ZIMMER BIOMET
Your progress. Our promise.™

MAX VPC™ Screw System

Surgical Technique

Table of Contents

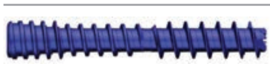
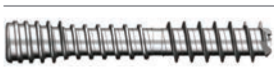
Introduction 2
Variable Pitch Compression Screw – Reference Chart 2
Patient Positioning 4
Volar Approach for Scaphoid Fracture 5
Dorsal Approach for Scaphoid Fracture 9
DIP Fusion Technique 13
Ordering Information 16
Indications 20

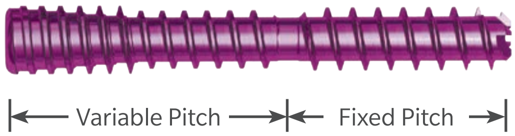
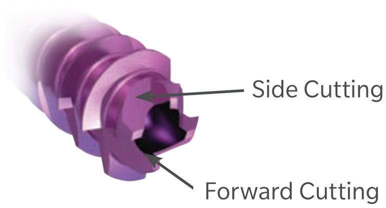
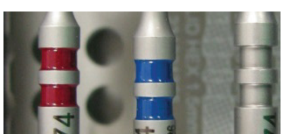
Introduction

The MAX VPC (Variable Pitch Compression) Screw System is comprised of headless, fully threaded, cannulated screws designed with a constant pitch thread form near the tip and a variable pitch thread form near the head of the screw giving the user tactile feel during installation, all while providing compression to the bone fragments. The tip of the screw features four forward cutting flutes and two side cutting flutes designed to provide self-tapping capability. The screws are driven with a standard metric Hex drive (1.5 mm, 2.0 mm, 2.5 mm) that incorporates a tapered tip to secure the screw to the driver. The fully threaded design provides bone purchase throughout the entire length of the screw which results in structural support during bone healing.

The instrumentation was developed around the simplicity of the surgery. The color coded system allows for easy identification of specialized instrumentation to the corresponding sized screws. Short cobalt chrome K-wires are provided to facilitate navigation and align bone fragments while still remaining rigid for the screw insertion.

Variable Pitch Compression Screw – Reference Chart

	Screw Type	K-wire	Cannulated Drill Ø	Driver Size	Screw Lengths
	2.5 mm	0.9 mm	1.8 mm	1.5 mm Hex	8–14 mm (1 mm increments) 16–30 mm (2 mm increments)
	3.4 mm	1.1mm	2.4 mm	2.0 mm Hex	14–34 mm (2 mm increments)
	4.0 mm	1.4 mm	3.2 mm	2.5 mm Hex	16–40 mm (2 mm increments)

Product	Feature	Benefit
	Fully threaded screw design	Can provide structural support during healing
	Continuously variable pitch vs fixed pitch	The resulting difference in pitch between the tip and head sections reduces the two bone fragments, while providing the user with distinct tactile feedback. The differences in pitch and geometry are synchronized such that the initial installation torque is much lower than final installation torque resulting in feedback to the user. This is achieved by the varying amount of displacement from tip to head.
	Smaller Diameter Head	The smaller diameter head size requires reduced bone removal during insertion. The ratio of tip major diameter versus head major diameter is at least 90% indicating that the head diameter is similar to the overall major diameter of the screw. The socket accommodates industry standard metric hex drives.
	Cutting Flutes	The tip of the screw features four forward cutting flutes and two side facing cutting flutes designed to provide self-tapping capability and facilitate installation.
	Color Coded System 2.5 mm = Magenta 3.4 mm = Blue 4.0 mm = Silver	Color coded system offers easy identification between screw system to help reduce confusion in the operating room.
	Depth Gauge	The elongated slider tip on the end of the depth gauge penetrates through the soft tissue to the surface of the bone to allow for an accurate reading.
	Cobalt Chrome K-wire	Cobalt chrome K-wires can provide increased stiffness and reduces the likelihood of kinking during use.* The shorter lengths (95 mm, 105 mm, 127 mm) make instrumentation more user friendly and facilitates reduction by securely holding bone fragments.
	Cannulated Hex Driver	The VPC Drivers offer both cannulated and solid options. Cannulated drivers include a tapered tip designed to hold the screw in its initial position for ease upon insertion.

* Yield strength for Stainless Steel is 110 Ksi min versus 208 Ksi for 35NLT Alloy CoCr.

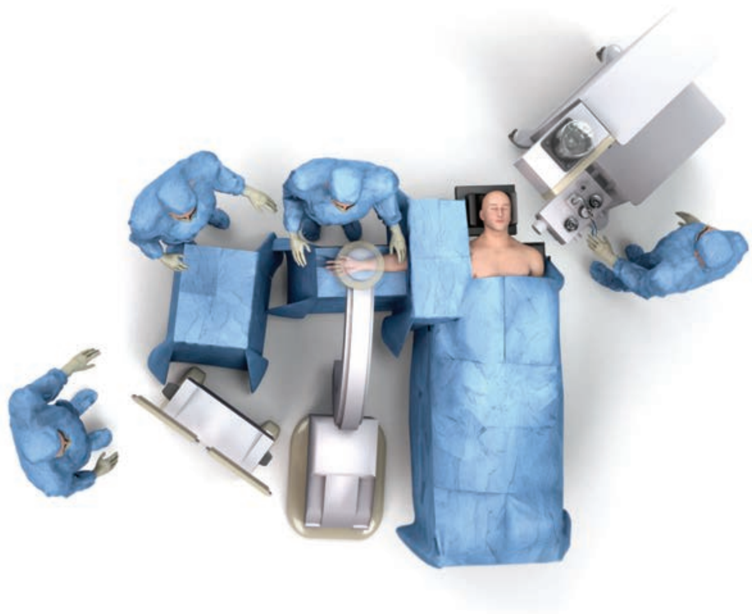


Figure 1

Figure 2

Patient Positioning

Patient may be positioned in supine or beach chair with a radiolucent sterile hand table (Figure 1). A proximal pneumatic tourniquet is utilized and the arm is prepped and draped.

For volar approach repairs, traction can be used to aid in reduction of fragments. Fluoroscopy should be referenced during the course of the procedure to confirm targeting and placement.

The four scaphoid views (AP, true lateral, radial oblique, ulnar oblique) detect most of carpal fractures. A fisted AP view can be helpful in detecting scaphoid fractures (Figure 2).

Figure 3

Figure 4

Volar Approach for Scaphoid Fracture

Center the skin incision over the scaphoid tuberosity just radially to the FCR (Flexor Carpi Radialis) tendon at the wrist flexion crease (Figure 3). Identify and ligate the superficial palmer branch of the radial artery. Incise the FCR tendon sheath and retract the tendon ulnarly. Place the wrist in flexion and excise down to the distal pole of the scaphoid.

Instrumentation is arranged by color matched sizing:
2.5 mm = Magenta
3.4 mm = Blue
4.0 mm = Silver

Place the K-wire in the center of the distal end of the scaphoid. The starting point is slightly radial on the tuberosity and driven to the proximal center end of the scaphoid.

Proper placement of the K-wire will require a resection notch out of the trapezium to gain proper alignment.

A soft tissue guide can be used to help in the placement of the K-wire.

The K-wire will be aligned perpendicular to the fracture line and aimed at the apex of the scaphoid (Figure 4).

Note: By gently levering on the trapezium this maneuver brings the distal pole of the scaphoid more radial and thus ultimately facilitates screw insertion.

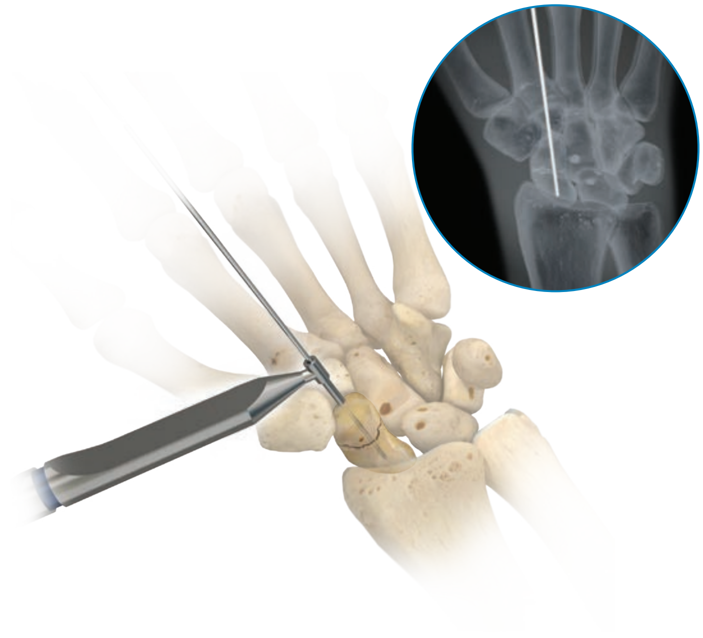


Figure 5

Figure 6

Volar Approach for Scaphoid Fracture (cont.)

Drive the K-wire across the fracture, continually checking the direction on fluoroscopy and aiming for the apex of the proximal pole (Figure 5). Use fluoroscopy to verify that the K-wire lies on the central axis of the scaphoid.

Fluoroscopic imaging should be used to confirm appropriate intraoperative position of the K-wire checking every 1–2 mm to ensure accurate trajectory and minimize possibility of wire bending.

Note: A second K-wire can be driven parallel to the initial K-wire to help prevent anti-rotation of the scaphoid. Use the soft tissue guide to ensure the second K-wire will not impede with the screw insertion.

Advance the K-wire to stop just short of the articular surface.

The screw length can be determined by inserting the depth gauge over the K-wire and reading off the laser etched mark on the K-wire where it aligns on the depth gauge. The corresponding reading is then used to determine the screw length. It is recommended to subtract 4 mm from the total measurement to ensure screw centered and 2 mm away from either articular surface after installation (Figure 6). As an alternative, a two wire approach can be accomplished by placing a second K-wire on the near cortex and measuring the difference between the K-wires.

Figure 7

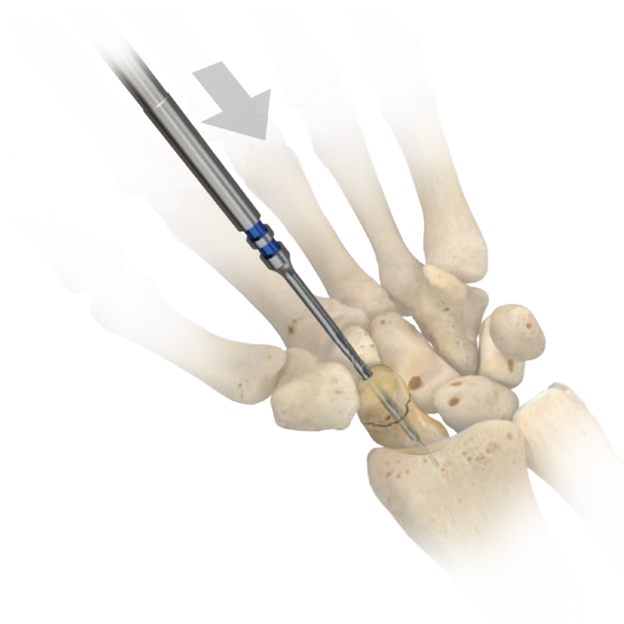


Figure 8

Volar Approach for Scaphoid Fracture (cont.)

After taking a measurement insert the K-wire through the scaphoid and into the distal radius about 2 mm side. This will reduce the risk of the K-wire backing out during the drilling process (Figure 7).

Slide the corresponding profile drill over the K-wire to near cortex (Figure 8). Advance the profile drill just enough to open the near cortex. Remove the profile drill and place the cannulated drill over the K-wire and advance until it reaches 2 mm from the articular surface.

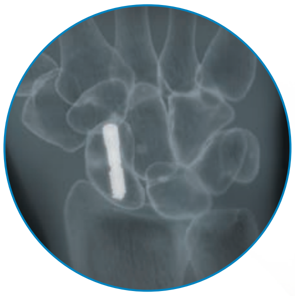


Figure 9a

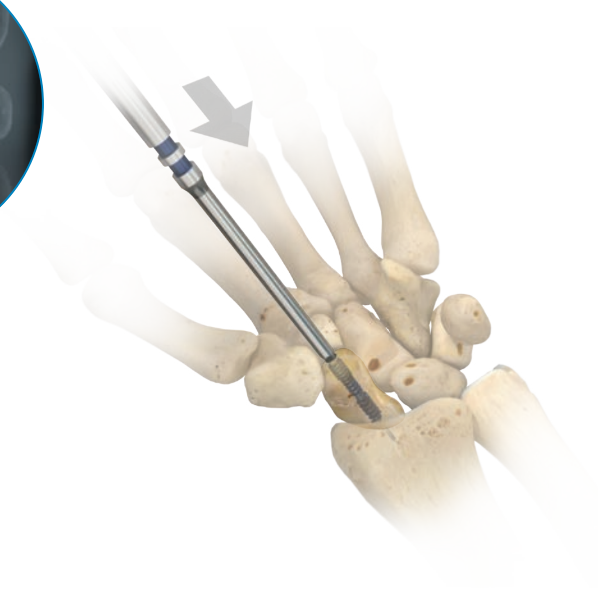


Figure 9

Volar Approach for Scaphoid Fracture (cont.)

Confirm on fluoroscopy that the fracture is closed (Figure 9a). Placement and length of the screw should establish that both leading and trailing edges of the screw are beneath the articular surfaces (Figure 9). Finally, remove the K-wire.

Note: Screw should be seated 1–2 mm under the near cortex.

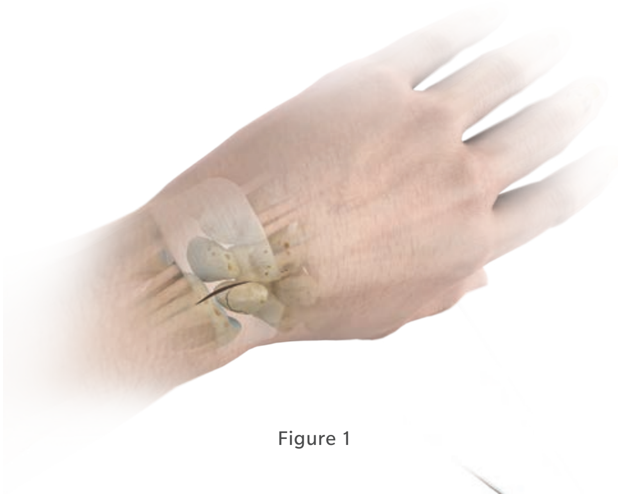


Figure 1

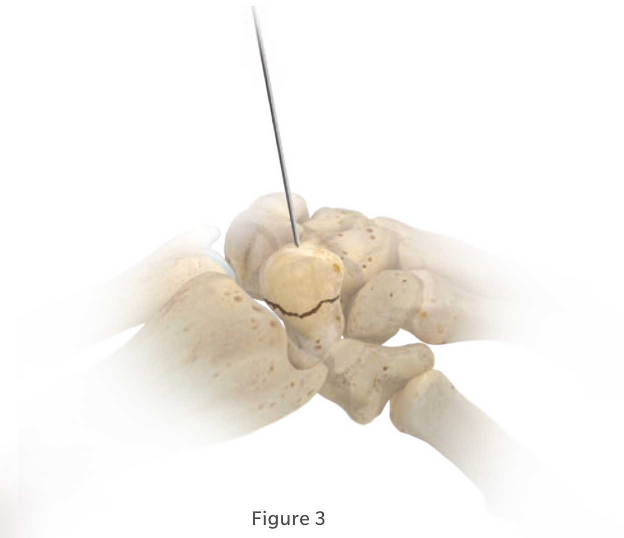


Figure 3

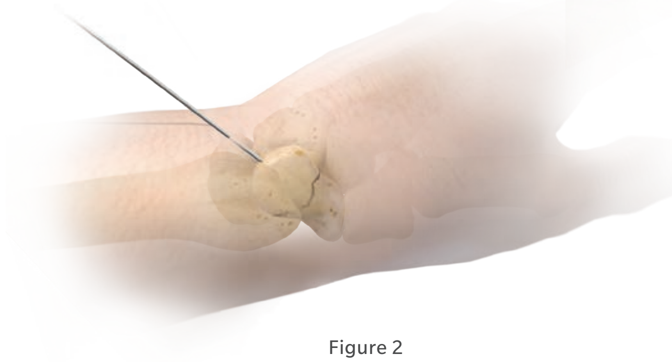


Figure 2

Dorsal Approach for Scaphoid Fracture

Make a straight dorsal skin incision starting over Lister's Tubercle and extend for about 3 to 4 cm distally. Identify and protect the dorsal superficial branch of the radial nerve that runs in the radial skin flap of the wound. Incise the extensor retinaculum over the ELP (Extensor Pollicis Longus) tendon, which will open the distal part of the third extensor compartment. Retract the ELP radially together with the tendons of the second extensor compartment. Then retract the extensor digitorum and extensor indicis ulnarly.

Percutaneous Approach

Flex the wrist to expose the proximal pole of the scaphoid.

Make a stab incision distal to the scaphotrapezial joint, continue to incise through the subcutaneous tissues by blunt dissection. Then incise the capsule of the scaphotrapezial joint. The distal pole of the scaphoid is now visible (Figure 1).

Instrumentation is arranged by color matched sizing:
2.5 mm = Magenta
3.4 mm = Blue
4.0 mm = Silver

Introduce the K-wire (Figures 2–3) through the soft tissue guide, aiming for the base of the 1st metacarpal. Fluoroscopy should be used to confirm the appropriate position of the K-wire. Stop the K-wire 2 mm short of the articular surface.

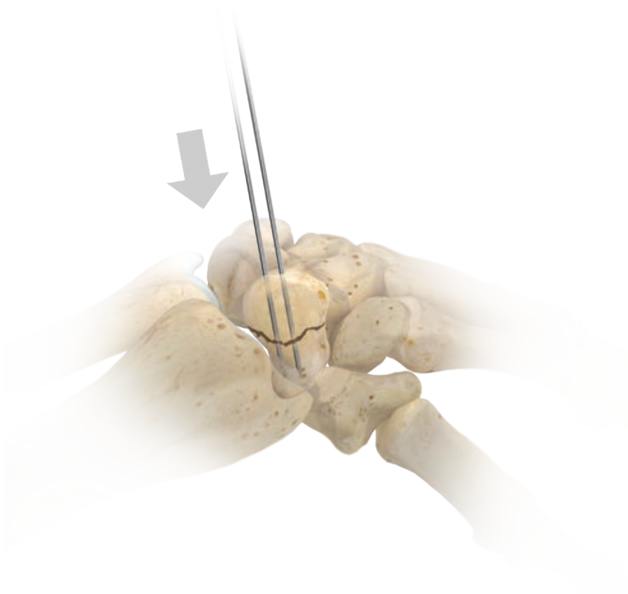


Figure 4

Figure 5

Dorsal Approach for Scaphoid Fracture (cont.)

Install a secondary K-wire to provisionally fixate fragments during drilling and screw insertion (Figure 4).

After the secondary K-wire is inserted, a measurement can be taken using either the depth gauge or by comparing an additional K-wire to the primary K-wire and subtracting the difference. In either case remember to subtract 4 mm from the total measurement to ensure the screw can be equally spaced 2 mm from either distal/proximal articular surface when centered in scaphoid. The depth gauge will show a true measurement (Figure 5).

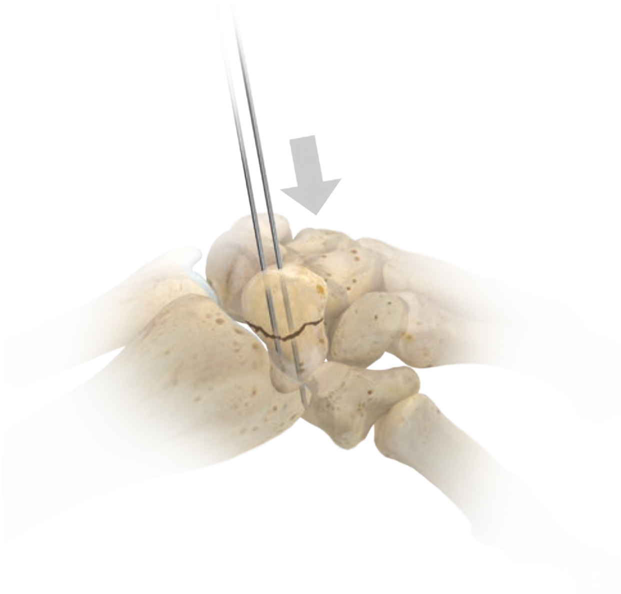


Figure 6

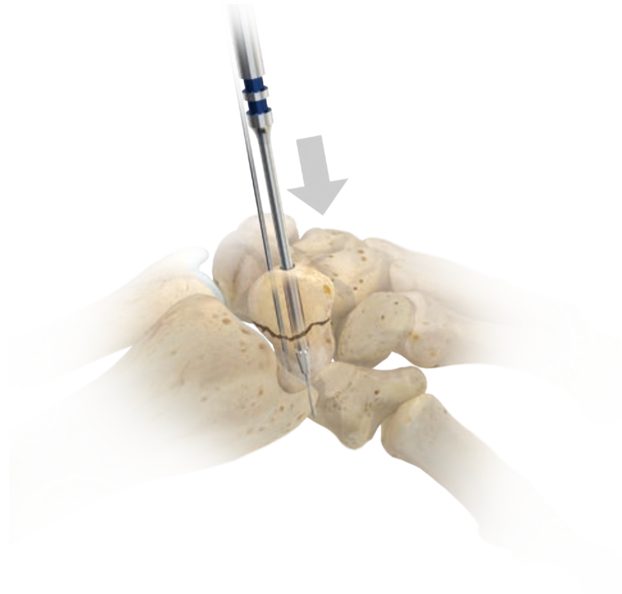


Figure 7

Dorsal Approach for Scaphoid Fracture (cont.)

If extraction of the K-wire during drilling is a concern advance the K-wire past the far cortex after the measurement has been taken, but prior to drilling (Figure 6).

Advance the appropriately sized profile drill over the K-wire, and open the near cortex (Optional) (Figure 7).

Note: The profile drill is NOT recommended for use under power.

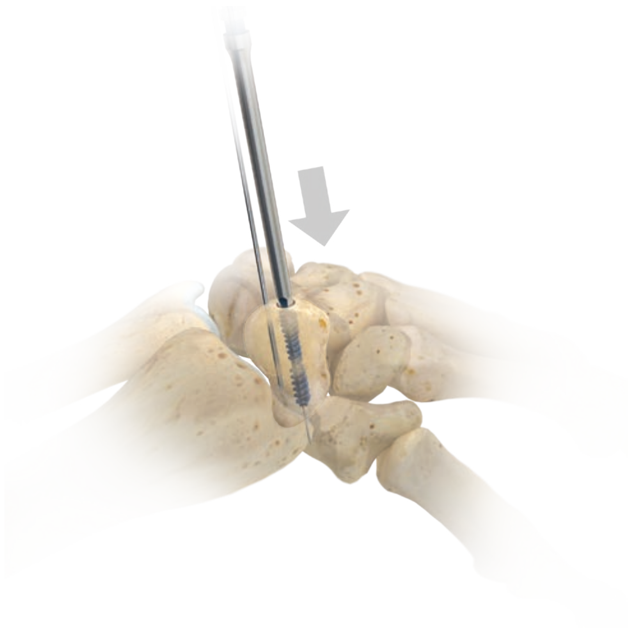


Figure 8

Figure 9

Dorsal Approach for Scaphoid Fracture (cont.)

Place the cannulated drill over the K-wire and advance past the fracture site. Use fluoroscopy to verify the drill location in relation to the fracture line.

Note: Avoid drilling less than 2 mm near the tip of the K-wire to allow sufficient bone to secure the K-wire upon removing cannulated drill (Figure 8).

Using the corresponding cannulated hex driver, place the screw over the K-wire and advance until the fracture is reduced. Verify under fluoroscopy that the fracture is stable and that the screw is in the correct position.

Note: Screw should be seated 1–2 mm under the near cortex.

Figure 1

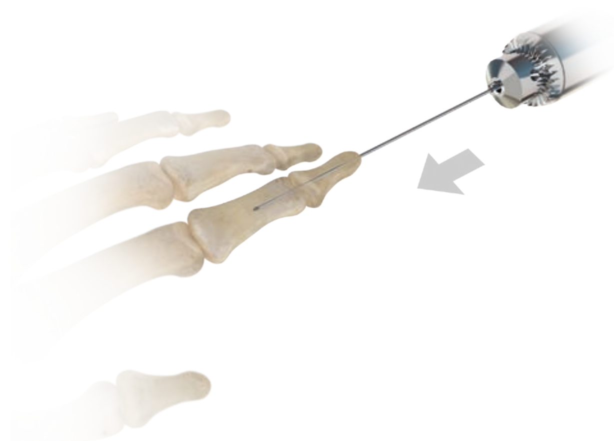


Figure 2

DIP Fusion Technique

Flex the distal fragment to allow access the joint. Using the K-wire guide, insert the double-ended K-wire along the intermedullary canal and exit through the distal phalanx (Figure 1).

Instrumentation is arranged by color matched sizing:
2.5 mm = Magenta
3.4 mm = Blue
4.0 mm = Silver

Drive the K-wire through until it is flush with the joint surface, reduce and advance the K-wire proximally through the DIP joint into the middle phalanx (Figure 2).

Figure 3

Figure 4

DIP Fusion Technique (cont.)

Make a 1 cm horizontal incision in the tip of the distal phalanx.

To measure, place the depth gauge over the top of the K-wire and slide down to the bone. Measure from the laser etch mark on the K-wire to depth gauge scale. A two wire approach can be accomplished by placing a second K-wire on the near cortex and measuring the difference between the K-wires (Figure 3).

Select the cannulated drill and place over the K-wire. Drill using either a power drill or hand reamer across the joint into the middle phalanx to the desired depth (Figure 4).

Note: If the final seating of the screw is below the surface of the distal phalanx, the depth must be accounted for in the depth of the hole.

Figure 5

DIP Fusion Technique (cont.)

Insert the screw with the selected driver (Figure 5). If distraction occurs stop and remove the screw. Then re-drill the hole to remove any impeding objects and re-insert the screw. Confirm seating on fluoroscopy to ensure both leading and trailing edges of the screw are below the articular surface. Lastly remove the K-wire.

Ordering Information

2.5 mm Screws

Product	Description	Non-Sterile
	**MAX VPC Screw 2.5 mm x 8 mm**	233225008
	MAX VPC Screw 2.5 mm x 9 mm	233225009
	MAX VPC Screw 2.5 mm x 10 mm	233225010
	MAX VPC Screw 2.5 mm x 11 mm	233225011
	MAX VPC Screw 2.5 mm x 12 mm	233225012
	MAX VPC Screw 2.5 mm x 13 mm	233225013
	MAX VPC Screw 2.5 mm x 14 mm	233225014
	MAX VPC Screw 2.5 mm x 16 mm	233225016
	MAX VPC Screw 2.5 mm x 18 mm	233225018
	MAX VPC Screw 2.5 mm x 20 mm	233225020
	MAX VPC Screw 2.5 mm x 22 mm	233225022
	MAX VPC Screw 2.5 mm x 24 mm	233225024
	MAX VPC Screw 2.5 mm x 26 mm	233225026
	MAX VPC Screw 2.5 mm x 28 mm	233225028
	MAX VPC Screw 2.5 mm x 30 mm	233225030

2.5 mm Instruments

Description	Part Number
K-wire CoCr 0.9 x 95 mm	231209095
Cannulated Drill 1.8 mm	231201025
Cannulated Profile Drill 2.5 mm	231201125
Cannulated Driver Hex 1.5 mm AO	231201225
Solid Driver Hex 1.5 mm AO	231201325
Soft Tissue Guide 0.9 mm x 1.8 mm	231201425
Depth Gauge - 2.5/3.4 VPC	231201530

Ordering Information

3.4 mm Screws

Product	Description	Non-Sterile
	**MAX VPC Screw 3.4 mm x 14 mm**	233230014
	MAX VPC Screw 3.4 mm x 16 mm	233230016
	MAX VPC Screw 3.4 mm x 18 mm	233230018
	MAX VPC Screw 3.4 mm x 20 mm	233230020
	MAX VPC Screw 3.4 mm x 22 mm	233230022
	MAX VPC Screw 3.4 mm x 24 mm	233230024
	MAX VPC Screw 3.4 mm x 26 mm	233230026
	MAX VPC Screw 3.4 mm x 28 mm	233230028
	MAX VPC Screw 3.4 mm x 30 mm	233230030
	MAX VPC Screw 3.4 mm x 32 mm	233230032
	MAX VPC Screw 3.4 mm x 34 mm	233230034

3.4 mm Instruments

Description	Non-Sterile
K-wire CoCr 1.1 x 105 mm	231211105
Cannulated Drill 2.4 mm	231201030
Cannulated Profile Drill 3.4 mm	231201130
Cannulated Driver Hex 2.0 mm AO	231201230
Solid Driver Hex 2.0 mm AO	231201330
Soft Tissue Guide 1.1 mm x 2.4 mm	231201430
Depth Gauge - 2.5/3.4 VPC	231201530

Ordering Information

4.0 mm Screws

Product	Description	Non-Sterile
	**MAX VPC Screw 4.0 mm x 16 mm**	233240016
	MAX VPC Screw 4.0 mm x 18 mm	233240018
	MAX VPC Screw 4.0 mm x 20 mm	233240020
	MAX VPC Screw 4.0 mm x 22 mm	233240022
	MAX VPC Screw 4.0 mm x 24 mm	233240024
	MAX VPC Screw 4.0 mm x 26 mm	233240026
	MAX VPC Screw 4.0 mm x 28 mm	233240028
	MAX VPC Screw 4.0 mm x 30 mm	233240030
	MAX VPC Screw 4.0 mm x 32 mm	233240032
	MAX VPC Screw 4.0 mm x 34 mm	233240034
	MAX VPC Screw 4.0 mm x 36 mm	233240036
	MAX VPC Screw 4.0 mm x 38 mm	233240038
	MAX VPC Screw 4.0 mm x 40 mm	233240040

4.0 mm Instruments

Description	Non-Sterile
K-wire CoCr 1.4 x 127 mm	231214127
Cannulated Drill 3.2 mm	231201040
Cannulated Profile Drill 4.0 mm	231201140
Cannulated Driver Hex 2.5 mm AO	231201240
Solid Driver Hex 2.5 mm AO	231201340
Soft Tissue Guide 1.4 mm x 3.2 mm	231201440
Depth Gauge - 4.0 VPC	231201540

Ordering Information

Common Instrumentation

Description	Non-Sterile
Mini 4 Ratchet Handle	110017406
Quick Connect Handle Blue	231200106
VPC System - Tray Lid	231201001
VPC System - Tray Base	231201002
VPC System - Screw Caddy	231201003

Sterile Instrumentation

Description	Sterile
Cannulated Drill 1.8 mm ST	212001025
Cannulated Drill 2.4 mm ST	212001030
Cannulated Drill 3.2 mm ST	212001040
Profile Cannulated Drill 2.5 mm ST	212001125
Profile Cannulated Drill 3.4 mm ST	212001130
Profile Cannulated Drill 4.0 mm ST	212001140
K-wire CoCr 0.9 x 95 mm ST	212009095
K-wire CoCr 1.1 x 105 mm ST	212011105
K-wire CoCr 1.4 x 127 mm ST	212014127
K-wire DBL Trocar 0.9 x 95 mm ST	133209095
K-wire DBL Trocar 1.1 x 105 mm ST	133211105
K-wire DBL Trocar 1.4 x 127 mm ST	133214127

INDICATIONS

The Biomet Variable Pitch Compression Screw System is indicated for alignment and stabilization of small bone fractures.

Specifically:

- Fixation of small bones, such as those in the foot, ankle, wrist, elbow and hand for treatment of fractures, non-unions, or mal-unions

- Ligament reconstruction

- Osteochondritis dissecans

- Arthrodesis of the foot, ankle, wrist, elbow and hand

- Small bone osteotomies, including first metatarsal head osteotomy, metatarsal osteotomies, phalangeal osteotomies, and carpal/metacarpal osteotomies.

These procedures may be indicated as part of trauma, deformity, osteoarthritis, and rheumatoid arthritis.

This material is intended for health care professionals and the Zimmer Biomet sales force only. Distribution to any other recipient is prohibited. All content herein is protected by copyright, trademarks and other intellectual property rights owned by or licensed to Zimmer Biomet or its affiliates unless otherwise indicated. This material must not be redistributed, duplicated or disclosed, in whole or in part, without the express written consent of Zimmer Biomet.

Check for country product clearances and reference product specific instructions for use. For complete product information, including indications, contraindications, warnings, precautions, and potential adverse effects, see the package insert, zimmerbiomet.com, or contact your local Zimmer Biomet representative.

This technique was prepared in conjunction with a licensed health care professional. Zimmer Biomet does not practice medicine. The treating surgeon is responsible for determining the appropriate treatment, technique(s), and product(s) for each individual patient.

©2016 Zimmer Biomet

EC REP **Authorized Representative**
Biomet UK Ltd.
Waterton Industrial Estate
Bridgend, South Wales
CF31 3XA
UK

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

ZIMMER BIOMET
Your progress. Our promise.™

0111.2-GLBL-en-REV0816

www.zimmerbiomet.com