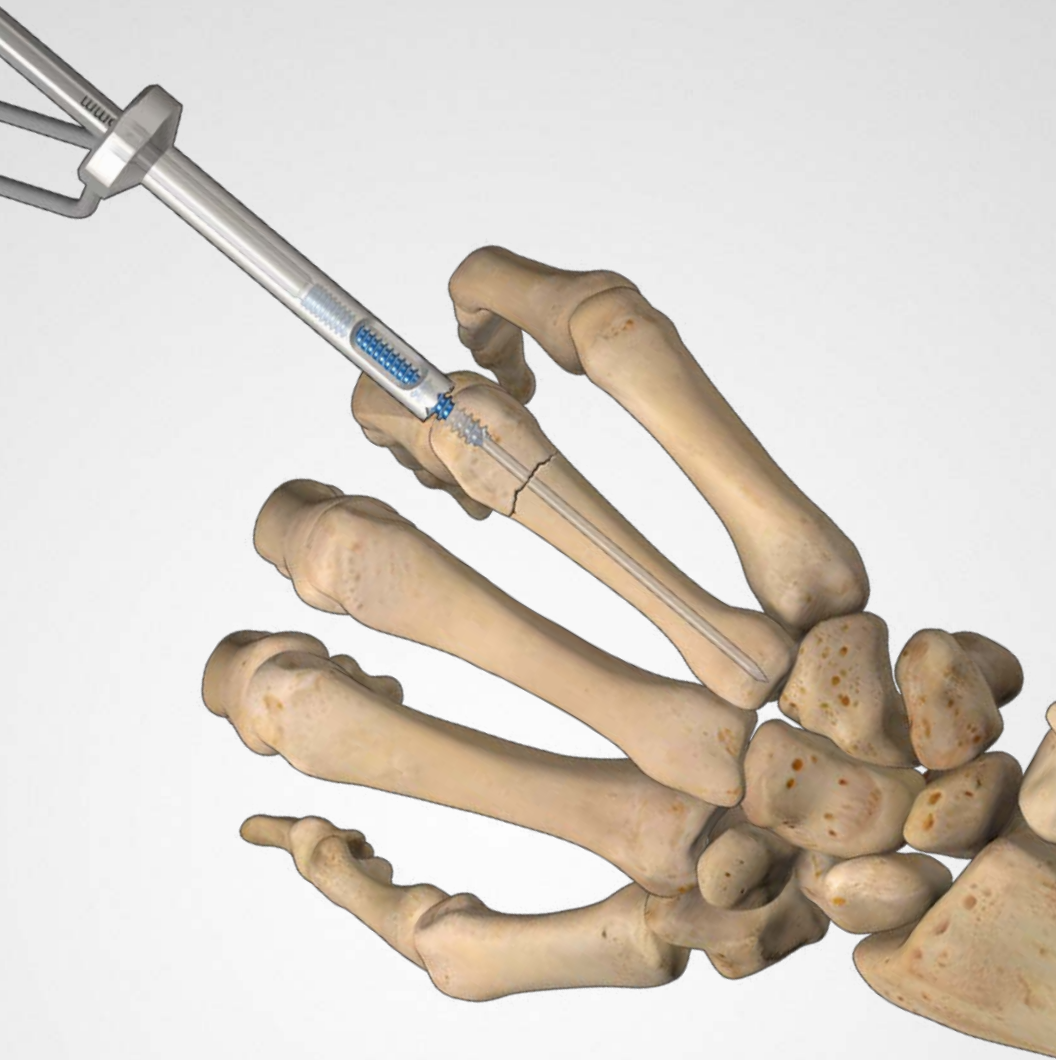




Acutrak 2® Headless Compression Screw System

Supplemental Use Guide—Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach



Acumed® is a global leader of innovative orthopaedic and medical solutions.



We are dedicated to developing products, service methods, and approaches that improve patient care.



Acumed® Acutrak 2® Headless Compression Screw System—Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach

Metacarpal fractures account for up to 10% of all fractures.¹ Traditionally, displaced transverse fractures have been stabilized with plate and screw constructs or K-wires. Recently, intramedullary screw fixation has become more widely utilized due to ease of implantation, biomechanically superior fixation, and early mobilization.

Retrograde Approach Overview

The approach is ideal for transverse shaft or distal metacarpal fractures. Traditionally, the retrograde approach for intramedullary screw fixation of a metacarpal fracture entails performing an arthrotomy through the dorsal joint capsule and either splitting the extensor tendon or incising the adjacent sagittal band. The fracture is reduced by introducing a guide wire retrograde, starting at the metacarpal head, down the shaft, and across the fracture site to the base of the metacarpal. The metacarpal head and canal are drilled, followed by screw placement.

This guide is intended for supplemental use only and is not intended to be used as a stand-alone surgical technique. Reference the Acumed Acutrak 2 Headless Compression Screw System Surgical Technique (SPF00-02) for more information.

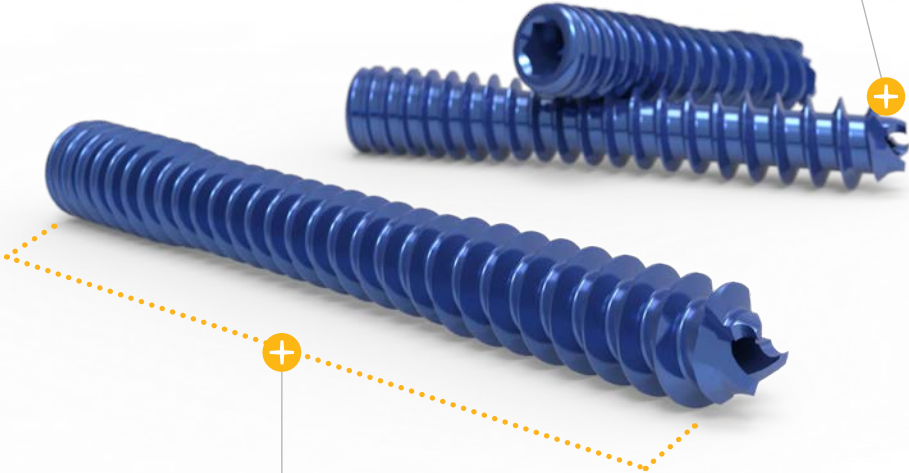
	Definition
Warning	Indicates critical information about a potential serious outcome to the patient or the user.
Caution	Indicates instructions that must be followed in order to ensure the proper use of the device.
Note	Indicates information requiring special attention.

Table of Contents

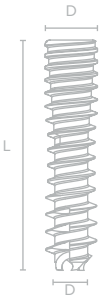
System Features	2
Surgical Technique	4
Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach	4
Reference	10

System Features

Cutting flutes are engineered to make the screw self-tapping and facilitate insertion into hard bone

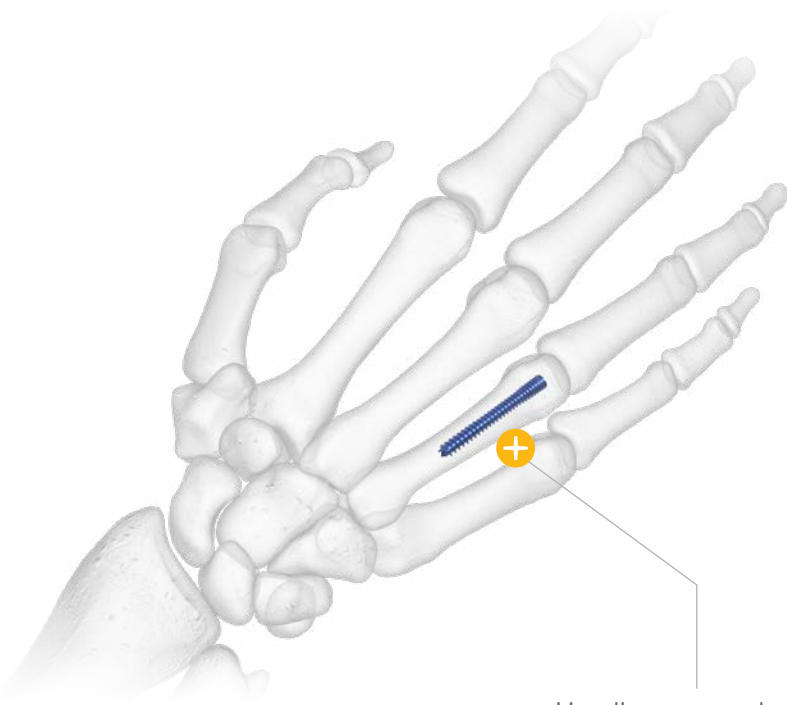


Fully threaded, continuously variable thread pitch allows each thread along the entire length of the screw to aid in the reduction and compression of the fracture



Acutrak 2 Screws	Diameter	Length
Micro	Tip: 2.5 mm	1 mm increments 8–14 mm
	Tail: 2.8 mm	2 mm increments 14–30 mm
Mini	Tip: 3.5 mm	2 mm increments 16–30 mm
	Tail: 3.6 mm	
Standard	Tip: 4.0 mm	2 mm increments 16–34 mm
	Tail: 4.1 mm	
4.7 mm	Tip: 4.5 mm	2 mm increments 20–30 mm
	Tail: 4.7 mm	5 mm increments 30–50 mm

System Features [continued]



Headless screw design is intended to minimize soft tissue irritation

	Mean Canal Width (Coronal)	Mean Canal Width (Sagittal)	Minimum Diameter Screw	Recommended Screw
Index Finger	3.2 mm	3.8 mm	4.0 mm	Standard or 4.7 mm
Middle Finger	3.2 mm	3.9 mm	4.0 mm	Standard or 4.7 mm
Ring Finger	2.8 mm	3.5 mm	3.5 mm	Mini or Standard
Small Finger	4.1 mm	3.7 mm	4.0 mm	Standard or 4.7 mm

See reference 2 on page 10

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach

Mihir J. Desai, MD



Figure 1

1 Patient Positioning

Patients are placed on an operating room table with the affected limb on a hand table. Fractures are typically closed reduced. In subacute or chronic fractures, a mini-open approach can be used to access the fracture site to perform debridement of callus or interposed soft tissue.

Reduction can be achieved by a Jahss maneuver with the MCP and PIP joints flexed at 90 degrees, followed by use of the proximal phalanx to push up on the metacarpal head combined with direct pressure over the apex of the fracture. By holding all the MCP joints in flexion, rotational alignment of the fracture can be verified.

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach [continued]

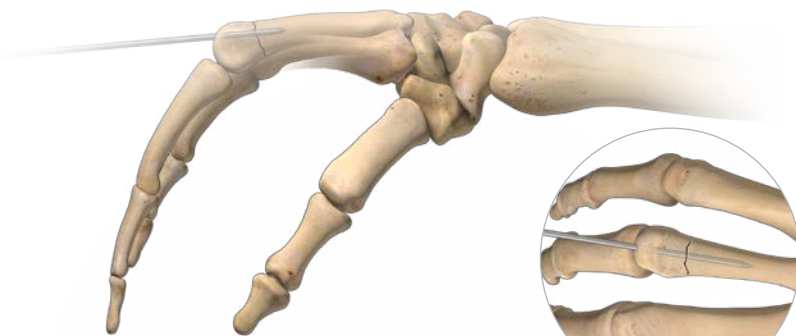


Figure 2

Figure 3

2 Guide Wire Placement

Divert the extensor tendon radially or ulnarly with a fingertip. The retrograde guide wire (80-1524, 80-1525, WS-0906ST, WS-1106ST, or WS-1407ST) is introduced percutaneously through the palpable metacarpal head down the medullary canal. Alternatively, a mini-open incision can be made over the MCP joint.

Under fluoroscopic imaging, the guide wire is placed centrally on the articular surface of the metacarpal head on the AP view and in the dorsal one-third of the articular surface on the lateral view. This will ensure that the guide wire passes easily down the longitudinal axis of the metacarpal. The dorsal one-third of the metacarpal head surface only articulates with the proximal phalanx during MCP hyperextension; thus this is an ideal area for screw placement with minimal sequelae.

The fracture is then reduced and the appropriately sized guide wire (80-1524, 80-1525, WS-0906ST, WS-1106ST, or WS-1407ST) is inserted in an intramedullary retrograde fashion from the metacarpal head, down the shaft, and across the fracture site, into the base.

Under fluoroscopic imaging, confirm fracture reduction and placement of the guide wire down the center of the medullary canal.

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach [continued]

Figure 4



3 Determine Screw Length

Measure guide wire length by using the Acutrak 2 Screw Sizer (AT2-SMCZ) or Micro Acutrak 2 Screw Sizer (80-1523) (see chart). Select a screw of the appropriate length subtracting 4-6 mm to allow for fracture compression and countersinking.

Part Number	Part Description	Screw Sizer	Description	Measurement Range
WS-0906ST	.035 x 5.75 in Single Trocar Guide Wire	AT2-SMCZ	AT2 Screw Sizer	8–20 mm
80-1524	.035 x 6 in Single Trocar Guide Wire	80-1523	Micro Acutrak 2 Screw Sizer	8–30 mm
80-1525	.035 x 6 in Double Trocar Guide Wire			

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach [continued]

Figure 5

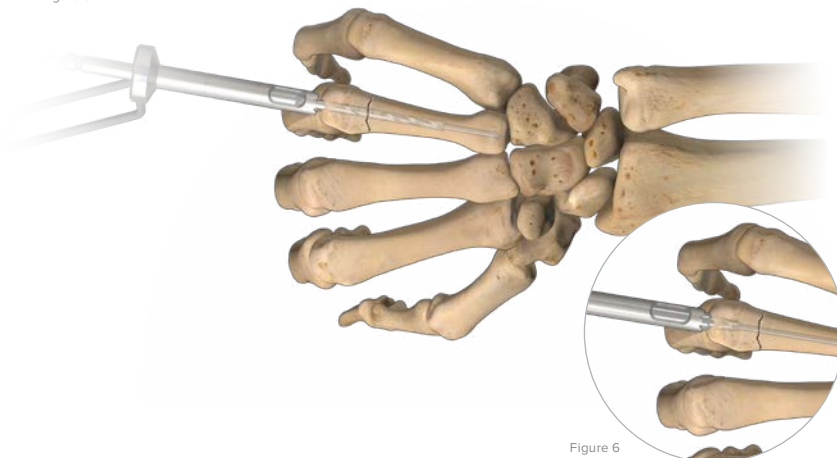


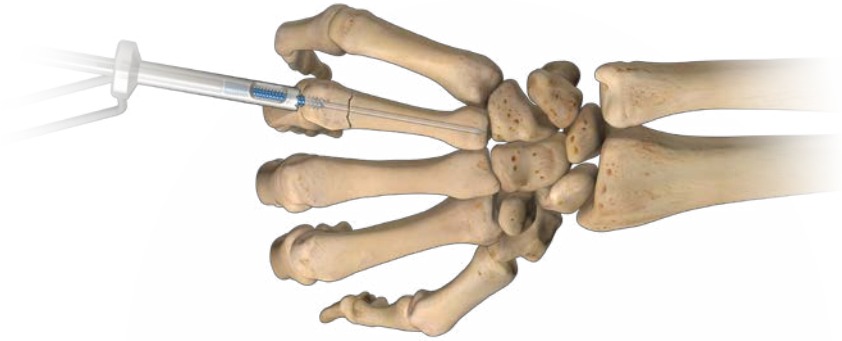
Figure 6

4 Drilling the Metacarpal

Place the optional Acutrak Short Cannula Assembly (80-0519) over the guide wire. Use the appropriate size long drill (80-1522, AT2M-L1813, or AT2-L2515) to drill the metacarpal shaft past the fracture site. The near cortex should be drilled with the appropriately sized profile drill (AT2-1509, AT2M-1813, or AT2-2515).

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach [continued]

Figure 7



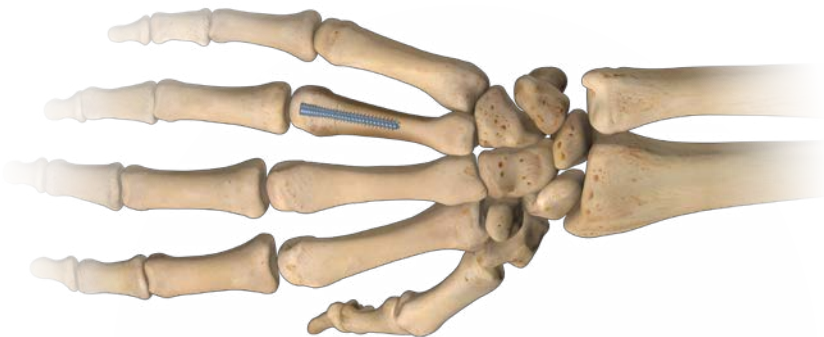
5 Screw Insertion

The self-tapping headless compression screw is then advanced retrograde over the guide wire with the appropriately sized cannulated hex driver tips (HT-0915, HT-1120, or HT-1725). It is helpful to hold the patient's fingers with the MCP and proximal interphalangeal joints flexed to 90 degrees to continue to control for rotational deformities while the screw advances.

Screw placement should be performed under fluoroscopic imaging to ensure maintenance of reduction. Fluoroscopy is also used to verify screw placement with enough threads across the fracture site and appropriate countersinking of the screw distally. The guide wire is then removed.

Acutrak Intramedullary Fixation of Metacarpal Fractures: Retrograde Approach [continued]

Figure 8



6 Skin Closure and Splinting

The wound is then irrigated. Skin closure is performed typically with 4–0 nylon sutures. The small rent in the extensor mechanism does not usually require closure. The hand is splinted in intrinsic plus position. Patients can be seen at 4–5 days post-operatively for splint removal and started on active range of motion exercises. The patient is fitted with a removable thermoplastic orthosis to be worn between exercises.

Reference

1. Hoang D, Huang J. Antegrade intramedullary screw fixation: a novel approach to metacarpal fractures. *J Hand Surg GO*. 2019;1(4):229-235.
2. Hoang D, Vu C, Jackson M, Huang J. An anatomical study of metacarpal morphology utilizing CT scans: evaluating parameters for antegrade intramedullary compression screw fixation of metacarpal fractures. *J Hand Surg*. 2020; advance online publication. <https://doi.org/10.1016/j.jhsa.2020.08.007>



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