MICRONAIL™
intramedullary distal radius system

surgical technique

SURGEON DESIGN TEAM
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Proper surgical procedures and techniques are the responsibility of the medical professional. Each surgeon must evaluate the appropriateness of the procedure used based on personal medical training and experience. Wright cannot recommend a particular surgical technique suitable for all patients.
PATIENT SELECTION

The MICRONAIL™ Intramedullary Distal Radius System is primarily designed for minimally-invasive fixation of extra-articular fractures and simple intra-articular fractures of the distal radius. It is particularly useful for treatment of patients who have failed non-operative treatment of such fractures and in osteotomies.

IMPLANT/DESIGN FEATURES

- Titanium alloy (Ti-6Al-4V ELI)
- Universal configuration for left and right wrists
- Available in four anatomical sizes
- Zero profile

Three 2.5mm fixed-angle locking screws buttress the subchondral plate and secure the distal fracture fragment(s) to the nail. The distal screws are anatomically configured to approximate the radial inclination while the volar-dorsal angle divergence provides stable, three-point fixation. The distal screw heads are completely recessed below the surface of the nail.

Two 2.7mm self-tapping, bi-cortical, proximal screws resist shortening and angulation of the distal fracture fragment. The screws are placed through the proximal body of the nail while the low-profile head rests on the dorsal surface of the bone.

A 2.0mm hole located in the proximal body allows for temporary fixation using a K-wire during fracture reduction.

NOTE | For more information about the MICRONAIL™ System and the recommended surgical technique, please refer to the surgical and animation videos.
INITIAL REDUCTION
Achieve provisional angular (dorsal/volar) reduction prior to initiating the MICRONAIL™ procedure. To stabilize reduction, temporarily place a 0.062” K-wire (P/N 59410625) dorsal to volar | FIGURES 1, 2 along the ulnar cortex of the radius. | FIGURE 3 Length can be adjusted intra-operatively.

FIGURE 1 | Optional K-wire

FIGURE 2 |

FIGURE 3 | Keep K-wire out of broaching path.
SURGICAL EXPOSURE

Make a 2-3cm longitudinal incision centered over the radial styloid. Bluntly dissect through the subcutaneous tissue. Mobilize any branches of the radial sensory nerve and retract from the surgical field. Dissect down to the periosteum between the 1st and 2nd dorsal extensor compartments.

FIGURE 6
CORTICAL WINDOW

Insert a K-wire (P/N 59410625) 3-4mm proximal to the radioscaphoid joint line and centered (dorsal to volar) in the radial styloid. | FIGURES 7, 8
Use fluoroscopy to verify position (both AP and lateral). | FIGURES 9, 10
NOTE | Entering the styloid too proximal can lead to improper nail position and reduce subchondral support.

Insert the 6.1mm Cannulated Starter Drill (P/N 26949468) through the Starter Drill / K-wire Guide (P/N 26949462) and over the K-wire to create a cortical window. If necessary, use a small rongeur to enlarge the hole proximally to allow for easier broach insertion.
CANAL ENTRY

Create a bolster using two folded towels and place beneath the wrist. Deviate the wrist ulnarily to gain access to the medullary canal. Insert the Starter Awl (P/N 26949471) through the cortical window and into the medullary canal until the shoulder of the awl is countersunk beneath the cortical bone. | FIGURES 11, 12 Keep the tip of the starter awl against the radial cortex. | FIGURE 13
BROACHING
Broach in a manner similar to a total hip arthroplasty or total shoulder arthroplasty. Gently tap the Broaches (P/N 26949451 through 4) with a small mallet as needed to advance or remove the broaches. FIGURE 14 Broach down the axis of the radius staying parallel with the dorsal surface and close to the radial cortex creating a rectangular path for the Implant.

FIGURE 15
Verify proper broach placement by inserting a K-wire through the distal hole of the Broaches. The K-wire should lie just below the subchondral bone.

FIGURE 16
Insert guide wire 2-3mm proximal to articular surface.

SIZING
Broach using progressively larger Broaches until the Broach does not spin within the medullary canal (i.e. 2-finger pressure). Select appropriately-sized Implant (P/N 59410001 through 4). Down-sizing the Implant is recommended rather than "over-stuffing" the canal. This allows for some ability to fine-tune the reduction prior to inserting the proximal screws but does not sacrifice permanent stability.
IMPLANT INSERTION

Insert the Implant into the medullary canal using the outrigger assembly.

| FIGURE 17 | Position the Ourgger so the proximal guide is parallel to the dorsal surface of the radius. | FIGURE 18 | Verify proper implant placement by inserting a 2.0mm Drill Bit (P/N 26949461) through the most distal hole of the Outrigger. This can be done by hand power. The drill bit should lie within 3mm of the subchondral bone. | FIGURE 19 | Also, verify in lateral view that reduction has been maintained.

![Subchondral support](image)

Incorrect Correct Incorrect
BUTTRESS SCREW PLACEMENT

Drill the hole for the most distal Buttress Screw. This may be done by hand power using the Driver Handle. | FIGURE 20 Use the laser etchings on the drill bit to determine proper screw length paying careful attention to stay out of the DRUJ. The most common screw lengths are 20-24mm. Use the Screwdriver Handle (P/N 44112009) and self-retaining Cruciform Screwdriver (P/N 26949470) to remove the appropriate size 2.5mm Buttress Screw (P/N 59412516 through 28) from the screw caddy. A firm stop will be felt when the Buttress Screw is locked into the implant.

If position and length of the most distal Buttress Screw are satisfactory, | FIGURE 21 the steps are repeated for the two remaining Buttress Screws. Care should be taken to retract any soft tissues. If necessary, the initial incision can be enlarged.

The Buttress Screws should now be positioned in a divergent fashion and the distal fragment should now be securely captured. | FIGURES 22, 23
PROXIMAL EXPOSURE
Using the Proximal Targeting Guide as a template, mark a 2-3cm line on the skin of the patient that spans the two screw holes. Temporarily remove the Proximal Targeting Guide and make the skin incision. | FIGURE 24
Retract the extensor tendons and bluntly dissect the underlying soft tissue to the surface of the radius. | FIGURE 25 Reattach the Proximal Targeting Guide.
FINAL REDUCTION
Prior to securing the implant proximally, final reduction can be performed. Any provisional K-wires that remain should be removed. Restore length as needed by manipulating the Threaded Handle. If necessary, temporarily maintain reduction by inserting a K-wire through one of the K-wire holes on the Proximal Targeting Guide. | FIGURES 26, 27

CORTICAL SCREW PLACEMENT
Insert the three nested proximal guides (Obturator, Drill Guide and Tissue Protector) into the Proximal Targeting Guide | FIGURE 28 until they come to rest on the cortical bone surface. | FIGURE 29 Remove the Obturator (P/N 26949483) to drill the hole for the Cortical Screw.
Drill through the first (dorsal) cortex and through the implant until the drill bit reaches the second (volar) cortex. Determine screw length by noting which laser marking on the drill bit is closest to the measuring edge of the Tissue Protector (P/N 26949480).  

**FIGURE 30** Add 2mm as necessary.

Complete the bicortical hole by drilling through the second (volar) cortex. Remove the Drill Guide (P/N 26949472) and insert the Screw Guide (P/N 26949446). Insert the appropriate size screw and tighten until the head is flush with the bone. Repeat these steps for the remaining Cortical Screw. Cortical Screws are typically 12-14cm long.

**CLOSURE**

Remove the Outrigger Assembly by removing the provisional K-wire and loosening the distal locking knob.

Take the forearm and wrist through a full ROM to ensure that there are no penetrating screws in the DRUJ or radiocarpal joint and check overall fracture stability. Irrigate the surgical site and perform standard skin closure.

**POSTOPERATIVE TREATMENT**

Place the wrist in a splint for 7-10 days. Start finger motion immediately post-op.

At the first post-op visit, remove the splint and progress therapy.
# APPENDIX A | ORDERING INFORMATION

## MICRONAIL™ INTRAMEDULLARY DISTAL RADIUS SYSTEM

### KIT #  CATALOG #  DESCRIPTION  KIT QTY

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**TOTAL INSTRUMENTS** 30

**TOTAL** 96

59412025 MICRONAIL™ IN CLEAR RADIUS 1
ADDITIONAL PRODUCTS

SHORT WORKING TIME FORMULA
84XS-0404
MICRO MIIG® STAT
Procedure Kit for Grafting
with Fixation Hardware