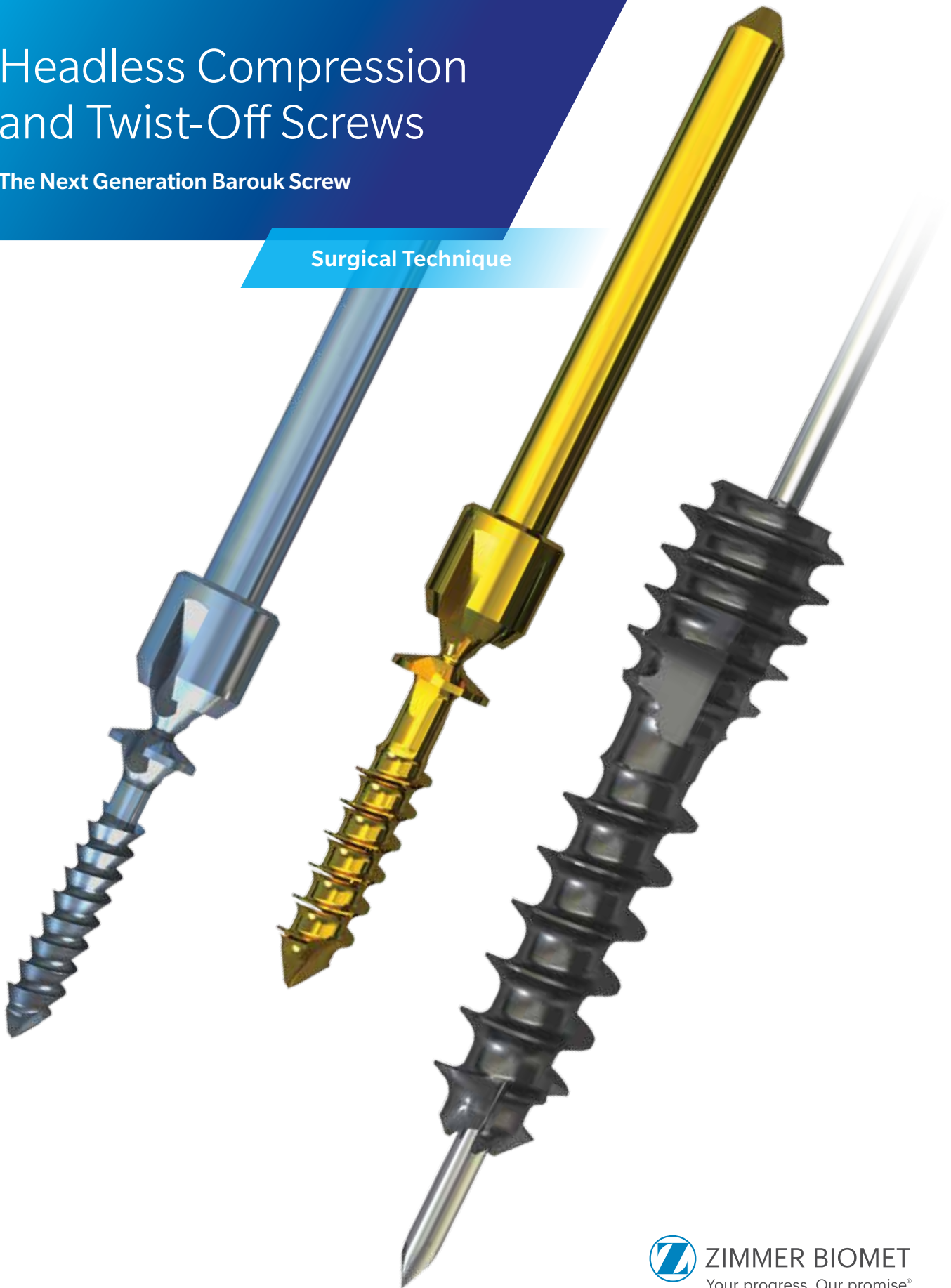


# Headless Compression and Twist-Off Screws

The Next Generation Barouk Screw

Surgical Technique





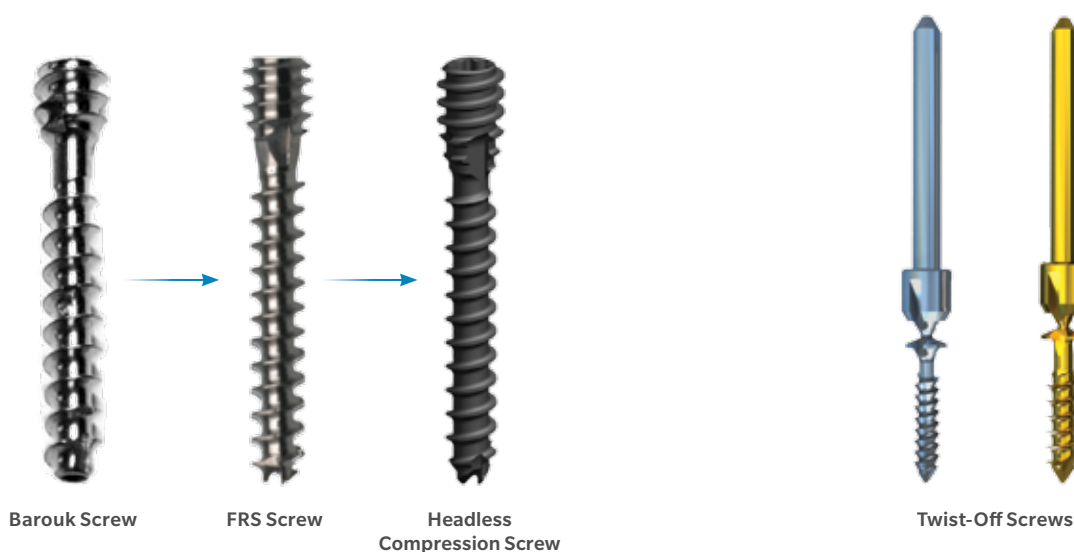
# Table of Contents

<b>System Introduction</b> .....	2
<b>Headless Compression Screw</b> .....	4
Incision .....	5
Lateral Release .....	5
<b>Unicortical Applications</b> .....	6
Osteotomy .....	6
K-Wire Placement.....	7
Screw Measurement.....	8
Insertion.....	9
Drilling (Optional).....	9
Screw Removal.....	9
<b>Bicortical Osteotomy</b> .....	10
K-Wire Placement.....	10
Drilling (Optional).....	10
Insertion.....	11
Screw Removal.....	11
<b>Twist-Off Screw</b> .....	12
Surgical Approach .....	13
Osteotomy .....	13
Insertion.....	14
Final Step .....	16
<b>Ordering Information</b> .....	17
<b>Indications and Contraindications</b> .....	19

## System Introduction

### The Next Generation Barouk Screw System

The Headless Compression and Twist-Off Screw System is the latest advancement in cannulated headless compression and low profile solid twist-off screws. It is designed to minimize soft tissue irritation. These screws offer key design improvements over the Barouk and FRS Screw Systems as below.



Barouk Screw

FRS Screw

Headless  
Compression Screw

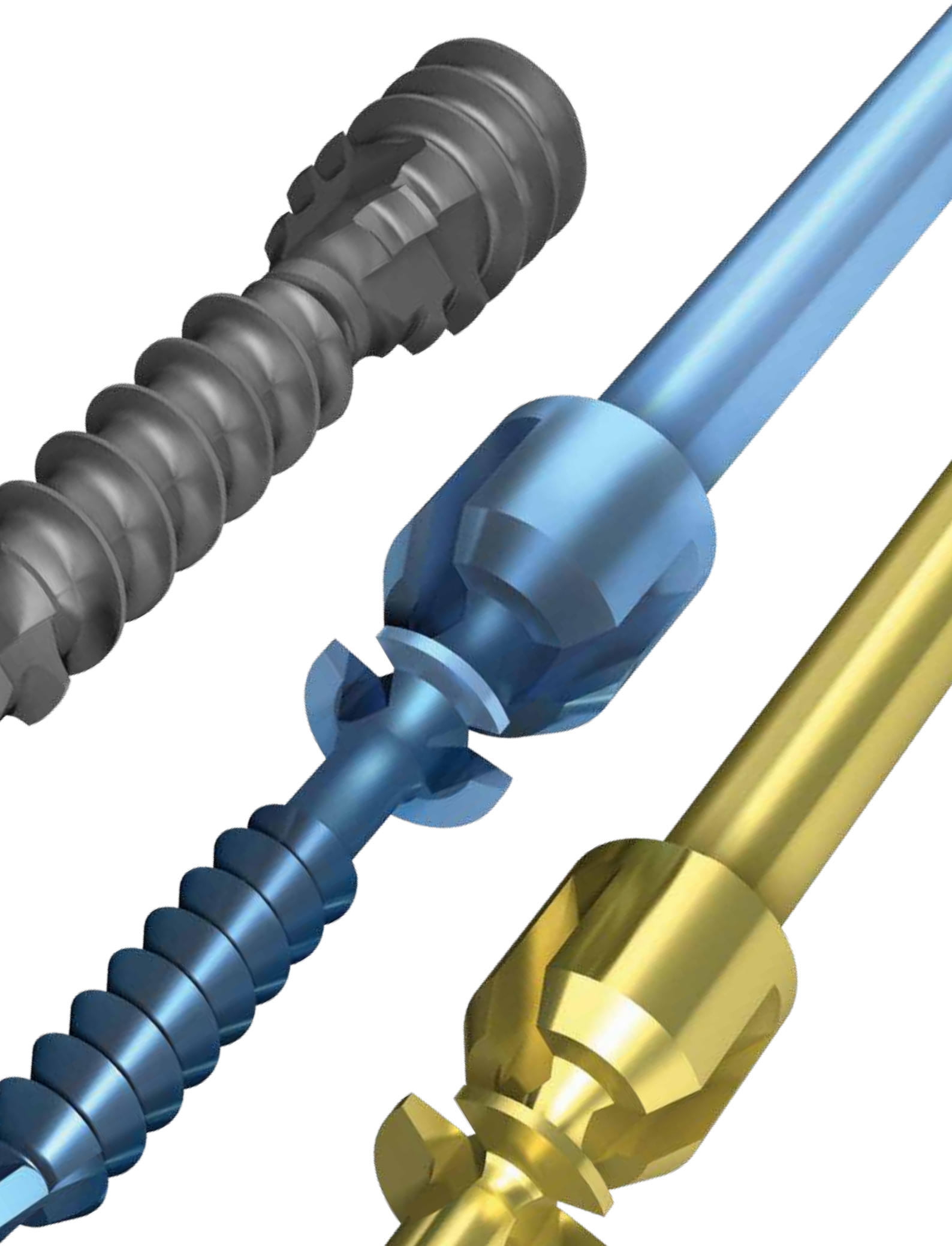
Twist-Off Screws

#### Headless Compression Screws

- T7 hexalobe drive designed to maximize screw insertion torque performance
- Lengthened and tapered distal head threads designed to maximize compression
- 1.8 mm Screw minor diameter designed to maximize strength over previous 2.5 mm screw designs<sup>1</sup>
- Cobalt chrome 0.9 mm diameter guide-wire k-wire designed to maximize screw stiffness over stainless steel design
- TiMAX<sup>®</sup> titanium for increased fatigue strength over stainless steel and color anodized titanium<sup>2</sup>
- Four-tip cutting edges designed to maximize screw insertion efficiency over two-tip design
- Expanded screw length offering for broader surgical selection
- Partially-threaded 2.5 mm screws designed for interphalangeal arthrodesis

#### Twist-Off Screws

- Driver shaft diameter designed for use with pin driver attachment
- Extended driver shaft designed for improved site visualization over short shaft design
- 3-prong driver designed for improved driver/screw engagement over two-prong design
- Cutting tip designed to maximize distal cortical purchase
- Expanded screw length offering designed to provide a broader surgical selection
- 2.7 mm diameter cancellous screw designed to maximize purchase in softer bone



## Headless Compression Screws

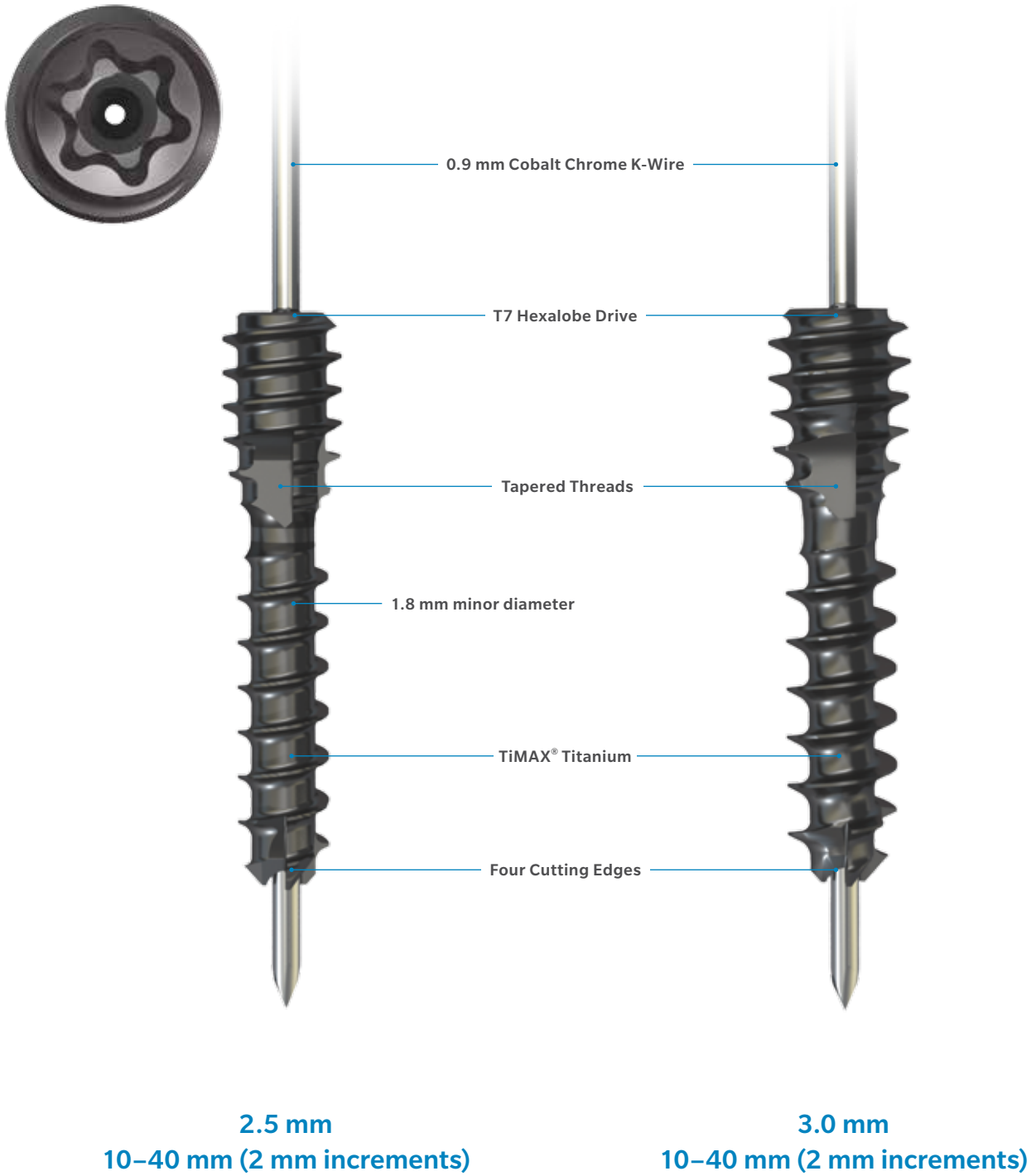




Figure 1

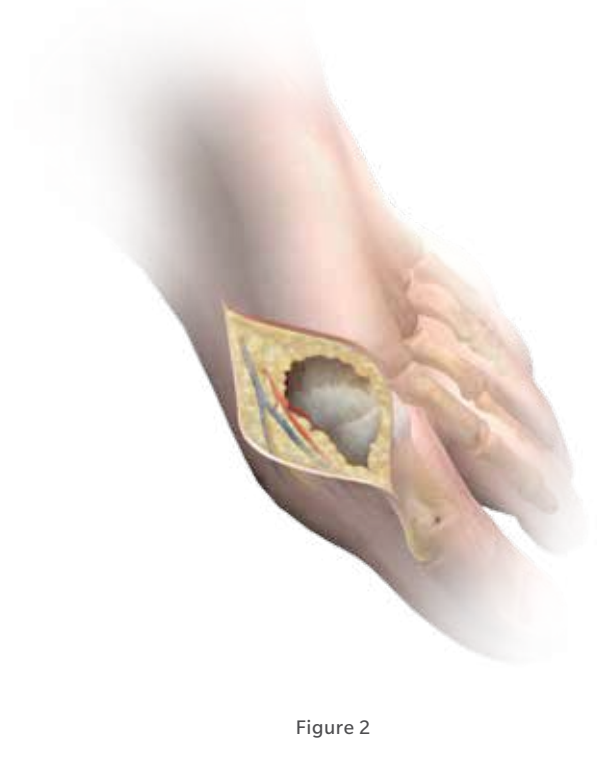


Figure 2

## Headless Compression Screw Technique

The following surgical technique describes the use of a Headless Compression Screw for a distal Chevron osteotomy of the first metatarsal or various types of osteotomies (Figure 1).

### Incision

A 7 cm incision is centered over the dorsal aspect of the first metatarsophalangeal joint, just medial and parallel to the EHL tendon. The incision is carried down to the subcutaneous tissues (Figure 2). Retract the soft tissues carefully being certain to protect the neurovascular bundle in the skin flap.

### Lateral Release

If necessary, a standard lateral release is performed through the same incision. This includes the release of the adductor tendon and the fibular sesamoidal ligament.





Figure 3a



Figure 3



Figure 3b

## Headless Compression Screw Technique – Unicortical Applications

### Osteotomy

A linear capsulotomy is then used to expose the joint. The hypertrophic medial eminence on the 1<sup>st</sup> metatarsal head is then osteotomized (Figure 3).

Insert a 0.9 mm k-wire perpendicular into the center of the first metatarsal head (Figure 3a).

A medially based long arm Chevron type osteotomy is then created from medial to lateral. Remove the k-wire. The capital fragment is then mobilized and transposed laterally to correct the 1<sup>st</sup> IMA and impacted on the 1<sup>st</sup> metatarsal shaft (Figure 3b).





Figure 4

### K-Wire Placement

The osteotomy is then stabilized in a uni-cortical application, such as a distal Chevron osteotomy, by advancing the 0.9 mm K-Wire across the osteotomy site until the tip is visible. Retract the wire slightly, so the tip is below the articular cartilage (Figure 4). Verify k-wire position via fluoroscopy.

**Note:** It is recommended to subtract 3-4 mm from the depth gauge measurement to avoid penetrating the articular cartilage with the distal tip of the screw. For example, if the measurement is 20 mm then select the 16 mm screw.

**Tip:** When using a screw longer than 28 mm for oblique applications, it may be beneficial to use a 0.9 mm x 105 mm k-wire.

**Tip:** Screw length can be measured off of the black band on the k-wire, which indicates the 70 mm mark for use with the depth gauge.

**Tip:** For hammertoe applications, a sterile double tipped 0.9 mm x 152 mm k-wire is available for order.

### K-Wire Options

---

0.9 x 70 mm K-wire Cobalt Chrome

---

0.9 x 105 mm Sterile K-wire Cobalt Chrome

---

0.9 x 152 mm Trocar Sterile K-wire Stainless Steel

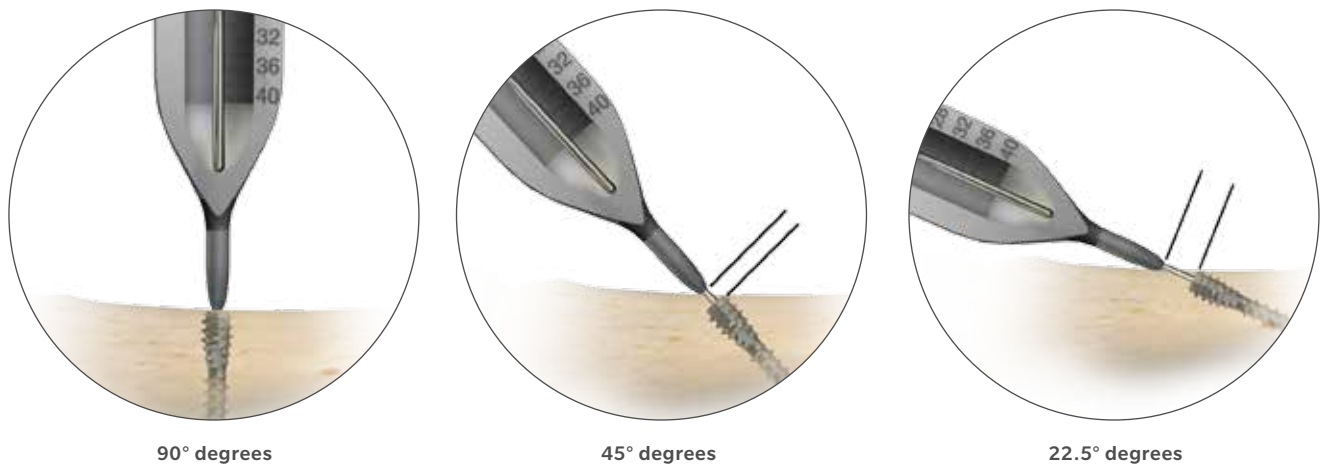


Figure 5

### Screw Measurement

The length of the screws is measured using the depth gauge. Slide the depth gauge over the 0.9 mm k-wire down to bone ensuring the depth gauge is sitting flush against bone.

**Note:** The depth gauge is only compatible with the 0.9 mm x 70 mm and 0.9 mm x 105 mm k-wires.

The depth gauge displays the measurement from the distal tip of the depth gauge to the tip of the k-wire.

**Important:** The screw length may vary depending upon the level of obliquity applied to the k-wire during insertion. To determine the screw length, and with the obliquity of the k-wire in mind, record the measurement. Using the K-Wire Obliquity Chart below, subtract the corresponding millimeters from the recorded measurement (Figure 5).

It is recommended that each screw length be verified off the screw caddy measurement slot before the screw is implanted.

### K-Wire Obliquity

90 degrees	Subtract 0 mm from measurement
45 degrees	Subtract 2 mm from measurement
22.5 degrees	Subtract 5-6 mm from measurement

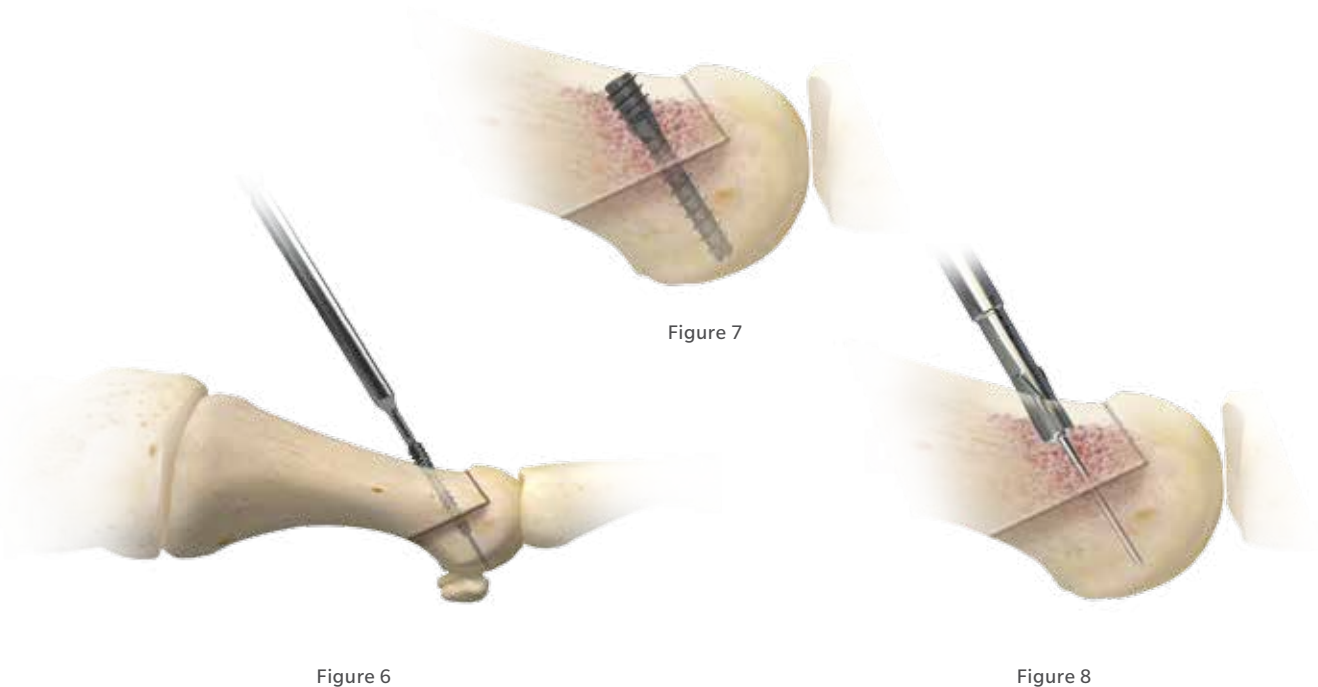


Figure 6

Figure 7

Figure 8

### Insertion

Load the screw onto the T7 Cannulated Driver and Mini Ratchet Handle. Place screw over the 0.9 mm k-wire down to surface of bone. Advance the screw into bone by turning the T7 Cannulated Driver clockwise (Figure 6). Continue advancing until the head of the screw is at or just below the near cortex. After compression is achieved, remove the T7 Cannulated Driver and 0.9 mm k-wire. Verify screw position with fluoroscopy (Figure 7).

### Drilling (Optional)

**Note:** The Zimmer Biomet Headless Compression screws are designed to be self-drilling and self-tapping, and may be inserted under power.

If the bone is deemed to be too hard prior to screw insertion, or an oblique approach is required, use a Head Relief Drill to prepare the near cortex. This may reduce the risk of the driver twisting prior to screw failure (as designed) or twisting before the screw head is fully inserted.

**Tip:** For the 2.5 mm screw use the 2.5 mm Head Relief Drill, and for the 3.0 mm screw, use the 3.0 mm Head Relief Drill (Figure 8).

### Screw Removal

For screw removal, insert the T7 Solid Driver into the head of the screw, and turn the Driver counterclockwise until the screw is removed.

2.5 mm Head Relief Drill AO  
110027746



3.0 mm Head Relief Drill AO  
110027747





Figure 9



Figure 10

## Headless Compression Screw Technique – Bicortical Applications

### K-Wire Placement

For bi-cortical applications, such as the Scarf-Z or Ludloff osteotomy, insert the k-wire until the tip begins to exit the outer wall of the far cortex (Figure 9). Screw measurement subtraction is not necessary for bi-cortical fixation.

### K-Wire Options

0.9 x 70 mm K-wire Cobalt Chrome

0.9 x 105 mm Sterile K-wire Cobalt Chrome

0.9 x 152 mm Trocar Sterile K-wire Stainless Steel

### Drilling (Optional)

**Note:** The Zimmer Biomet Headless Compression screws are designed to be self-drilling and self-tapping, and may be inserted under power.

If the bone is deemed to be too hard, or an oblique approach is required, use a Head Relief Drill to prepare the near cortex. This may reduce the risk of the driver twisting prior to screw failure (as designed) or twisting before the screw head is fully inserted.

**Tip:** For the 2.5 mm screw use the 2.5 mm Head Relief Drill, and for the 3.0 mm screw, use the 3.0 mm Head Relief Drill (Figure 10).



Figure 11

### Drilling (Optional) (cont.)

In situations where bi-cortical lagging is required (such as a Scarf-Z Osteotomy), use the 2.0 mm Cannulated AO Drill for preparation of the far cortex (Figure 11).

The medial cortical shelf and metatarsal head are then osteotomized and rasped to a smooth contour.

### Insertion

Load the screw onto the T7 Cannulated Driver and Mini Ratchet Handle. Place screw over the 0.9 mm k-wire down to surface of bone. Advance the screw into bone by turning the T7 Cannulated Driver clockwise. Continue advancing until the head of the screw is at or just below the near cortex. After compression is achieved, remove the T7 Cannulated Driver and 0.9 mm k-wire. Verify screw position with fluoroscopy.

### Screw Removal

For screw removal, insert the T7 Solid Driver into the head of the screw, and turn the Driver counterclockwise until the screw is removed.

**2.0 x 65 mm Cann Drill Bit AO 110027744**  
Compatible with the  
70 mm and longer k-wires



**2.0 x 80 mm Cann Drill Bit AO 110018532**  
compatible with the  
105 mm and longer k-wires



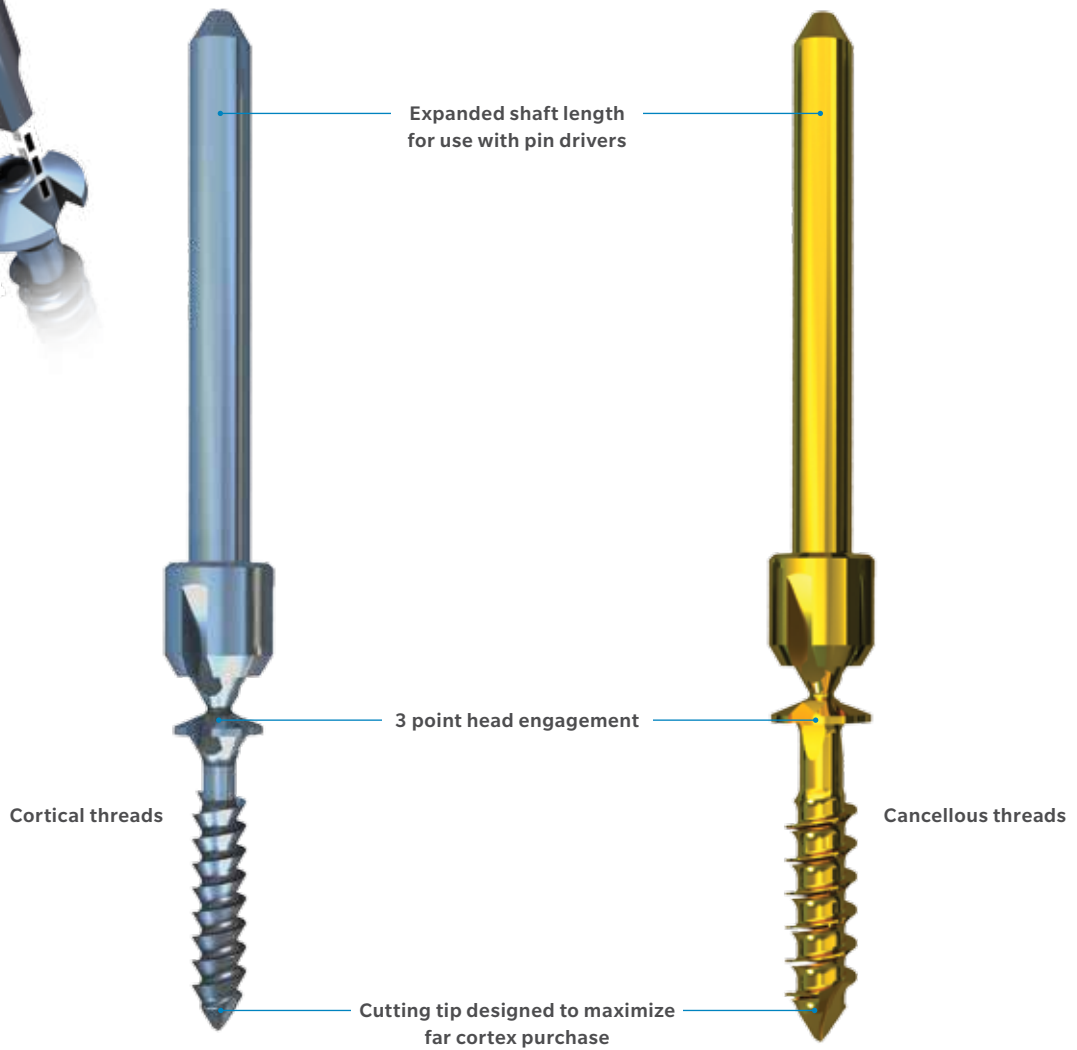
**2.5 mm Head Relief Drill AO  
110027746**



**3.0 mm Head Relief Drill AO  
110027747**



## Twist-Off Screws



**2.0 mm Screw**  
8 mm–15 mm (1 mm increments)

**2.7 mm Screw**  
8 mm–16 mm (1 mm increments)  
18–24 mm (2 mm increments)



Figure 1

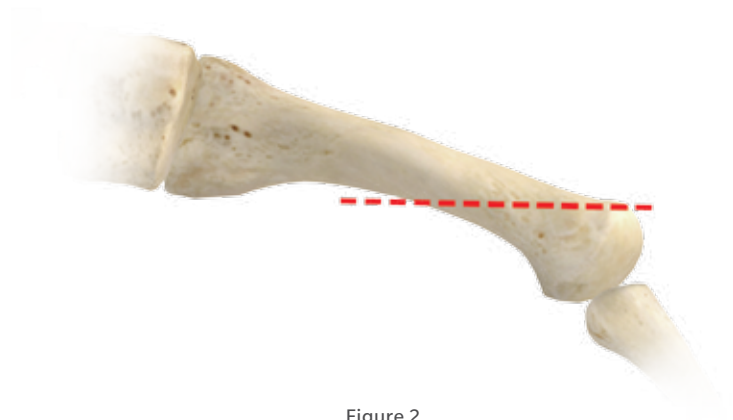


Figure 2

## Twist-Off Screw Technique

The following surgical technique describes a Twist-Off Screw being used in a Weil osteotomy.

### Surgical Approach

A Weil osteotomy is performed using a dorsal approach. Incision is initiated within the intermetatarsal space and extends to the web space (Figure 1). Osteotomy skin retraction provides exposure of both extensor muscles.

Place the lesser metatarsal in plantar flexion to expose the metatarsal head and dislocate the joint. Placing one Hohmann retractor on each side of the metatarsal should make this maneuver much easier. The use of a spreader helps to ensure a safe osteotomy by providing adequate protection.

## Osteotomy

The osteotomy is made horizontal and parallel to the sole. It starts in the cartilage of the head, near the dorsal margin, and should be at least 2.5 cm long (Figure 2).

**Caution:** The direction of the cut should be adjusted according to the condition of the forefoot. In case of pes cavus, the cut may be too short and the resection level should therefore be raised. In case of pes planus (or for the fourth or fifth metatarsals), the cut may be too long and the resection level should be lowered.





Figure 3

### Osteotomy (cont.)

Once the osteotomy has been completed, slide the plantar segment of the metatarsal head proximally to the desired position (Figure 3).

ⓘ **Note:** For applications other than a Weil osteotomy, it may be necessary to measure for screw length prior to insertion. To do so, insert the 0.9 mm k-wire across the osteotomy to the desired depth. Slide the depth gauge over the k-wire ensuring that it is sitting flush with the bone. The depth gauge displays the measurement from the distal tip of the depth gauge to the top of the k-wire.

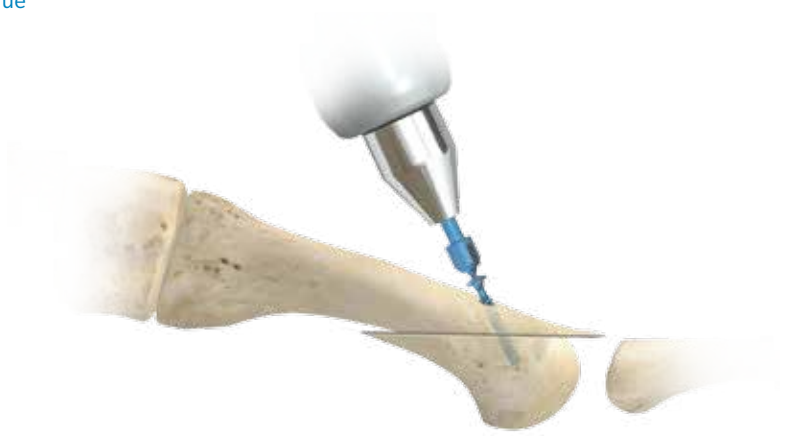


Figure 4



Figure 5

### Insertion

Hold the head against the metatarsal with the forefinger. The placement of a dorsal clamp aids in accurate head positioning and desired fixation. Using the Pin Driver on the Twist-Off Screw, drive the screw into the bone slowly under power at the same trajectory as was the k-wire (Figure 4).

ⓘ **Note:** To reduce the potential for the tip of the screw to slide down the bone while under power, perforate the near cortex with the 0.9 mm k-wire prior to screw insertion (Figure 5).

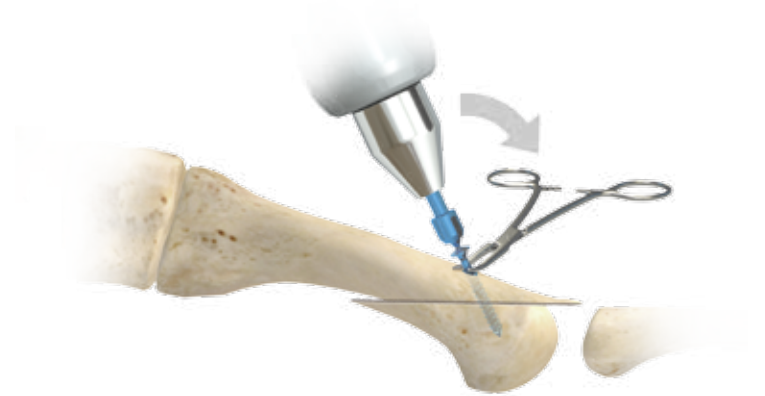


Figure 7



Figure 8



Figure 6

### Insertion (cont.)

Once the screw head engages the dorsal cortex, the support prongs are designed to snap off (Figure 6).

If inserting the Twist-Off Screw in osteoporotic bone, stop advancing the screw before the head engages the near cortex. Place a general mosquito clamp against the screw, below the head, applying pressure while bending the pin driver towards the mosquito clamp (Figure 7), until the shaft breaks off from the screw head.

Place the Twist-Off Finishing Driver on the Mini Ratchet Handle and finish screw placement by hand (Figure 8).



Figure 9

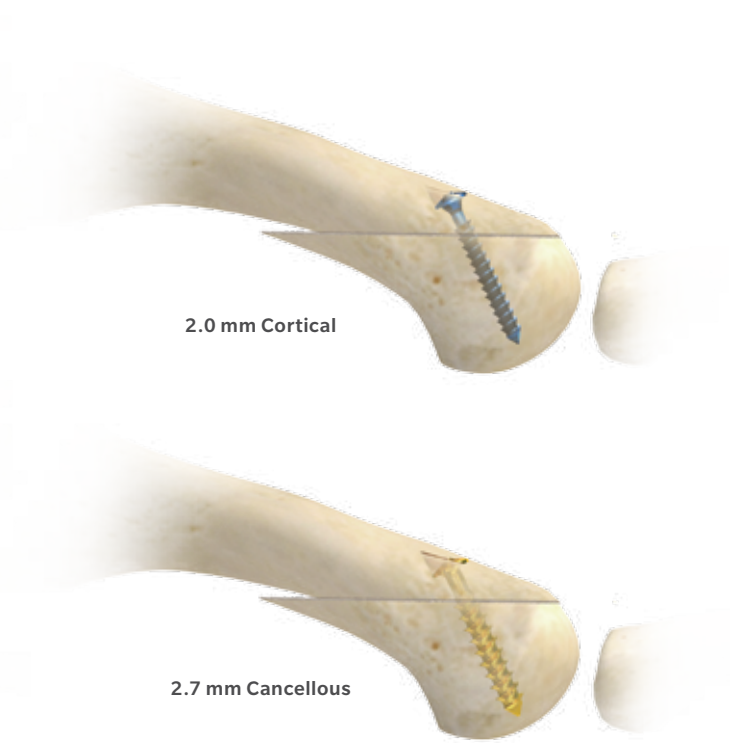


Figure 10

## Final Step


Resection of the dorsal peak is the final step of this procedure (Figure 9). Despite shortening, Z-shaped release of extensor muscles is often necessary. Close the incision.

ⓘ **Note:** The 2.0 mm Twist-Off Screw is designed with cortical threads, while the 2.7 mm Twist-Off Screw has cancellous threads for use in softer bone and is designed for increased purchase (Figure 10).

## Ordering Information


### Headless Compression Screws

#### 2.5 mm Screws, Fully Threaded

	Non-Sterile	Sterile	Description
	110018415	110018431	HCS Screw 2.5 x 10
	110018416*	110018432	HCS Screw 2.5 x 12
	110018417*	110018433	HCS Screw 2.5 x 14
	110018418*	110018434	HCS Screw 2.5 x 16
	110018419*	110018435	HCS Screw 2.5 x 18
	110018420*	110018436	HCS Screw 2.5 x 20
	110018421*	110018437	HCS Screw 2.5 x 22
	110018422*	110018438	HCS Screw 2.5 x 24
	110018423*	110018439	HCS Screw 2.5 x 26
	110018528	110018554	HCS Screw 2.5 x 28
	110018529	110018555	HCS Screw 2.5 x 30
	110018530	110018556	HCS Screw 2.5 x 32
	110018550	110018557	HCS Screw 2.5 x 34
	110018551	110018558	HCS Screw 2.5 x 36
	110018552	110018559	HCS Screw 2.5 x 38
	110018553	110018560	HCS Screw 2.5 x 40


\*Included in tray

#### 3.0 mm Screws, Fully Threaded

	Non-Sterile	Sterile	Description
	110018448	110018464	HCS Screw 3.0 x 10
	110018449*	110018465	HCS Screw 3.0 x 12
	110018450*	110018466	HCS Screw 3.0 x 14
	110018451*	110018467	HCS Screw 3.0 x 16
	110018452*	110018468	HCS Screw 3.0 x 18
	110018453*	110018469	HCS Screw 3.0 x 20
	110018454*	110018470	HCS Screw 3.0 x 22
	110018455*	110018471	HCS Screw 3.0 x 24
	110018456*	110018472	HCS Screw 3.0 x 26
	110018457*	110018473	HCS Screw 3.0 x 28
	110018458*	110018474	HCS Screw 3.0 x 30
	110018459*	110018475	HCS Screw 3.0 x 32
	110018460*	110018476	HCS Screw 3.0 x 34
	110018461	110018477	HCS Screw 3.0 x 36
	110018462	110018478	HCS Screw 3.0 x 38
	110018463	110018479	HCS Screw 3.0 x 40

\*Included in tray

#### 2.5 mm Screws, Partially Threaded

	Non-Sterile	Sterile	Description
	110018424	110018440	HCS Screw 2.5 x 28 PT
	110018425	110018441	HCS Screw 2.5 x 30 PT
	110018426	110018442	HCS Screw 2.5 x 32 PT
	110018427	110018443	HCS Screw 2.5 x 34 PT
	110018428	110018444	HCS Screw 2.5 x 36 PT
	110018429	110018445	HCS Screw 2.5 x 38 PT
	110018430	110018446	HCS Screw 2.5 x 40 PT


## Twist-Off Screws

### 2.0 mm Twist-Off Screws (Cortical)

	Non-Sterile	Sterile	Description
	110018481	110018489	Twist-Off Screw 2.0 x 8
	110018482	110018490	Twist-Off Screw 2.0 x 9
	110018483*	110018491	Twist-Off Screw 2.0 x 10
	110018484*	110018492	Twist-Off Screw 2.0 x 11
	110018485*	110018493	Twist-Off Screw 2.0 x 12
	110018486*	110018494	Twist-Off Screw 2.0 x 13
	110018487*	110018495	Twist-Off Screw 2.0 x 14
	110018488*	110018496	Twist-Off Screw 2.0 x 15

\*Included in tray

### 2.7 mm Twist-Off Screws (Cancellous)

	Non-Sterile	Sterile	Description
	110018498	110018512	Twist-Off Screw 2.7 x 8
	110018499	110018513	Twist-Off Screw 2.7 x 9
	110018500*	110018514	Twist-Off Screw 2.7 x 10
	110018501*	110018515	Twist-Off Screw 2.7 x 11
	110018502*	110018516	Twist-Off Screw 2.7 x 12
	110018503*	110018517	Twist-Off Screw 2.7 x 13
	110018504*	110018518	Twist-Off Screw 2.7 x 14
	110018505*	110018519	Twist-Off Screw 2.7 x 15
	110018506*	110018520	Twist-Off Screw 2.7 x 16
	110018508*	110018522	Twist-Off Screw 2.7 x 18
	110018509*	110018523	Twist-Off Screw 2.7 x 20
	110018510*	110018524	Twist-Off Screw 2.7 x 22
	110018511*	110018525	Twist-Off Screw 2.7 x 24

\*Included in tray

## Instruments & Disposables

### Instruments

Non-Sterile	Sterile	Description
110038661	-	T7 Driver Cannulated AO
110018535	-	Depth Gauge
PA017†	-	Screw Forceps
110018537	-	T/O Finishing Driver AO
110038662	-	T7 Driver Solid AO
PA720	-	Osteotomy Clamp
110017406	-	Mini 4 Sided Ratchet Handle, Secure AO
110018539	-	Implant and Instrument Case
110018538	-	Implant and Instrument Lid
110018561	-	HCS Screw Caddy
110018562	-	Twist-Off Screw Caddy

†item is sterile packed only

### Disposables

Non-Sterile	Sterile	Description
110018526	110018527	0.9 x 70 mm K-wire
-	110018532	2.0 x 80 mm Cann Drill Bit AO
110027744	110027745	2.0 x 65 mm Cann Drill Bit AO
110027746	110018533	2.5 mm Head Relief Drill AO
110027747	110018534	3.0 mm Head Relief Drill AO
-	110025493	0.9 x 105 mm Sterile K-wire
-	164206135	0.9 x 152 mm Trocar Sterile K-wire

## Indications and Contraindications

### INDICATIONS

The Zimmer Biomet Headless Compression and Twist-Off Screws are indicated for fixation of bone fractures, fusion of a joint (arthrodesis) or bone reconstruction (osteotomy) of the mid-foot bones, metatarsal and phalanges of the foot or the phalanges, metacarpals and carpals of the hand. In the foot, these include procedures to correct Hallux Valgus (bunions), Hallux Varus and Hallux Rigidus Correction, Hammer toe, Claw toe and Mallet toe.

### CONTRAINDICATIONS

1. Infections.
2. Patient conditions including blood supply limitations, insufficient quantity or quality of bone.
3. Patients with mental or neurologic conditions who are unwilling or incapable of following postoperative care instructions.
4. Foreign body sensitivity where material sensitivity is suspected, testing is to be completed prior to implantation of the device.







## References

1. FRS Update (FRS and Twist-Off screws) Design Rationale. Biomet. FX000090 Rev. C. Bending strength analysis is not necessarily indicative of clinical performance.
2. Data on File at Biomet. Mechanical testing #DVA-107504-DVER. Mechanical testing is not necessarily indicative of clinical performance.

All content herein is protected by copyright, trademarks and other intellectual property rights, as applicable, owned by or licensed to Zimmer Biomet or its affiliates unless otherwise indicated, and must not be redistributed, duplicated or disclosed, in whole or in part, without the express written consent of Zimmer Biomet.

This material is intended for health care professionals. Distribution to any other recipient is prohibited.

For product information, including indications, contraindications, warnings, precautions, potential adverse effects and patient counseling information, see the package insert and [www.zimmerbiomet.com](http://www.zimmerbiomet.com).

Check for country product clearances and reference product specific instructions for use.

Zimmer Biomet does not practice medicine. This technique was developed in conjunction with health care professionals. This document is intended for surgeons and is not intended for laypersons. Each surgeon should exercise his or her own independent judgment in the diagnosis and treatment of an individual patient, and this information does not purport to replace the comprehensive training surgeons have received. As with all surgical procedures, the technique used in each case will depend on the surgeon's medical judgment as the best treatment for each patient. Results will vary based on health, weight, activity and other variables. Not all patients are candidates for this product and/or procedure. Caution: Federal (USA) law restricts this device to sale by or on the order of a surgeon. Rx only.

© 2018 Zimmer Biomet. All rights reserved.



### Authorized Representative

Biomet UK Ltd.  
Waterton Industrial Estate  
Bridgend, South Wales  
CF31 3XA  
UK



**ZIMMER BIOMET**  
Your progress. Our promise.®

1990.1-GLBL-en-REV0518 A4



### Legal Manufacturer

Biomet Trauma  
P.O. Box 587  
56 E. Bell Drive  
Warsaw, Indiana 46581-0587  
USA

[zimmerbiomet.com](http://zimmerbiomet.com)

**CE** 0086

CE mark on a surgical technique is not valid unless there is a CE mark on the product label.