FIELD ORTHOPAEDICS

CASE REPORT

Modified Approach to Griplasty™ CMC Suspensionplasty: Technical Note and Case Report

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ABSTRACT

Background

Trapeziectomy with suspensionplasty is a treatment for carpometacarpal osteoarthritis (CMCOA). The Griplasty™ System, featuring dual sling arms, offers superior thumb metacarpal base support with potential accelerated rehabilitation benefits. The dorsal surgical technique may require abductor pollicis longus (APL) additional mobilization, which may compromise surgical exposure.

Methods

We describe a modified approach maintaining the APL in its anatomical position through strategic retraction techniques, potentially reducing tissue disruption while preserving construct positioning.

Results

Initial experience demonstrates successful implementation with adequate construct stability using modified retraction techniques.

Conclusion

This technical modification may offer advantages in surgical efficiency and tissue preservation while maintaining the essential benefits of the original Griplasty™ technique.

INTRODUCTION

Trapeziectomy with supplemental techniques such as suspensionplasty and ligament reconstruction tendon interposition (LRTI) have become the dominant surgical approach to treating carpometacarpal osteoarthritis (CMCOA) (1).

Griplasty™ is a novel suture suspension device with two sling arms designed to support the thumb metacarpal base in functional movements and allowing direct incorporation of adjacent soft tissue. This may offer superior stability and early motion rehabilitative options for patients.

Overview of Standard Griplasty™ Technique

In the standard Griplasty™ technique using the dorsal approach, an incision is centred over the trapezium. Following nerve and tendon mobilization, the tissues are released and a trapeziectomy is performed.

The APL is then retracted ulnarly, and a bicortical suture anchor is deployed with a K-wire secured guide through an oblique bone tunnel across the index metacarpal between the 2nd and 3rd metacarpals.

A second bicortical suture anchor is then deployed with a K-wire secured guide through a bone tunnel through the thumb metacarpal base. This is directed from the palmar aspect of the thumb metacarpal base and directed obliquely and dorsally to exit in the 1st-2nd intermetacarpal space.

After positioning the V-sling, and tying provisional knots on the white suture lines, a third suspension point is created by securing the blue sutures (with needles) to the APL and/or capsule of the thumb metacarpal base. Construct testing is performed before final knots are tied, sutures trimmed, and the soft-tissues closed.

Rationale for alternative surgical approach in the dorsal procedure

With the standard dorsal approach, mobilizing the APL ulnarly comes at the cost of reduced surgical visibility of the 2nd metacarpal, and of increased operative time.

Furthermore, additional dissection of the radial side of the wound may be required to expose the volar aspect of the thumb MC in the standard approach.

The objective of this alternative approach is to maintain the APL radially and instead elevate the thumb MC base dorsally exposing the volar insertion point for the suture anchor entry.

CASE PRESENTATION

Patient Information

The patient is a 55-year-old healthy, active female with a 4-year history of atraumatic pain, weakness, and swelling in her dominant thumb carpometacarpal joint.

Physical examination revealed a 'shoulder deformity' of the thumb metacarpal base with dorsal subluxation and the trapezium. Provocative testing demonstrated pain on 'relocation test' and 'grind test' with pain and crepitus on range of motion. Palmar and radial abduction of the thumb was limited by 30% of the contralateral side with a 50% loss in pinch strength.

AP, lateral, and oblique radiographs of the hand revealed narrowing of the thumb carpometacarpal joint space and sclerocystic changes in the adjacent bones with dorsal subluxation of the thumb metacarpal on the trapezium.

Surgical indications include pain and/or weakness associated with degeneration of the thumb carpometacarpal joint recalcitrant to conservative treatment measures.

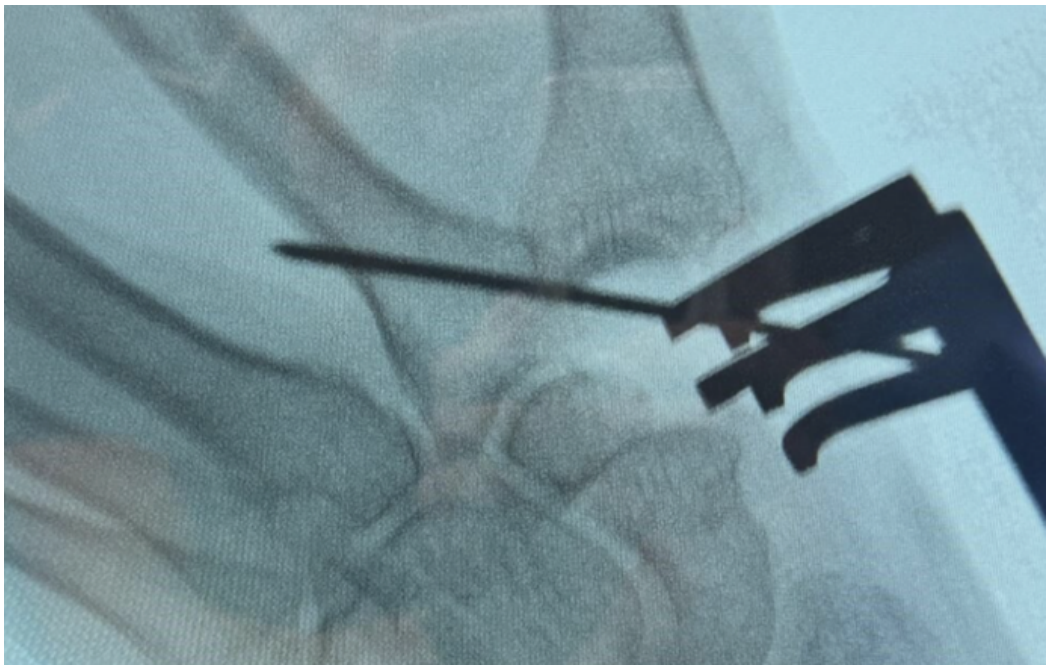
Surgical Technique

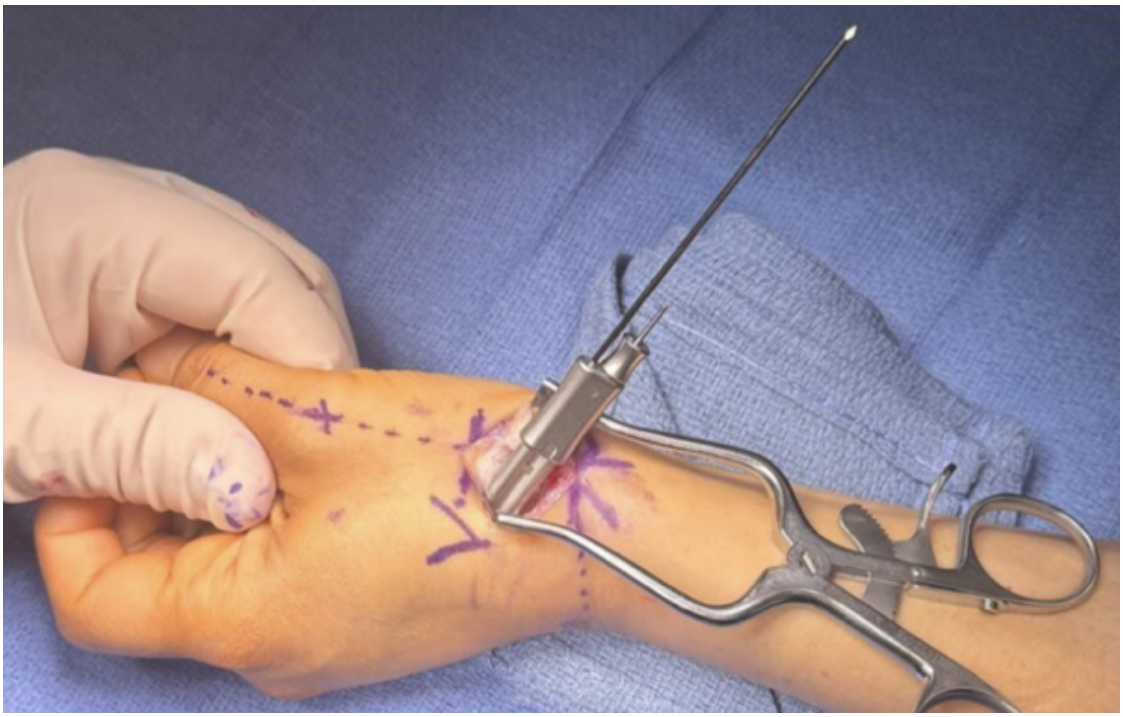
A dorsal incision was made centered over the trapezium extending distal to the radial styloid.

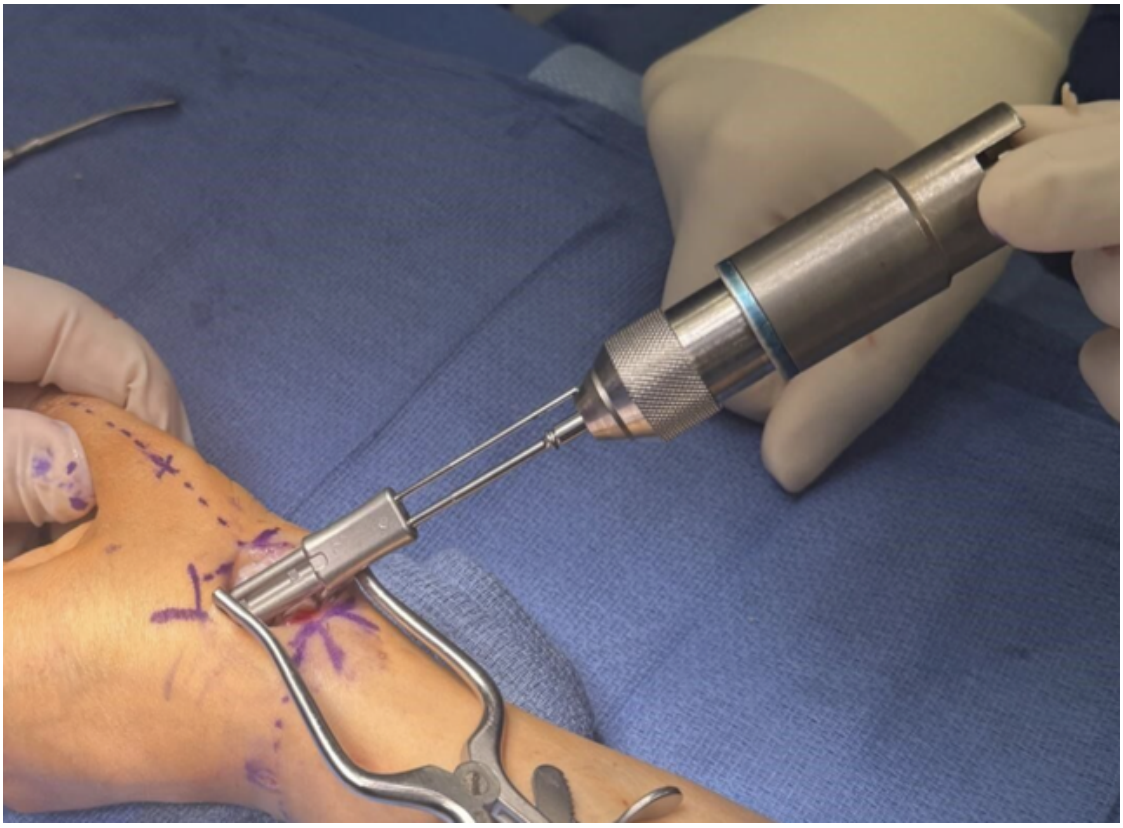
The dorsal radial sensory nerve branches were identified and carefully retracted. The first compartment tendons were then mobilized by incising the superficial retinaculum distal to the first compartment sheath. The tendons are then retracted and the deep fascia over the radial artery in incised allowing mobilization and retraction of the radial artery proximally.

The dorsal trapezium and carpometacarpal and scaphotrapezial joints and capsule were visualized. The dorsal periosteum and capsule was released and elevated and the trapezium was resected.

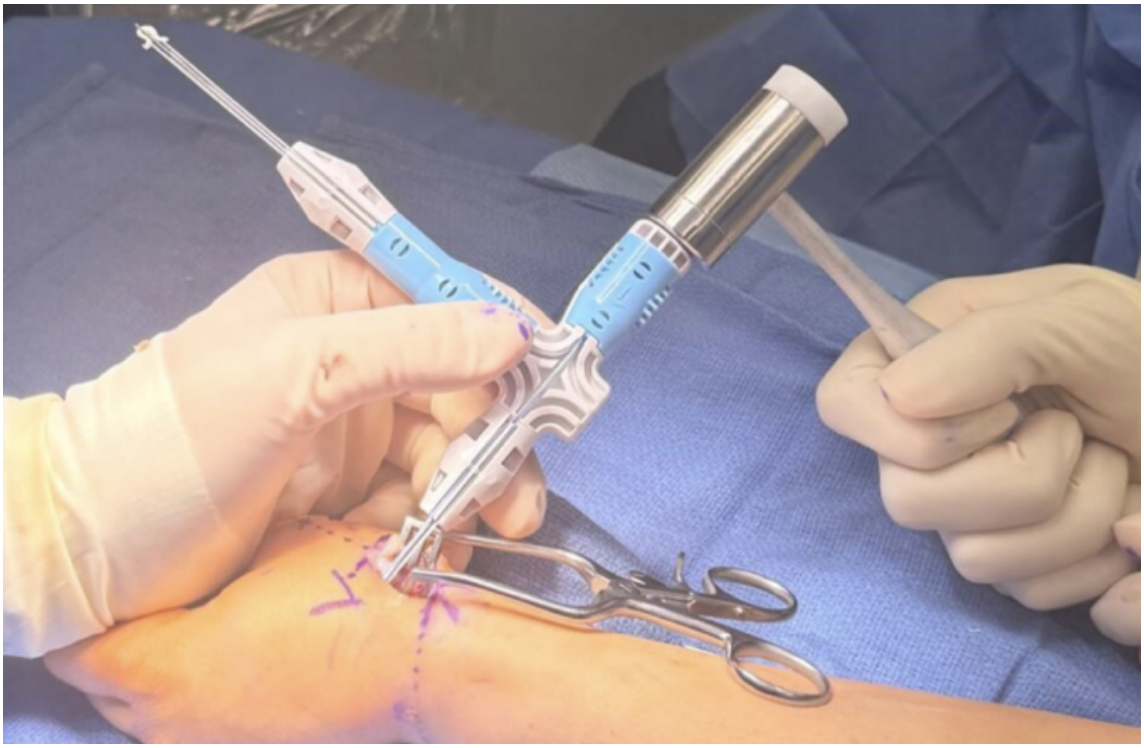
The index metacarpal anchor was secured first. The Parallel Guide Assembly was positioned on the distal index metacarpal joint facet directed at a 45-degree angle relative to the index metacarpal. The 'Trajectory' K-wire was placed through the Guide Sleeve and across the index metacarpal entering the 2nd-3rd intermetacarpal space. The "Guide" K-wire was then placed parallel through the Parallel Wire Guide. The Trajectory K-wire was overdrilled bicortically with the Cannulated 2.4 mm drill bit.

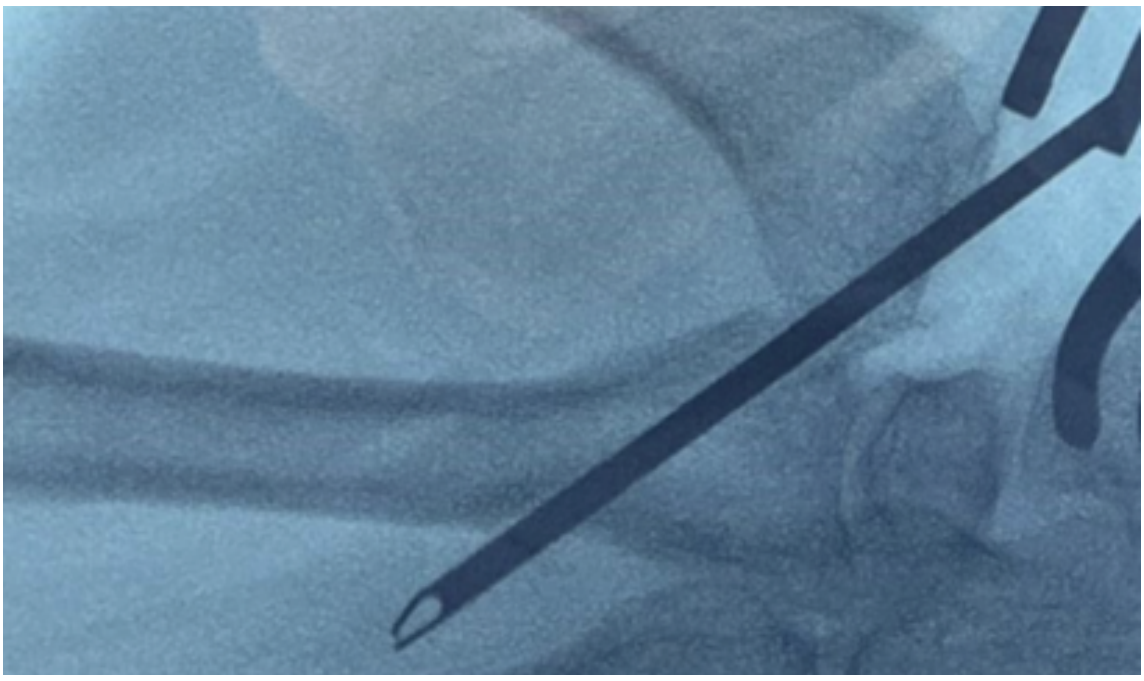






The Parallel Guide Assembly was removed exposing the Guide K-wire. The T-Handle (anchor inserter) was placed over the Guide K-wire through the index arm of the inserter. The index anchor was advanced across both cortices of the index metacarpal using a mallet. Positioning and depth were confirmed with fluoroscopy verifying the inserter was extending beyond the index metacarpal far cortex and in the 2nd-3rd intermetacarpal space.



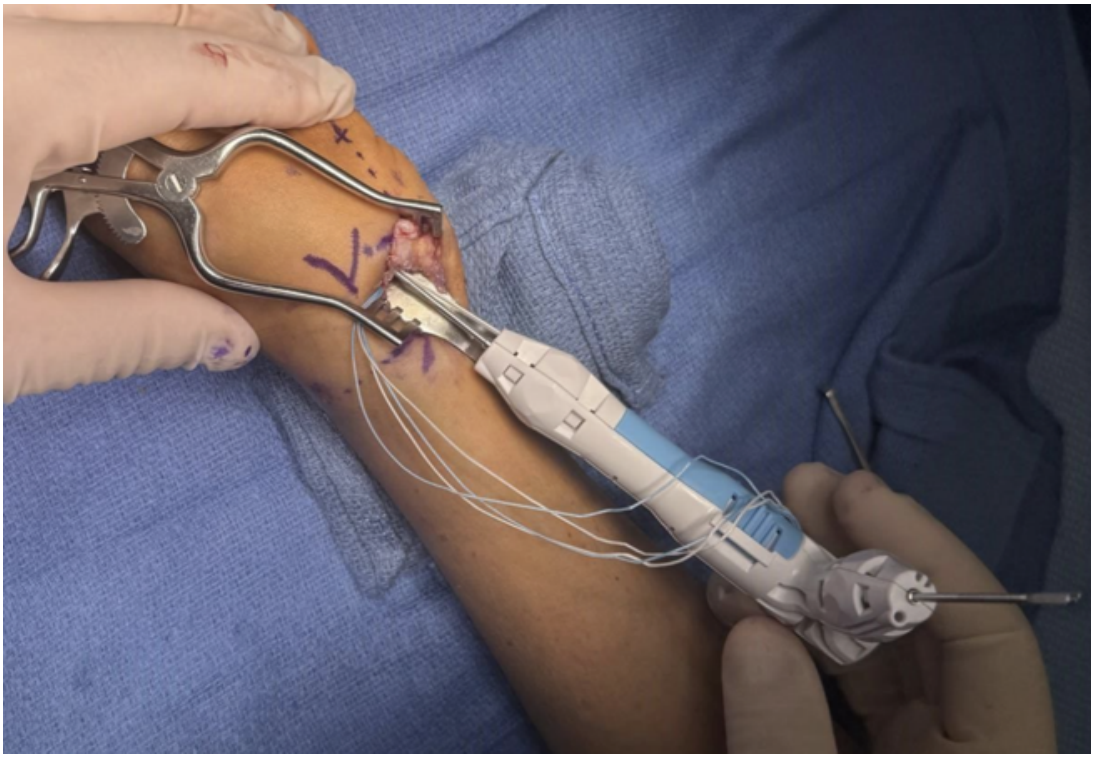


Attention was then turned to insertion of the thumb anchor. A small Hohmann retractor was placed beneath the volar edge of the thumb metacarpal base allowing it to be levered dorsally over the scaphoid. This exposed the insertion site of the Trajectory K-wire along the volar-radial edge of the thumb metacarpal base.

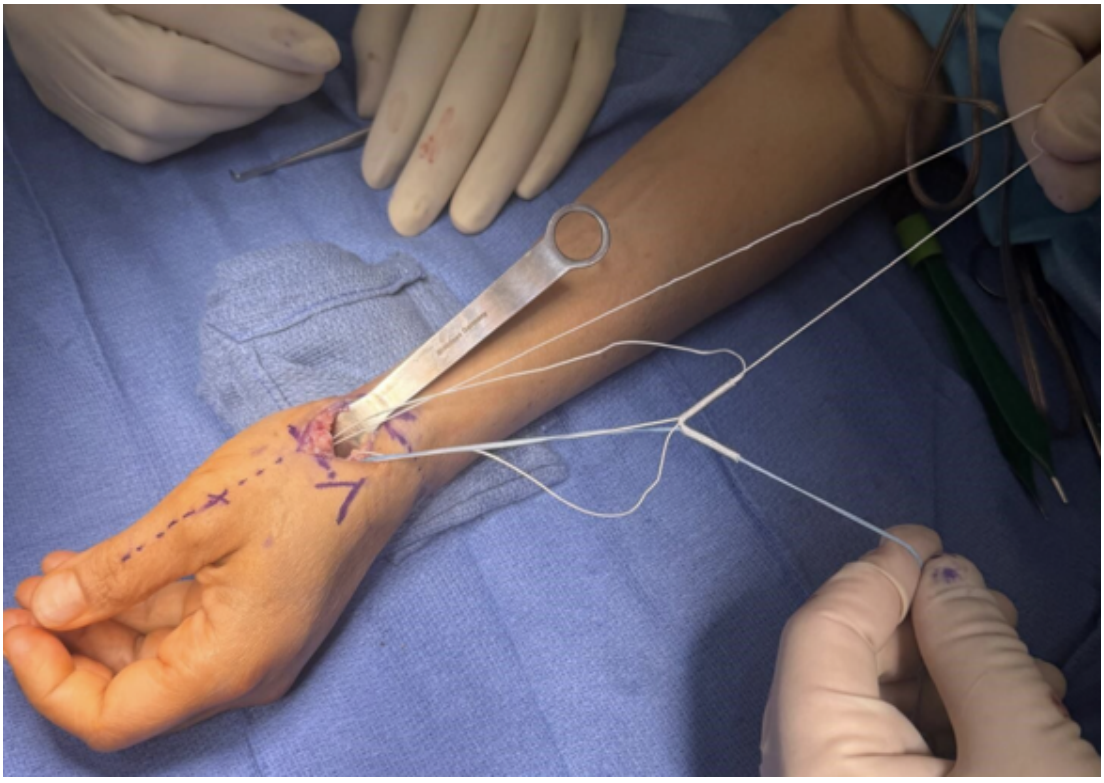
The Trajectory K-wire was advanced through the guide with a starting point at the '4 o'clock' position for the left thumb or '8 o'clock' position for the right thumb. This was directed to the opposite cortex along the dorsoulnar metacarpal entering the index-thumb intermetacarpal space.

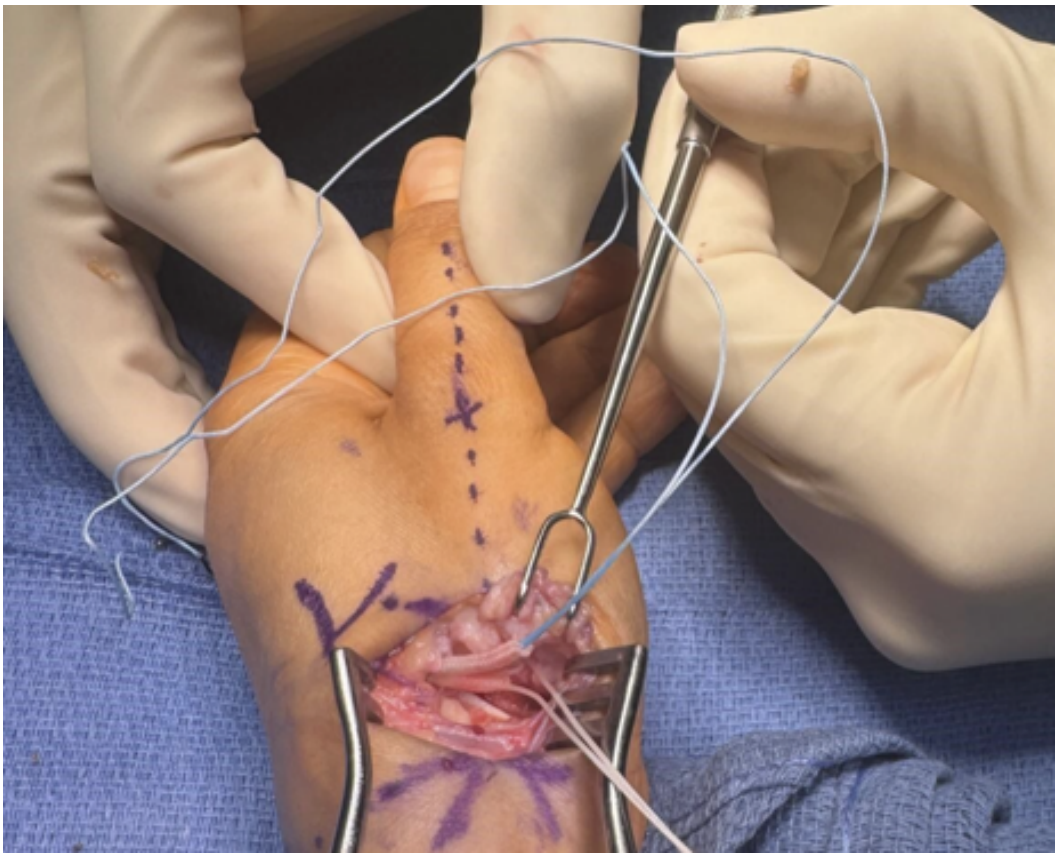
The Guide K-wire was then placed through the Parallel Wire Guide and the Trajectory K-wire sleeve is removed and the cannulated drill is passed over the Trajectory K-wire creating a bicortical bone tunnel. The Parallel Wire Guide was removed exposing the Guide K-wire.

The thumb side of the anchor inserter was then placed over the Guide K-wire and the anchor was advanced through the bone tunnel with a mallet with fluoroscopic confirmation of its depth and positioning.



The V-sling was shuttled to the base of index metacarpal by toggling the white and blue suture lines.





The blue arms of the V-sling were sutured to the APL and/or capsule near the insertion to the Thumb metacarpal with a horizontal mattress technique.

The construct was stress-tested with ballottement and circumduction confirming stability and lack of impingement. Final knots were then tied, suture lines trimmed, and the capsule and wound were closed.

POST-OPERATIVE PROTOCOL

The patient was placed in a soft dressing figure-8 splint soft bandage to support and immobilize the base of the thumb. Motion was allowed and encouraged in the fingers and the thumb interphalangeal joint.

At 1-2 weeks postoperatively the postoperative dressing splint was removed and an orthoplast splint was created leaving the interphalangeal joint free and placing the thumb in modest palmar and radial abduction with the wrist in neutral position.

The splint was allowed to be removed for bathing, keyboarding, and every 2-4 hours to allow for range of motion of the wrist and thumb metacarpalphalangeal and interphalangeal joints. Active circumduction and cross-palm abduction of the thumb was also encouraged instructing the patient to touch the tip of the thumb to each of the fingers and towards the base of the small finger.

The splint will be weaned and discontinued between 4-6 weeks postoperatively and a soft neoprene sleeve can be used for an additional 4-6 weeks depending on stability and comfort. Strengthening and endurance exercises of the hand and thumb will begin at 6-8 weeks depending on stability.

DISCUSSION

In this case report, I present a modification to the Griplasty™ dorsal technique that maintains the APL in its anatomical position while achieving metacarpal base exposure through mechanical elevation. By using a small Hohmann retractor to lever the thumb metacarpal base dorsally, this approach potentially reduces soft tissue disruption and operative time compared to the standard technique requiring APL mobilization. The modification eliminates the need for additional radial dissection while maintaining the core principles and biomechanical advantages of the original Griplasty™ technique.

While our initial experience suggests this modification is reproducible and achieves adequate construct stability, several considerations warrant discussion. The learning curve may differ

from the standard technique, particularly in determining optimal Hohmann placement and managing the thumb anchor deployment without parallel guide assembly. Patient selection remains crucial, and contraindications may include significant metacarpal base deformity that could compromise mechanical elevation. Long-term comparative studies are needed to validate whether the theoretical advantages in tissue preservation and operative efficiency translate to improved clinical outcomes.

CONCLUSION

This modified approach to Griplasty™ CMC suspensionplasty offers potential advantages in surgical efficiency and tissue preservation. Initial experience suggests the technique is reproducible while maintaining construct stability. Further investigation is warranted to validate long-term outcomes and specific benefits.

References

1. Wu EJ, Fossum BW, Voort WV, Bayne CO, Szabo RM. Surgeon preferences in the treatment of thumb carpometacarpal osteoarthritis. World J Orthop. 2024 May 18;15(5):435–43.

Product Resources

Field Orthopaedics. (2024). Griplasty™ Surgical Technique. Brisbane, Australia: Field Orthopaedics.