.8 screwdriver blade (A-2013) with the large handle with quick connector (A-2074) due to the high torque forces that will be transmitted through the 2.8 mm screws.

To remove the screws from the implant container, insert the screwdriver vertically with the corresponding color code into the screw head of the desired screw and pick up the screw with axial pressure.



Notice
The screw will not hold without axial pressure!

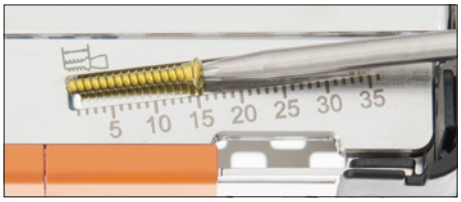
Vertically extract the screw from the compartment.



Notice
Picking up the screw repeatedly may lead to permanent deformation of the self-retaining area of the HexaDrive inside the screw head. Therefore, the screw may no longer be able to be picked up correctly. In this case, a new screw has to be used.

SpeedTip C-Snap screws feature a snap-off pin for connecting to a 1.8 mm K-wire driver as well as the HexaDrive self-holding technology. The HexaDrive self-holding technology is only accessible after the pin has snapped off (see chapter SpeedTip C-Snap Screws).

Check the screw length and diameter at the scale of the measuring module. The screw length is determined at the end of the screw head.



Surgical Techniques

General Surgical Techniques

Two lag screw techniques can be used, depending on the implant.

Lag Screw Technique Using Cortical Screws

The drill guides for lag screws are used to perform the classic lag screw technique according to AO/ASIF.

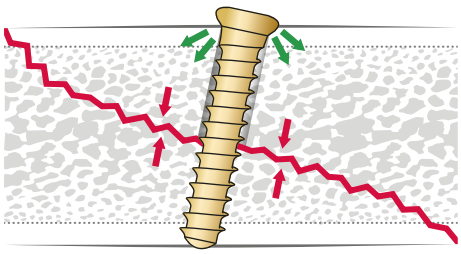
System	Screw Size	Drill Guide for Lag Screw
Fore- and Midfoot System 2.0/2.3, 2.8	2.0/2.3, 2.8	 A-2022
Hallux System 2.8	2.8	 A-2820
Calcaneus System 3.5	3.5	 A-2920

1. Drilling the gliding hole

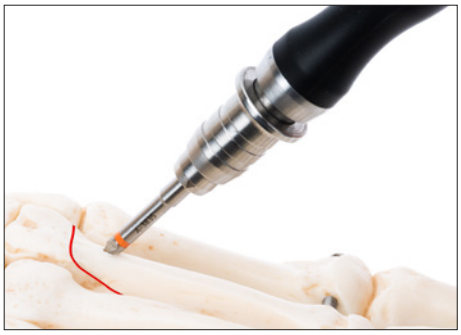
The Fore- and Midfoot System has a special drill guide for drilling gliding holes (A-2022; labeled with “LAG”). With the Hallux System 2.8, use the end of the drill guide A-2820 labeled with “LAG”. With the Calcaneus System 3.5, use the end of the drill guide A-2920 with two green bars (also labeled with “LAG”). Use the twist drill for gliding holes (two colored rings) of the required system size to drill perpendicular to the fracture line.

Notice

Do not drill further than to the fracture line.



2. Drilling the core hole
Insert the end of the drill guide of the same system size (A-2022, A-2820 or A-2920 with one colored bar) into the gliding hole and use the twist drill for core holes (one colored ring) to drill the core hole.



3. Compressing the fracture/osteotomy
Compress the fracture or osteotomy with the corresponding cortical screw by inserting the screw until the desired compression is achieved. The screw head should not protrude.

4. Optional steps before compression
If required, use the corresponding countersink for cortical screws (A-3835 or A-3930 respectively) to create a recess in the bone for the screw head.

Notice
Use the handle (A-2070, A-2071, A-2073 or A-2074) instead of a power tool to reduce the risk of countersinking too far through the near cortex.

Optionally, a washer (A-4700.70) can also be used to achieve a larger contact surface between screw head and bone.


2:1

Lag Screw Technique Using Lag Screws

4.0 transfixation screws (A-5936.xx) can be used as independent lag screws.

1. Drilling the core hole
Use the twist drill (A-3832, one orange ring) to drill the core hole in combination with the drill guide (A-2820). There is no need of an additional gliding hole drilling.

2. Compressing the fracture/arthrodesis
Insert the transfixation screw of the corresponding length until reaching the desired compression in the bone gap.

3. Optional steps before compression
If required, use the countersink (A-3930) to create a recess in the bone for the screw head.

A-3930

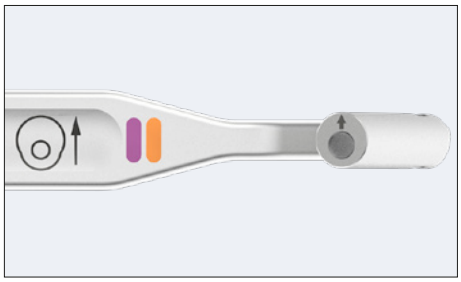
Notice
Use the handle (A-2070, A-2071, A-2073 or A-2074) instead of a power tool to reduce the risk of countersinking too far through the near cortex.

Specific Surgical Techniques

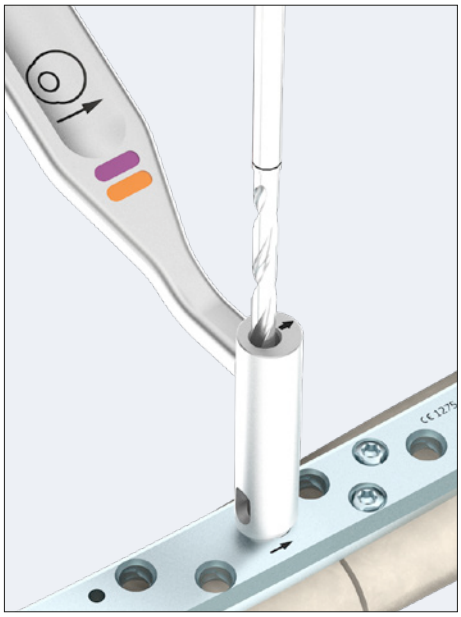
TriLock^{PLUS}

TriLock^{PLUS} holes are available on all MTP fusion plates (A-4860.10–19) and the medial TMT-1 fusion plates (A-4860.30–31).

TriLock^{PLUS} allows for 1 mm compression and angular stable locking in one step.



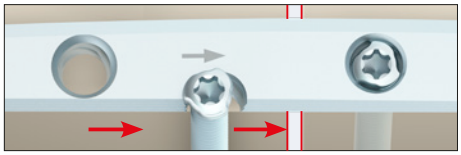
For this technique, a TriLock screw, the 2.5/2.8 drill guide TriLock^{PLUS} (A-2026) and a plate with a TriLock^{PLUS} screw hole are required. The TriLock^{PLUS} screw holes and the respective end of the drill guide are both marked with an arrow indicating the direction of the compression. Before using a TriLock^{PLUS} hole, ensure that there is no fixation on the TriLock^{PLUS} side, and fix the plate with at least one TriLock screw on the opposite side of the fracture or osteotomy line.



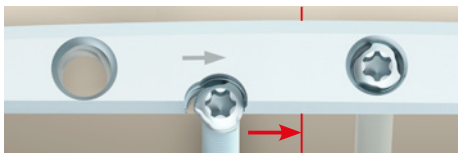
1. Positioning the drill guide in the plate
Following the direction of the compression, insert the 2.5/2.8 drill guide TriLock^{PLUS} (A-2026) perpendicular to the plate. The arrow on the drill guide and the plate both indicate the direction of the compression.

Caution
Correct compression is only achieved if the drill guide is inserted in a 90° angle into the plate.

2. Drilling through the drill guide TriLock^{PLUS}
Use the twist drill for core holes with one orange ring (A-3832) to completely drill through the bone (bicortically).

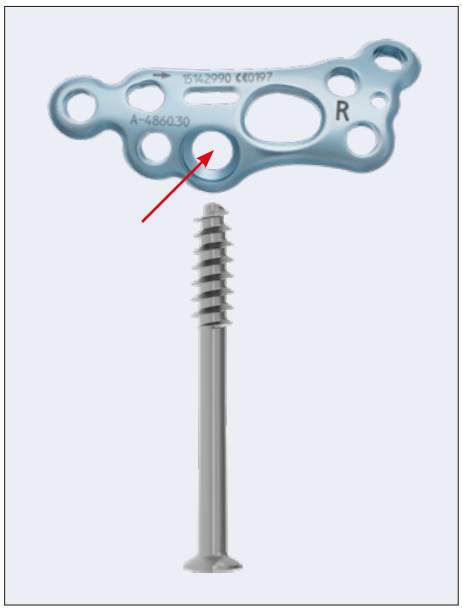


3. Inserting the screw and locking in final position
Insert a TriLock screw into the pre-drilled hole. Axial compression starts as soon as the screw head touches the plate. The final position is reached when the screw is locked into the TriLock screw hole.

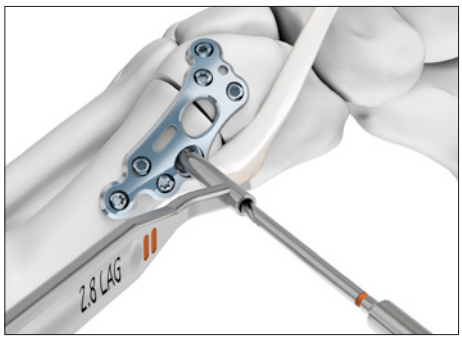


Caution
TriLock^{PLUS} holes can also be used as conventional TriLock holes allowing for multidirectional (± 15°) and angular stable locking with TriLock screws or for the insertion of cortical screws. For conventional drilling, use the respective end of the drill guide (A-2021, A-2026 or A-2820), see also chapter Drilling.

Transfixation Screws



Classic Lapidus arthrodesis
2.8 TriLock TMT-1 medial fusion plates (A-4860.30 and A-4860.31) have a specific hole to insert an optional transfixation screw (A-5936.xx) in the second metatarsal. This fixation from the first to the second metatarsal is also referred to as the classic Lapidus arthrodesis.



1. Drilling the hole for the transfixation screw
Perform the Lapidus arthrodesis according to the surgeon‘s technique.

Pre-drill the transfixation screw with the twist drill (A-3832, single orange ring). Use the “LAG” end (serrated end) of the drill guide (A-2820) to center the twist drill in the transfixation hole and protect the surrounding tissue from direct contact with the drill. Drill over the entire length of the first and second metatarsal.

Recommendation
Typically, an angle of 20° dorsally is needed for the ideal placement of the screw into the second metatarsal.

2. Assigning the screw length and screw insertion
Assign the depth of the resulting hole with the depth gauge (A-2837). Insert a transfixation screw using a screwdriver blade (A-2013).

For an extended surgical technique refer to “Hallux System 2.8 – Surgical Technique” at www.medartis.com.

MTP Reamers

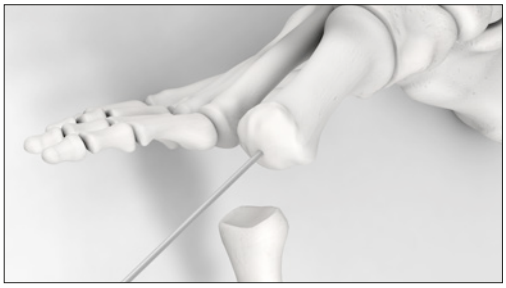
Cup and cone shaped reamers to prepare the MTP joint surfaces are available in five pairs.

Paired sizes are:
16 mm, 18 mm, 20 mm, 22 mm und 24 mm
Cannulation for 1.6 mm K-wire

A-3030.06
Cannulated MTP Reamer, Cone 20 mm

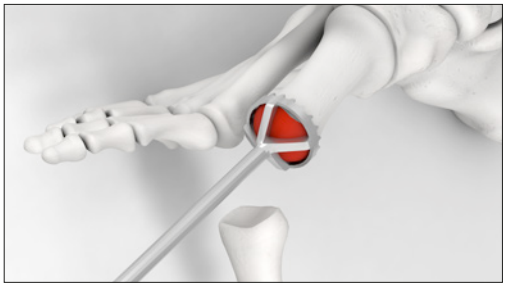
A-3030.05
Cannulated MTP Reamer, Cup 20 mm

1. Inserting the first K-wire
Insert the 1.6 mm K-wire into the first metatarsal head. Ensure the wire is coaxial to the central canal and inserted up to the diaphysis.

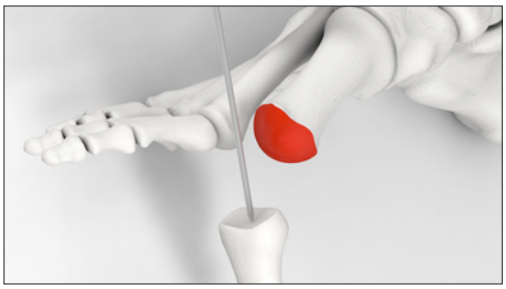


2. Proximal reaming (Cone)
Select the appropriate proximal reamer. Slide the reamer over the K-wire. Always start with a larger size and work down to a smaller size until the desired reaming is reached.

After reaming, remove the K-wire from the first metatarsal.

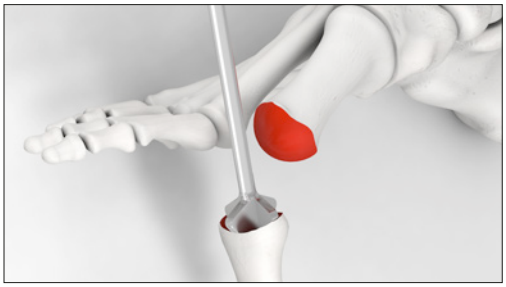


3. Inserting the second K-wire
Insert a K-wire into the center of the proximal phalange. Ensure the K-wire is coaxial to the central canal and inserted further than the desired reaming depth.



4. Distal reaming (Cup)
Slide the appropriate distal reamer (same diameter as MTP reamer Cone) over the K-wire and ream until the cartilage is removed from the joint.

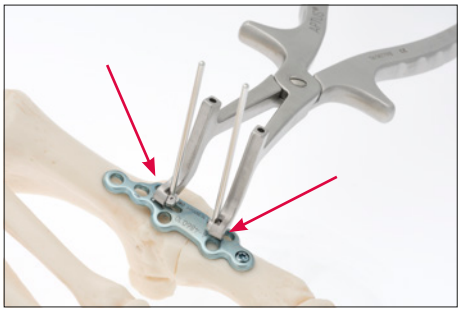
Recommendation
Do not ream too deep in order to avoid length loss. Ream, however, deep enough to remove the cartilage.



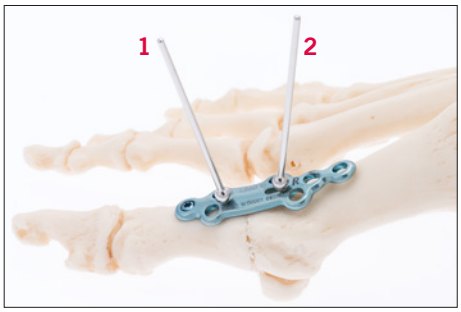
Compression and Distraction Forceps with 1.6 mm Olive K-Wires

APTUS Hallux MTP plates, MTP revision plates and TMT medial plates feature a K-wire hole and a K-wire slot for compression with 1.6 mm olive K-wires or standard 1.6 mm K-wires.

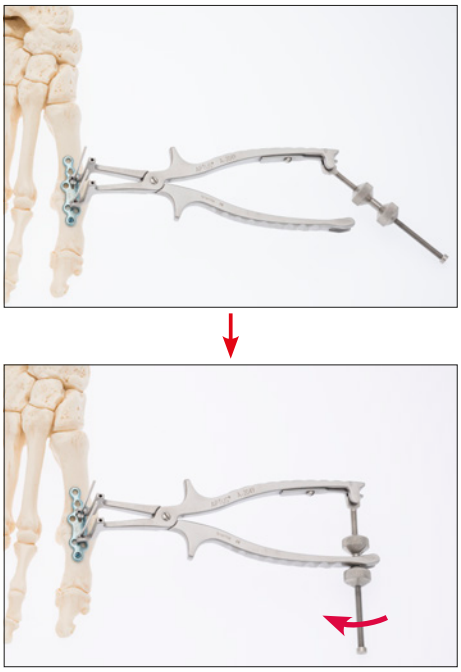
1. Using the compression and distraction forceps
When using olive K-wires (A-5045.xx), always have the curved ends of the instrument (A-2049) pointing towards the plate.



2. Inserting the olive K-wires
Align the plate and fix it on one side with a TriLock screw. Choose two olive K-wires with adequate length for bicortical fixation.
Insert the first olive K-wire through the K-wire hole until the olive gets in contact with the plate surface. Do not overtighten the olive K-wire as this would lead to stripping of the thread inside of the bone.
Insert the second olive K-wire through the far end of the K-wire slot until the olive is in contact with the plate.



3. Applying compression
Place the curved end with the cupped mouth pieces of the compression and distraction forceps over the olives and apply a gentle compression. Slide the knurled nut into the slot of the handle. Turn the nut clockwise to gradually apply additional compression and to sustain the interfragmentary compression.



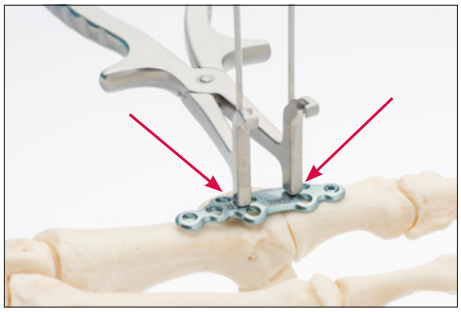
Caution
Do not overcompress! Too high compression could possibly damage either the bone or the K-wires.
Use X-ray control to verify the correct reduction and compression. Fix the plate to the bone using TriLock screws.

Compression and Distraction Forceps with 1.6 mm Standard K-Wires

The compression and distraction forceps (A-2049) can also be used for compression or distraction in combination with standard 1.6 mm K-wires (A-5042.41 or A-5040.41) through the holes in its jaws.

Notice
Distraction can only be carried out with standard 1.6 mm K-wires. The olive K-wires are not suitable for distraction.

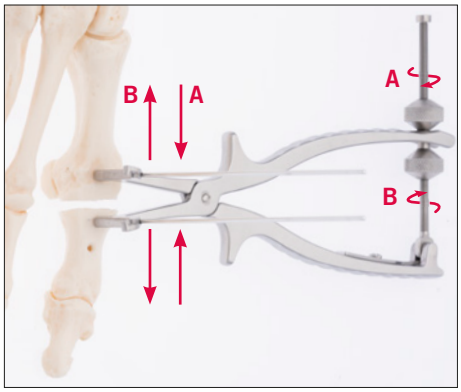
1. Using the compression and distraction forceps
Always use the compression and distraction forceps (A-2049) with the flat or straight ends towards the bone or plate. The curved ends have to point up.



2. Inserting the K-wires
Place a K-wire (A-5042.41 or A-5040.41) through the K-wire hole more or less perpendicularly to the bone surface. Slide the forceps over the wire and insert the second K-wire through the K-wire slot. The instrument should be in direct contact with the bone or the plate surface.

Alternatively: Insert both K-wires through the compression and distraction forceps using the K-wire hole and the K-wire slot as K-wire guide.

3. Applying compression or distraction
For **compression (A)**, close the forceps until the bone fragments get into contact with each other. Slide the knurled nut into the slot of the handle and turn the nut clockwise to apply the desired compression.



For **distraction (B)**, pull the handles apart. Slide the knurled nut into the slot of the handle and turn the nut counterclockwise until the desired distraction is reached.

Caution
Overcompression or overdistraction could damage the bone and/or the K-wires. If the forceps is placed at a too high distance from the bone, the K-wires may possibly bend.

2.0, 2.8 SpeedTip C Screws

SpeedTip is the patented technology of self-drilling screws.
SpeedTip C screws feature a partially threaded shaft for compression.
All SpeedTip C screws are available with standard HexaDrive interface.

A-5411.xx
2.0 SpeedTip C Screw, HD6

A-5811.xx
2.8 SpeedTip C Screw, HD7

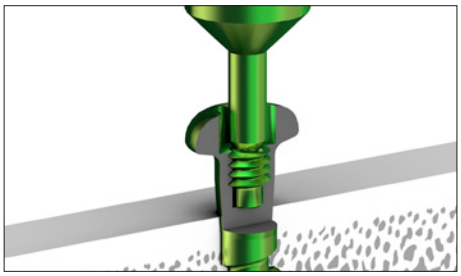
2.0 SpeedTip C-Snap Screws

A-5417.xx
2.0 SpeedTip C-Snap Screw, HD6

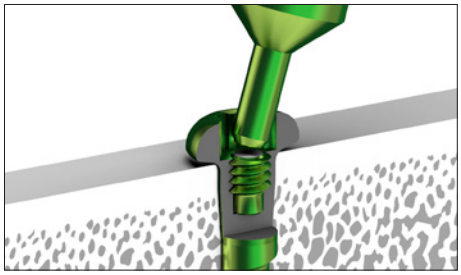
SpeedTip C-Snap screws feature a snap-off pin for insertion using a K-wire driver.

1. Picking up the SpeedTip C-Snap screw
After assigning the screw length, pick up the SpeedTip C-Snap screw using a K-wire driver (Ø 1.8 mm) or an appropriate three-jaw chuck.

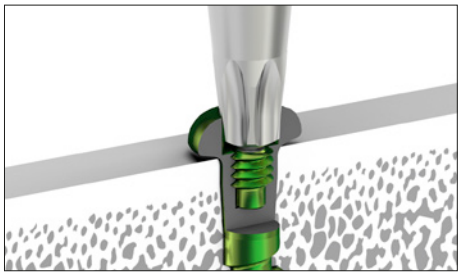
2. Inserting the screw
Advance the SpeedTip C-Snap screw until the head is flush and the snap-off occurs.
In case of very hard bone, the snap-off can occur even before reaching the final position (see Step 4).



3. Manual snap-off (optionally)
In patients with soft or osteoporotic bone, it might be necessary to break off the pin manually from the screw by tilting off the snap-pin.



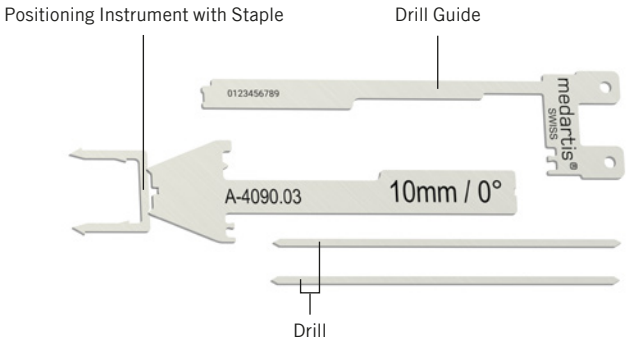
4. Final tightening (optionally)
After the pin is separated from the screw, final tightening can be done manually using the HexaDrive screwdriver HD6 (A-2610 or A-2611 with A-2073).



Notice
Use the power tool to insert SpeedTip C and SpeedTip C-Snap screws only. Under no circumstances may it be used for inserting TriLock screws or cortical screws.

Staples All-in-One

The sterile packed all-in-one staples (A-4090.01S, A-4090.02S, A-4090.03S, A-4090.04S) are used for example for fixing an Akin osteotomy.



1. Preparing the staple

The staples are available in two widths (8 mm and 10 mm) and two different angles (0 ° and 26°).

Which staple is selected depends on the location of the osteotomy and the anatomy of the patient.

A-4090.01S
Staple All-in-One,
8 mm, 0°

A-4090.02S
Staple All-in-One,
8 mm, 26°

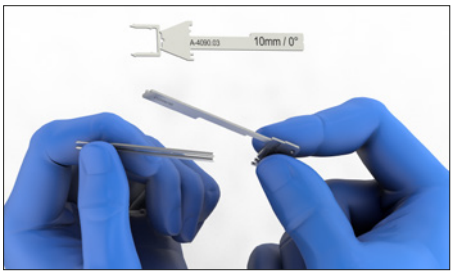
A-4090.03S
Staple All-in-One,
10 mm, 0°

A-4090.04S
Staple All-in-One,
10 mm, 26°

To detach the individual elements of the staple, hold the Staple All-in-One at its ends. Make sure to grasp the positioning instrument and the staple by the corresponding junction points to prevent the staple from being detached prematurely.

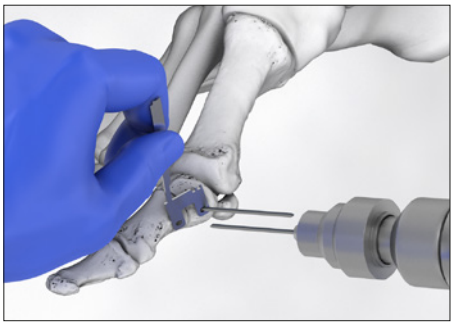
Detach the two drills and the drill guide by applying slight opposite pressure against the positioning instrument.

Detach the drills from the drill guide in the same way.



2. Drilling

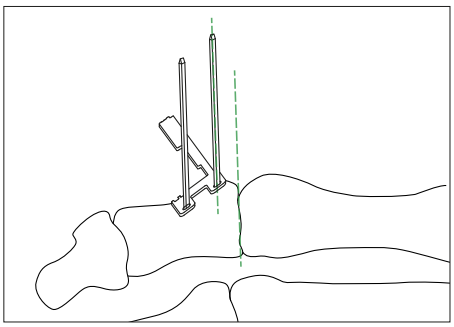
Drill the first hole through the drill guide using one of the detached drills. Leave the drill in the drill hole for fixation of the drill guide. Make sure that the osteotomy is completely closed, and the lateral cortex is intact, before drilling the second hole. With the second drill, drill the second hole parallel to the first drill hole through the drill guide. Due to the slightly wider distance of the drill holes in relation to the staple width, compression will be achieved during the insertion of the staple.



As an alternative to the drills (1 x 1 mm), K-wires Ø 1.4 mm can be used.

Notice

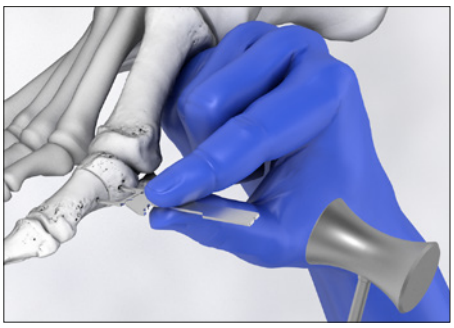
With the 26° staples (A-4090.02S and A-4090.04S), pre-drilling must be carried out parallel to the joint surface.



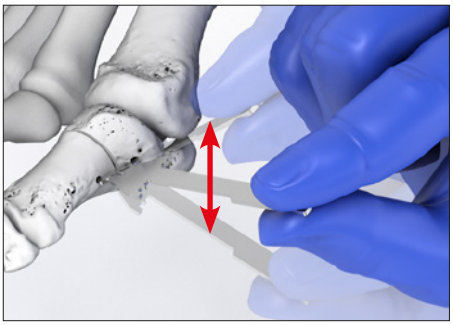
3. Inserting the staple

Remove the drill guide and the drills.

Insert the staple monocortically into the pre-drilled holes using the positioning instrument and if needed a small mallet.



Detach the positioning instrument from the staple by moving it slightly up and down



If the staple is not completely inserted, the positioning instrument acts as a tamp to correct the insertion depth of the staple using a small mallet. To do so, turn the positioning instrument by 90° to the staple and place it with the notch onto the staple.

The completely inserted staple is resting on the bone.

Notice
In case of osteoporotic bone, the staple should be detached from the positioning instrument before insertion and be inserted manually.

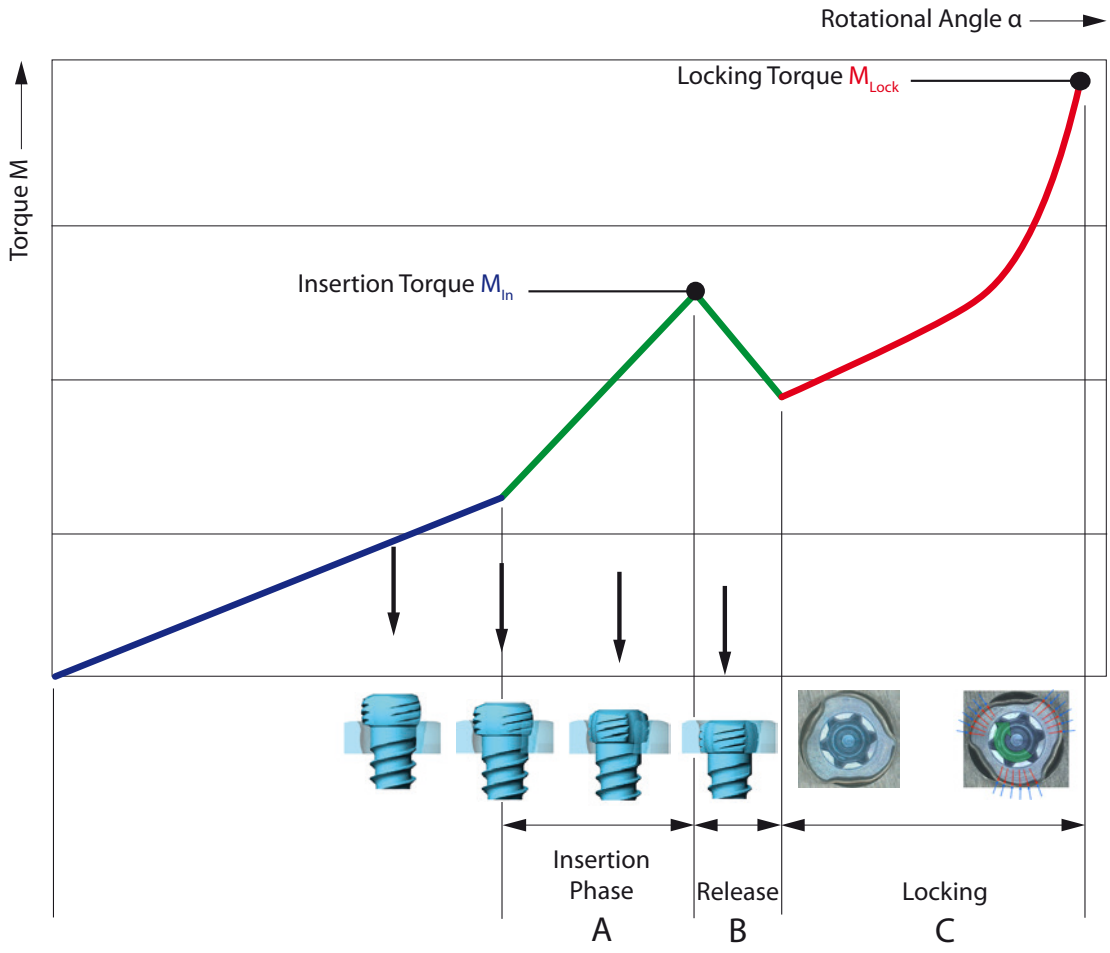
2.0 / 2.3, 2.8 TriLock® Locking Technology

Correct Application of the TriLock Locking Technology

The screw is inserted through the plate hole into a pre-drilled canal in the bone. An increase of the tightening torque will be felt as soon as the screw head gets in contact with the plate surface.

This indicates the start of the “Insertion Phase” as the screw head starts entering the locking zone of the plate (section “A”in the diagram). Afterwards, a drop of the tightening torque occurs (section “B” in the diagram). Finally the actual locking is initiated (section “C” in the diagram) as a friction connection is established between screw and plate when tightening firmly.

The torque applied during fastening of the screw is decisive for the quality of the locking as described in section “C” of the diagram.



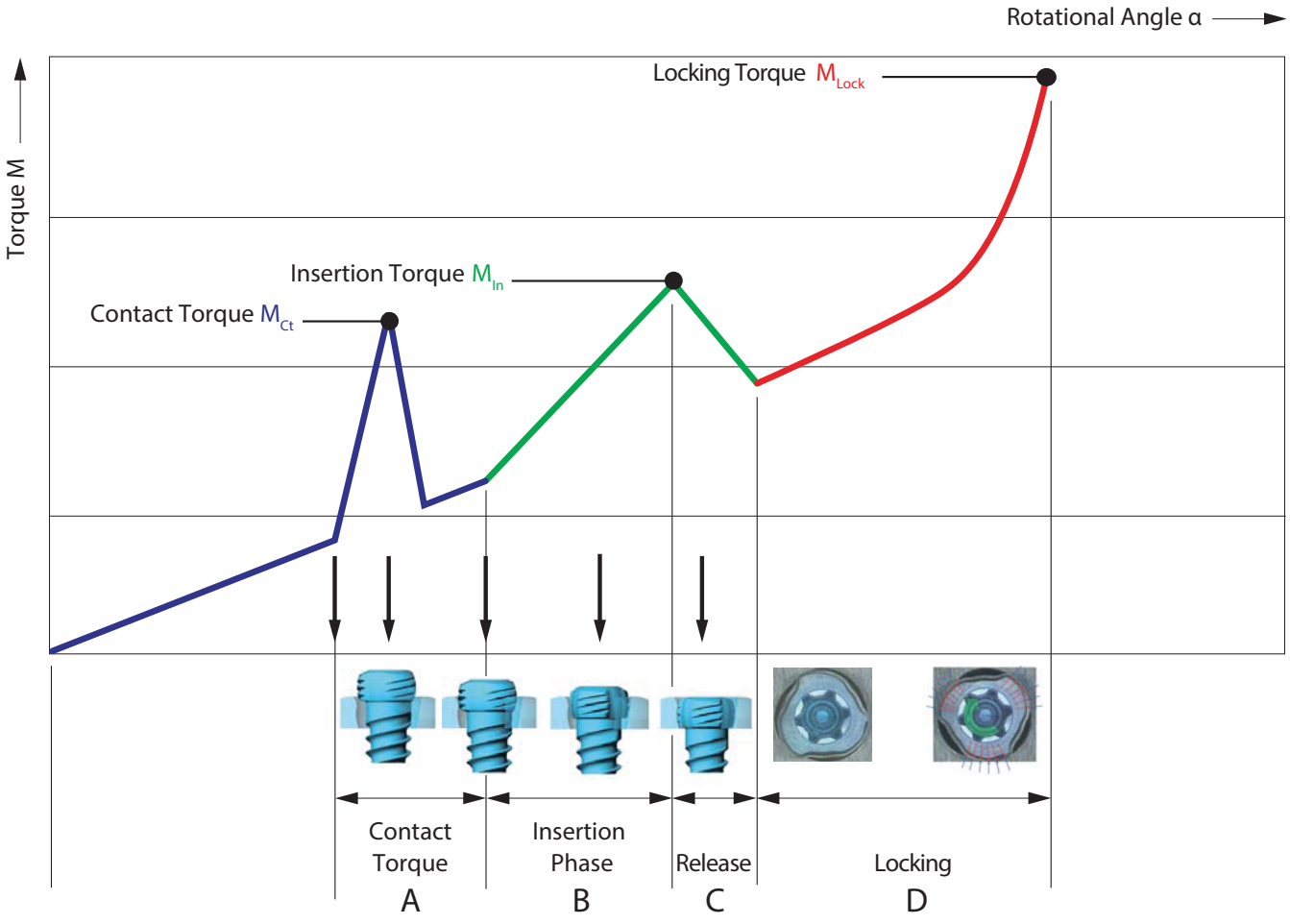
3.5 TriLock® Locking Technology

Correct Application of the TriLock Locking Technology

The screw is inserted through the plate hole into the pre-drilled bone. A “contact torque” will be felt once the screw head makes contact with the plate surface. This torque increase is easily perceived (section “A” in the diagram).

The torque then decreases before it starts increasing again during the “Insertion Phase”, as the screw head enters the locking hole (section “B” in the diagram).
Once the screw head has entered the locking hole, a second decrease of torque occurs (section “C” in the diagram). Finally, the actual locking is initiated (section “D” in the diagram) as a friction connection is established between screw and plate when tightening firmly. The torque applied in section “D” is decisive for the quality of the locking.

In summary, two intermediate torque maxima have to be overcome before the final locking of the screw.



Correct Locking (± 15°) of the TriLock Screws

Correct locking has occurred only when the screw head has locked flush with the locking contour (fig. 1 and 3).

However, if there is still a noticeable protrusion (fig. 2 and 4), the screw head has not completely entered the locking contour of the plate. In this case, the screw has to be retightened to obtain full penetration and proper locking. In case of poor bone quality a slight axial pressure might be necessary to achieve proper locking.

After having reached the locking torque (M_{Lock}), do not further tighten the screw, otherwise the locking function cannot be guaranteed anymore.

Correct: LOCKED

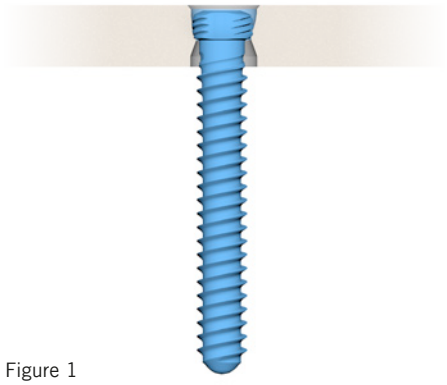


Figure 1

Incorrect: UNLOCKED

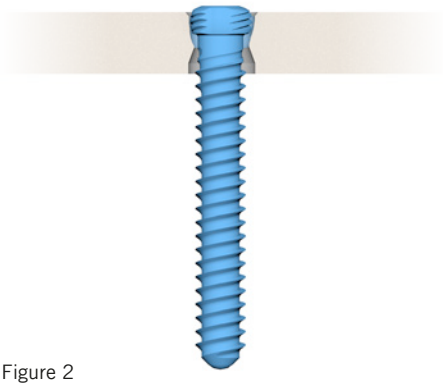


Figure 2

Correct: LOCKED

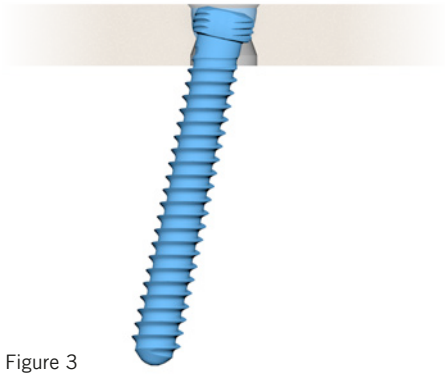


Figure 3

Incorrect: UNLOCKED

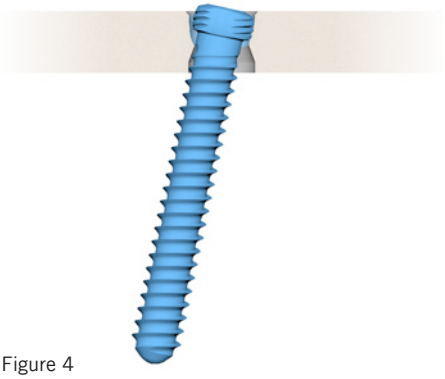


Figure 4

Appendix

Implants and Instruments

For detailed ordering information, please refer to the APTUS Ordering Catalog, also available at www.medartis.com

Plates and Staples

Art. No.
A-4090.01S
A-4090.02S
A-4090.03S
A-4090.04S
A-4655.01
A-4655.01S
A-4655.03
A-4655.03S
A-4655.08
A-4655.08S
A-4655.12
A-4655.12S
A-4655.13
A-4655.13S
A-4655.67
A-4655.67S
A-4655.68
A-4655.68S
A-4655.69
A-4655.69S
A-4700.70
A-4700.70/1
A-4700.70/1S
A-4750.70
A-4750.70/1
A-4750.70/1S
A-4850.01
A-4850.01S
A-4850.03
A-4850.03S
A-4850.08
A-4850.08S
A-4850.12
A-4850.12S
A-4850.13
A-4850.13S
A-4850.67
A-4850.67S
A-4850.68
A-4850.68S
A-4850.69
A-4850.69S

Art. No.
A-4850.70
A-4850.70S
A-4850.71
A-4850.71S
A-4860.10
A-4860.10S
A-4860.11
A-4860.11S
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A-4860.17
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A-4860.37
A-4860.37S
A-4950.71
A-4950.71S
A-4950.72
A-4950.72S
A-4950.73
A-4950.73S
A-4950.74
A-4950.74S
A-4950.75
A-4950.75S

Art. No.
A-4950.76
A-4950.76S

Screws

Art. No.
A-5411.10/1
A-5411.10/1S
A-5411.11/1
A-5411.11/1S
A-5411.12/1
A-5411.12/1S
A-5411.13/1
A-5411.13/1S
A-5417.10/1
A-5417.11/1
A-5417.12/1
A-5417.13/1
A-5450.06
A-5450.06/1
A-5450.06/1S
A-5450.07
A-5450.07/1
A-5450.07/1S
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A-5450.14/1S
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A-5450.16/1
A-5450.16/1S

Art. No.
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