MICA™

Minimally Invasive Foot Surgery

CHEVRON OSTEOTOMY SURGICAL TECHNIQUE

WRIGHT™

FOCUSED EXCELLENCE

Contents

Wright recognizes that proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training, experience, and patient condition. Prior to use of the system, the surgeon should refer to the product Instructions For Use package insert for additional warnings, precautions, indications, contraindications and adverse effects. Instructions For Use package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this surgical technique and the Instructions For Use package inserts are available on wright.com under the link for Prescribing Information.

Please contact your local Wright representative for product availability.

chapter 1

Introduction

| FIGURE 1
MICA™ Fully Threaded Screw

The MICA™ Screw System is a cannulated fully-threaded titanium alloy screw system that is indicated for use in bone reconstruction, osteotomy, arthrodesis, joint fusion, fracture repair, and fracture fixation of bones appropriate for the size of the device. With self-drilling and self-tapping headless compression screws | **FIGURE 1** in diameters of 3.0mm and 4.0mm (**Table 1**), the MICA™ Screw System provides extensive versatility for surgical procedures of the foot within one comprehensive system.

TABLE 1: AVAILABLE DIAMETERS AND LENGTHS

HEADLESS SCREWS

Diameter	Screw Lengths
3.0mm	32mm, 34mm, 36mm, 38mm, 40mm, 42mm, 44mm, 46mm, 48mm
4.0mm	38mm, 40mm, 42mm, 44mm, 46mm, 48mm, 50mm, 52mm, 54mm, 56mm, 58mm, 60mm

System Basics

- The MICA™ Screw System offers the simplicity of self-tapping cannulated compression screws in 3.0mm and 4.0mm diameters.
- All MICA™ Screws are manufactured from titanium alloy (Ti 6Al-4V) to provide consistent strength.
- Screws are color-coded by diameter to easily identify associated instrumentation (**Table 2**).
- Pilot Drills, Countersinks, and Drivers have corresponding color-coded banding to match screw diameter, simplifying the pairing of instrumentation with screw selection. **| FIGURE 2**
- Cannulated drill bits are included for use in hard cortical bone, when an oblique approach is desired, or when bicortical fixation is required.
- Cannulated Countersinks are provided to recess screw heads into the cortex of the bone.

| FIGURE 2
Colored banding on the pilot drill, driver and countersink simplifies identification with screw size.

TABLE 2: HEADLESS SCREWS

Screw Diameter	Color	Pilot Drill	Countersink	Driver	K-wire
3.0mm	Brown	2.2mm	2.8mm	2.0mm Hex	0.9mm
4.0mm	Blue	3.0mm	4.0mm	2.5mm Hex	1.4mm

chapter 2

Indications and Warnings

Indications

The MICA™ Screw is indicated for fixation of bone fractures or for bone reconstruction. Examples include:

- Mono or Bi-Cortical osteotomies in the foot or hand
- Distal or Proximal metatarsal or metacarpal osteotomies
- Weil osteotomy
- Fusion of the first metatarsophalangeal joint and interphalangeal joint
- Fixation of osteotomies for Hallux Valgus treatment (such as Scarf, Chevron, etc.)
- Akin type osteotomy
- Arthrodesis base first metatarsal cuneiform joint to reposition and stabilize metatarsus varus primus
- Calcaneus/cuboid arthrodesis
- Talar/navicular arthrodesis

Contraindications

General Surgical Contraindications:

- Infection;
- Physiologically or psychologically inadequate patient;
- Irreparable tendon system;
- Possibility for conservative treatment;
- Growing patients with open epiphyses;
- Patients with high levels of activity.

Prior to use of the system, the surgeon should refer to the product instructions for use package insert for warnings, precautions, indications, contraindications and adverse effects. Instructions for use package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this surgical technique and the instructions for use package inserts are available on wright.com under the link for Prescribing Information.

Patient Positioning and Set Up

3

NOTE: Patient positioning based on right handed Health Care Professional.

Patient positioning equipment set-up is extremely important when performing any MICA™ procedure.

The patient's feet should be positioned off the end of the table, enabling ease of access for x-ray, thereby allowing biplanar x-ray views throughout the procedure. **| FIGURE 3**

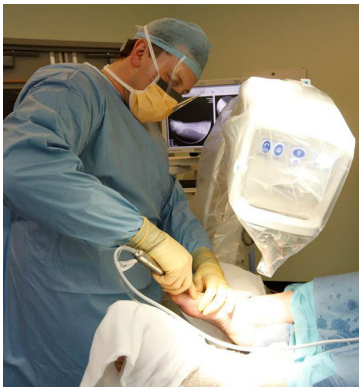
The x-ray itself should come in from the patient's right allowing rotation of the c-arm to achieve Anterior-Posterior and Lateral views of each foot. **| FIGURE 4**

The Burr Machine is positioned to the patient's left. **| FIGURE 5**

This set-up enables free movement of the surgeon around the patient's feet, to either stand at the side or end of the table as the operation demands. The position of the equipment is independent of whether the operative side is left or right. **| FIGURE 6** The positioning of equipment can be mirrored for a left-handed surgeon.

| FIGURE 3

| FIGURE 4



| FIGURE 5

| FIGURE 6

Surgical Technique

4

Chevron Osteotomy

2mm x 20mm MICA Burr (57SR0220)

Patient Presentations:

Hallux valgus deformity

Surgical Approach

01SM64
MICA™ Blade

57S0MI06
MICA™ Blade Handle
(part of a set)

Using the MICA™ Blade (01SM64), a stab incision is placed over the dorso-medial aspect of the proximal edge of the 'flare' of the medial eminence. The placement of this incision is vital.

The incision must avoid the dorso-medial cutaneous nerve to the Hallux; if palpable, this nerve should be marked before placing the incision.

57S0MI06
Straight Periosteal Elevator
(part of a set)

Once the incision is made, the Straight Periosteal Elevator (57S0MI06) is used to carefully create a working area for the burr. This is created over the dorsal surface of M1 but not on the plantar surface, as this may risk damage to the blood supply of the M1 head.

Osteotomy with Burr

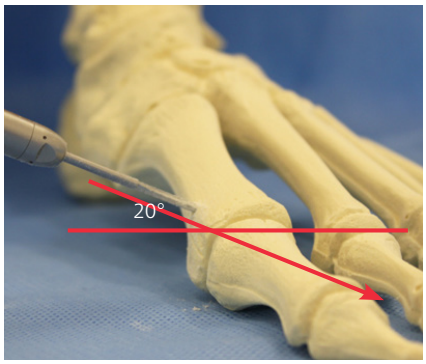
2mm x 20mm MICA™ Burr (57SR0220)

57SR0220
2mm x 20mm MICA™ Burr

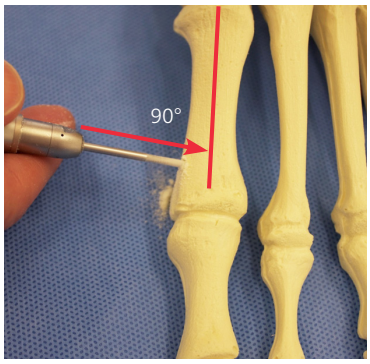
The plane of the osteotomy is defined by the entry cut of the burr into the metatarsal. It is from this entry cut that the dorsal and plantar limbs of the chevron are then made. In other words, this first entry of the burr creates the apex of the chevron.

It must be noted that the osteotomy will remove 2mm of bone. This needs to be accounted for when deciding on the plane of the osteotomy. The Burr (57SR0220) should generally be perpendicular to the first metatarsal and angled approximately 20° plantarly, allowing for any lost length and height to be regained when lateralizing the metatarsal head. It is wise to view initial osteotomy planes under x-ray. **| FIGURES 7 AND 8**

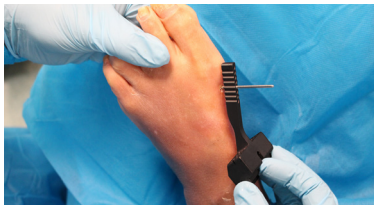
NOTE: Burrs were designed to be used at 6000 RPM. Higher rotation could cause increased risk of bone necrosis or soft tissue damage.



| FIGURE 7

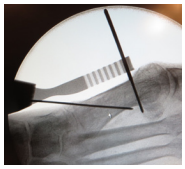


| FIGURE 8

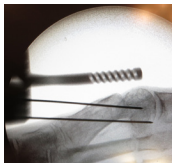


| FIGURE 9

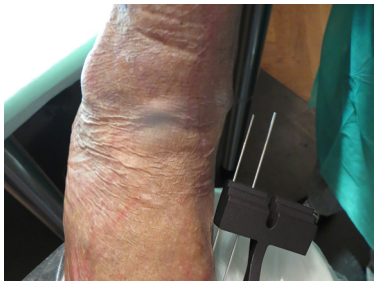
| FIGURE 10



| FIGURE 11



| FIGURE 13



| FIGURE 12

| FIGURE 14

Targeting Guide (57700001)

NOTE: Two different styles of targeting guide are available for use with this system. If using the first (57700001), follow the directions for use below. If using the second (57700011), follow the directions for use following the Osteotomy section below.

Once the correct plane has been determined, insert the 2 X 20mm MICA™ Burr (57SR0220) into the medial cortex. Once the burr has exited the lateral cortex, stop and remove the hand piece from the burr.

Then, place the Targeting Guide (57700001) over the burr and place the k-wire alignment holes proximal of the TMT1 joint. **| FIGURE 9**

NOTE: The more dorsal alignment holes can be used as an external visual check of your k-wire positioning. **| FIGURE 10**

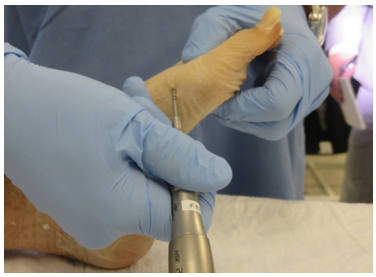
Using x-ray guidance, insert the 1.4mm k-wire (DSDS1014S) through the Targeting Guide in the preferred plane and direction, and into the base of the first metatarsal.

The 1.4mm wire should exit proximal to the burr and then be left *in situ*. **| FIGURE 11** A 0.9mm k-wire (DSDS1009S) is then inserted using the Targeting Guide. This wire should be distal and parallel to the 1.4mm k-wire. Again, this wire is inserted proximal to the Burr and left *in situ* until the osteotomy and lateralization are completed. **| FIGURES 12 and 13**

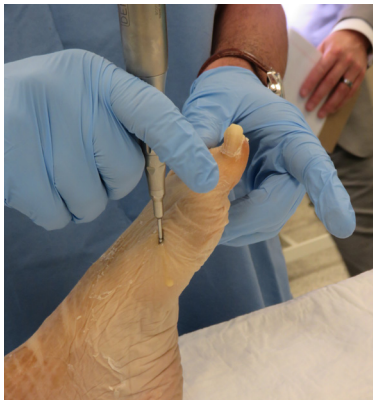
The Burr (57SR0220) is now removed from the metatarsal and the Targeting Guide can slide off the k-wires. **| FIGURE 14**

57700001
Targeting Guide

| FIGURE 15



| FIGURE 16



| FIGURE 17

Osteotomy with Burr

The dorsal osteotomy is the first limb to be created. Insert the 2 x 20mm MICA™ burr (57SR0220) into the stab incision portal and bi-cortical osteotomy hole. **| FIGURE 15**

Once the burr exits the lateral cortex of the metatarsal, rotate and lift the hand piece so that the burr cuts dorsally until you have completed the dorsal limb of the osteotomy. **| FIGURE 16**

NOTE: Is it important to rotate AND lift while cutting to both prevent any thermal injury to the skin/soft tissues, and prevent plantar extension of the osteotomy on the near cortex. Imagine the skin portal as the fulcrum point for rotation.

The Plantar limb is created by placing the burr back to the original bi-cortical position. Then, under controlled power, slowly translate the burr plantarly and at the same time rotate the hand piece dorsally and laterally (so the burr moves in a plantar medial direction) until the burr exits the medial cortex. **| FIGURE 17**

NOTE: After completing the Plantar osteotomy, the hand piece should be dorsal to the Hallux to ensure the burr has fully exited the medial cortex of the metatarsal.

Once the cut is complete (confirmed by the motion at the osteotomy site), the metatarsal head can be displaced along its defined plane. Displacement is achieved by placing the Straight Periosteal Elevator (57S0MI06), Elevator (57700002) or First Met Translator (577000MT) through the existing portal, into the diaphysis of the proximal fragment and levering the distal fragment laterally. **| FIGURE 18**

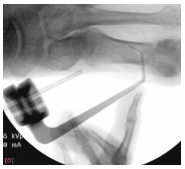
NOTE: Care must be taken not to fracture the medial cortex of the proximal fragment. To avoid this, make sure the elevator is inserted sufficiently deeply into the diaphysis.

***NOTE: Elevation of the metatarsal head is avoided by ensuring that the straight periosteal elevator remains directly over the medial eminence during displacement.* | FIGURE 18**

57700002
Elevator

577000MT
First Met Translator

| FIGURE 18



| FIGURE 19

| FIGURE 20

| FIGURE 21

| FIGURE 22

| FIGURE 23

| FIGURE 24

57700011
Target Guide

57700214
K-Wire Sleeve 1.4mm

57700209
K-Wire Sleeve 0.9mm

Target Guide (57700011)

Place the Target Guide (57700011) into the osteotomy and orient so that the tip is located at the desired exit point of the 4mm MICA™ Screw. **| FIGURE 19**

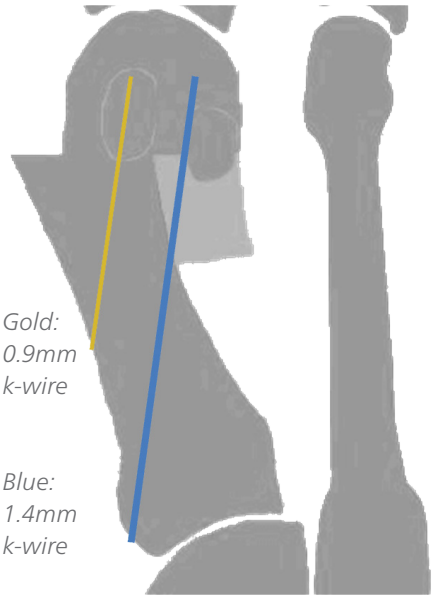
NOTE: The more dorsal alignment holes can be used as an external visual check of your k-wire positioning.

Insert a 1.4mm K-Wire Sleeve (57700214) into the lateral hole of the Target Guide. Use the MICA™ Blade to create a small incision through which to insert the K-Wire Sleeve. Advance the Sleeve until the tip contacts the medial aspect of the first metatarsal. Insert a 1.4mm K-Wire (DSDS1014S) through the K-Wire Sleeve and into the base of the first metatarsal. K-Wire advancement should be stopped just short of the osteotomy. **| FIGURE 20** Insert a 0.9mm K-Wire Sleeve (57700209) into the medial hole of the Target Guide. A 0.9mm K-Wire (DSDS1009S) is then inserted through the 0.9mm K-Wire Sleeve until the tip is just proximal to the osteotomy. **| FIGURE 21** Both sleeves are now removed from the Target Guide. **| FIGURE 22** The Guide may be removed from the foot by rotating medially so that the K-Wires slide through the slot in the Target Guide, and then rotating the Target Guide dorsally to remove the tip from the incision site. **| FIGURE 23**

As described previously, once the Target Guide is removed, the osteotomy may be displaced laterally using the Straight Periosteal Elevator, Elevator, or First Met Translator by inserting the tip through the existing portal, into the diaphysis of the proximal fragment and levering the distal fragment laterally. **| FIGURE 24**

Fixation of the Osteotomy

The osteotomy is fixed internally with 2 cannulated screws.



Gold: 0.9mm k-wire

Blue: 1.4mm k-wire

| FIGURE 25

STEP 1 – K-WIRE
Once the lateralization and plantarization have been achieved, drive the 1.4mm and 0.9mm k-wires into the metatarsal head. (These are already positioned from targeting step).

***NOTE: The proximal/lateral 1.4mm k-wire should sit in the lateral half of the metatarsal head and the distal/medial 0.9mm wire should sit in the medial half of the metatarsal head. Both 1.4mm and 0.9mm k-wires should not breach the MTP Joint.* | FIGURE 25**

| FIGURE 26

577000DG
MICA™ Depth Gauge

57S00030
3.0mm Cannulated Drill

57S00022
2.2mm Cannulated Drill

57S01040
4.0mm Countersink

DSDS1028S
2.8mm Countersink

57S00122
2.2mm Solid Drill

57S00130
3.0mm Solid Drill

57S02025
2.5mm Hex Driver

57S02020
2.0mm Hex Driver

STEP 2 – MEASURE
Use the MICA™ Depth Gauge (577000DG) to determine which size 4mm MICA™ screw is needed for the proximal/lateral 1.4mm k-wire. Repeat for the distal/medial 3mm MICA™ screw to be placed over the 0.9mm k-wire. | **FIGURE 26**

STEP 3 – DRILL
For the 4mm MICA™ Screw, use the 3.0mm Cannulated Drill (57S00030) and the 4.0mm Countersink (57S01040).

For the 3mm MICA™ screw, use the 2.2mm Cannulated Drill (57S00022) and the 2.8mm Countersink (DSDS1028S).

NOTE: Alternatively, non-cannulated drills are available. 2.2mm (57S00122) for the 3.0mm MICA™ Screw and 3.0mm (57S00130) for the 4.0mm MICA™ Screw.

NOTE: For greater security, it is recommended to pass the k-wire distally through the skin and attach it to a clip to prevent it from getting stuck in the cannulated drills.

| FIGURE 28

STEP 4 – SCREW
The 4mm MICA™ screw will be inserted over the 1.4mm k-wire using the 2.5mm Hex Driver (57S02025) attached to the Handle (45765001).

The 3mm MICA™ screw will be inserted over the 0.9mm k-wire using the 2.0mm Hex Driver (57S02020), attached to the Handle (45765001). | **FIGURE 27**

| FIGURE 27

Insert each screw until the angled head is flush with the medial aspect of the first metatarsal. | **FIGURE 28**

NOTE: It is important to remember to align the line on the Hex Driver with the beveled head of the MICA™ screw to allow for greater control when inserting the screw. This alignment allows the user to determine when the MICA™ screw is seated flush. X-ray will also confirm this.
| **FIGURE 29**

| FIGURE 29

45765001
Handle

Lateral Release

If required, this is performed through a stab incision over the lateral extreme of the dorsal aspect of the 1st MTP joint line.

The MICA™ Blade (01SM64) is angled parallel to the joint, with the blade facing laterally, so as not to damage the articular surfaces. The blade is then deepened towards the plantar lateral aspect of the 1st MTPJ. **| FIGURE 30**

The lateral head of the Flexor hallucis brevis (lateral sesamophalangeal ligament) is divided on the plantar aspect of the joint. **| FIGURE 31** This is a thickening of the plantar lateral capsule of the joint (plantar plate) and has a gritty quality when cut. Do not continue the cut laterally, otherwise the lateral collateral ligament will be cut.

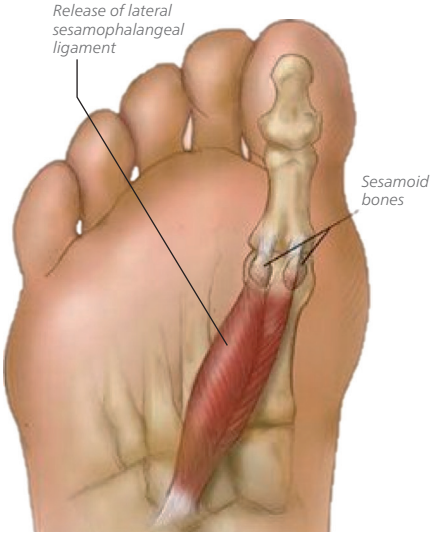
The x-ray may help to guide the MICA™ Blade (01SM64) positioning and a varus movement of the hallux against the correctly positioned blade completes the cut.

X-ray views are helpful to confirm the release by observing a static lateral sesamoid on varus movement of the hallux.

In mild to moderate Hallux valgus deformities, this is usually sufficient release of the lateral soft tissues.

Depending on surgeon preference, with greater deformities, the adductor hallucis and the sesamoid-metatarsal ligament can also be divided.

| FIGURE 30 MICA™ blade position



| FIGURE 31

Explant Information

Removal of the 3.0mm screw may be performed by using the 2.0mm Hex Driver (57S02020).

Removal of the 4.0mm screw may be performed by using the 2.5mm Hex Driver (57S02025).

If removal of the implant is required due to revision or failure of the device, the surgeon should contact the manufacturer using the contact information located on the back cover of this surgical technique to receive instructions for returning the explanted device to the manufacturer for investigation.

POSTOPERATIVE MANAGEMENT
Postoperative care is the responsibility of the medical professional.

Ordering Information

MICA™ Screws

Part Number	Description
3.0mm MICA™ Screws	
57S13032	MICA™ Screw 3.0mm x 32mm
57S13034	MICA™ Screw 3.0mm x 34mm
57S13036	MICA™ Screw 3.0mm X 36mm
57S13038	MICA™ Screw 3.0mm X 38mm
57S13040	MICA™ Screw 3.0mm X 40mm
57S13042	MICA™ Screw 3.0mm X 42mm
57S13044	MICA™ Screw 3.0mm X 44mm
57S13046	MICA™ Screw 3.0mm X 46mm
57S13048	MICA™ Screw 3.0mm X 48mm
4.0mm MICA™ Screws	
57S34038	MICA™ Screw 4.0mm X 38mm
57S34040	MICA™ Screw 4.0mm X 40mm
57S34042	MICA™ Screw 4.0mm X 42mm
57S34044	MICA™ Screw 4.0mm X 44mm
57S34046	MICA™ Screw 4.0mm X 46mm
57S34048	MICA™ Screw 4.0mm X 48mm
57S34050	MICA™ Screw 4.0mm X 50mm
57S34052	MICA™ Screw 4.0mm X 52mm
57S34054	MICA™ Screw 4.0mm X 54mm
57S34056	MICA™ Screw 4.0mm X 56mm
57S34058	MICA™ Screw 4.0mm X 58mm
57S34060	MICA™ Screw 4.0mm X 60mm

MICA™ Instruments

Part Number	Description
Sterile Consumable Instruments	
DSDS1009S	K-Wire MICA™ 0.9 X 150mm Sterile
DSDS1014S	K-Wire MICA™ 1.4 X 150mm Sterile
57S00022	2.2mm X 60mm Drill Bit Sterile
57S00030	3.0mm X 60mm Drill Bit Sterile
57S00122	2.2mm X 60mm Solid Drill Sterile
57S00130	3.0mm X 60mm Solid Drill Sterile
57S02020	2.0mm Hex Driver Sterile
57S02025	2.5mm Hex Driver Sterile
57S0MI06	MIS Sterile Instrument Pack
01SM64	MICA™ Blade
Sterile Burrs	
57SC0208	MICA™ Burr 2 X 8mm Sterile
57SR0212	MICA™ Burr 2 X 12mm Sterile
57SR0220	MICA™ Burr 2 X 20mm Sterile
57SC0320	MICA™ Burr 3 X 20mm Sterile
57SW3113	MICA™ Wedge Burr 3.1 X 13mm Sterile
Non Sterile Instruments	
57700001	Targeting Guide
57700002	Elevator
577000DG	MICA™ Depth Gauge
45765001	Cannulated AO Handle
57700011	Target Guide
57700209	K-Wire Sleeve 0.9mm
57700214	K-Wire Sleeve 1.4mm
577000MT	First Met Translator

WRIGHT
FOCUSED EXCELLENCE

1023 Cherry Road
Memphis, TN 38117
800 238 7117
901 867 9971
www.wright.com

56 Kingston Road
Staines-upon-Thames
Surrey TW18 4NL
United Kingdom
+44 (0)845 833 4435

161 Rue Lavoisier
38330 Montbonnot Saint Martin
France
+33 (0)4 76 61 35 00

015856B_17-Oct-2017