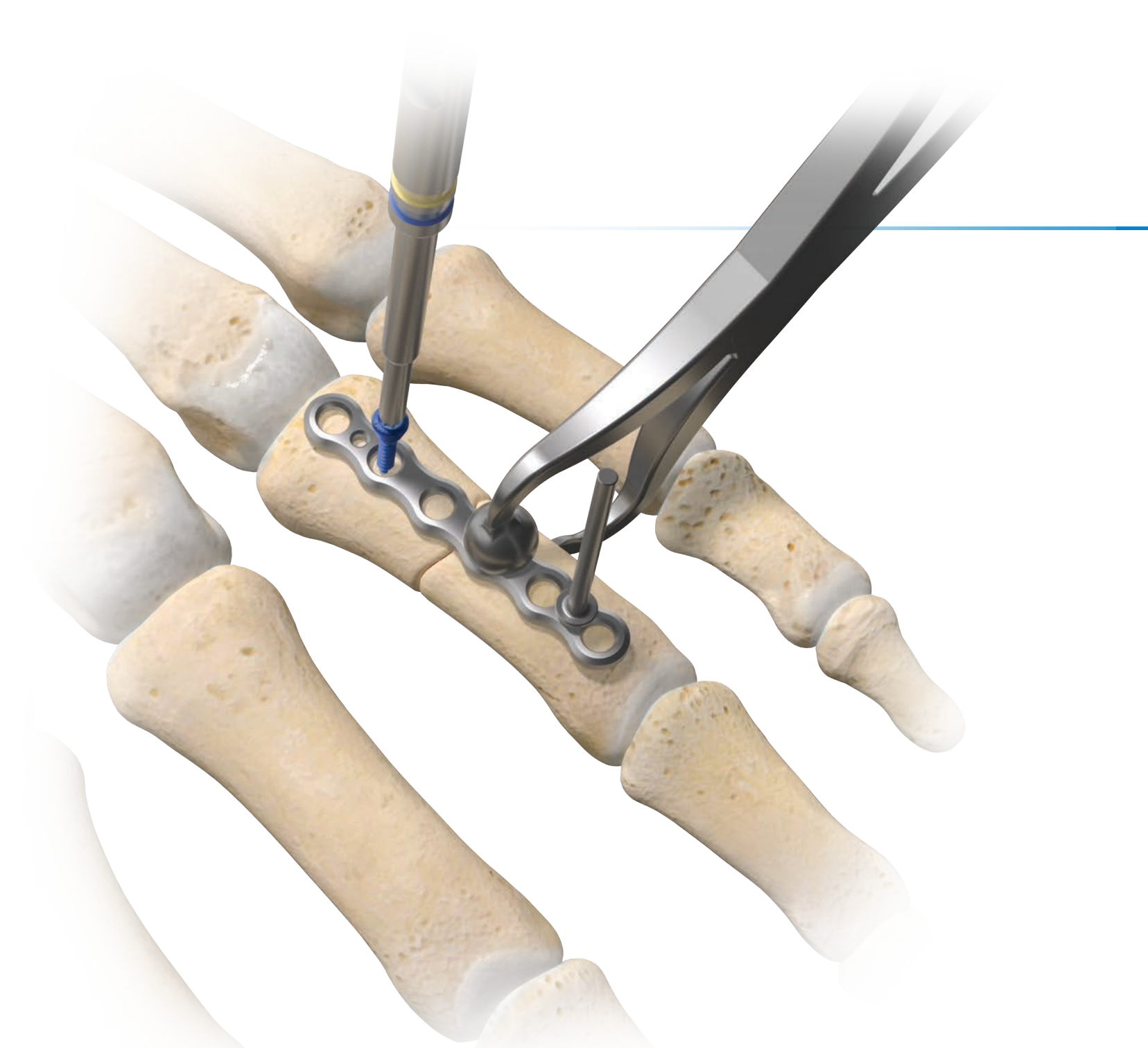
ZIMMER BIOMET
Moving You Forward.™

A.L.P.S. mvX™ Hand System

Surgical Technique



A.L.P.S. mvX™ Hand System

Technique Guide

Table of Contents

Indications and Contraindications 03

Portfolio of Hand and Wrist Solutions 05

System Overview 07

Intramedullary Nails 07

Plate Families 08

Screw Options 14

Featured System Instrumentation 15

Screw Instrumentation 17

Plate Cutting and Bending 21

Intramedullary Nail Technique 23

Standard Fracture Plate Technique 25

Condylar Plate Technique 29

Avulsion Hook Plate Technique 31

Rotation Correction Plate Technique 33

Bennett/Rolando Plate Technique 37

Ordering Information 41

Indications and Contraindications

Intended Use

The Zimmer Biomet A.L.P.S. mvX Mini-Fragment System is intended to bridge or otherwise stabilize bone fragments to facilitate healing.

Plates

Indications

Plates

The A.L.P.S. mvX Mini-Fragment System is indicated for fixation of fractures, osteotomies, non-unions, malunions, replantations, and fusions of short bones and small fragments of bone including, but not limited to the hand, wrist, foot, and ankle. The A.L.P.S. mvX Mini-Fragment System is also intended for reduction and stabilization of non-load bearing long bone fragments. The A.L.P.S. mvX Mini-Fragment System is not for Spinal Use.

WARNING: This device is not approved for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic, or lumbar spine.

NOTE: This Surgical Technique alone does not provide sufficient background for direct use of the instrument and implant set. Instruction by a surgeon experienced in handling these instruments is highly recommended.

For safe and effective use of this implant system, the surgeon should be familiar with this recommended surgical technique for the device that has been chosen from the system.

In every case, accepted surgical practice should be followed in postoperative care and the patient should be made aware about the devices and the allowed activities with these implants.

Contraindications

Plates

Contraindications include:

- Infection.
- Patient conditions including blood supply limitations, obesity and insufficient quantity or quality of bone.
- Patients with mental or neurologic conditions who are unwilling or incapable of following postoperative care instructions.
- Foreign body sensitivity. If material sensitivity is suspected, testing is required prior to implanting the device.

Indications and Contraindications

Intramedullary Nails

Indications

Intramedullary Nails

The Zimmer Biomet A.L.P.S. mvX IM Threaded Screws are indicated for use in bone reconstruction, osteotomy, arthrodesis, joint fusion, fracture repair, and fracture fixation of bones appropriate for the size of the device. Screws are intended for single use only.

Contraindications

Intramedullary Nails

The implant should not be used in a patient who has current, or who has a history of:

- Local or systemic acute or chronic inflammation
- Active infection or inflammation
- Suspected or documented metal allergy or intolerance

Portfolio of Hand

The A.L.P.S. mvX Hand System was designed with hand surgeons in mind, to provide an expansive and comprehensive set of solutions for fracture management and deformity correction of the hand. This expands Zimmer Biomet's portfolio of hand and wrist solutions. Other hand and wrist solutions include the DVR Crosslock System and the A.L.P.S. mvX Mini Fragment System.

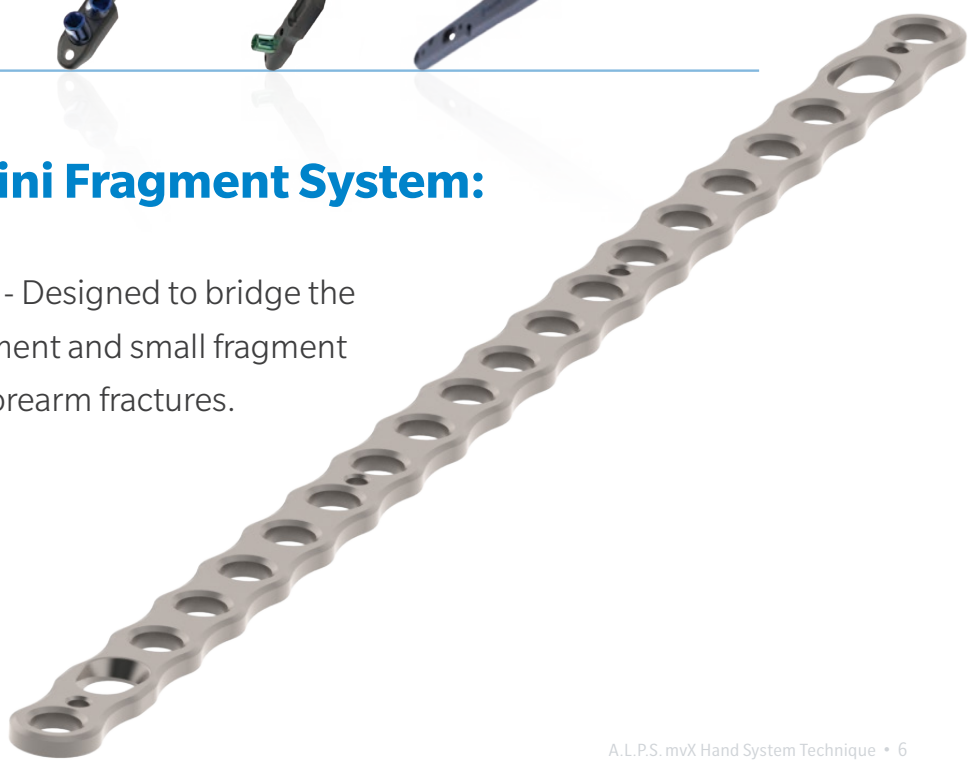
and Wrist Solutions

DVR® Crosslock System:

- Crosslock Plates • Wrist Plates • Volar Rim Plates • Wrist Spanning Plate

A.L.P.S. mvX Mini Fragment System:

- 2.7mm Straight Plate - Designed to bridge the gap between mini fragment and small fragment fixation. Applicable in forearm fractures.



Comprehensive Hand Fracture Care in One System

The A.L.P.S. mvX Hand System is designed to provide a comprehensive offering of implant solutions for fractures, osteotomies, fusions, mal-unions and non-unions of the hand. The system includes anatomic specialty plates as well as non-anatomic plates of various sizes and lengths that utilize variable angle locking technology to meet the varying clinical needs of the patient and surgeon.
This system includes:

Fracture plates	Specialty Plates	Intramedullary Nails

Anatomic specialty plates are procedure specific. The system features non-compressive intramedullary nails for fractures of the metacarpals. Specific components of the system are:

3 families of plates 1.3mm, 1.5/2.0mm, and 2.4mm	4 families of intramedullary nails 3.0mm, 3.5mm, 4.0mm, and 4.5mm	Non-locking and locking screws with variable angle capability with a cone of angulation of up to 30°

Intramedullary Nails

The A.L.P.S. mvX Intramedullary Nails are non-compressive nails designed to aid in the reduction of metacarpal fractures. Simple, easy-to-use instrumentation, including a unique depth gauge with the ability to measure for both nail length and nail diameter, allows for a streamlined surgical experience. The depth gauge can be used to template the nail diameter by placing it over the fracture and using fluoroscopy to visualize the various nail diameter options on the bone.

NAIL DIAMETER (mm)				
THREAD DIAMETER	**3.0mm**	**3.5mm**	**4.0mm**	**4.5mm**
BOX STICKER COLOR				
THREAD LENGTH	Fully Threaded	Fully Threaded	Fully Threaded	Fully Threaded
NAIL LENGTH	30mm, 40mm, 45mm, 50mm, 55mm, 60mm, 70mm		40mm, 45mm, 50mm, 55mm, 60mm, 70mm	
DRIVER	T8	T8	T8	T8

DRILL BIT DIAMETERS (mm)				
DRILL BIT	2.0mm	2.7mm	2.7mm	3.0mm

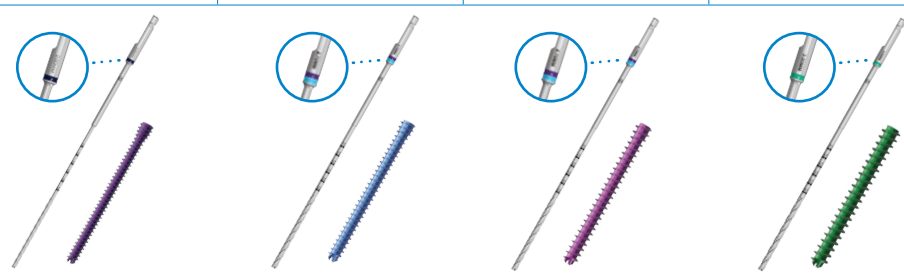
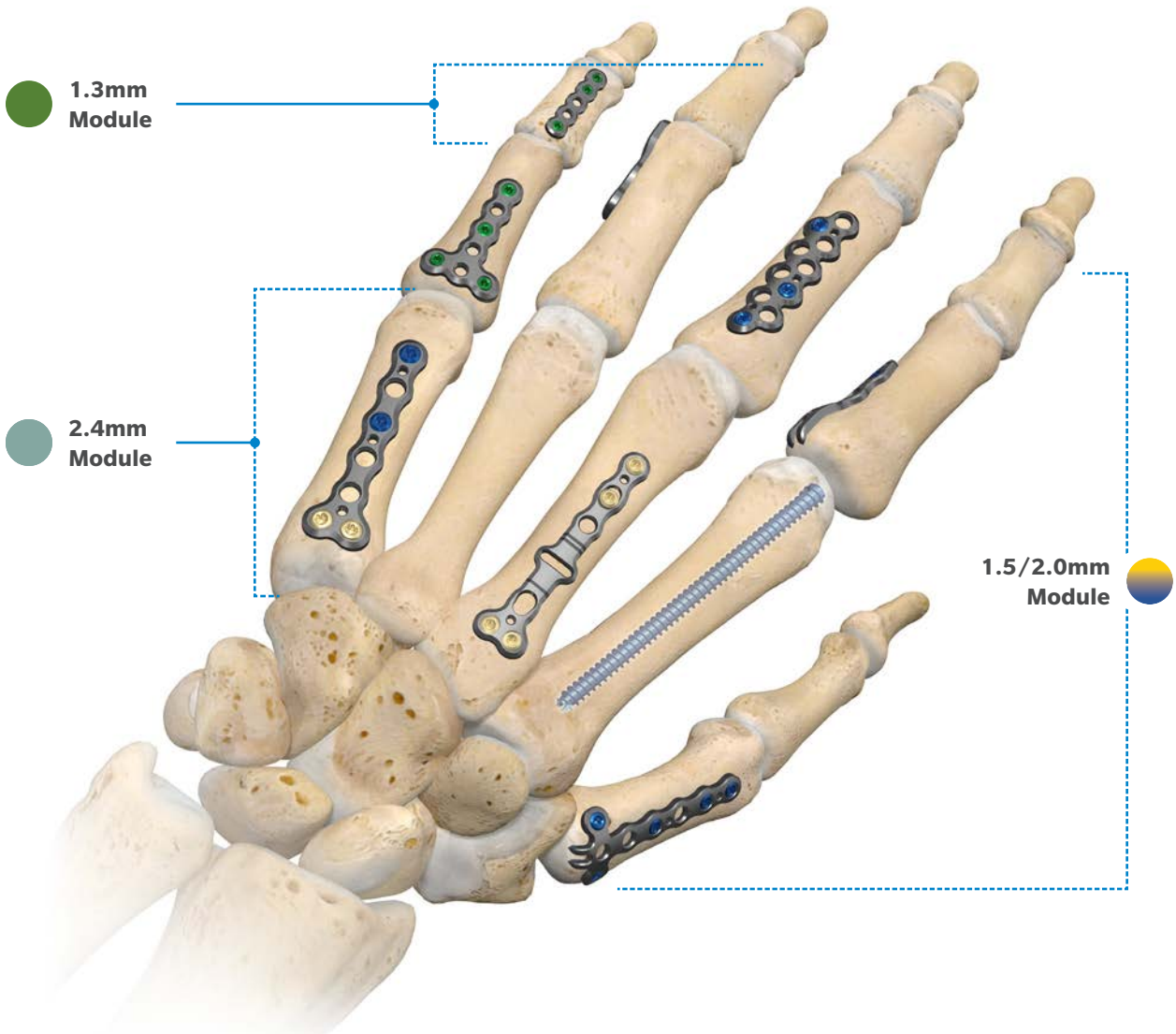
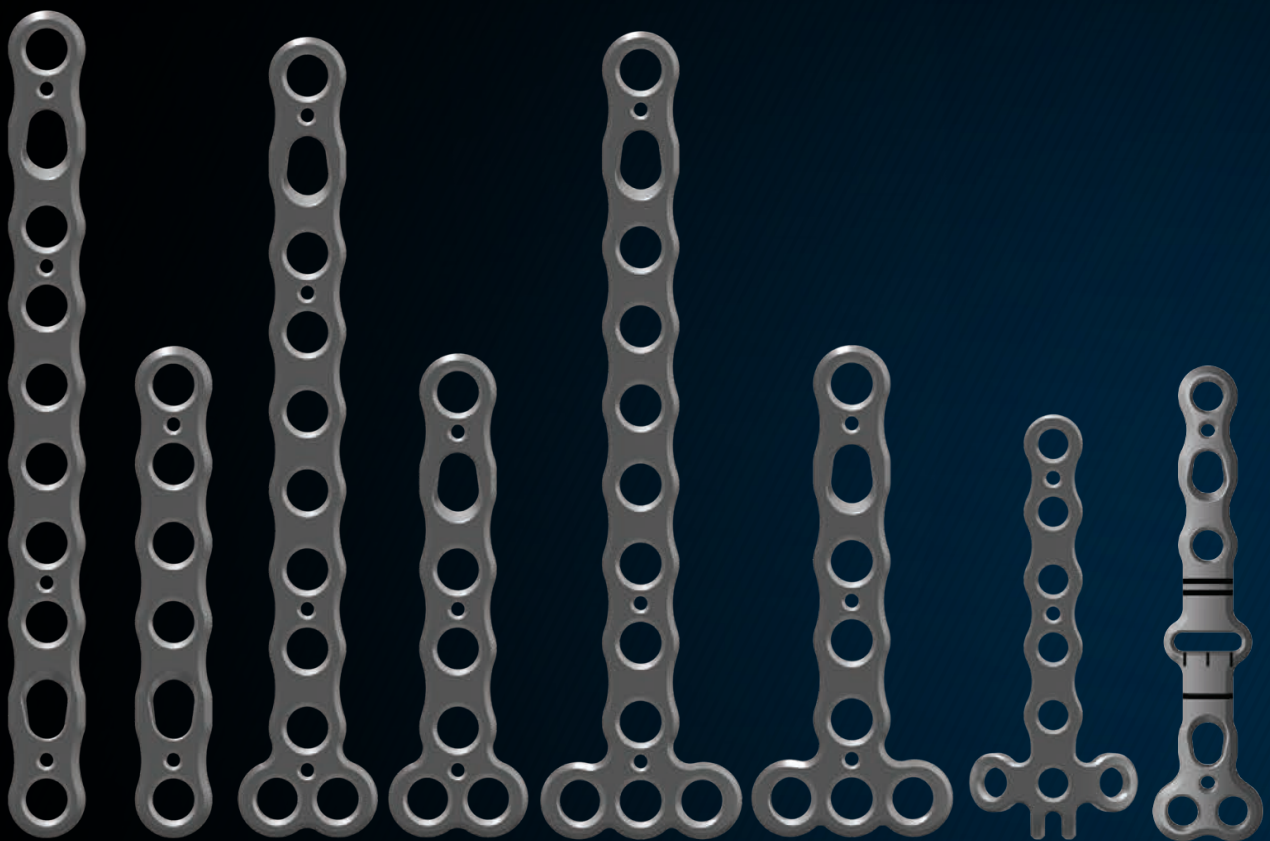


Plate Families



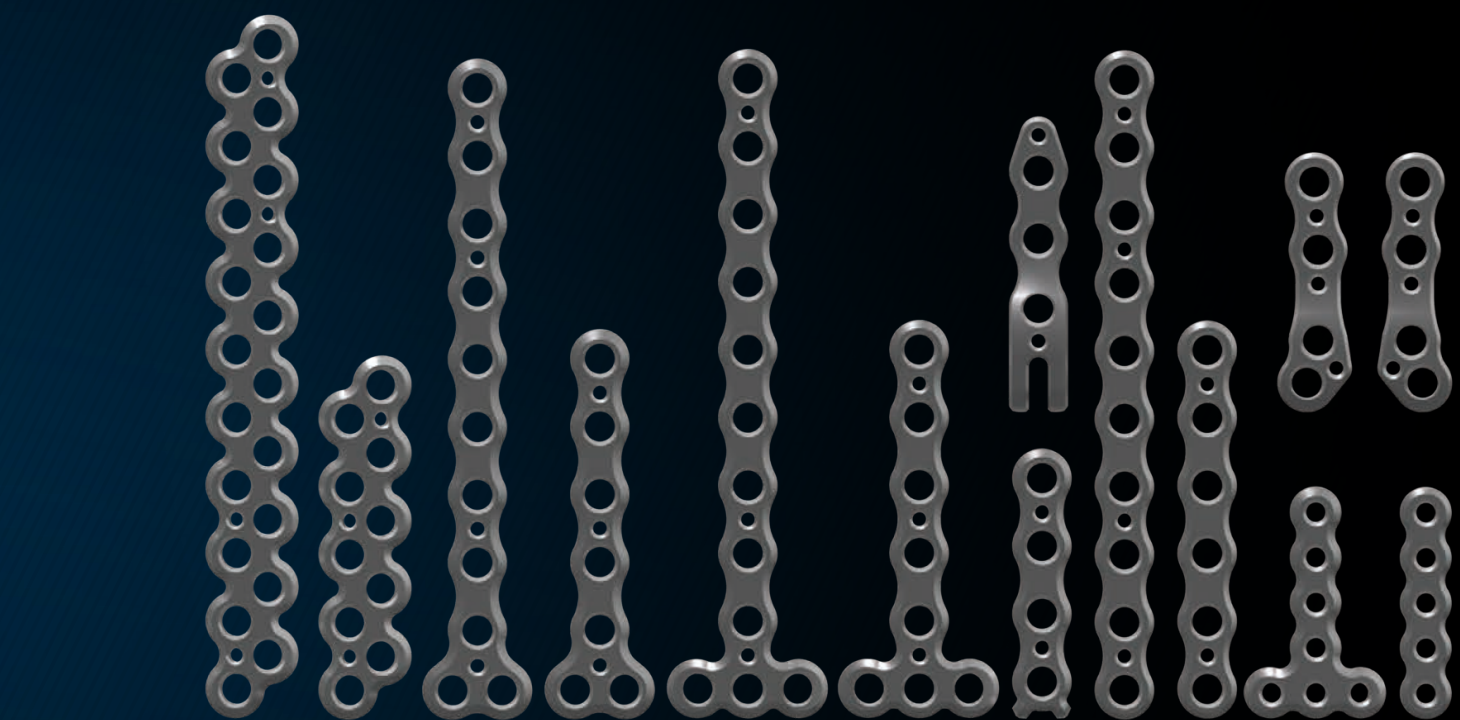
The A.L.P.S. mvX Plates are available in three size modules: 1.3mm, 1.5/2.0mm, and 2.4mm. With the ability to use both 1.5 and 2.0mm screws within the same plates in the 1.5/2.0mm plate module, A.L.P.S. mvX provides surgeons with versatility and options.

PLATE FAMILY MODULE	MIDDLE PHALANGES	PROXIMAL PHALANGES	METACARPALS
1.3MM	●		
1.5/2.0MM	●	●	●
2.4MM			●

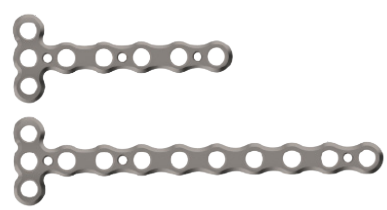


A.L.P.S. mvX™ Hand System

Fracture and Specialty Plates



Fractures Plates

	Plate Family Size	Plate Family Name	Offerings
	1.3mm	Straight Plate	Offered in a 5-hole plate
	1.3mm	T-Plate	Offered in a 4-hole plate
	1.5/2.0mm	Straight Plate	Offered in a 6 and 10-hole plate
	1.5/2.0mm	T-Plate	Offered in a 5 and 9-hole plate
	1.5/2.0mm	Narrow Y-Plate	Offered in a 5 and 9-hole plate

Fractures Plates

	Plate Family Size	Plate Family Name	Offerings
	1.5/2.0mm	Straight Tine Plate	Offered in a 4-hole plate
	1.5/2.0mm	Offset Plate	Offered in a 10 and 20-hole plate
	2.4mm	Straight Plate	Offered in a 6 and 10-hole plate
	2.4mm	T-Plate	Offered in a 5 and 9-hole plate
	2.4mm	Narrow Y-Plate	Offered in a 5 and 9-hole plate

Specialty Plates

All specialty plates are available in the 1.5/2.0mm module.

Condylar Plate

The Condylar Plate is designed to assist in fixation of fractures involving the phalangeal head/neck. Offered in left and right side specific plates.

Avulsion Hook Plate

The Avulsion Hook Plate is designed to reduce fractures involving the phalangeal base at the collateral ligament insertion. The plate is designed with a small tine to reduce the collateral ligament and fragment with distal shaft fixation.

Bennett/Rolando Plate

The Bennett/Rolando Plate is designed to aid in reduction of fractures involving the base of the first metacarpal. The plate is designed to contour to the anatomy while providing multiple points of variable angle locking screw fixation into basilar fragments. The plate is also designed with a small hook to allow for reduction of smaller avulsion fragments.

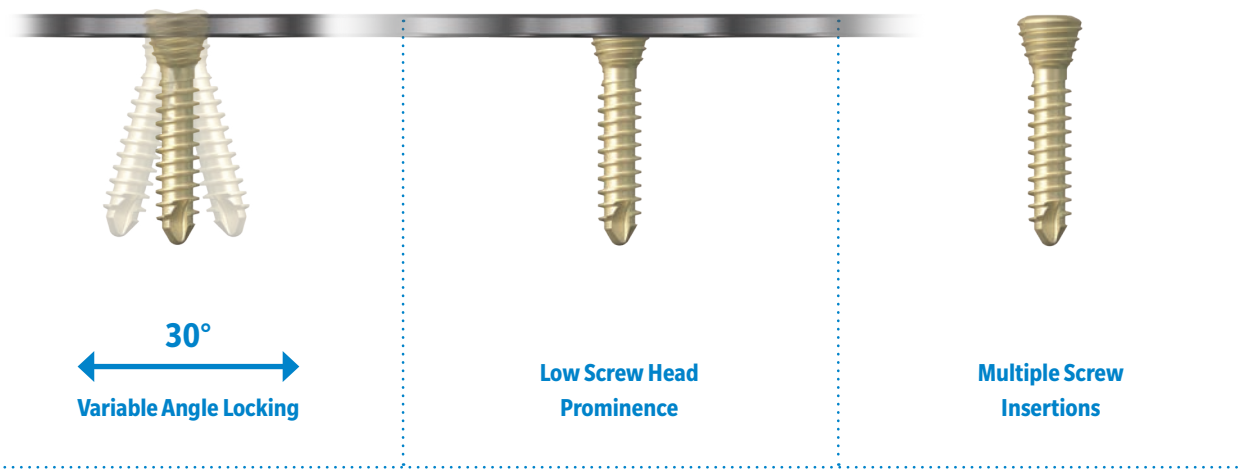
Rotational Correction Plate

The Rotational Correction Plate is designed to provide rotational correction through two different osteotomy locations, distally and proximally.

Screw Options

The A.L.P.S. mvX Hand System utilizes low-profile, non-locking screws along with variable and fixed angle locking screws.

- Variable angle locking screws (available in 1.5, 2.0, and 2.4mm) provide a 30° cone of angulation allowing for flexibility in achieving optimal screw placement while maintaining a low screw head prominence.
- Locking screws are designed to withstand up to three insertions without damaging the integrity of the locking mechanism, giving surgeons peace of mind and intraoperative adaptability.
- 1.5 and 2.0mm screws are interchangeable within the same plates in the 1.5/2.0mm plate module.



	1.3mm Screws	1.5mm Screws	2.0mm Screws	2.4mm Screws
				
THREAD DIAMETER	1.3mm	1.5mm	2.0mm	2.4mm
DRILL	0.9mm	1.0mm	1.5mm	1.8mm
DRIVER	T4	T6	T6	T8
SCREW LENGTH	6mm - 16mm	6mm - 24mm	6mm - 24mm	6mm - 24mm
SCREW LENGTH INCREMENTS	1mm	1mm	1mm	1mm

Featured System Instrumentation

A.L.P.S. mvX offers simple, intuitive instrumentation designed to create efficiencies in the operating room for a streamlined surgical workflow.

Small Spin Down Forceps

These forceps are designed to securely grip and position implants to the bone during plate placement and fracture reduction. The finely tipped ends allow for precise engagement with the plate screw holes. The forceps can then be locked in place using the spin down feature once positioned in the desired location.

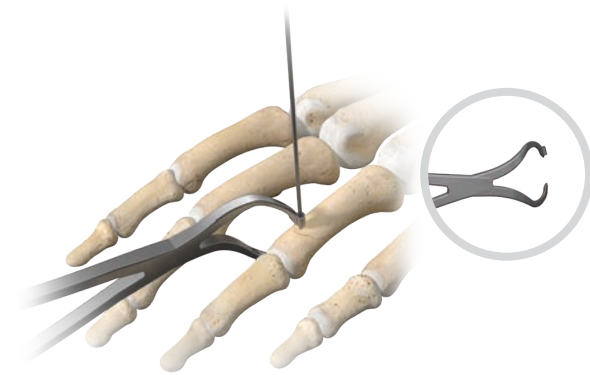


Plate Holder with K-Wire Slot

The Plate Holder with a K-Wire Slot allows for the insertion of a K-Wire through the holder and plate hole, directly into the bone, providing additional stabilization during complex procedures.

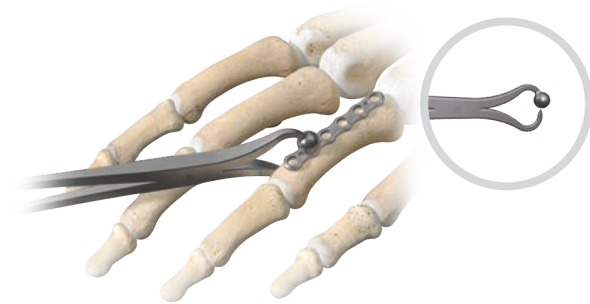


Plate Holder with Ball End

The Plate Holder with Ball End is uniquely designed for stable and precise positioning of surgical plates onto the bone using the screw holes in the plate. The ball end provides versatile angulation, allowing for optimal alignment on bone surfaces while not harming the screw hole locking mechanism.

Featured System Instrumentation

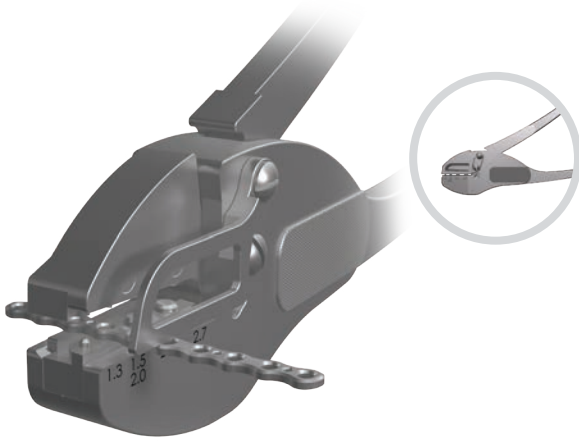


Plate Cutting Pliers

Designed for efficiency and precision, these Plate Cutting Pliers allow surgeons to quickly and accurately trim orthopedic plates to the desired size with high-strength cutting and a comfortable grip.

Plate Bending Pliers

The Plate Bending Pliers are designed for contouring the plates with precision for customizing per surgeon needs. Additionally, their design is mindful of preserving the integrity of the plate's screw hole locking

Screw Instrumentation

A.L.P.S. mvX screw instrumentation is designed to be user-friendly.

- One driver is used for the screws in each plate module:
  - T4 driver for 1.3mm screws
  - T6 driver for 1.5/2.0mm screws
  - T8 driver for 2.4mm screws
- Color-coded instrumentation to match the screws for each screw size allows for easy identification

1.3mm Screw Instruments - Color-coded in Green

	770130010	1.3mm Non-Locking Screw
	770131010	1.3mm Locking Screw
	770002090	0.9mm Drill
	770004130	Thread in/Fixed 0.9mm Drill Guide
	770006130	0.9mm Fixed Angle Drill Guide
	770009130	1.3/1.5mm Depth Gauge (26mm)
	770001040	T4 Retention Driver

Screw Instrumentation

1.5mm Screw Instruments - Color-coded in Dark Blue

	770150010	1.5mm Non-Locking Screw
	770151010	1.5mm Locking MDS
	770002100	1.0mm Drill
	770004150	Thread in/Fixed 1.0mm Drill Guide
	770006150	1.0mm Fixed Angle/VA Double Drill Guide
	770009130	1.3/1.5mm Depth Gauge (26mm)
	770001060	T6 Retention Driver

Screw Instrumentation

2.0mm Screw Instruments - Color-coded in Gold

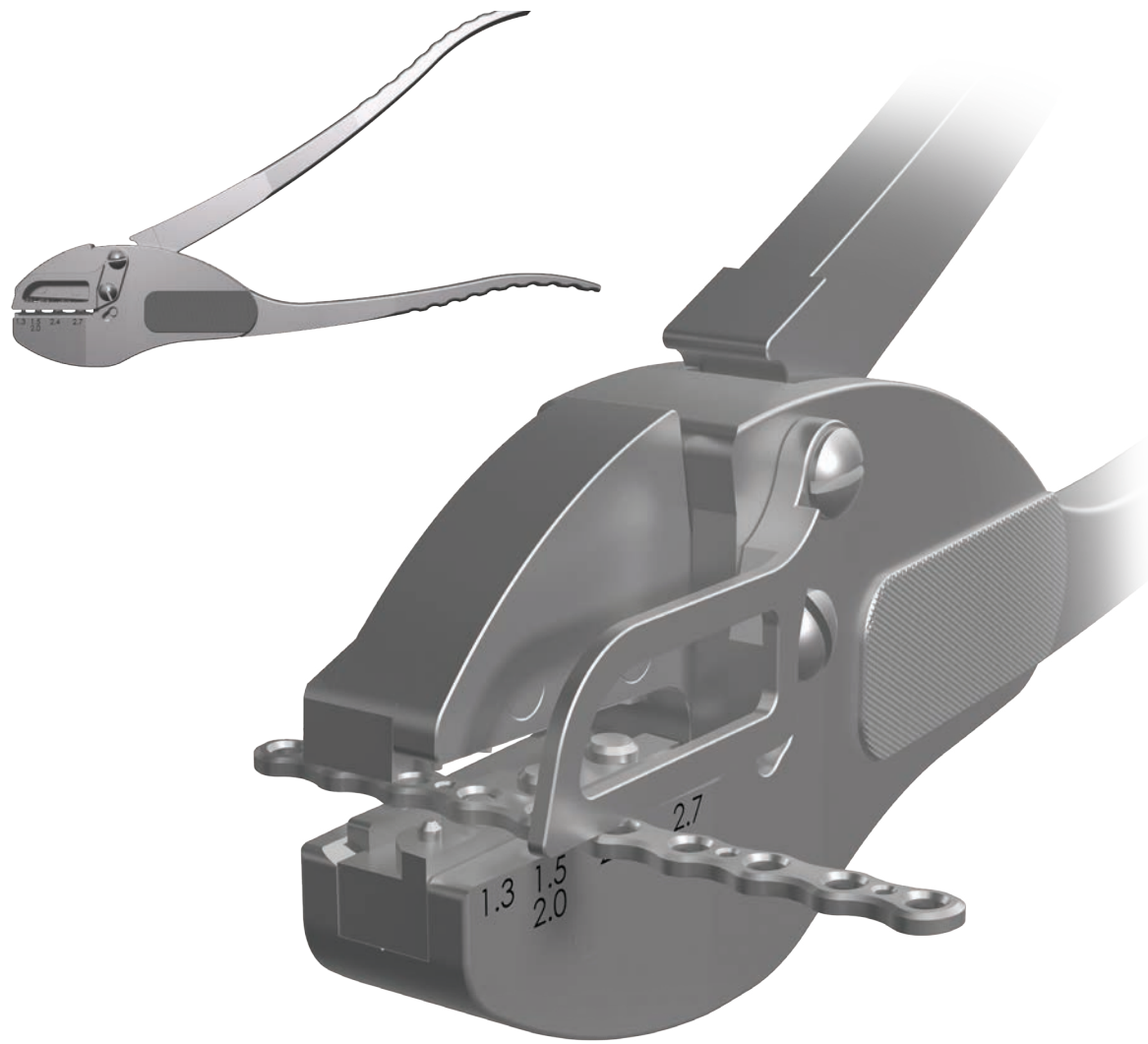
	770200010	2.0mm Non-Locking Screw
	770201010	2.0mm Locking MDS
	770008200	2.0mm Countersink
	770002150	1.5mm Drill, Short
	770003200	2.0 mm Overdrill
	770004200	Thread in/Fixed 1.5mm Drill Guide, Short
	770010200	1.5/1.8mm Compression Slot Drill Guide
	770006200	1.5mm Fixed Angle/VA Double Drill Guide
	770009240	2.0/2.4mm Depth Gauge (26mm)
	770001060	T6 Retention Driver

Screw Instrumentation

2.4mm Screw Instruments - Color-coded in Turquoise

	770240010	2.4mm Non-Locking Screw
	770241010	2.4mm Locking MDS
	770008240	2.4mm Countersink
	770002180	1.8mm Drill, Short
	770003240	2.4mm Overdrill
	770004240	Thread in/Fixed 1.8mm Drill Guide, Short
	770010200	1.5/1.8mm Compression Slot Drill Guide
	770006240	1.8mm Fixed Angle/VA Double Drill Guide
	770009240	2.0/2.4mm Depth Gauge (26mm)
	770001080	T8 Retention Driver

Plate Cutting



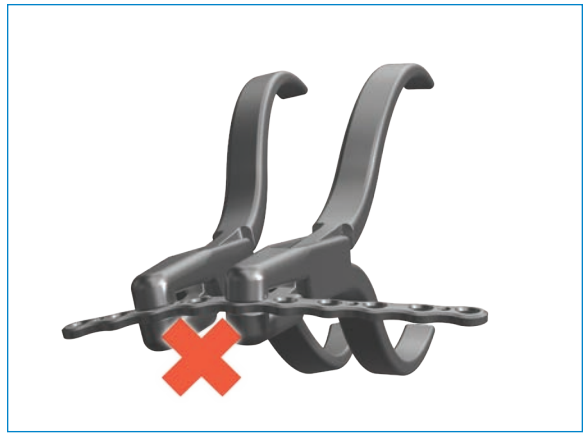
Plates may be cut to the desired length using the Plate Cutting Pliers (770020010).

The Plate Cutting Pliers are equipped with slots to accommodate 1.3mm, 1.5/2.0mm, and 2.4mm plates. These slots not only safeguard the screw holes but also enable the user to create a rounded edge on the plate. To use it, position the plate marking-side up in the plate cutter, ensuring that the final screw hole aligns with the relevant slot. Place the section of the plate you wish to retain towards the guarded side of the cutter.

Squeeze the handle of the cutter to cut a rounded edge into the plate.

The plate cutter leaves a rounded edge. Use the file on the side of the cutter to remove any sharp edges that remain after cutting.

Plate Bending



Plates may be bent if desired using the Plate Bending Pliers (770024010). Place bending pliers into adjacent screw holes.

Note: Never bend the plate across screw holes.

Bend plate to match patient anatomy.

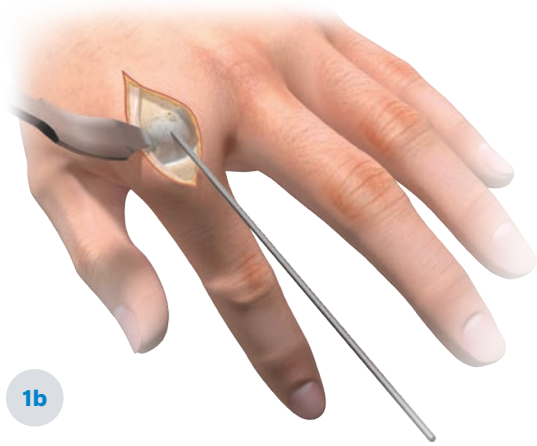
Warning: Repeated bending of the plate in alternating directions can compromise its strength or lead to breakage. Avoid bending, straightening, and then re-bending the plate more than once.

Intramedullary Nail Technique

1a

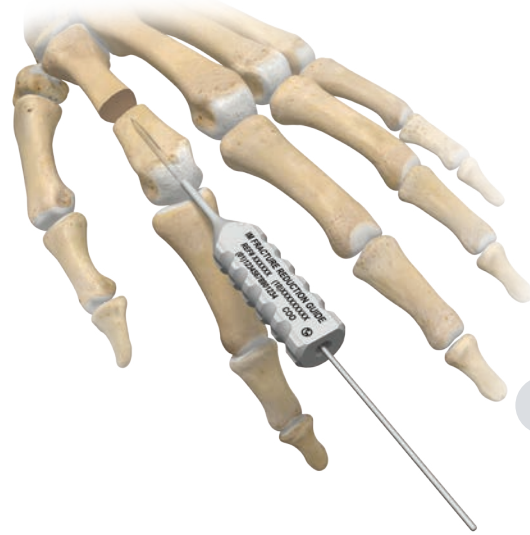
Exposure and K-Wire Insertion

Position the patient to allow for exposure of the fracture site. Make an incision per surgeon preference and carefully dissect soft tissue to expose the fracture (Figure 1a).

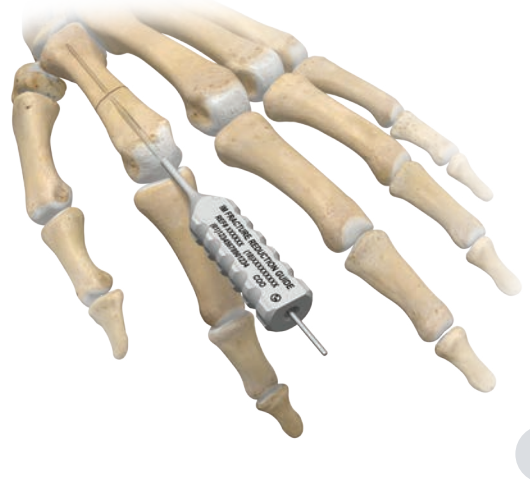


1b

Insert the K-Wire into the metacarpal head and continue in a retrograde fashion until the K-Wire tip reaches the proximal cortex (Figure 1b).



1c

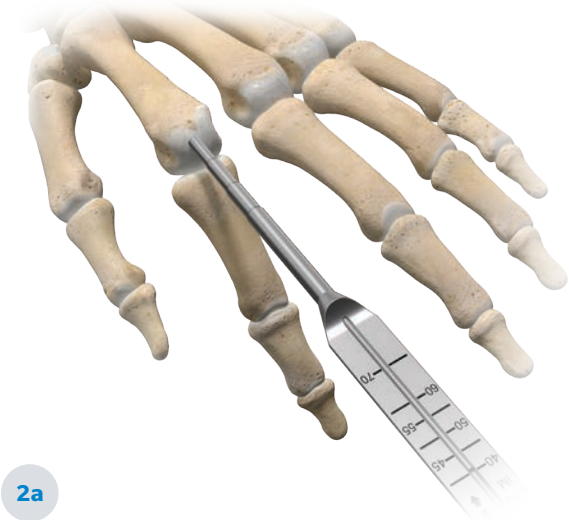


1d

IM Fracture Reduction Guide

If desired, the IM Fracture Reduction Guide can be used to assist with fracture reduction. Insert the K-Wire into to the distal segment of the fracture and pre-drill the distal segment over the K-Wire. Pass the IM Fracture Reduction Guide over the K-Wire into the distal segment. Using fluoroscopy, align the K-Wire to the proximal segment of the fracture after reduction. Pass the K-Wire into the proximal segment. Deflection will always be toward the handle flat (Figure 1c, 1d). Remove the guide.

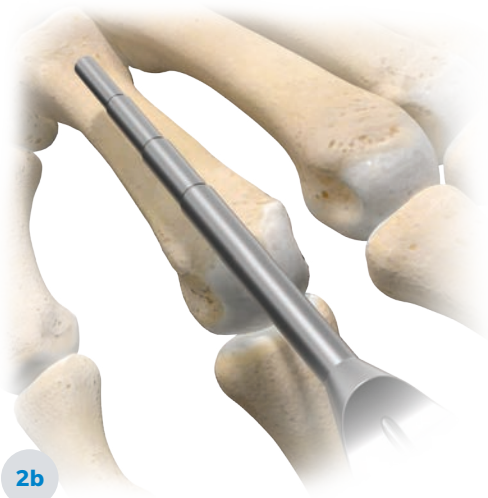
Intramedullary Nail Technique



2a

Measure for Nail Diameter and Length

Use the Depth Gauge (770900001) to measure both the diameter and length of the intended nail site. Slide the Depth Gauge over the K-Wire to measure for nail length (Figure 2a).



2b

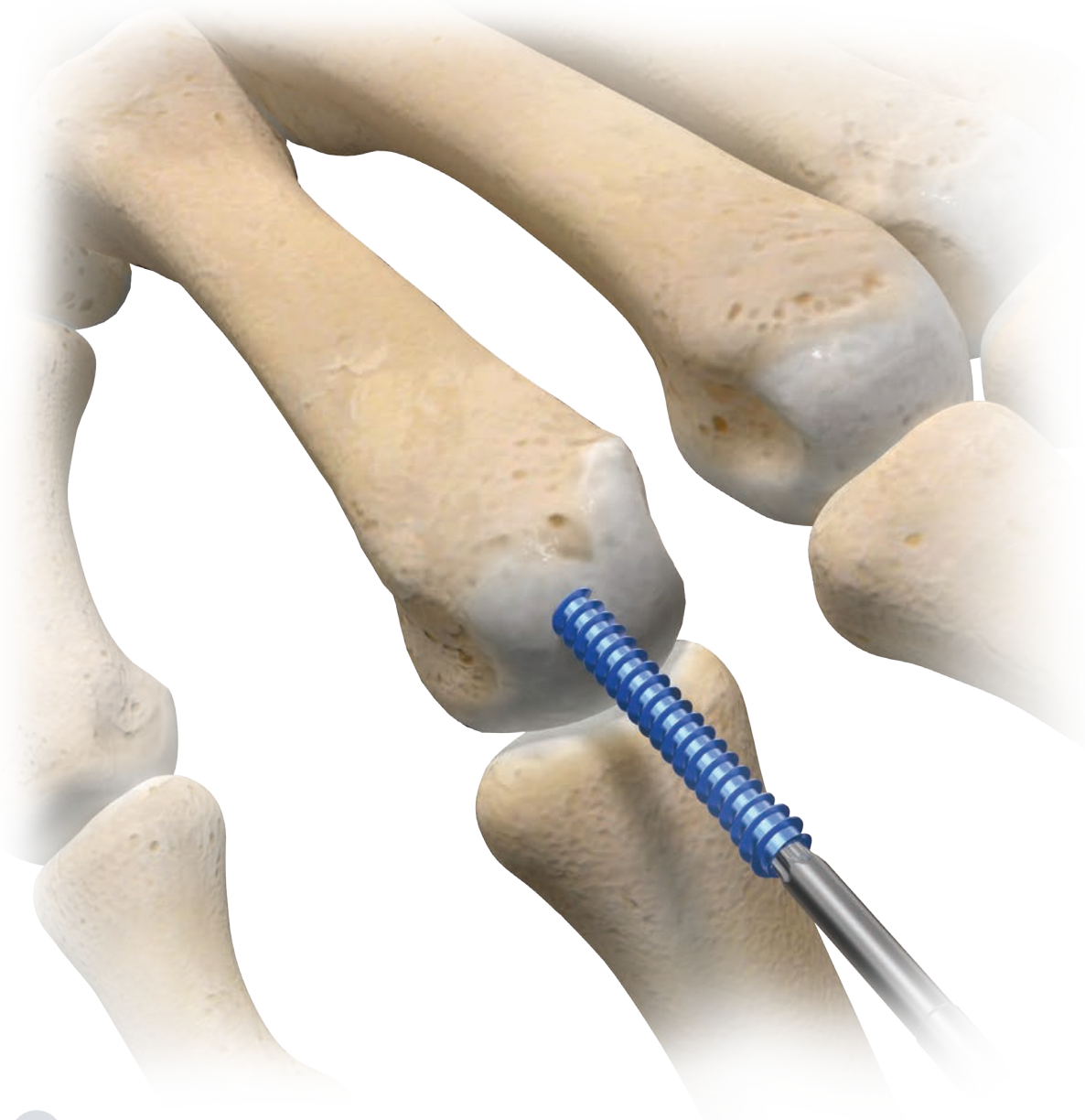
To measure for diameter, lay the Depth Gauge along the top of the metacarpal. The distal end of the Depth Gauge has four diameters that correlate to each size intramedullary nail and can be used with fluoroscopy to determine the correct intramedullary nail diameter (Figure 2b).

3

Drill for Intramedullary Nail

Select the correct cannulated drill per table on page 7. Pass the drill over the K-Wire and drill to the required depth, ensuring to cross the fracture site (Figure 3). If the IM Fracture Reduction Guide was used, complete the pre-drill of the bone. Do not remove the K-Wire at this time.

Intramedullary Nail Technique

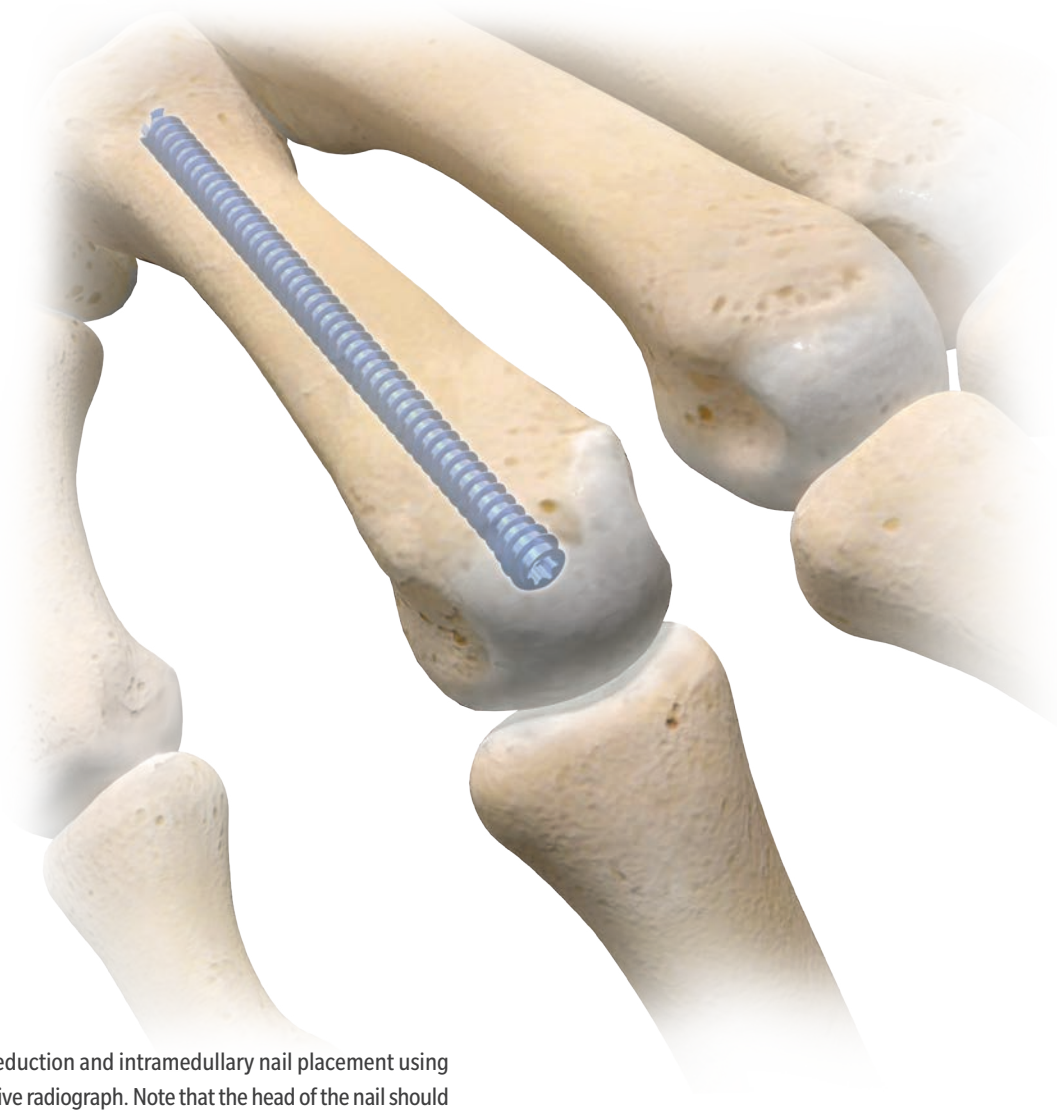


4

Place Intramedullary Nail

Insert the selected intramedullary nail over the K-Wire and to the desired depth using the corresponding hexalobe driver (Figure 4).

Intramedullary Nail Technique



Closure

Confirm the reduction and intramedullary nail placement using an intraoperative radiograph. Note that the head of the nail should be below the articular surface (Figure 5). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

5

Implant Removal

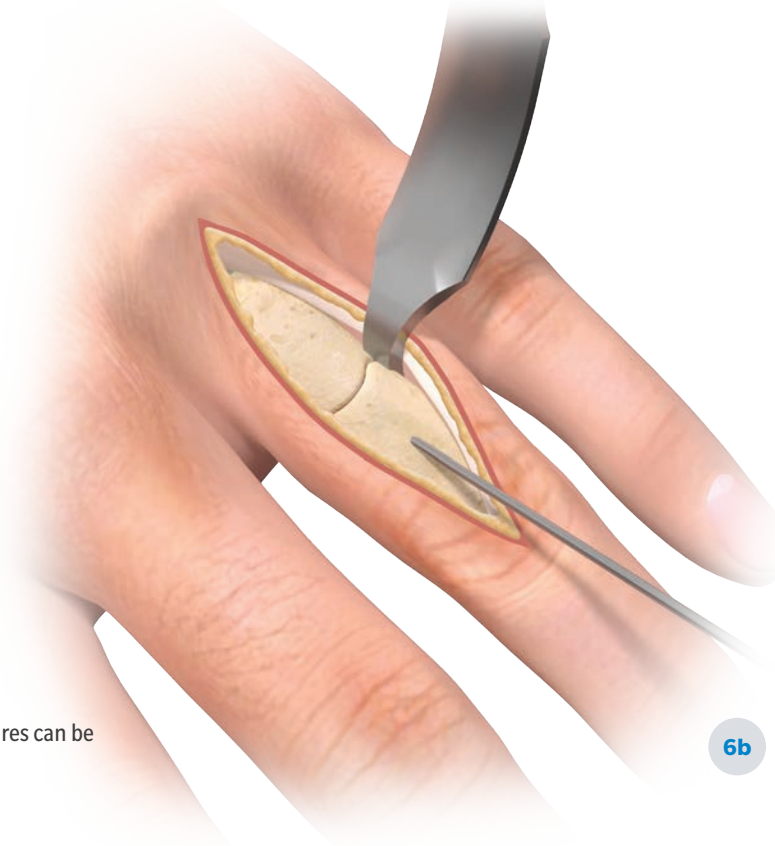
Intramedullary nail removal should always be started manually. Once started, the nail may be removed either with power or manually.

Plating Technique - Fracture Plate Technique

6a

Exposure and Fracture Reduction

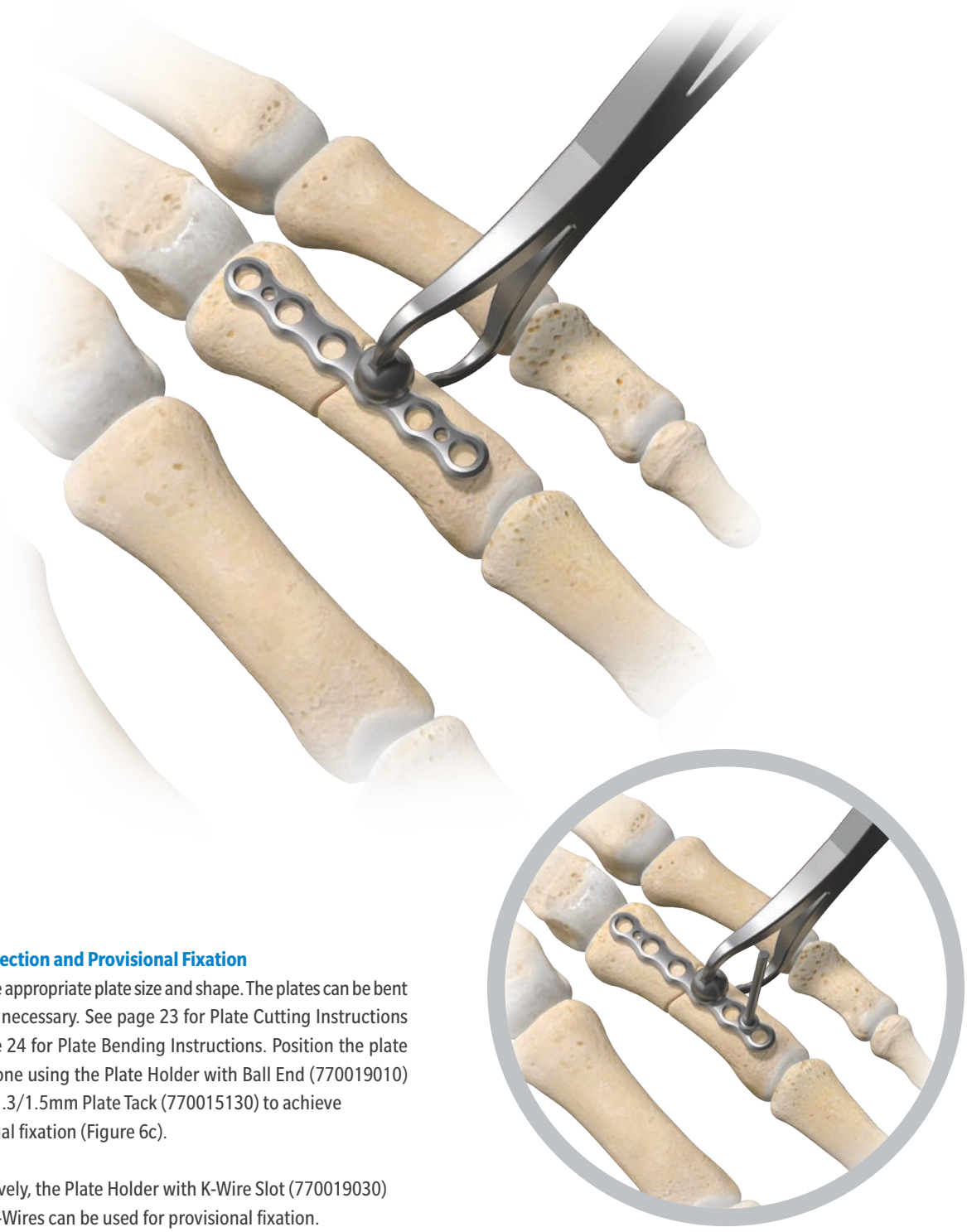
Position the patient to allow for exposure of the fracture site. Make an incision per surgeon preference and carefully dissect soft tissue to expose the fracture (Figure 6a).



6b

Reduce the fracture using standard techniques; K-Wires can be used to achieve temporary stabilization (Figure 6b).

Plating Technique - Fracture Plate Technique



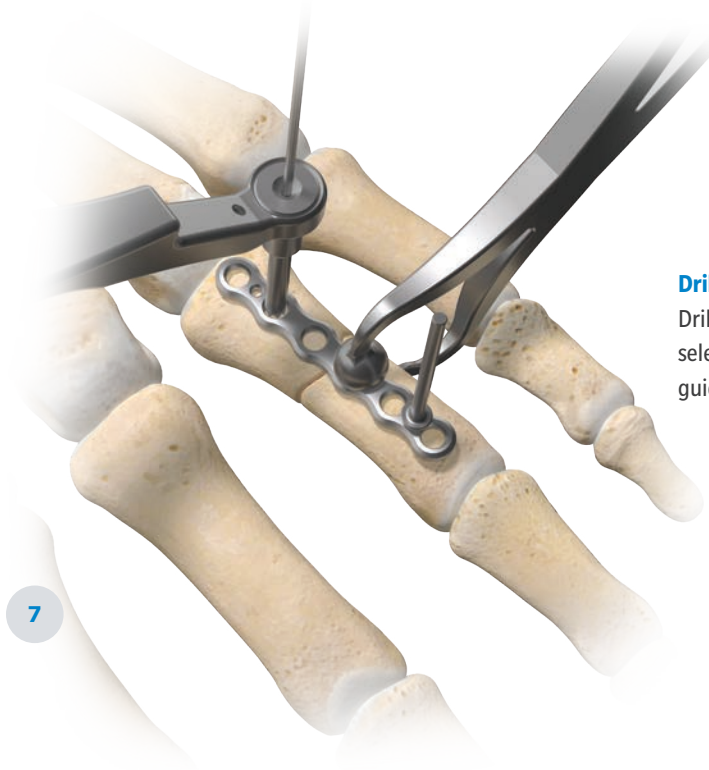
6c

Plate Selection and Provisional Fixation

Select the appropriate plate size and shape. The plates can be bent or cut as necessary. See page 23 for Plate Cutting Instructions and page 24 for Plate Bending Instructions. Position the plate on the bone using the Plate Holder with Ball End (770019010) and the 1.3/1.5mm Plate Tack (770015130) to achieve provisional fixation (Figure 6c).

Alternatively, the Plate Holder with K-Wire Slot (770019030) and/or K-Wires can be used for provisional fixation.

Plating Technique - Fracture Plate Technique



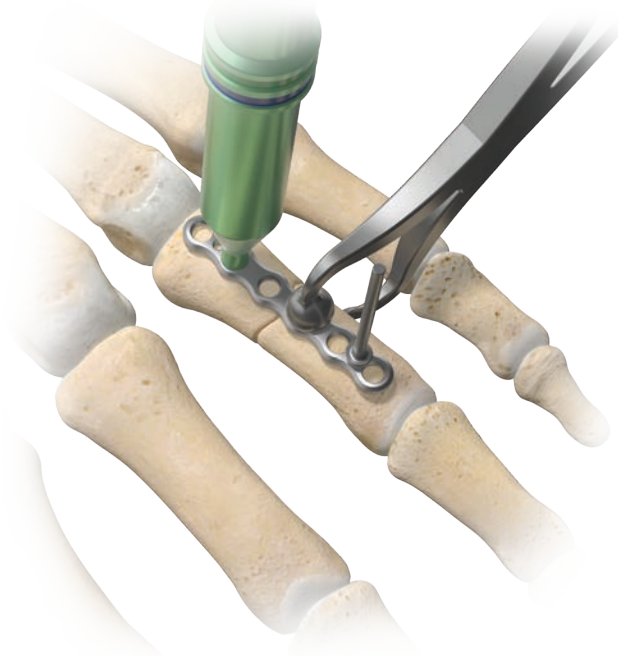
7

Drill Screw Holes

Drill using the appropriately sized drill and drill guide for the selected screw (Figure 7). See Table 1 (pg. 28) for drill and drill guide sizing.

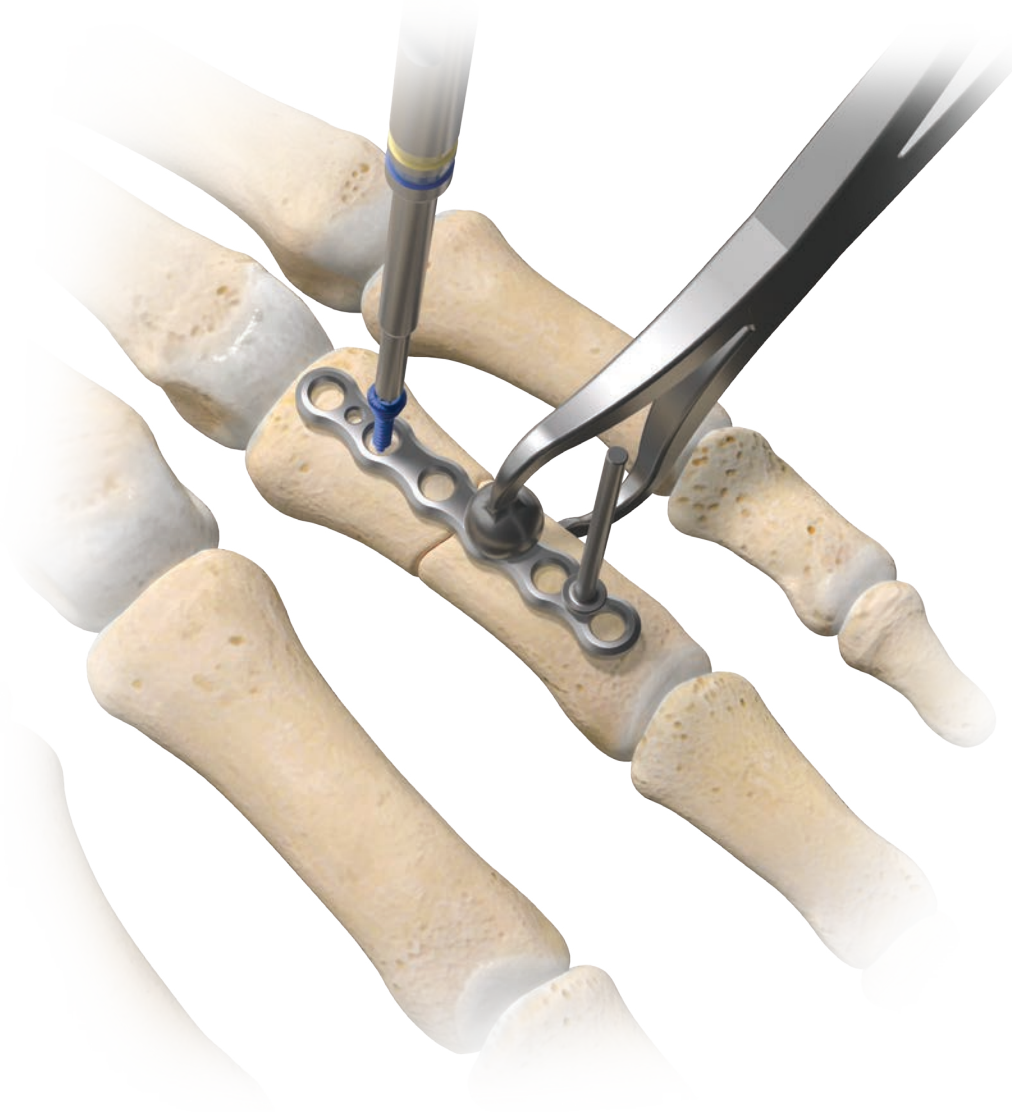
Measure for Screw Length

Measure to determine the necessary screw length using the appropriately sized Depth Gauge (Figure 8), or Thread in/Fixed Drill Guide. See Table 1 for depth gauge sizing.



8

Plating Technique - Fracture Plate Technique



9

Insert Screws

Select and insert the appropriate length screws using the corresponding driver (Figure 9). See Table 1 (pg. 28) for driver sizing. Utilize the necessary number of screws to secure the plate to the bone. Locking and Non-Locking Screws are available in 1.3, 1.5, 2.0, and 2.4mm sizes. See page 14 for screw options. The 1.5, 2.0, and 2.4mm Locking Screws are multidirectional, allowing for placement in a cone of angulation up to 30°.

Using the Compression Slot

For plates that have a compression slot, if desired, once the first screw is fully inserted, the compression slot may be used to achieve compression of the fracture. If compression is desired, use the 2.0/2.4 Compression Slot Drill Guide (770010200) to drill using the "C" side of the drill guide. Place the screw at the small end of the slot. If neutralization is desired, drill using the "N" side of the drill guide. Place the screw at the large end of the slot. Compression is always achieved from the small end of the slot to the large end.

Plating Technique - Fracture Plate Technique

10

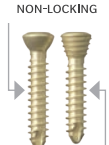
Closure

Confirm the reduction and plate and screw placement using an intraoperative radiograph (Figure 10). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

Plating Technique - Fracture Plate Technique

Table 1: Screw Family Instruments

SCREW SIZE	DRILL	DRILL GUIDE OPTIONS	DEPTH GAUGE	DRIVER
1.3mm	**0.9mm Drill** (770002090)	**Thread in/Fixed 0.9mm Drill Guide** 770004130 **0.9mm Fixed Angle Drill Guide** 770006130	**1.3/1.5mm Depth Gauge (26mm)** 770009130	**T4 Retention Driver** 770001040
1.5mm	1.0**mm Drill** (770002100)	**Thread in/Fixed 1.0mm Drill Guide** 770004150 **1.0mm Fixed Angle/ VA Double Drill Guide** 770006150	**1.3/1.5mm Depth Gauge (26mm)** 770009130	**T6 Retention Driver** 770001060
2.0mm	1.5**mm Drill Short** (770002150) 2.0**mm Overdrill** (770003200)	**Thread in/Fixed 1.5mm Drill Guide, Short** 770004200 **1.5mm Fixed Angle/ VA Double Drill Guide** 770006200	**2.0/2.4mm Depth Gauge (26mm)** 770009240	**T6 Retention Driver** 770001060
2.4mm	**1.8mm Drill Short** (770002180) **2.4mm Overdrill** (770003240)	**Thread in/Fixed 1.8mm Drill Guide, Short** 770004240 **1.8mm Fixed Angle/ VA Double Drill Guide** 770006240	**2.0/2.4mm Depth Gauge (26mm)** 770009240	**T8 Retention Driver** 770001080

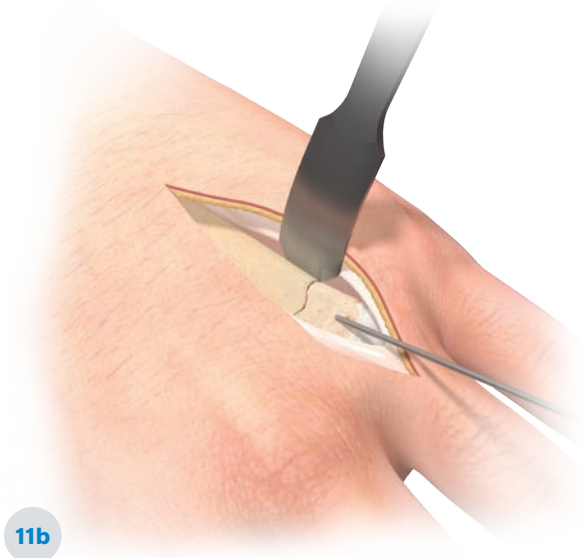
1.3mm Screws	1.5mm Screws	2.0mm Screws	2.4mm Screws
NON-LOCKING	NON-LOCKING	NON-LOCKING	NON-LOCKING
			
FIXED ANGLE LOCKING	VARIABLE ANGLE LOCKING	VARIABLE ANGLE LOCKING	VARIABLE ANGLE LOCKING

Plating Technique - Condylar Plate Technique

11a

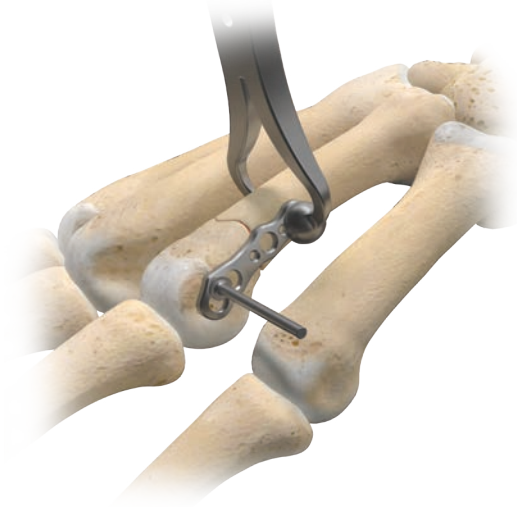
Exposure and Fracture Reduction

Position the patient with their forearm pronated to allow for exposure of the fracture site. Make an incision per surgeon preference and carefully retract tendons to expose the fracture (Figure 11a).



11b

Reduce the fracture using standard techniques; K-Wires can be used to achieve temporary stabilization (Figure 11b).

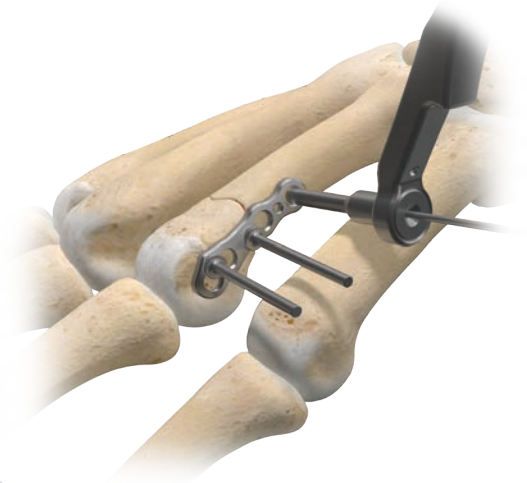


12

Plate Selection and Provisional Fixation

Position the appropriate plate, either the 1.5/2.0mm Condylar Plate Angle Right (770506021) or 1.5/2.0mm Condylar Plate Angle Left (770506022), on the metacarpal proximal to the ligamentous insertion on the metacarpal head. Position the plate on the bone using the Plate Holder with Ball End (770019010) and the 1.3/1.5mm Plate Tack (770015130) to achieve provisional fixation (Figure 12). Alternatively, the Plate Holder with K-Wire Slot (770019030) and/or K-Wires can be used for provisional fixation.

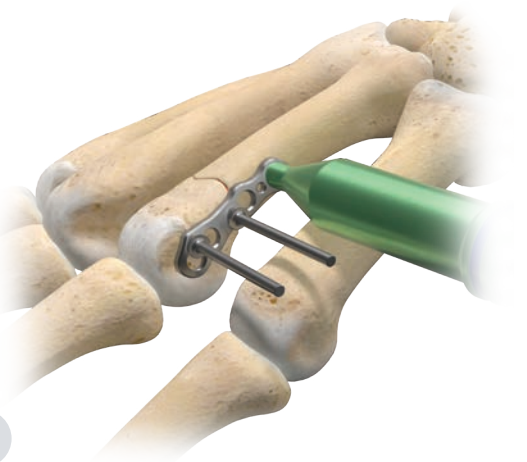
Plating Technique - Condylar Plate Technique



13

Drill Screw Holes

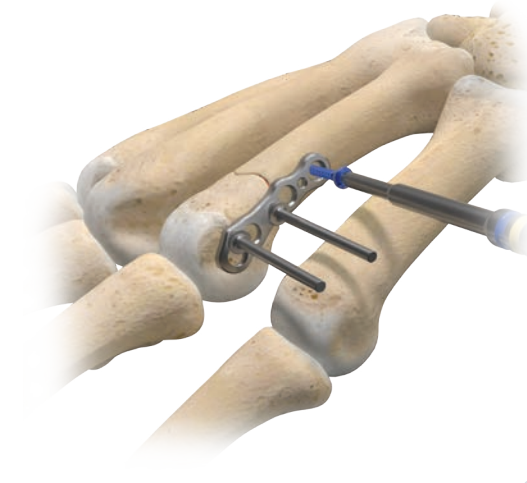
Drill for the proximal screw using the appropriately sized drill and drill guide for the selected screw (Figure 13). See Table 1 (pg. 28) for drill and drill guide sizing.



14

Measure for Screw Length

Measure to determine the necessary screw length using the appropriately sized Depth Gauge (Figure 14), or Thread In/ Fixed Drill Guide. See Table 1 for depth gauge sizing.



15

Insert Screws

Select and insert the appropriate length screw using the corresponding driver to secure the plate to the bone. See Table 1 for driver sizing. Drill, measure, and insert the distal screws in the same manner (Figure 15).

16

Closure

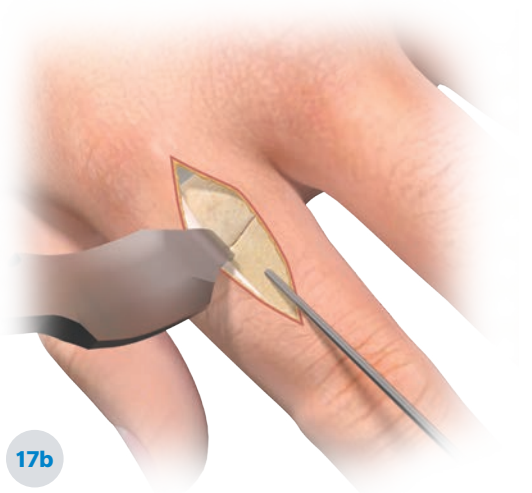
Confirm the reduction and plate and screw placement using an intraoperative radiograph (Figure 16). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

Plating Technique - Avulsion Hook Plate Technique

17a

Exposure and Fracture Reduction

Position the patient with their forearm pronated to allow for exposure of the fracture site. Make an incision per surgeon preference and carefully retract tendons to expose the fracture (Figure 17a).



17b

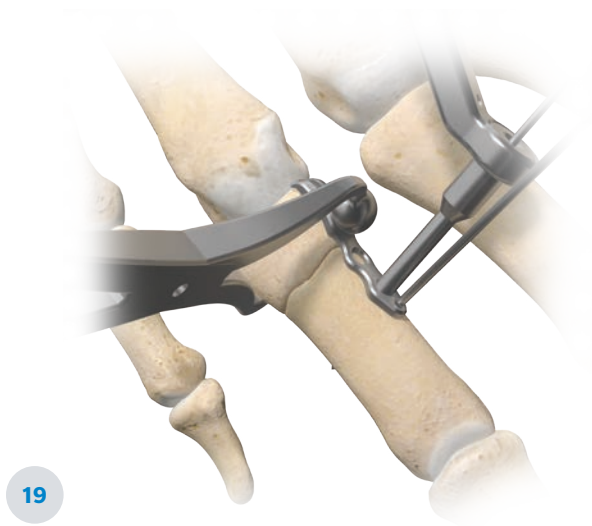
Reduce the fracture using standard techniques; K-Wires can be used to achieve temporary stabilization (Figure 17b).

18

Plate Selection and Provisional Fixation

Position the 1.5/2.0mm Avulsion Hook Plate (770507030) along the phalangeal base with anatomical location determined by the fracture pattern. Position the plate on the bone using the Plate Holder with Ball End (770019010) and the 1.3/1.5mm Plate Tack (770015130) to achieve provisional fixation (Figure 18). Alternatively, the Plate Holder with K-Wire Slot (770019030) and/or K-Wires can be used for provisional fixation.

Plating Technique - Avulsion Hook Plate Technique



19

Drill Screw Holes

Drill using the appropriately sized drill and drill guide for the selected screw (Figure 19). See Table 1 (pg 28) for drill and drill guide sizing.

20

Measure for Screw Length

Measure to determine the necessary screw length for each desired screw hole using the appropriately sized Depth Gauge (Figure 20) or Thread In/Fixed Drill Guide. See Table 1 for drill and drill guide sizing.

21

Insert Screws

Select and insert the appropriate length screws in the desired screw holes using the corresponding driver to secure the plate to the bone (Figure 21). See Table 1 for driver sizing.

22

Closure

Confirm the reduction and plate and screw placement using an intraoperative radiograph (Figure 22). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

Plating Technique - Rotation Correction Plate Technique

23

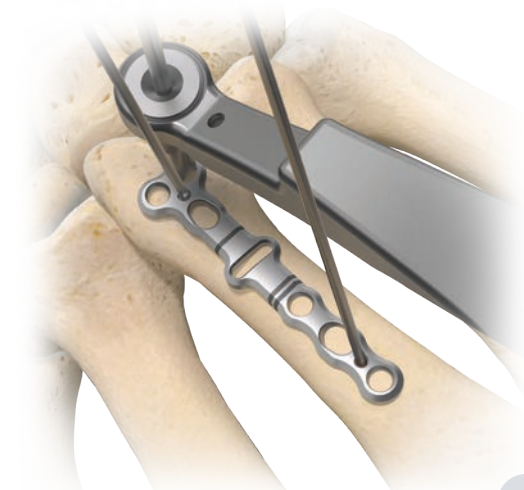
Exposure

Position the patient with their forearm pronated to allow for exposure of the osteotomy site. Make an incision per surgeon preference and carefully retract tendons to expose the osteotomy location (Figure 23).

24

Plate Placement and Initial Fixation

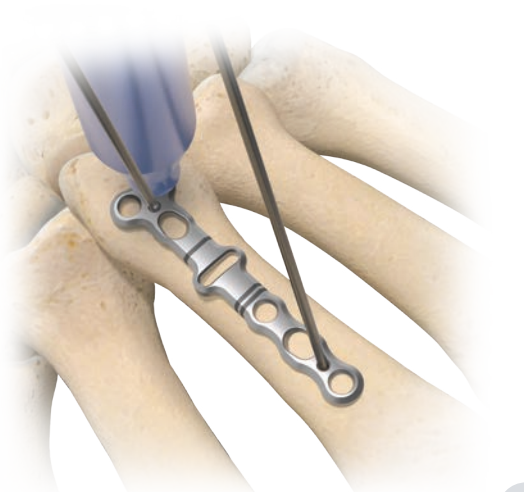
Position the 1.5/2.0mm Rotation Correction Plate (770508040) along the metacarpal. Use the K-Wires for provisional fixation (Figure 24).



25

Drill Proximal Screw Holes

Drill for the distal screws using the appropriately sized drill and drill guide for the selected screw (Figure 25). See Table 1 (pg. 28) for drill and drill guide sizing.

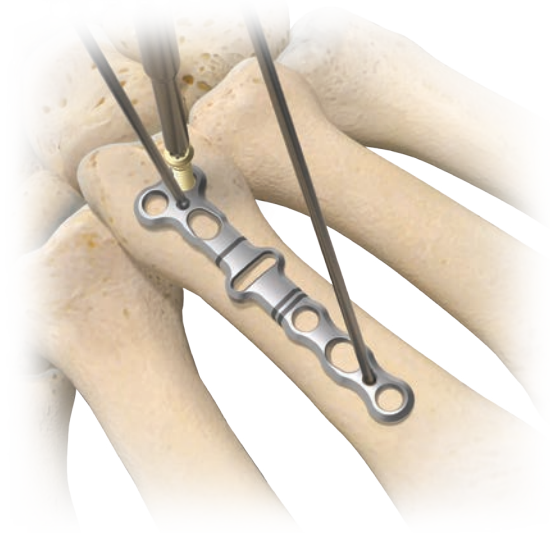


26

Measure for Screw Length

Measure to determine the necessary screw length for each proximal screw hole using the appropriately sized Depth Gauge (Figure 26). See Table 1 for depth gauge sizing.

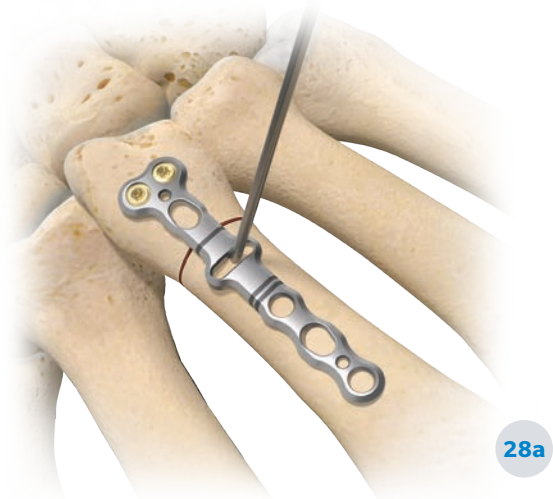
Plating Technique - Rotation Correction Plate Technique



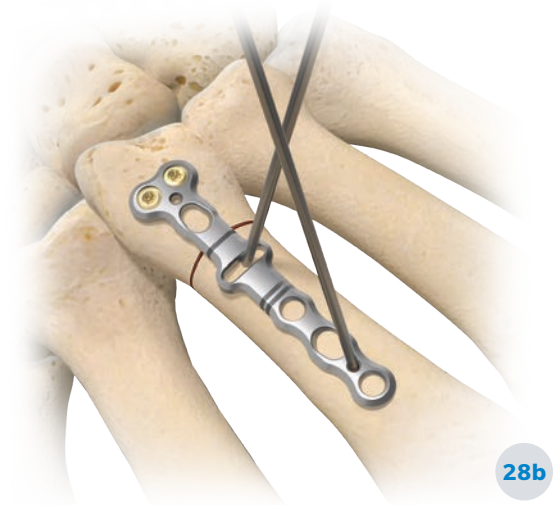
27

Insert Proximal Screws

Select and insert the appropriate length screws in the proximal screw holes using the corresponding driver to secure the plate to the bone (Figure 27). See Table 1 for driver sizing. Remove K wires.



28a



28b

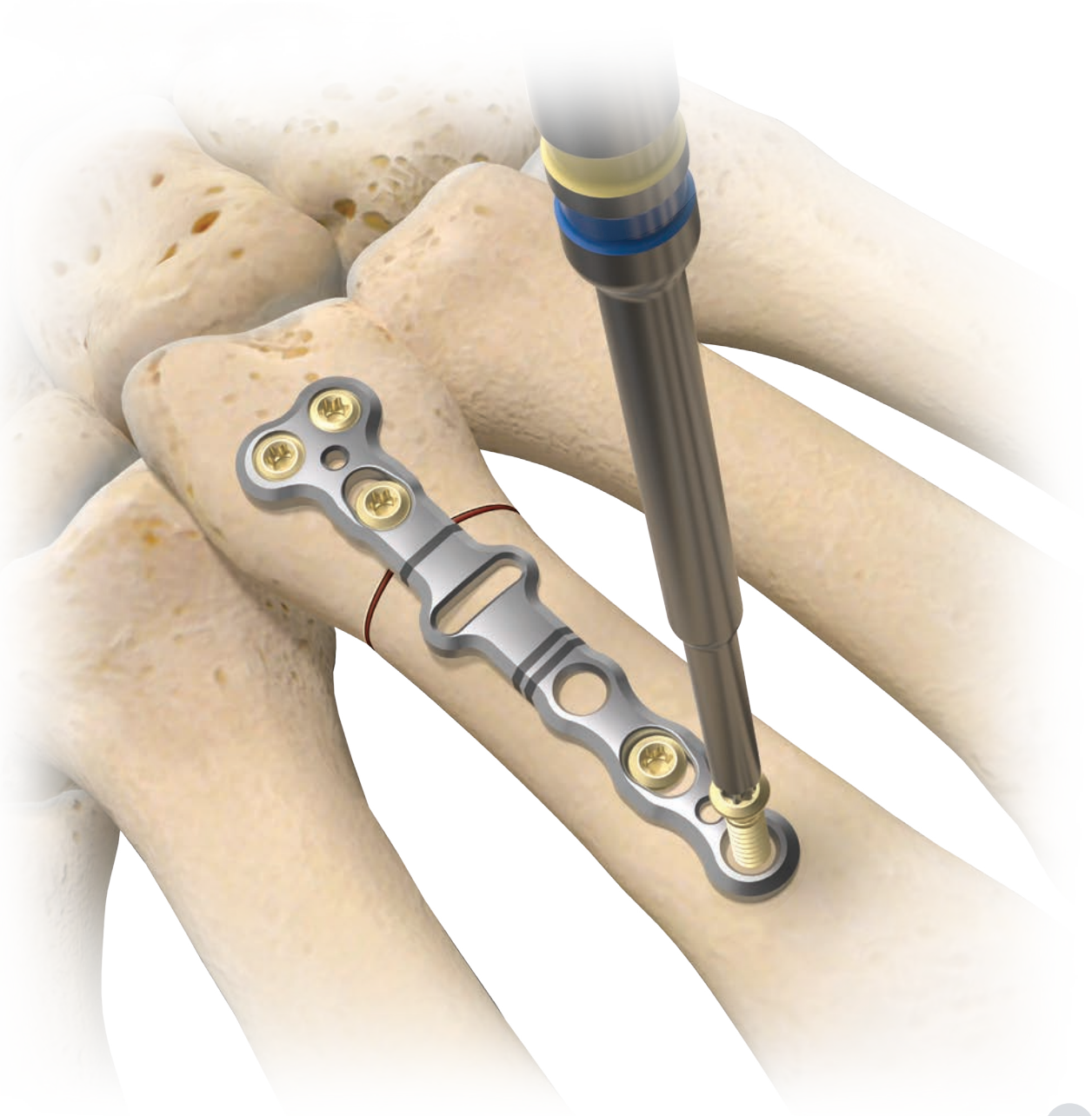
Osteotomy and Rotational Correction

Create an osteotomy between the proximal screws and the rotation slot. Manually rotate the osteotomy with the rotational K-Wire (Figure 28a) and provisionally reduce and hold in place distally with an additional K-Wire (Figure 28b). Alternatively, the 1.3/1.5mm Plate Tack (770015130) can be used.

Osteotomy Compression

If desired, manually compress the osteotomy and place a non-locking screw in the compression slot

Plating Technique - Rotation Correction Plate Technique

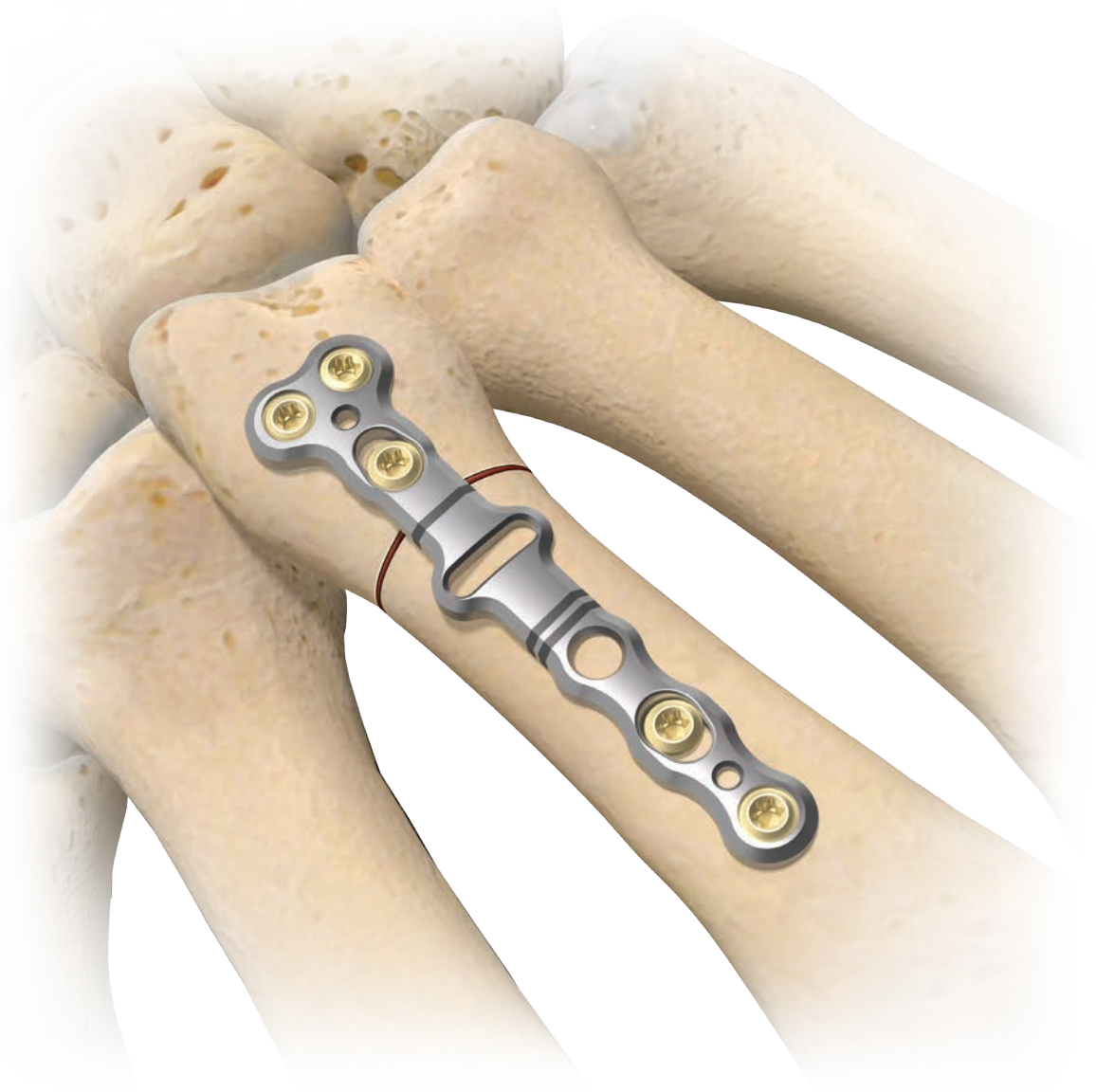


29

Drill, Measure, and Insert Distal Screws

Drill using the appropriately sized drill and drill guide for the selected screw. See Table 1(pg. 28) for drill and drill guide sizing. Measure to determine the necessary screw length for each distal screw hole using the appropriately sized Depth Gauge. See Table 1 for drill and drill guide sizing. Alternatively, if the Thread In/Fixed Drill Guide was used, the screw length can be determined by using the calibrations on the drill guide to read the measurement mark on the drill. Select and insert the appropriate length screws in the distal screw holes using the corresponding driver to secure the plate to the bone (Figure 29). See Table 1 for driver sizing.

Plating Technique - Rotation Correction Plate Technique



30

Closure

Confirm the reduction and plate and screw placement using an intraoperative radiograph (Figure 30). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

Note: The Rotation Correction Plate can be used for either a metacarpal head rotation or a metacarpal shaft rotation. Use the appropriate etch line for the osteotomy based on the rotation necessary.

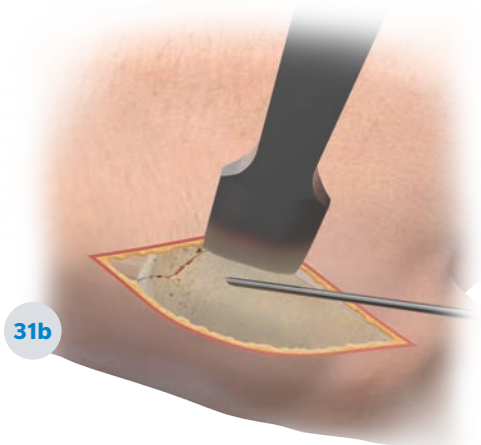
Plating Technique - Bennett/Rolando Plate Technique

31a

Exposure and Fracture Reduction

Position the patient with their forearm pronated to allow for exposure of the fracture site. Make an incision per surgeon preference and carefully retract tendons to expose the fracture (Figure 31a).

Reduce the fracture using standard techniques; K-Wires can be used to achieve temporary stabilization (Figure 31b).

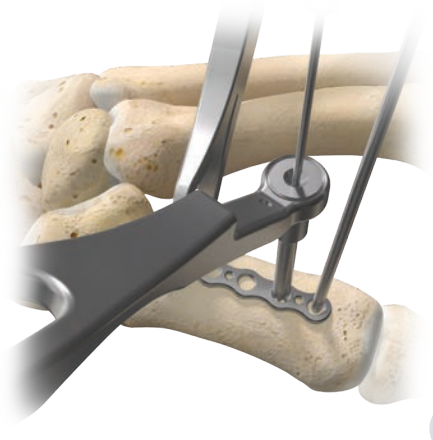


31b

32

Plate Selection and Provisional Fixation

Position the 1.5/2.0mm Bennett/Rolando Plate (770509050) on the first metacarpal, distal to the ligamentous insertion on the metacarpal base, ensuring that the hooks do not violate the joint space. Position the plate on the bone using the Plate Holder with Ball End (770019010) and the 1.3/1.5mm Plate Tack (770015130) to achieve provisional fixation (Figure 32). Alternatively, the Plate Holder with K-Wire Slot (770019030) and/or K-Wires can be used for provisional fixation.

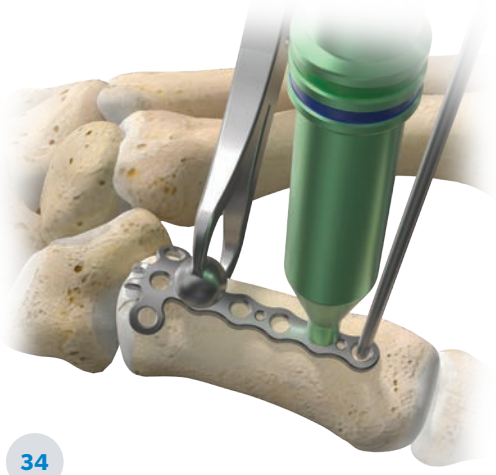


33

Drill Distal Screw Holes

Drill for the distal screws using the appropriately sized drill and drill guide for the selected screw (Figure 33). See Table 1 (pg. 28) for drill and drill guide sizing.

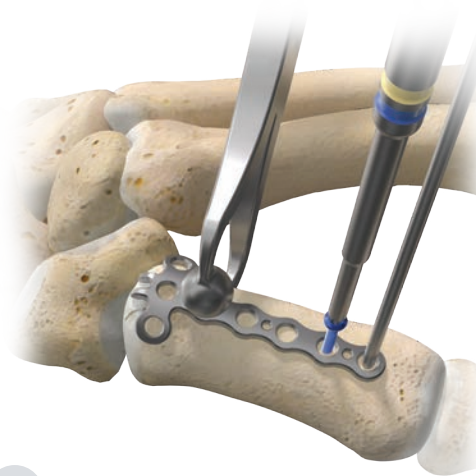
Plating Technique - Bennett/Rolando Plate Technique



34

Measure for Distal Screw Length

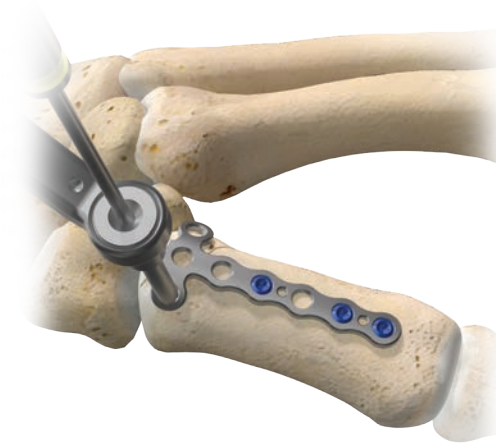
Measure to determine the necessary screw length for each distal screw hole using the appropriately sized Depth Gauge (Figure 34) or Thread In/Fixed Drill Guide. See Table 1 (pg. 28) for depth gauge sizing.



35

Insert Distal Screws

Select and insert the appropriate length screws in the distal screw holes using the corresponding driver to secure the plate to the bone (Figure 35). See Table 1 (pg. 28) for drill and driver sizing.



36a

Drill, Measure, and Insert Proximal Screws

Drill using the appropriately sized drill and drill guide for the selected screw. See Table 1 for drill and drill guide sizing. Measure to determine the necessary screw length for each proximal screw hole using the appropriately sized Depth Gauge (Figure 36a). See Table 1 for depth gauge sizing. Select and insert the appropriate length screws in the proximal screw holes using the corresponding driver to secure the plate to the bone (Figure 36b). See Table 1 for driver sizing.

36b

Plating Technique - Bennett/Rolando Plate Technique

37

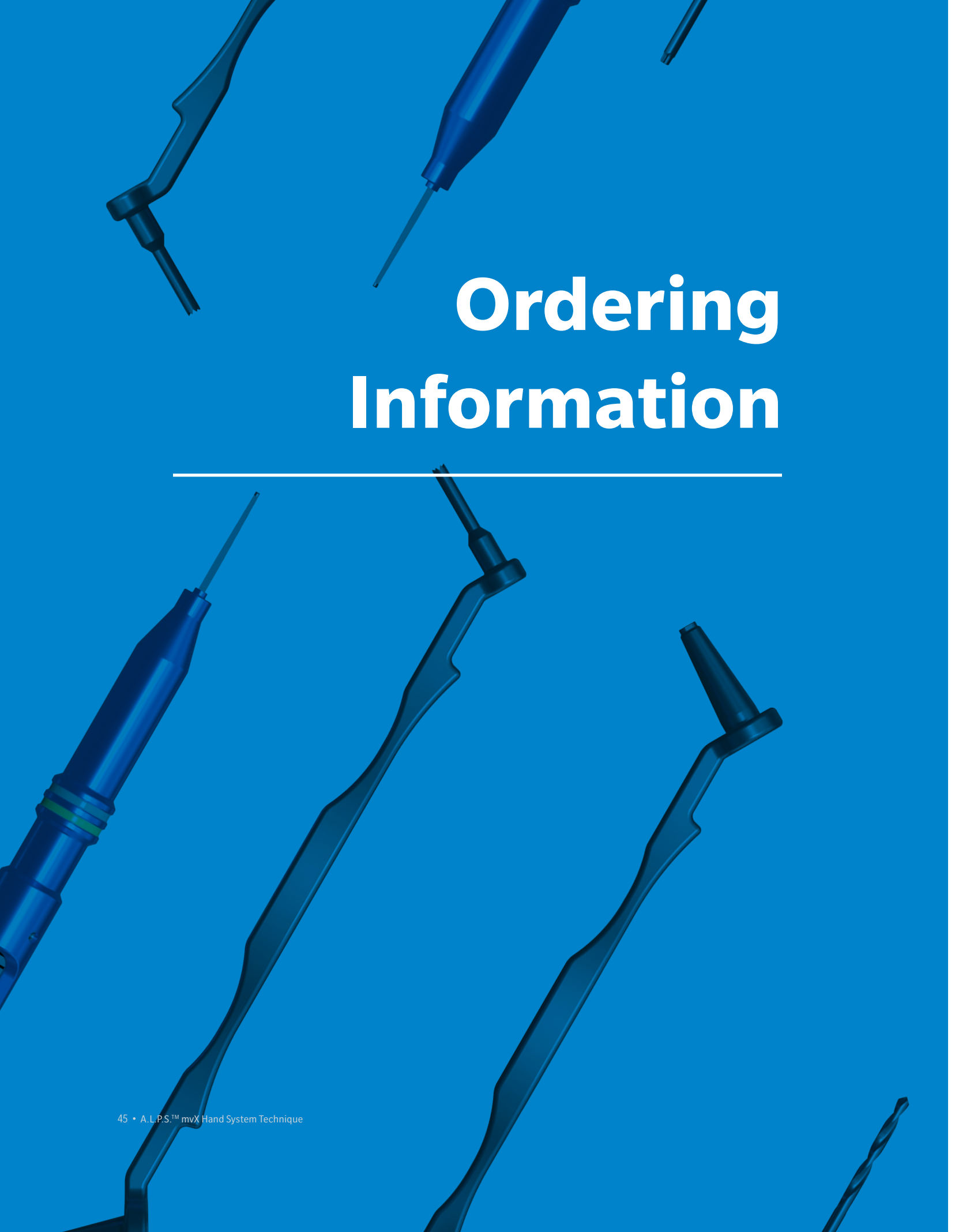
Closing

Confirm the reduction and plate and screw placement using an intraoperative radiograph (Figure 37). Irrigate the wound. Close the subcutaneous tissue and musculature in separate layers. Close the skin and dress the wound.

Plate Removal*

To remove any of the plates, use the appropriate driver based on the size of the screws in the plate. When removing a 1.3mm screw, use the T4 driver. When removing a 1.5 or 2.0mm screw, use the T6 driver. When removing a 2.4mm screw, use the T8 driver. Once all screws are removed from the construct, remove the plate from the bone.

*Applies to all the techniques



Ordering Information

Ordering Information

1.3mm Plate Family

Part#	Description
770515050	1.3mm Straight Plate, 5H
770516040	1.3mm T Plate, 4H

1.5/2.0mm Plate Family

Part#	Description
770500060	1.5mm/2.0mm Straight Plate, 6H
770500100	1.5mm/2.0mm Straight Plate, 10H
770503040	1.5mm/2.0mm Straight Tine Plate, 4H
770501090	1.5mm/2.0mm 3H T Plate, Curved, 9H
770510050	1.5mm/2.0mm Narrow Y Plate, 5H
770510090	1.5mm/2.0mm Narrow Y Plate, 9H
770511100	1.5mm/2.0mm Offset Plate, 10H
770511200	1.5mm/2.0mm Offset Plate, 20H
770506021	1.5mm/2.0mm Condylar Plate, Angle Left
770506022	1.5mm/2.0mm Condylar Plate, Angle Right
770507030	1.5mm/2.0mm Avulsion Hook Plate
770501050	1.5mm/2.0mm 3H T Plate, Curved, 5H
770508040	1.5mm/2.0mm Rotation Correction Plate
770509050	1.5mm/2.0mm Bennett/Rolando Plate

2.4mm Plate Family

Part#	Description
770609050	2.4mm 3H T Plate, Curved, 5H
770609090	2.4mm 3H T Plate, Curved, 9H
770611050	2.4mm Narrow Y Plate, 5H
770611090	2.4mm Narrow Y Plate, 9H
770608060	2.4mm Straight Plate, Curved, 6H
770608100	2.4mm Straight Plate, Curved, 10H

Ordering Information

Intramedullary Nails

	Part#	Description
	770300040	3.0mm IM Nail, 40mm
	770300045	3.0mm IM Nail, 45mm
	770300050	3.0mm IM Nail, 50mm
	770300055	3.0mm IM Nail, 55mm
	770300060	3.0mm IM Nail, 60mm
	770300070	3.0mm IM Nail, 70mm
	770352040	3.5mm IM Nail, 40mm
	770352045	3.5mm IM Nail, 45mm
	770352050	3.5mm IM Nail, 50mm
	770352055	3.5mm IM Nail, 55mm
	770352060	3.5mm IM Nail, 60mm
	770352070	3.5mm IM Nail, 70mm

Intramedullary Nails

	Part#	Description
	770401040	4.0mm IM Nail, 40mm
	770401045	4.0mm IM Nail, 45mm
	770401050	4.0mm IM Nail, 50mm
	770401055	4.0mm IM Nail, 55mm
	770401060	4.0mm IM Nail, 60mm
	770401070	4.0mm IM Nail, 70mm
	770450040	4.5mm IM Nail, 40mm
	770450045	4.5mm IM Nail, 45mm
	770450050	4.5mm IM Nail, 50mm
	770450055	4.5mm IM Nail, 55mm
	770450060	4.5mm IM Nail, 60mm
	770450070	4.5mm IM Nail, 70mm

Ordering Information

1.3mm Non-Locking Screws

Part#	Description
770130006	1.3mm Non-Locking Screw 6mm
770130007	1.3mm Non-Locking Screw 7mm
770130008	1.3mm Non-Locking Screw 8mm
770130009	1.3mm Non-Locking Screw 9mm
770130010	1.3mm Non-Locking Screw 10mm
770130011	1.3mm Non-Locking Screw 11mm
770130012	1.3mm Non-Locking Screw 12mm
770130013	1.3mm Non-Locking Screw 13mm
770130014	1.3mm Non-Locking Screw 14mm
770130015	1.3mm Non-Locking Screw 15mm
770130016	1.3mm Non-Locking Screw 16mm

1.3mm Locking Screws

Part#	Description
770131006	1.3mm Locking Screw 6mm
770131007	1.3mm Locking Screw 7mm
770131008	1.3mm Locking Screw 8mm
770131009	1.3mm Locking Screw 9mm
770131010	1.3mm Locking Screw 10mm
770131011	1.3mm Locking Screw 11mm
770131012	1.3mm Locking Screw 12mm
770131013	1.3mm Locking Screw 13mm
770131014	1.3mm Locking Screw 14mm
770131015	1.3mm Locking Screw 15mm
770131016	1.3mm Locking Screw 16mm

Ordering Information

1.5mm Non-Locking Screws

Part#	Description
770150006	1.5mm Non-Locking Screw 6mm
770150007	1.5mm Non-Locking Screw 7mm
770150008	1.5mm Non-Locking Screw 8mm
770150009	1.5mm Non-Locking Screw 9mm
770150010	1.5mm Non-Locking Screw 10mm
770150011	1.5mm Non-Locking Screw 11mm
770150012	1.5mm Non-Locking Screw 12mm
770150013	1.5mm Non-Locking Screw 13mm
770150014	1.5mm Non-Locking Screw 14mm
770150015	1.5mm Non-Locking Screw 15mm
770150016	1.5mm Non-Locking Screw 16mm
770150017	1.5mm Non-Locking Screw 17mm
770150018	1.5mm Non-Locking Screw 18mm
770150019	1.5mm Non-Locking Screw 19mm
770150020	1.5mm Non-Locking Screw 20mm
770150021	1.5mm Non-Locking Screw 21mm
770150022	1.5mm Non-Locking Screw 22mm
770150023	1.5mm Non-Locking Screw 23mm
770150024	1.5mm Non-Locking Screw 24mm

1.5mm Locking Multi-Directional Screws

Part#	Description
770151006	1.5mm Locking MDS 6mm
770151007	1.5mm Locking MDS 7mm
770151008	1.5mm Locking MDS 8mm
770151009	1.5mm Locking MDS 9mm
770151010	1.5mm Locking MDS 10mm
770151011	1.5mm Locking MDS 11mm
770151012	1.5mm Locking MDS 12mm
770151013	1.5mm Locking MDS 13mm
770151014	1.5mm Locking MDS 14mm
770151015	1.5mm Locking MDS 15mm
770151016	1.5mm Locking MDS 16mm
770151017	1.5mm Locking MDS 17mm
770151018	1.5mm Locking MDS 18mm
770151019	1.5mm Locking MDS 19mm
770151020	1.5mm Locking MDS 20mm
770151021	1.5mm Locking MDS 21mm
770151022	1.5mm Locking MDS 22mm
770151023	1.5mm Locking MDS 23mm
770151024	1.5mm Locking MDS 24mm

Ordering Information

2.0mm Non-Locking Screws

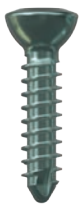
Part#	Description
770200006	2.0mm Non-Locking Screw 6mm
770200007	2.0mm Non-Locking Screw 7mm
770200008	2.0mm Non-Locking Screw 8mm
770200009	2.0mm Non-Locking Screw 9mm
770200010	2.0mm Non-Locking Screw 10mm
770200011	2.0mm Non-Locking Screw 11mm
770200012	2.0mm Non-Locking Screw 12mm
770200013	2.0mm Non-Locking Screw 13mm
770200014	2.0mm Non-Locking Screw 14mm
770200015	2.0mm Non-Locking Screw 15mm
770200016	2.0mm Non-Locking Screw 16mm
770200017	2.0mm Non-Locking Screw 17mm
770200018	2.0mm Non-Locking Screw 18mm
770200019	2.0mm Non-Locking Screw 19mm
770200020	2.0mm Non-Locking Screw 20mm
770200021	2.0mm Non-Locking Screw 21mm
770200022	2.0mm Non-Locking Screw 22mm
770200023	2.0mm Non-Locking Screw 23mm
770200024	2.0mm Non-Locking Screw 24mm

2.0mm Locking Multi-Directional Screws

Part#	Description
770201006	2.0mm Locking MDS 6mm
770201007	2.0mm Locking MDS 7mm
770201008	2.0mm Locking MDS 8mm
770201009	2.0mm Locking MDS 9mm
770201010	2.0mm Locking MDS 10mm
770201011	2.0mm Locking MDS 11mm
770201012	2.0mm Locking MDS 12mm
770201013	2.0mm Locking MDS 13mm
770201014	2.0mm Locking MDS 14mm
770201015	2.0mm Locking MDS 15mm
770201016	2.0mm Locking MDS 16mm
770201017	2.0mm Locking MDS 17mm
770201018	2.0mm Locking MDS 18mm
770201019	2.0mm Locking MDS 19mm
770201020	2.0mm Locking MDS 20mm
770201021	2.0mm Locking MDS 21mm
770201022	2.0mm Locking MDS 22mm
770201023	2.0mm Locking MDS 23mm
770201024	2.0mm Locking MDS 24mm

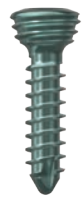
Ordering Information

2.4mm Non-Locking Screws



Part#	Description
770240006	2.4mm Non-Locking Screw 6mm
770240007	2.4mm Non-Locking Screw 7mm
770240008	2.4mm Non-Locking Screw 8mm
770240009	2.4mm Non-Locking Screw 9mm
770240010	2.4mm Non-Locking Screw 10mm
770240011	2.4mm Non-Locking Screw 11mm
770240012	2.4mm Non-Locking Screw 12mm
770240013	2.4mm Non-Locking Screw 13mm
770240014	2.4mm Non-Locking Screw 14mm
770240015	2.4mm Non-Locking Screw 15mm
770240016	2.4mm Non-Locking Screw 16mm
770240017	2.4mm Non-Locking Screw 17mm
770240018	2.4mm Non-Locking Screw 18mm
770240019	2.4mm Non-Locking Screw 19mm
770240020	2.4mm Non-Locking Screw 20mm
770240021	2.4mm Non-Locking Screw 21mm
770240022	2.4mm Non-Locking Screw 22mm
770240023	2.4mm Non-Locking Screw 23mm
770240024	2.4mm Non-Locking Screw 24mm

2.4mm Locking Multi-Directional Screws



Part#	Description
770241006	2.4mm Locking MDS 6mm
770241007	2.4mm Locking MDS 7mm
770241008	2.4mm Locking MDS 8mm
770241009	2.4mm Locking MDS 9mm
770241010	2.4mm Locking MDS 10mm
770241011	2.4mm Locking MDS 11mm
770241012	2.4mm Locking MDS 12mm
770241013	2.4mm Locking MDS 13mm
770241014	2.4mm Locking MDS 14mm
770241015	2.4mm Locking MDS 15mm
770241016	2.4mm Locking MDS 16mm
770241017	2.4mm Locking MDS 17mm
770241018	2.4mm Locking MDS 18mm
770241019	2.4mm Locking MDS 19mm
770241020	2.4mm Locking MDS 20mm
770241021	2.4mm Locking MDS 21mm
770241022	2.4mm Locking MDS 22mm
770241023	2.4mm Locking MDS 23mm
770241024	2.4mm Locking MDS 24mm

Washers

Part#	Description
770800020	2.0mm Screw Washer
770800024	2.4mm Screw Washer

Ordering Information

Instruments

Part#	Description
770004130	Thread in/Fixed 0.9mm Drill Guide
770004150	Thread in/Fixed 1.0mm Drill Guide
770004200	Thread in/Fixed 1.5mm Drill Guide, Short
770004240	Thread in/Fixed 1.8mm Drill Guide, Short
770007200	2.0mm Overdrill Guide
770007240	2.4mm Overdrill Guide
770019021	Point To Point Forceps Large
00-4816-001-00	Reduction Forceps, Ratcheting, Narrow
13573	Reduction Forceps, Serrated
13572	Sharp Hook
MHR	Mini Hohman Retractor
110017406	Mini Ratchet Handle AO

Instruments

Part#	Description
770010200	2.0/2.4 Compression Slot Drill Guide
770006130	0.9mm Fixed Angle Drill Guide
770006150	1.0mm Fixed Angle/VA Double Drill Guide
770006200	1.5mm Fixed Angle/VA Double Drill Guide
770006240	1.8mm Fixed Angle/VA Double Drill Guide
770019030	Plate Holder w/ K-Wire Slot
770019010	Plate Holder w/ Ball End
770020010	Plate Cutting Pliers
770024010	Plate Bending Pliers
770009130	1.3/1.5mm Depth Gauge (26mm)
770009240	2.0/2.4mm Depth Gauge (26mm)
770009200	2.0/2.4mm Depth Gauge (80mm)
770900001	Depth Gauge

Ordering Information

Instruments

Part#	Description
770018090	0.9mm K-Wire 6 In
770900103	1.1mm K-Wire 6 In
770018160	1.6mm K-Wire 6 In
770002090	0.9mm Drill
770002100	1.0mm Drill
770002150	1.5mm Drill, Short
770002180	1.8mm Drill, Short
770008200	2.0mm Countersink
770008240	2.4mm Countersink
770003200	2.0mm Overdrill
770003240	2.4mm Overdrill
770001040	T4 Retention Driver
770001060	T6 Retention Driver
770001080	T8 Retention Driver

Instruments

Part#	Description
770015130	1.3/1.5mm Plate Tack
770015240	2.0/2.4/2.7/3.5/4.0mm Plate Tack
770021200	2.0mm Fast Guides
770021240	2.4mm Fast Guides
770900004	2.0mm Drill
770900005	2.7mm Drill
770900006	3.0mm Drill
770900002	T8 Cannulated Driver
770900007	IM Fracture Reduction Guide

Ordering Information

Cases and Trays

Part#	Description
770101010	Hand Outer Case
00-5900-099-00	Generic Stackable Lid
770103010	Hand Screw Rack
770102020	Hand Screw Rack Lid
770104010	Hand Instrument Tray
770106010	Hand Fast Guide Caddy
770104030	Hand Plate/Instrument Tray

This material is intended for health care professionals. Distribution to any other recipient is prohibited. For product indications, contraindications, warnings, precautions, potential adverse effects and patient counseling information, see the instructions for use or contact your local representative; visit www.zimmerbiomet.com for additional product information. 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 product(s) and technique(s) 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.

ZIMMER BIOMET
Moving You Forward.™

4629.2-US-en-Issue Date YYYY-MM-DD
VV-12559

Manufacturer
Tyber Medical LLC
83 South Commerce Way, Ste. 310
Bethlehem, PA 18017
Phone: (866) 761-0933
Fax: (866) 889-9914
tybermedical.com

Distributor
Zimmer Biomet
1800 W. Center Street
Warsaw, IN 46580 USA
Tel: 1-800-348-2759
Fax: 574-372-3968
zimmerbiomet.com