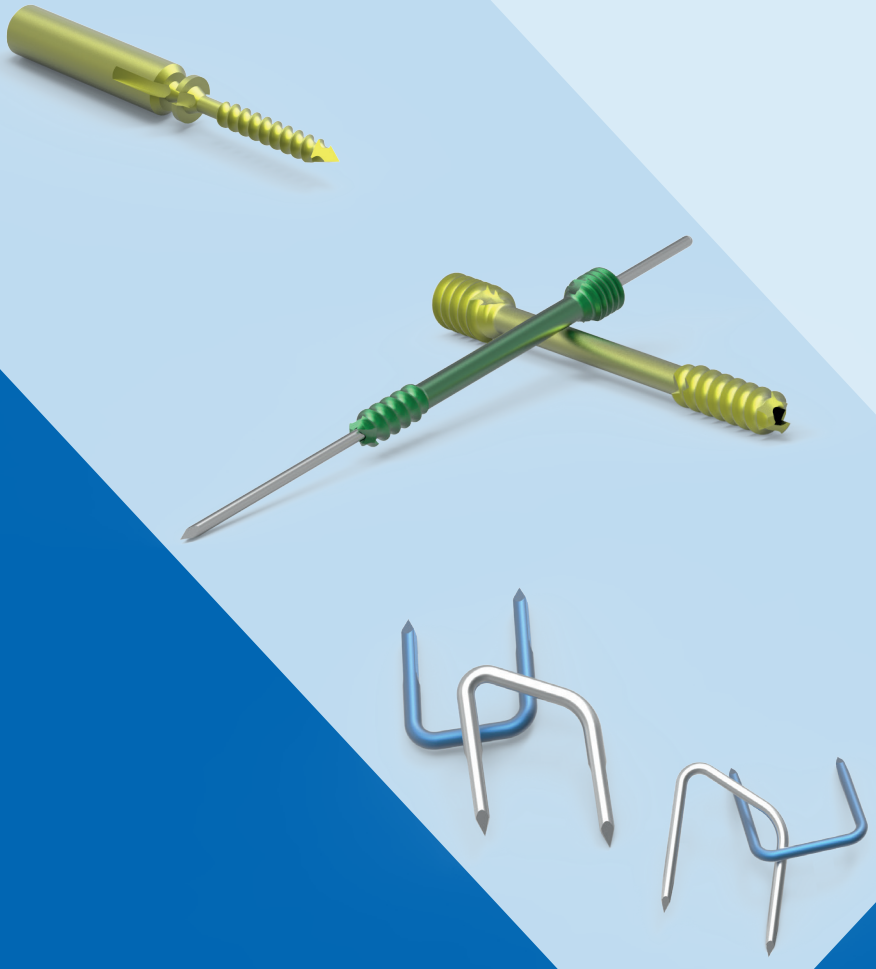
MARQUARDT
Medizintechnik



TWIN / CLICK OFF

▶ Table of Contents

Introduction	Product Specifications	2
	Indication CLICK OFF	2
	Indication TWIN 2.4	2
	Indication TIWN 3.0	2
	Indication Staple	2
Surgical Technique	CLICK OFF	3
	TWIN 2.4	4
	TWIN 3.0	6
	Staple	12
Product Informations	Implants	13
	Instruments	15
	MRI Safety Information	16

Note:

The surgical technique outlined below reflect the surgical procedure usually chosen by the clinical advisor. However, each surgeon must decide which surgical method and which approach is the most successful for his patient.

Introduction

Product Specifications

CLICK OFF

- Self-drilling
- Self-tapping
- Drill connection with predetermined breaking point

Indication:

Fixation of small bone fragments and osteotomies in the forefoot.

TWIN 2.4

- Compression due to different thread pitches at the screw head and at the screw tip
- Reverse cutting threads
- Colour coding: GREEN

Indication:

Fixation of fractures of small bone fragments, osteotomies and arthrodeses of small joints.

For example:

- Scaphoid fractures
- Metatarsal fractures
- Metacarpal fractures
- Fractures of the processus styloideus radii and ulnae
- Fractures of the proximal radius head
- Chevron and Akin osteotomy
- Arthrodesis of the distal interphalangeal joint

TWIN 3.0

- Compression due to different thread pitches at the screw head and at the screw tip
- Reverse cutting threads
- Colour coding: GOLD

Indication:

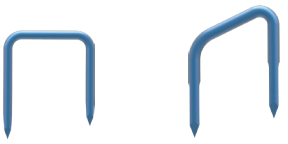
Fixation of fractures of small bone fragments and osteotomies and arthrodeses of small joints.

For example:

- Scaphoid fractures
- Scarf, Chevron and Akin osteotomy
- Arthrodesis of the first metatarsal phalangeal joint

Staples

- Straight 90° and angled 60°
- Different diameters: Ø 1.0 mm and Ø 1.6 mm
- Available in titanium and steel



Indication:

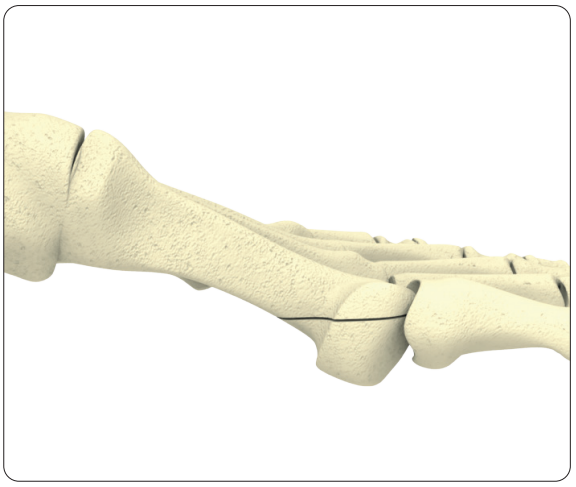
Fixation of osteotomies in the foot.

In particular for Akin osteotomy.

▶ Surgical Technique CLICK OFF

WEIL - Osteotomy

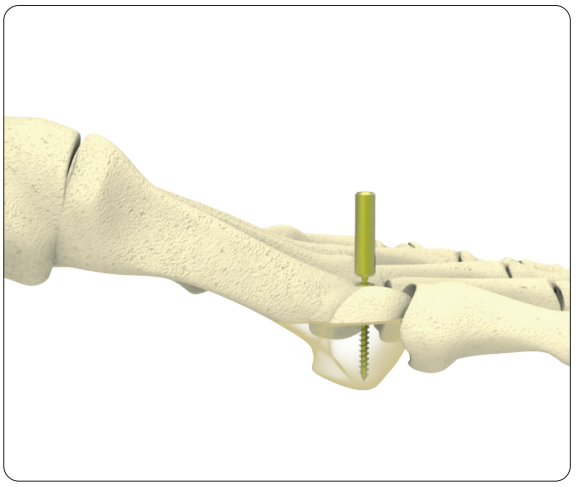
- The angled osteotomy should be performed extracapsularly in order to reduce the risk of arthrofibrosis.
- If necessary, a 1-2 mm thick bone disk can be removed in order to achieve strengthened dorsalisation of the metatarsal head.



Insertion of the CLICK OFF screw

Instruments

REF 12.20040.065	*Screwdriver shaft for CLICK OFF*
REF 11.90010.007	*K-wire Ø 1.0 mm, L 70 mm*

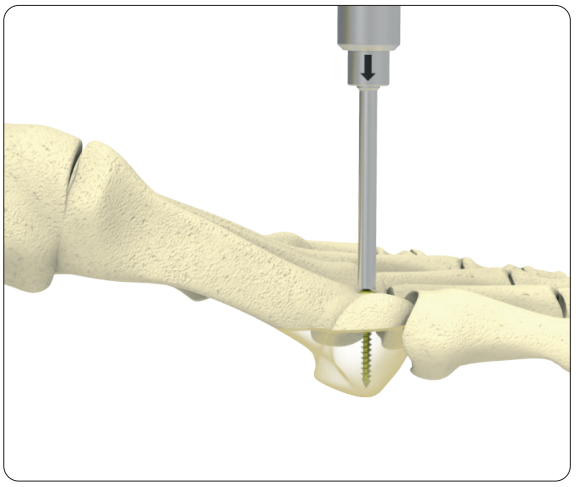


- The self-drilling, self-tapping CLICK OFF screw is screwed directly into the bone using the drilling machine. Pre-drilling with the K-wire is recommended for patients with extremely hard bone.
- When the cortical bone is reached, the osteotomy is fixed via the compression.
- The increasing torque due to the compression and the slight axial deflection of the drilling machine from the screw axis causes the head of the CLICK OFF screw to detach at the predetermined breaking point. For patients with very soft bone, it is recommended to loosen the predetermined breaking point 1 mm before the desired strength and to perform the last turns manually with the screwdriver shaft.
- If necessary, the screw can be screwed in further using the screwdriver shaft.
- Afterwards, protruding bone spurs are removed.

Removal of the CLICK OFF screw

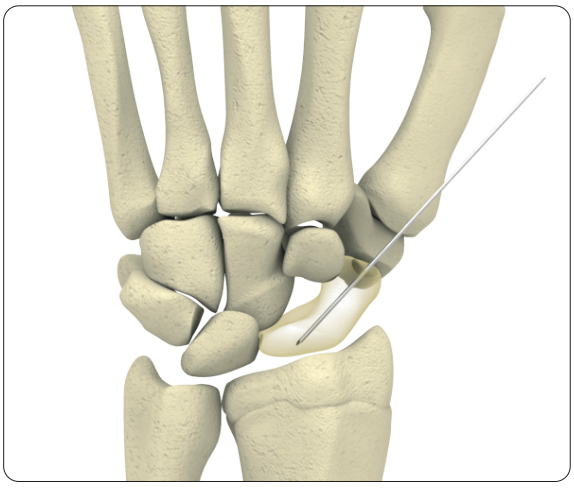
Instruments

REF 12.20040.065	*Screwdriver shaft for CLICK OFF*
REF 02.20050.010	*Handle with AO-Coupling*



- Removal or reimplantation of the CLICK OFF screw is performed using the screwdriver shaft with handle.

Surgical Technique TWIN 2.4



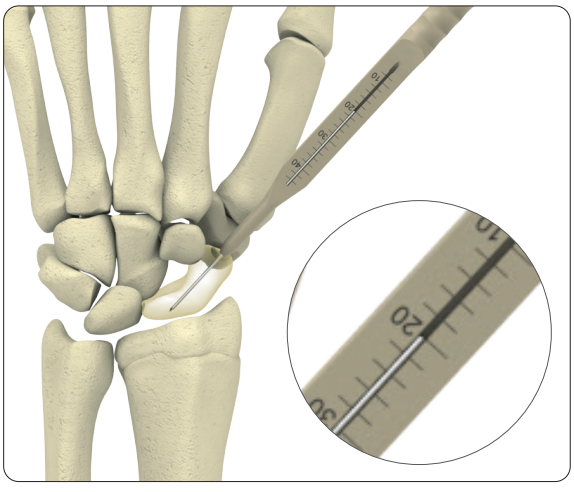
Hand - Scaphoid

Insertion of the K-wire

Instruments

REF 11.90008.070 *K-wire Ø 0.8 mm, L 70 mm*

- The K-wire is drilled under image intensification into the bone until the tip is anchored in the far cortex.
- To prevent bending of the K-wire, only slight pressure should be applied during insertion of the K-wire.

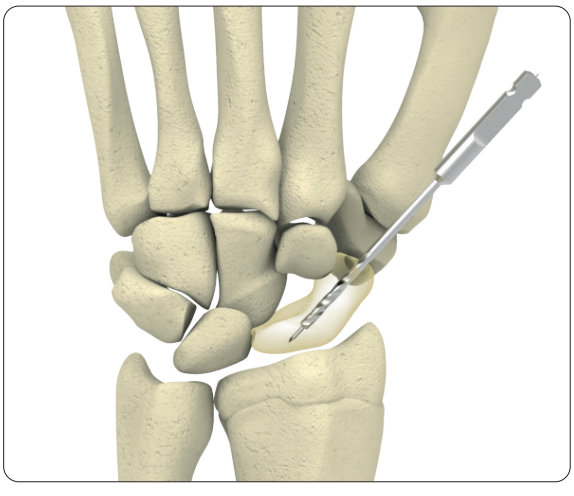


Measuring of the Screw Length

Instruments

REF 12.20100.060 *Length Determination Instrument for Kirschner Wires Ø 0.8 / 1.0 mm*

- The required screw length is determined using the length determination instrument.
- The end of the K-wire indicates the length of the required screw.



Drilling

Instruments

REF 12.20010.019(S) *Drill Bit Ø 1.9 mm*

REF 12.20030.060 *Countersink Ø 2.7 mm*

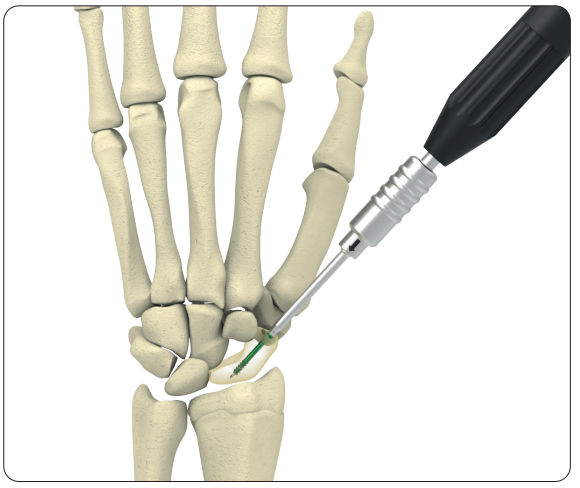
- The screw hole is pre-drilled using the drill bit via the K-wire.
- Afterwards, reaming is performed with the cannulated countersink via the K-wire.

Insertion of the TWIN 2.4

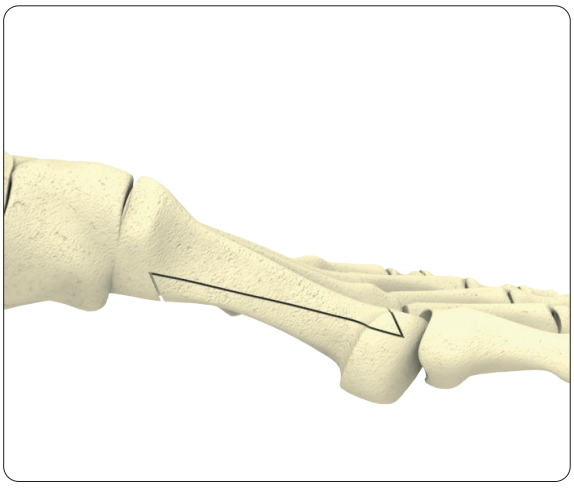
Instruments

REF 12.20040.007 *Screwdriver shaft, T7*
REF 02.20050.010 *Handle with AO-Coupling*

- Screwing in the compression screw via the K-wire using the screwdriver shaft with handle.

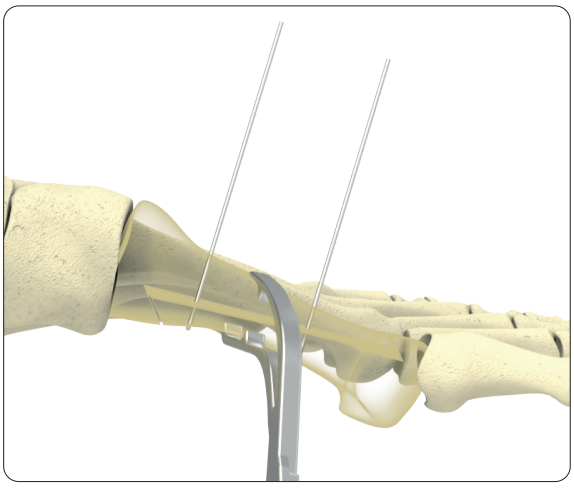


Surgical Technique TWIN 3.0



SCARF - Osteotomy

- As the first step, pseudo exostosis is removed.
- Next a Z-shaped osteotomy of the metatarsal I is performed.
- This is followed by repositioning through lateral displacement of the distal bone block.

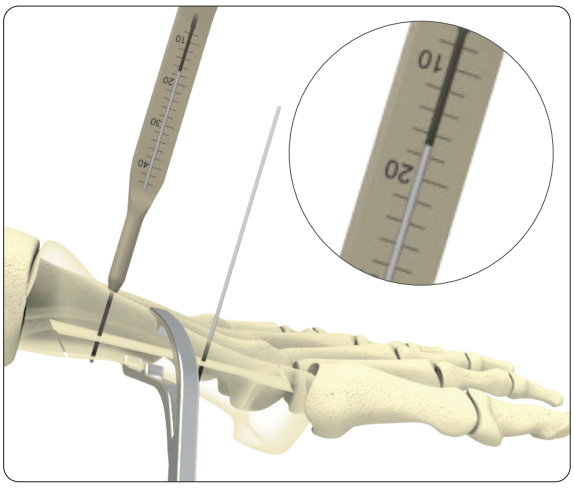


Insertion of the K-wire

Instruments

REF 11.90010.070	*K-wire Ø 1.0 mm, L 70 mm*
REF 12.20070.160	*Reduction forceps*

- Fixation of the osteotomy with the reduction forceps.
- Afterwards, the K-wires are inserted.



Measuring of the Screw Length

Instruments

REF 12.20100.060	*Length Determination Instrument for Kirschner Wires Ø 0.8 / 1.0 mm*

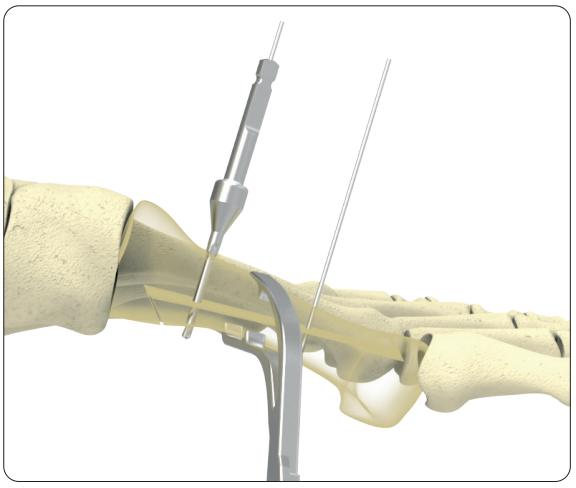
- The required screw length is determined using the length determination instrument.
- The end of the K-wire indicates the length of the required screw.

Drilling

Instruments

REF 12.20012.002 *Step reamer Ø 2.0/2.9 mm*

- The screw hole is pre-drilled using the cannulated step reamer via the K-wire.

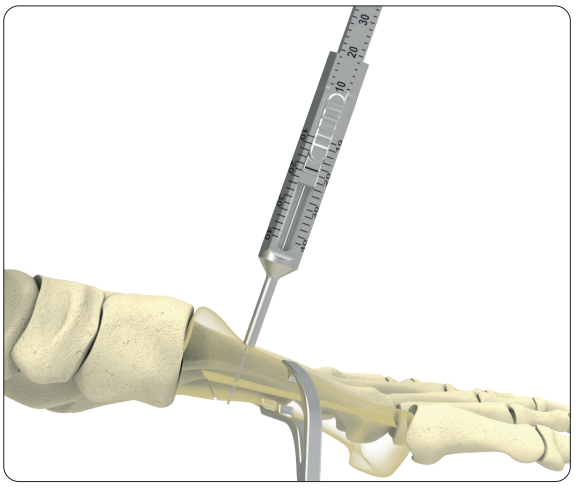


Measuring of the Screw Length – alternative method

Instruments

REF 02.20100.040 *Length Determination Instrument for Screws up to 40 mm*

- Alternatively, after drilling the length of the screw can also be determined using the length determination instrument.

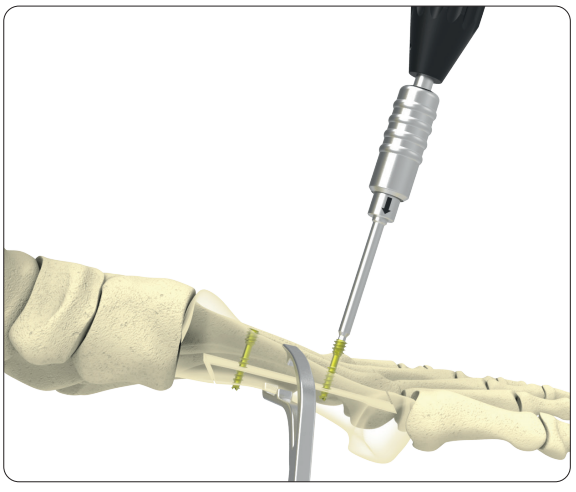


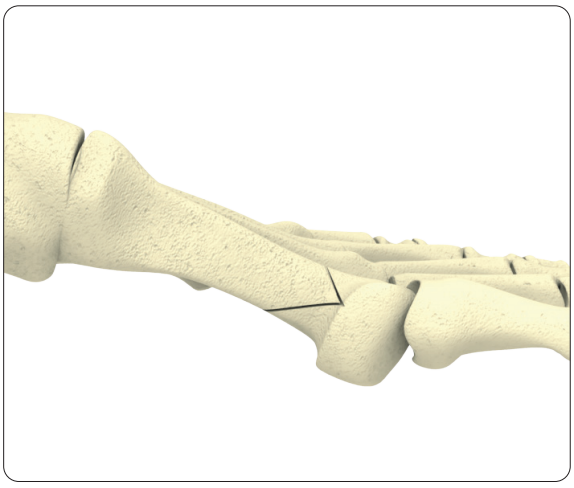
Insertion of the TWIN 3.0 mm

Instruments

REF 12.20040.002 *Screwdriver shaft, hex 2.0 mm*
REF 02.20050.010 *Handle with AO-Coupling*

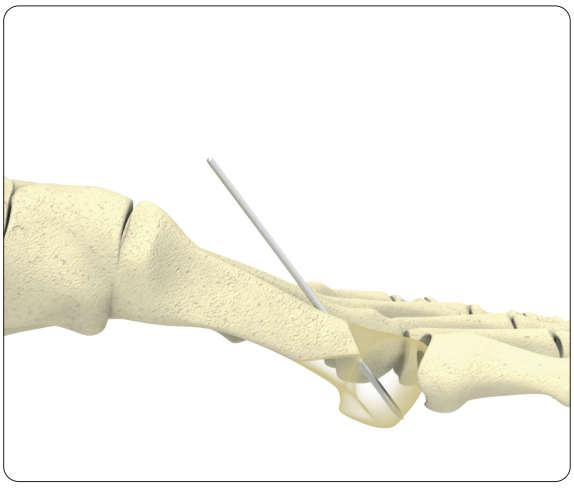
- Screwing in the compression screws via the K-wires using the screwdriver shaft with handle..





CHEVRON - Osteotomy

- As the first step, pseudo exostosis is removed.
- Afterwards, a V-shaped or L-shaped osteotomy of the head of the metatarsal I is performed.

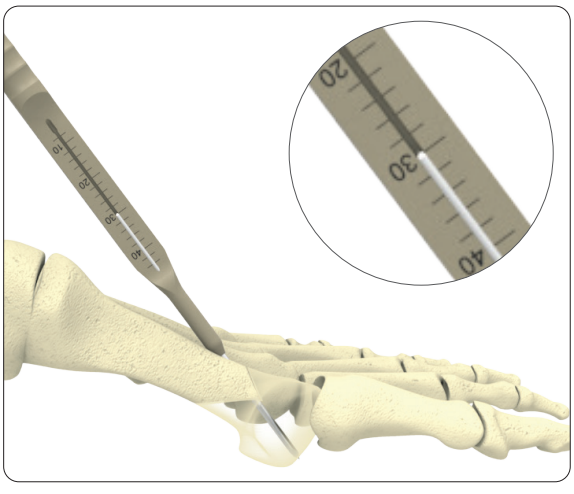


Insertion of the K-wire

Instruments

REF 11.90010.070 *K-wire Ø 1.0 mm, L 70 mm*

- Insertion of the K-wire up to the joint surface.



Measuring the Screw Length

Instruments

REF 12.20100.060 *Length Determination Instrument for Kirschner Wires Ø 0.8 / 1.0 mm*

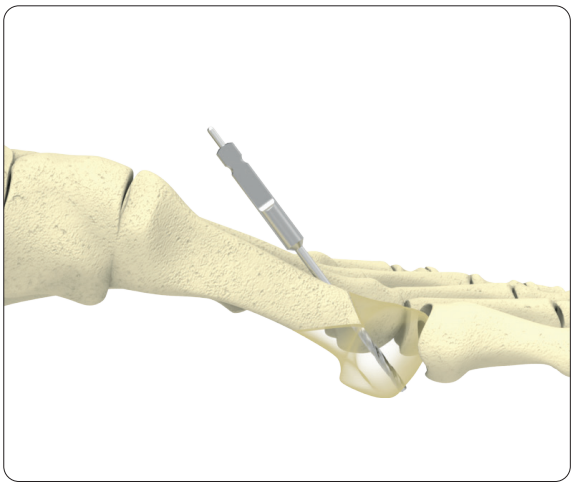
- The required screw length is determined using the length determination instrument.
- The end of the K-wire indicates the length of the required screw.
- The screw is normally chosen shorter than the measured result, so that the proximal part of the thread is fully embedded in the cortex and does not under any circumstances protrude in the joint.

Drilling

Instruments

REF 12.20010.002(S) *Drill bit Ø 2.0/1.0 mm*

- The screw hole is pre-drilled with the cannulated drill bit via the K-wire.

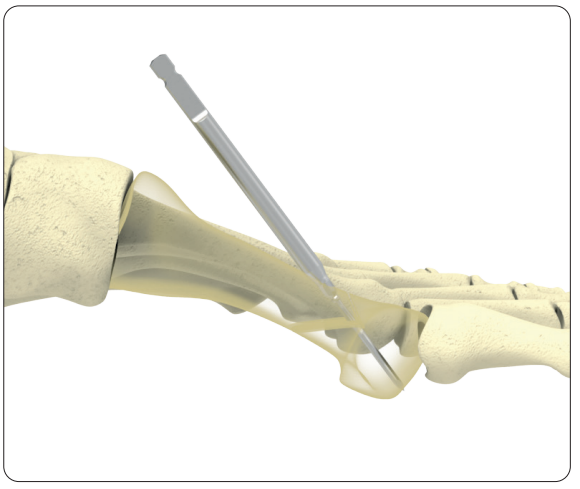


Drilling using the Countersink

Instruments

REF 12.20030.065 *Countersink Ø 2.9 mm*

- Afterwards, reaming is performed with the cannulated countersink via the K-wire.

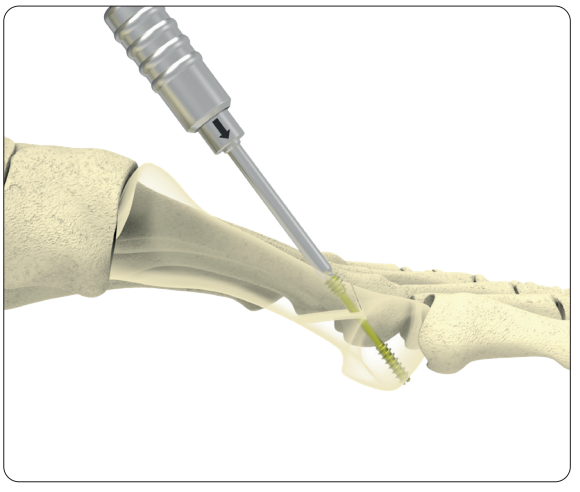


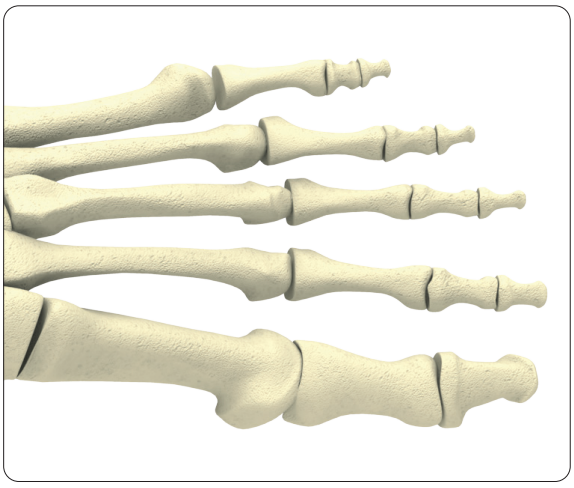
Insertion of the TWIN 3.0 mm

Instruments

REF 12.20040.002 *Screwdriver shaft, hex 2.0 mm*
REF 02.20050.010 *Handle with AO-Coupling*

- Screwing in the compression screws via the K-wires using the screwdriver shaft with handle.

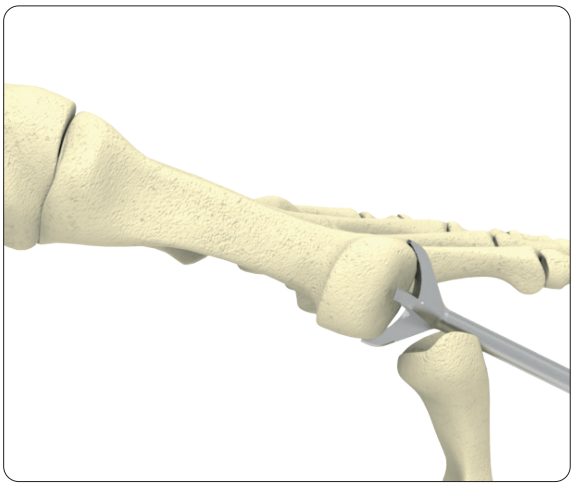




Arthrodesis of the MTP 1 joint

Access

- Dorsal longitudinal cut over the metatarsophalangeal joint of the hallux, approx. 4–5 cm.
- The tendon of the extensor hallucis longus muscle is retracted laterally.
- Separation of the joint capsule and presentation of the metatarsal head and the basis of the proximal phalanx.
- The joint capsule is preserved where possible and sutured during wound closure as a sliding layer between plate and extensor tendon.



Preparation of the metatarsophalangeal joint of the hallux: MT 1

Instruments

REF 12.20032.075	*Reamer for arthrodesis, concave, small*
REF 12.20033.075	*Reamer for arthrodesis, convave, large*
REF 11.90016.150	*K-wire Ø 1.6 mm, L 150 mm*

- Removal of the Osteophytes.
- The K-wire is inserted under plantar flexion of the phalanx into the metatarsal head and comes to rest centrally in the metatarsal I.
- A concave reamer is used to ream the joint surface of the metatarsal I until subchondral bone becomes visible.

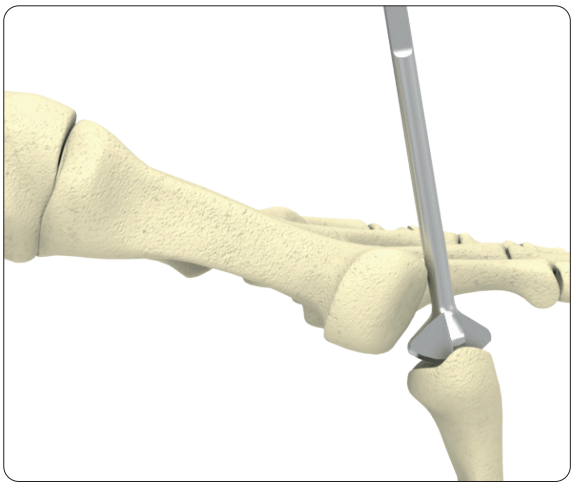
Note:

- If you are unsure about which size of reamer to use, start with a large reamer and then reduce the size if required.
- Only minor resection may be required for certain revision surgery. Reaming progress should be constantly monitored to prevent excessive shortening of the metatarsal I.

Preparation of the metatarsophalangeal joint of the Hallux: Phalanx

Instruments

REF 12.20030.075	*Reamer for arthrodesis, convex, small*
REF 12.20031.075	*Reamer for arthrodesis, convex, large*
REF 11.90016.150	*K-wire Ø 1.6 mm, L 150 mm*



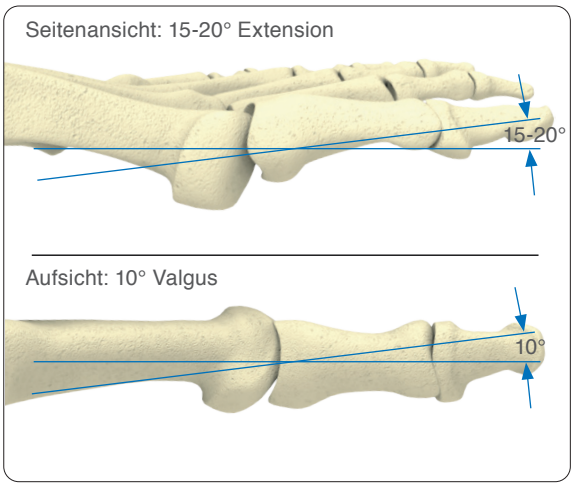
- Plantar flexion is preserved, and the K-wire is inserted in the proximal phalanx.
- The K-wire comes to rest centrally in the proximal phalanx.
- The joint surface of the phalanx is removed with a convex reamer.
- In order to obtain congruent surfaces, the same size of reamer should be used for this process as in the previous step described.

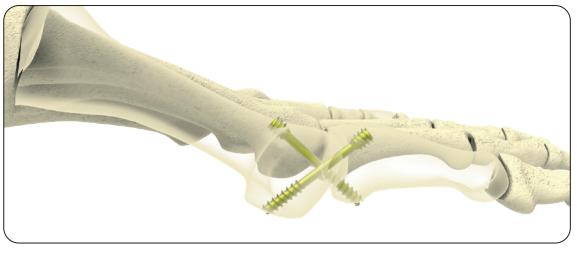
Note:

- The K-wire should not extend distally into the interphalangeal joint.
- During the reaming process, care must be taken to ensure that the metatarsal head is not damaged with the convex reamer.

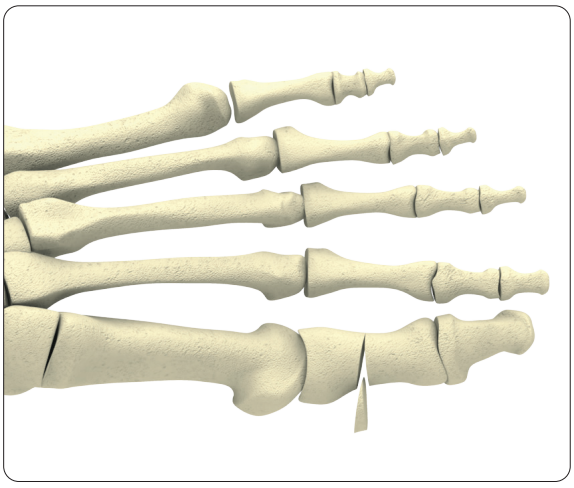
Positioning of the two Components

- Now the proximal phalanx is positioned in relation to the head at an angle of 15-20° extension and 10° valgus relative to the metatarsal I.
- The proximal phalanx has a conical shape, as a result of which the dorsal bone is impressed as a virtually planar surface.
- Furthermore, the plantar component should have sufficient dorsal extension.
- Under the image intensifier the position can be checked with two flat chisels.
- Once the correct position has been attained, temporary fixing is performed with a K-wire.
- The arthrodesis is fixed with 2 compression screws TWIN 3.0 that are inserted in a crossed arrangement.
- The screws are inserted as described above.





Surgical Technique Staple

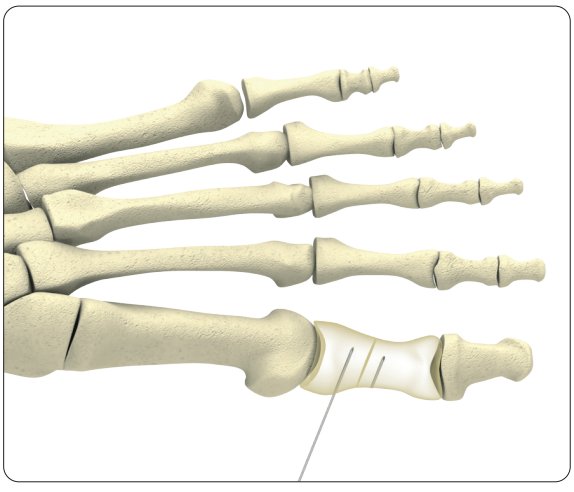


AKIN Procedure

Instruments

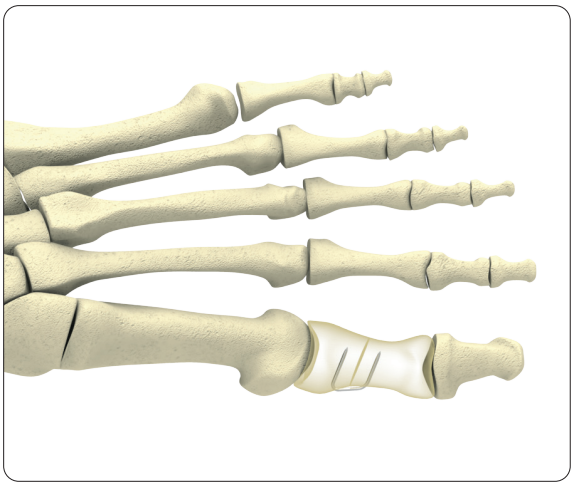
REF 11.90010.070	*K-wire Ø 1.0 mm, L 70 mm*
REF 11.90016.150	*K-wire Ø 1.6 mm, L 150 mm*

- Exposure of the proximal phalanx of the big toe.
- Exposure with 2 Hohmann retractors for protection of the flexor and extensor tendons.
- Insertion of the corresponding K-wire parallel to the base joint surface of the phalanx of the big toe. The lateral cortex is preserved here.
- Osteotomy is performed parallel to the inserted K-wire, and the lateral cortex likewise remains intact here.
- Based on the previously determined V-shaped portion of bone that needs to be removed, an angled osteotomy is performed distally of this.
- The V-shaped portion is then removed and the osteotomy is closed.



Drilling

- A bore is made approx. 4-5 mm distally of the osteotomy gap with the corresponding K-wire.
- Then the K-wire is removed.
- Alternatively, the staple can be inserted into the proximal hole.
- With the osteotomy folded closed, the correct distance can be marked with the staple tip.



Insertion of the Staple

Instruments

REF 12.20016.125	*Staple impactor basic unit*
REF 12.20016.135	*Impactor for staples 90°*
REF 12.20016.150	*Impactor for staples 60°*

- As the final step, the staple is inserted into both bores using the staple impactor basic unit.
- This results in stable osteosynthesis of the varisation osteotomy.

▶ Product Informations

Implants

Article Number	Length	Thread Length
12.03324.010S	10 mm	4 mm
12.03324.011S	11 mm	4 mm
12.03324.012S	12 mm	4 mm
12.03324.013S	13 mm	4 mm
12.03324.014S	14 mm	5 mm
12.03324.015S	15 mm	5 mm
12.03324.016S	16 mm	5 mm
12.03324.017S	17 mm	5 mm
12.03324.018S	18 mm	5 mm
12.03324.019S	19 mm	5 mm
12.03324.020S	20 mm	5 mm
12.03324.021S	21 mm	5 mm
12.03324.022S	22 mm	5 mm
12.03324.023S	23 mm	5 mm
12.03324.024S	24 mm	6 mm
12.03324.025S	25 mm	6 mm
12.03324.026S	26 mm	6 mm
12.03324.027S	27 mm	6 mm
12.03324.028S	28 mm	6 mm
12.03324.029S	29 mm	6 mm
12.03324.030S	30 mm	8 mm
12.03324.032S	32 mm	10 mm
12.03324.034S	34 mm	12 mm
12.03324.036S	36 mm	12 mm
12.03324.038S	38 mm	13 mm
12.03324.040S	40 mm	13 mm

TWIN Compression Screw Ø 2.4 / 3.2 mm

- Thread diameter: 2.4 / 3.2 mm
- Core diameter: 1.8 mm
- Pitch: 1.0 / 0.6 mm
- Hexalobe: T7
- Cannulation: 0.9 mm
- Material: Ti6Al4V

* All implants are also available in sterile. Therefor, add suffix "S" to article number.

TWIN Compression Screw
Ø 3.0 / 4.0 mm

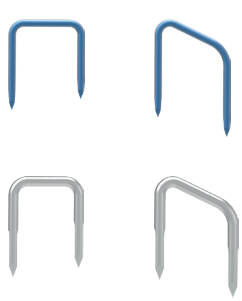
- Thread diameter: 3.0 / 4.0 mm
- Core diameter: 2.0 mm
- Pitch: 1.25 / 1.0 mm
- Hexagone: 2.0 mm
- Cannulation: 1.15 mm
- Material: Ti6Al4V

Article Number *	Length	Thread Length
12.03340.010	10 mm	5 mm
12.03340.012	12 mm	7 mm
12.03340.014	14 mm	7 mm
12.03340.016	16 mm	7 mm
12.03340.018	18 mm	7 mm
12.03340.020	20 mm	7 mm
12.03340.022	22 mm	10 mm
12.03340.024	24 mm	10 mm
12.03340.026	26 mm	10 mm
12.03340.028	28 mm	10 mm
12.03340.030	30 mm	10 mm
12.03340.034	34 mm	10 mm
12.03340.036	36 mm	10 mm
12.03340.038	38 mm	12 mm
12.03340.040	40 mm	12 mm

CLICK OFF Screw

- Thread diamter: 2.0 mm
- Pitch: 1.0 mm
- Material: Ti6Al4V

Article Number *	Screw Length
12.03402.010	10 mm
12.03402.011	11 mm
12.03402.012	12 mm
12.03402.013	13 mm
12.03402.014	14 mm
12.03402.015S	15 mm
12.03402.016S	16 mm
12.03402.017S	17 mm



Article Number *	Material	Diameter	Width	Angle
12.91009.012	Titanium	1.0 mm	10 mm	90°
12.91009.112	Titanium	1.0 mm	10 mm	60°
12.91511.016	Titanium	1.6 mm	12 mm	90°
12.91511.116	Titanium	1.6 mm	12 mm	60°

Article Number *	Material	Diameter	Width	Angle
12.90010.090	Stainless steel	1.0 mm	10 mm	90°
12.90010.060	Stainless steel	1.0 mm	10 mm	60°
12.90016.090	Stainless steel	1.6 mm	12 mm	90°
12.90016.060	Stainless steel	1.6 mm	12 mm	60°

* All implants are also available in sterile. Therefor, add suffix "S" to article number.

Instruments

11.90008.070 Kirschner Wire Ø 0.8 mm, trocar tip, L 70 mm

11.90010.070 Kirschner Wire Ø 1.0 mm, trocar tip, L 70 mm

11.90016.150 Kirschner Wire Ø 1.6 mm, trocar tip, L 150 mm

12.20010.002(S) Drill Bit Ø 2.0/1.0 mm, 3-flute, cannulated, AO-Coupling, L 65/35 mm

12.20010.019(S) Drill Bit Ø 1.9/0.9 mm, 3-flute, cannulated, AO-Coupling, L 70/40 mm

12.20012.002 Step Reamer Ø 2.0/2.9 mm with stop, cannulated, L 63/23 mm

12.20012.003 Step Reamer Ø 2.0/2.9 mm with stop, cannulated, short, L 53/13 mm

12.20040.002 Screwdriver Shaft, hex 2.0 mm, cannulated, AO-Coupling, L 65/35 mm

12.20040.007 Screwdriver Shaft, T7, cannulated, AO-Coupling, L 65/35 mm

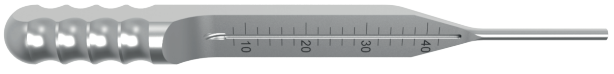
12.20040.065 Screwdriver Shaft for CLICK-OFF Screws, AO-Coupling, L 65/35 mm

12.20030.060 Countersink Ø 2.7 mm with stop, cannulated, AO-Coupling

12.20030.065 Countersink Ø 2.9 mm with stop, cannulated, AO-Coupling

02.20100.040 Length Determination Instrument, for Screws up to 40 mm

12.20100.060 Length Determination Instrument, for Kirschner Wires Ø 0.8/1.0mm x 70mm



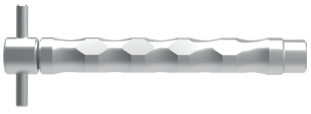
12.20030.075 Reamer for arthrodesis, convex, small

12.20031.075 Reamer for arthrodesis, convex, large

12.20032.075 Reamer for arthrodesis, concave, small

12.20033.075 Reamer for arthrodesis, concave, large

12.20016.125 Staple Impactor Basic Unit



12.20016.135 Impactor for Staples 90°

12.20016.150 Impactor for Staples 60°

02.20050.010 Handle with AO Coupling

02.20120.015 Screw Forceps, self-holding

12.20070.160 Reduction Forceps

Optional

12.20060.016 Drill Guide 1.0/1.6 for Staples

12.20061.007 Saw Guide for Chevron Osteotomie, 0.7 mm

MRI Safety Information

Non-clinical testing has demonstrated that the screw range from Marquardt Medizintechnik is MR Conditional in accordance with the ASTM F2503-20 standard definitions. A patient with this device can be safely scanned in an MR system meeting the following conditions:

- Cylindrical-bore
- Horizontal magnetic field (B_0)
- Spatial field gradient lower than or equal to
  - **1.5 T:** 23.45 T/m (2345 G/cm)
  - **3.0 T:** 11.75 T/m (1175 G/cm)
- Radiofrequency (RF) field exposure:
  - RF excitation: Circularly Polarized (CP)
  - RF transmit coil: whole-body transmit coil
  - RF receive coil type: whole-body receive coil
  - Maximum permitted whole-body averaged specific absorption rate (SAR): Normal Operating Mode, 2 W/kg.
  - Scan duration and wait time:

    1.5 T: 2 W/kg whole-body average SAR for **10min and 55s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **10min and 55s** if this limit is reached.

    3.0 T: 2 W/kg whole-body average SAR for **7min and 54s** of continuous RF (a sequence or back-to-back series/scan without breaks) followed by a wait time of **7min and 54s** if this limit is reached.
- The screws are expected to produce a maximum temperature rise of 6.2 °C at 1.5 T and 6.5 °C at 3 T both after the scanning periods presented above.
- The presence of this implant may produce an image artifact. Some manipulation of scan parameters may be needed to compensate for the artifact. In non-clinical testing, the image artifact caused by the device extends approximately 83 mm from the device edge when imaged with a spin echo pulse sequence and 65 mm with a gradient echo, both at 1.5 T.
- Patients with uncompromised thermoregulation and under uncontrolled conditions or patients with compromised thermoregulation (all persons with impaired systemic or reduced local thermoregulation) and under controlled conditions (a medical doctor or a dedicated trained person can respond instantly to heat induced physiological stress).

Note:

Undergoing an MRI scan, there is a potential risk for patients with a metallic implant. The electromagnetic field created by an MRI scanner can interact with the metallic implant, resulting in displacement of the implant, heating of the tissue near the implant, or other undesirable effects.

Release date: 04.03.2024 • 12.99100.002 • Rev.: 009/00

MARQUARDT
Medizintechnik

Dieter Marquardt Medizintechnik GmbH

Robert-Bosch-Straße 1 • 78549 Spaichingen, Germany
Telefon +49 7424 9581-0 • Telefax +49 7424 501441
info@marquardt-medizintechnik.de • www.marquardt-medizintechnik.de

CE 0297