

# Mini TightRope<sup>®</sup> CMC Fixation

Surgical Technique



# Mini TightRope® CMC Fixation

## Introduction

The Mini TightRope construct provides a unique means to suspend the thumb metacarpal for treatment of CMC arthritis. The Mini TightRope construct supports and maintains the thumb and index metacarpals in the proper relationship, while allowing for capsular healing, hematoma and scar tissue formation in the trapezial space. The construct consists of two strands of #2 FiberWire® suture which are fixed with two oblong, stainless steel buttons for cortical fixation.



**Some clinical outcomes for this technique that have been reported in the literature include:**

- Yao J, Song Y. Suture-button suspensionplasty for thumb carpometacarpal arthritis: a minimum 2-year follow-up. *J Hand Surg Am.* 2013;38(6):1161-5. doi:10.1016/j.jhssa.2013.02.040
  - “A study of 21 patients who underwent partial or complete trapeziectomy with TightRope fixation, followed by a 10 day immobilization period, resulted in 20/21 patients without adverse events and successful outcomes in all patients at 2 years. A standard immobilization protocol for K-wire fixation is 4 weeks”
  - “A study of 21 patients who underwent partial or complete trapeziectomy with TightRope fixation showed a trapezial height of 74% +/- 20% of the pre-operative height at two years of follow-up”

## C-Ring Aiming Guide

A C-Ring aiming guide is available as an option to assist with placement of the 1.1 mm tapered suture passing K-wire through the 1st and 2nd metacarpal. After the initial dissection, the C-Ring aiming guide can be placed with the sharp pointed tip on the desired exit point of the 2nd metacarpal. Care is taken to insure the exit point is in the proximal one-third of the bone and central to the bone in a dorsal/volar orientation.

**Note: It may be helpful to use the 1.1 mm K-wire to drill the cortex of the 2nd metacarpal on the ulnar side at the desired exit point. In doing so, the sharp point of the C-Ring guide will recess into this hole and prevent the guide from skiving along the bone.**

The ratcheting barrel guide is rotated with the teeth facing down and advanced until desired starting point on the 1st metacarpal. Once the guide is in place and an acceptable trajectory is achieved, the long 1.1 mm tapered suture passing K-wire is placed into the inner K-wire sleeve of the guide and advanced with a wire driver through all four cortices of the 1st and 2nd metacarpal.

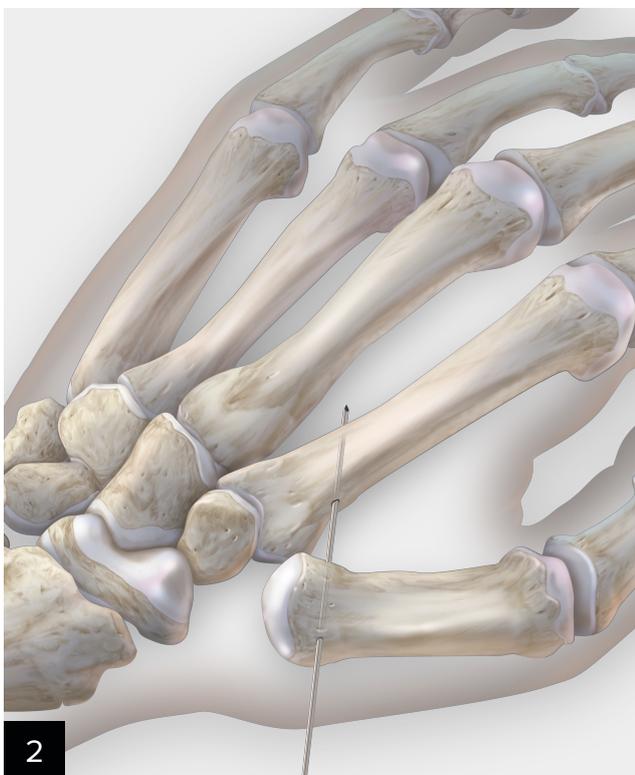


Once the K-wire exits the ulnar side of the 2nd metacarpal, the guide may be dismantled and the remaining procedure completed as described.



Create a 3 cm to 4 cm dorsoradial skin incision over the trapeziometacarpal joint. Safely retract the radial artery by means of a vessel loop, and take care to protect the branches of the dorsal radial sensory nerve. Make a longitudinal incision in the capsule and sharply dissect around the abductor pollicis longus which is attached to the radial base of the thumb metacarpal. Perform a hemi or full trapeziectomy to eliminate the bone-on-bone contact that is the source of pain.

Inspect the trapezial space and remove any remaining bone fragments or osteophytes surrounding the joint space to prevent impingement or continued pain. Make an additional 2 cm incision between the 2nd and 3rd metacarpal bases. Elevate the 2nd dorsal interosseous muscle subperiosteally from the ulnar aspect of the 2nd metacarpal to view the ulnar base of the index metacarpal – the eventual exit point of the K-wire. There is always a branch of the dorsal radial sensory nerve that should be identified and protected in this wound.



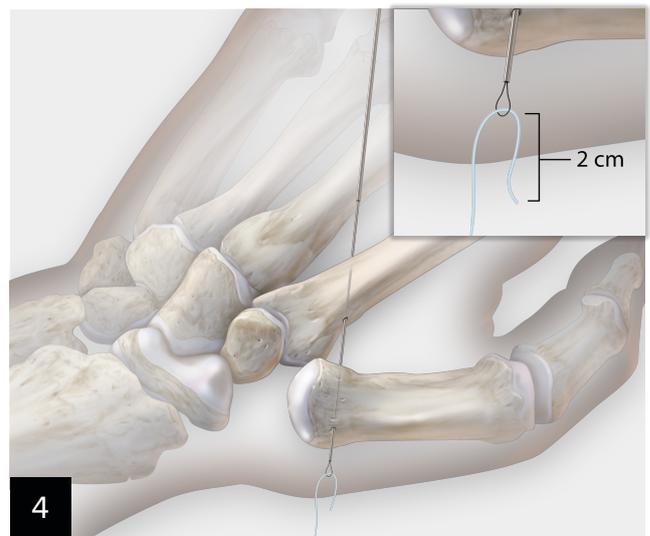
Place the 1.1 mm tapered suture passing K-wire starting on the proximal dorsoradial aspect of the 1st metacarpal. The K-wire should start as close to the base of the 1st metacarpal as possible. The hand should be in a relaxed neutral position. Providing axial traction, palmar abduction, and extension at the base of the 1st metacarpal will help reduce the metacarpal into proper position. (Placing one rolled towel between the thumb and palm will help maintain the position of the thumb in an abducted position.)

The K-wire is advanced through the base of the 1st metacarpal aiming towards the 2nd metacarpal base. The trajectory recommended is to place the K-wire within the proximal one-third of the 2nd metacarpal. A more proximal trajectory is easier to accomplish and suggested. The wire must exit in the central portion of the 2nd metacarpal (wire may tend to travel dorsally). Confirm the trajectory under fluoroscopy, while advancing the K-wire. An aiming guide is very useful and available if desired (see previous page). **Note: Advancing the K-wire under oscillation is suggested and maximizes control of the K-wire.**

## Mini TightRope® CMC Fixation Technique



Once proper trajectory is established, continue to advance the K-wire through the 2nd metacarpal exiting the small incision in the interspace. Four cortices should be penetrated. Continue to advance the K-wire until the thinner tapered portion of the guidewire is completely through all four cortices. The K-wire should now slide easily by hand.



Place the single strand of the Mini TightRope construct into the Nitinol loop of the K-wire. Only place 2 cm to 3 cm of suture through the loop, as more may bind in the small tunnel.



Pull the opposite end of the suture passing K-wire, bringing the suture completely through and exiting the 2nd metacarpal. Pull the suture and bring the oblong button to contact the radial side of the thumb metacarpal.



**6** Cut the suture on the ulnar side to create two strands of FiberWire® suture and load the second oblong button onto the suture, bringing the oblong button down to the 2nd metacarpal. Remove any slack from the construct and position the thumb into the desired position. The thumb can be reduced into the desired anatomic resting position by applying axial traction (to restore height until the base of the first metacarpal is in line with the base

of the 2nd metacarpal), palmar abduction and extension at base of 1st metacarpal. Over-tightening of the suture is not recommended as it may lead to decreased range of motion and possibly impingement of the base of the thumb metacarpal on the base of the 2nd metacarpal. Tie one provisional knot and check the range of motion clinically and under fluoroscopy to confirm full motion and no impingement.



**7** Tie approximately five knots over the second ulnar button to lock the construct into place. Knot strands may be left long and buried beneath the 2nd dorsal interosseous to prevent irritation. The 2nd dorsal interosseous fascia, CMC capsule and skin is closed in a standard fashion.

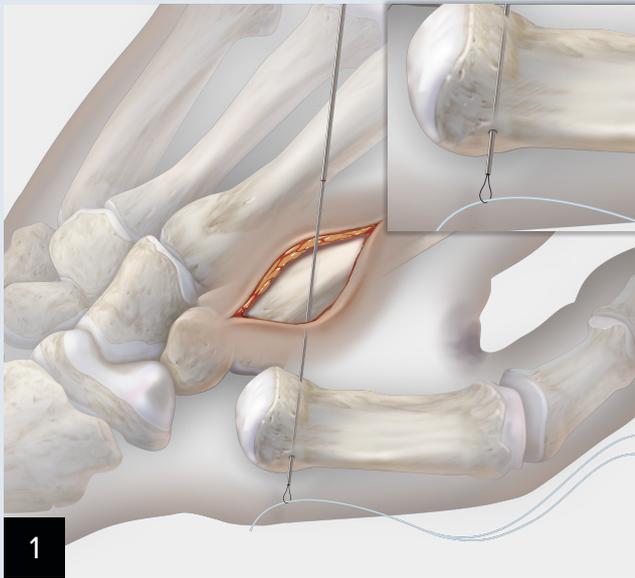


**Post-op Protocol:** Follow up with hand therapy at 10 to 14 days. Provide a thermoplastic, hand-based thumb spica splint to be worn for lifting > 5 lbs and for sleep. Otherwise, allow partial mobilization of up to 50% of grip power between two and six weeks. Increase mobilization steadily and advance to strengthening, as tolerated, until week 12. Afterwards, allow full mobilization with no activity restrictions.

**Device Removal:** If removal of the device is required a small incision over each cortical button can be made to gain access to the oblong button. The sutures through the buttons are cut, the buttons removed, and the suture construct is removed with a forceps or other appropriate suture grasping instrument.

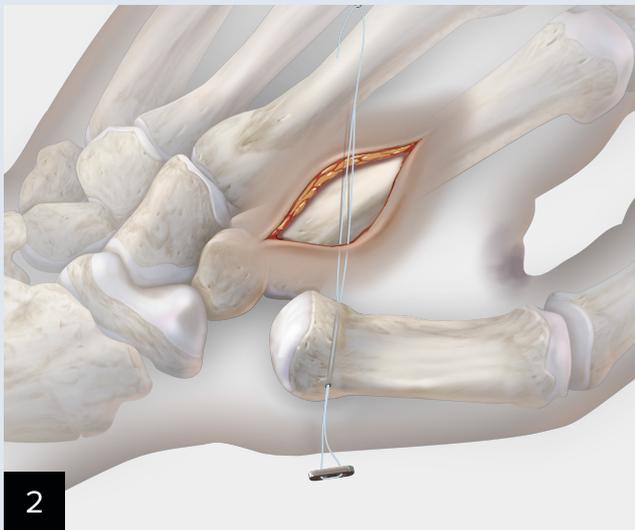
## Mini TightRope® CMC Fixation Technique (Alternate)

An alternate surgical technique is presented which may allow for a more controlled placement of the Mini TightRope construct through the 2nd metacarpal. Using the same radial dissection as the standard technique described previously, attention is directed to making an incision overlying the proximal one-third of the 2nd metacarpal, measuring approximately 2 cm. Care is taken to protect the dorsal sensory radial nerve branch. The soft tissues are dissected off the radial and ulnar borders of the base of the 2nd metacarpal so direct visualization of the bone is achieved.

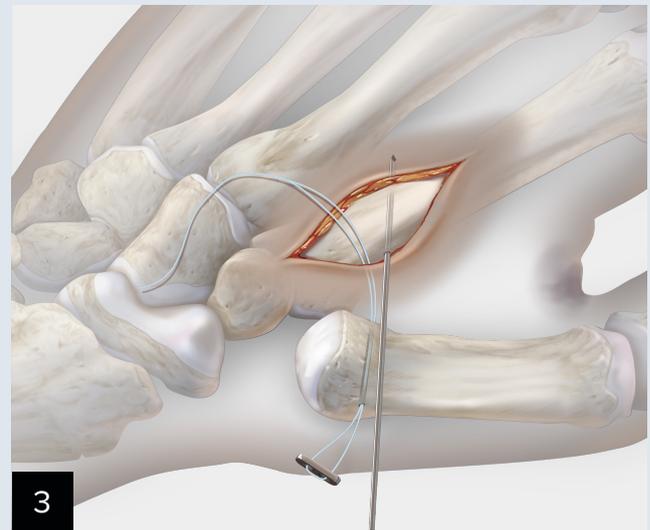


Soft tissue is dissected approximately 1 cm distal to the base of the 1st metacarpal, which is just past the insertion of the abductor pollicis longus. The 1.1 mm tapered suture passing K-wire is passed through the radial side of the 1st metacarpal, parallel to the base, until it exits the ulnar cortex. Pass the K-wire only a few millimeters through the ulnar side to establish the hole.

The thumb is abducted and the K-wire is advanced through the 1st metacarpal towards the 2nd, pointing towards the proximal one-third of the 2nd metacarpal and exiting through the soft tissue that brings it onto the dorsal side of the 2nd metacarpal cortex. **Do not pass the K-wire through the 2nd metacarpal at this time.** Allow the wire to exit dorsal to the bone out the 2nd metacarpal incision. Care is taken to protect the dorsal sensory branch of the radial nerve.

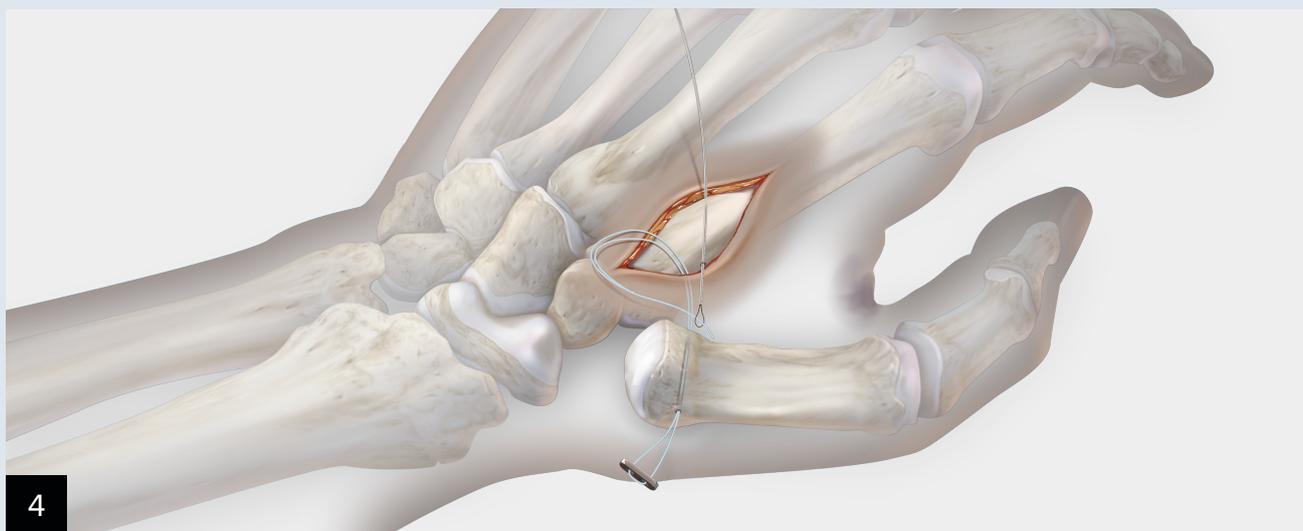


2 cm to 3 cm of the Mini TightRope construct end is placed through the 1.1 mm tapered suture passing K-wire loop and pulled through the base of the 1st metacarpal, exiting through only the soft tissue on the dorsal 2nd metacarpal incision.

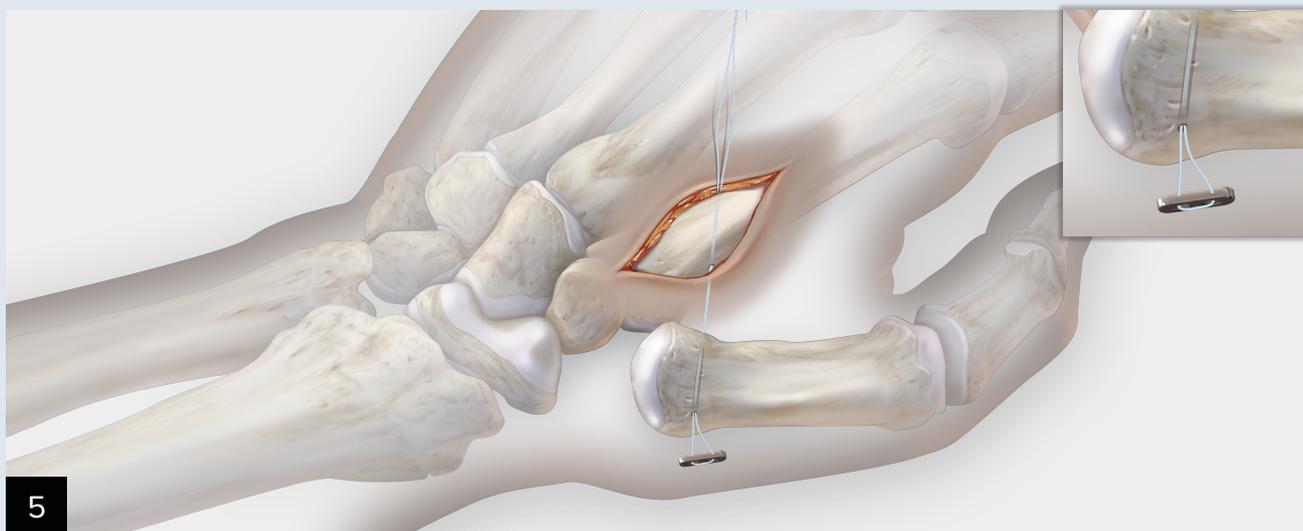


A second hole is established through the base of the 2nd metacarpal using the 1.1 mm tapered suture passing K-wire to establish a central hole from the radial to the ulnar side of the 2nd metacarpal proximal diaphysis. This is done under direct visualization of both the radial and ulnar sides of the 2nd metacarpal. Attention is paid to central placement of the drill hole in the 2nd metacarpal.

## Mini TightRope® CMC Fixation Technique (Alternate)



Once the hole is established, the nontapered, small diameter, blunt-tipped, flexible suture passing K-wire is used to pass the Mini TightRope construct through the 2nd metacarpal, exiting the ulnar side of the 2nd metacarpal. The wire is grasped in the interspace between the 2nd and 3rd metacarpals with a hemostat or needle holder, directed dorsally out the incision and the suture is pulled taut.



The Mini TightRope construct is cut to free two suture ends. The second button is secured on the ulnar side of the 2nd metacarpal using five or six knots. Remove all slack, but do not overtighten. Over-tensioning of the TightRope construct will cause decreased thumb motion, abduction, and possible ulnar impingement pain.

Check thumb position before securing the knot. The suture of the tied knot can be buried easily in the interspace between the 2nd and 3rd metacarpals, and the soft tissue is closed over the 2nd metacarpal. The joint capsule of the carpometacarpal joint is closed securely with suture. A thumb-spica forearm splint, or a hand-based thumb spica splint, is loosely applied to protect the thumb, hand, and wrist.

## Ordering Information

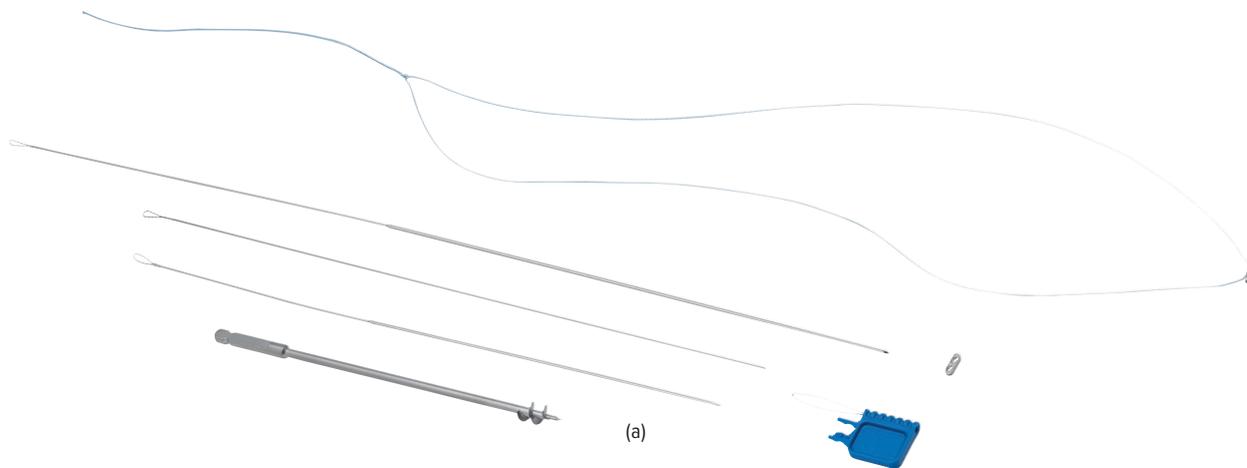
### CMC Mini TightRope Repair Kit (a)

Product Description	Item Number
Suture Passing K-Wire, short, 1.1 mm	AR-8919DS
Suture Passing K-Wire, long, 1.1 mm	
Suture Passing Wire, 8 in	
Oblong Button for Mini TightRope, 2.6 mm	
TightRope Suture Construct, 1.1 mm	
Trapeziectomy Tool w/ Handle	

### Optional Accessories

Product Description	Item Number
Parallel Aiming Guide	AR-8919G
0.86 mm Sleeve	AR-8919G-01
1.1 mm Sleeve	AR-8919G-02
1.6 mm Sleeve	AR-8919G-03
Drill Guide Instrument Case	AR-8919C
C-Ring Aiming Guide	AR-8826G
Sterile Trapeziectomy Tool w/ Handle	AR-8919-01S
Suture Passing K-Wire, short, 1.1 mm	AR-8914K

Products advertised in this brochure/surgical technique guide may not be available in all countries. For information on availability, please contact Arthrex Customer Service or your local Arthrex representative.



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