

# A Case of Carpal Tunnel Syndrome Resulting from Interference Screw Malposition after LRTI

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**Summary:** Many approaches to CMC arthroplasty have been described for treatment of advanced arthritis, yet there is no consensus on the “best” operation. Implantable hardware is increasingly utilized for metacarpal suspension, but few hardware-mediated complications have been documented. Here we present the case of a 69-year-old man with insidious-onset median neuropathy following ligament reconstruction and tendon interposition for CMC arthritis, utilizing interference screw fixation. After surgery, the patient developed median neuropathy, and his physical examination and MRI demonstrated a mass in the volar wrist. Operative exploration revealed an interference screw that was lodged immediately volar to the transverse carpal ligament, causing median nerve compression. Median neurolysis and screw removal led to symptom resolution. Carpal tunnel syndrome is an unreported complication of interference screw use during thumb CMC arthroplasty, and should be considered in patients with postoperative median neuropathy following ligament reconstruction and tendon interposition. (*Plast Reconstr Surg Glob Open* 2022;10:e4254; doi: [10.1097/GOX.0000000000004254](https://doi.org/10.1097/GOX.0000000000004254); Published online 13 April 2022.)

Thumb CMC arthritis occurs in approximately one-third of older adults and is seen in up to 75% of post-mortem joints.<sup>1,2</sup> Debilitating pain and loss of thumb prehension lead many patients to seek surgical treatment. Patient satisfaction following CMC arthroplasty is high, with revision rates as low as 3%; yet, there is no universally recognized standard of care.<sup>3,4</sup> Trapeziectomy with LRTI is commonly employed in Eaton class III/IV CMC arthritis, often utilizing the flexor carpi radialis for both metacarpal suspension and creation of an interposition mass.<sup>5</sup>

Despite favorable functional results and pain reduction, LRTI has a number of associated complications, including mechanical failure, atraumatic metacarpal fracture and subsidence, radial nerve sensory branch injury, iatrogenic tendon injury, infection, complex regional pain syndrome, weakened grip/pinch, and persistent pain due to unaddressed adjacent segment arthritic disease.<sup>3,6</sup> To our knowledge, this is the first reported case of carpal

tunnel syndrome (CTS) caused by implantable hardware in LRTI.

## CASE REPORT

A 69-year-old right-hand-dominant man presented to the senior author (BRG) in consultation with progressive numbness and pain of the left thumb, index, and long fingers. Five months earlier, he underwent trapeziectomy with LRTI, utilizing an interference screw for metacarpal suspension at an outside facility. The patient was recommended nighttime splinting by his primary surgeon, with no symptomatic improvement. MRI obtained prior to presentation revealed a retained foreign body in the volar soft tissues at the wrist.

A complete and comprehensive medical record was requested but not provided at presentation. However, an operative note obtained from the outside facility documented that LRTI was performed using flexor carpi radialis and an interference screw implanted for metacarpal suspension. The index surgeon specifically noted no intraoperative complications, with the screw ostensibly deployed in the first metacarpal. Neither screw malposition nor efforts to retrieve a misplaced screw were described in the record. Per patient report, the index surgeon attributed the MRI findings to screw migration as a result of metacarpal fracture, which may have occurred at the time of drilling.

Examination in our clinic was notable for a palpable mass at the volar base of the left thumb with associated

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Received for publication November 22, 2021; accepted February 15, 2022.

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DOI: [10.1097/GOX.0000000000004254](https://doi.org/10.1097/GOX.0000000000004254)

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article.



**Fig. 1.** Three-view radiograph series of a left hand following LRTI at an outside facility. The patient has asymptomatic subsidence at the CMC joint but no obvious cause for his progressive median neuropathy.

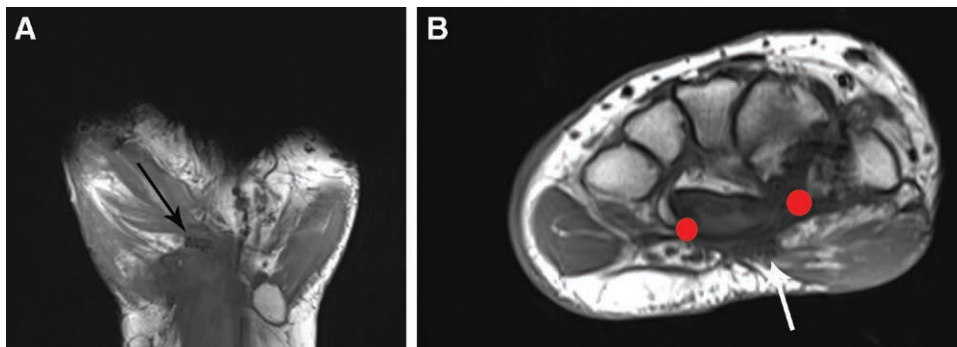
focal tenderness. Axial loading of the CMC joint did not elicit pain. Light touch sensation was diminished in the thumb, index, and long fingers. Tinel's and Durkan's tests at the wrist were positive. No thenar atrophy or weakness of abductor pollicis brevis was present. Plain film X-rays obtained in our clinic reflected trapeziectomy and mild thumb metacarpophalangeal joint degenerative changes, but no fractures other obvious abnormalities (Fig. 1). MRI demonstrated a mass resembling an interference screw immediately palmar to the transverse carpal ligament (Fig. 2). Due to his worsening median neuropathy and evidence of possible screw malposition, the patient elected to undergo surgical exploration. Intraoperatively, a 4×10mm biocomposite interference screw (Arthrex, Naples, Fla.) was extracted from the soft tissue directly overlying the transverse carpal ligament, and carpal tunnel

release was performed. The median nerve appeared intact without direct injury (Fig. 3). Postoperatively, the patient experienced immediate resolution of his numbness and pain symptoms. His postoperative course was uneventful.

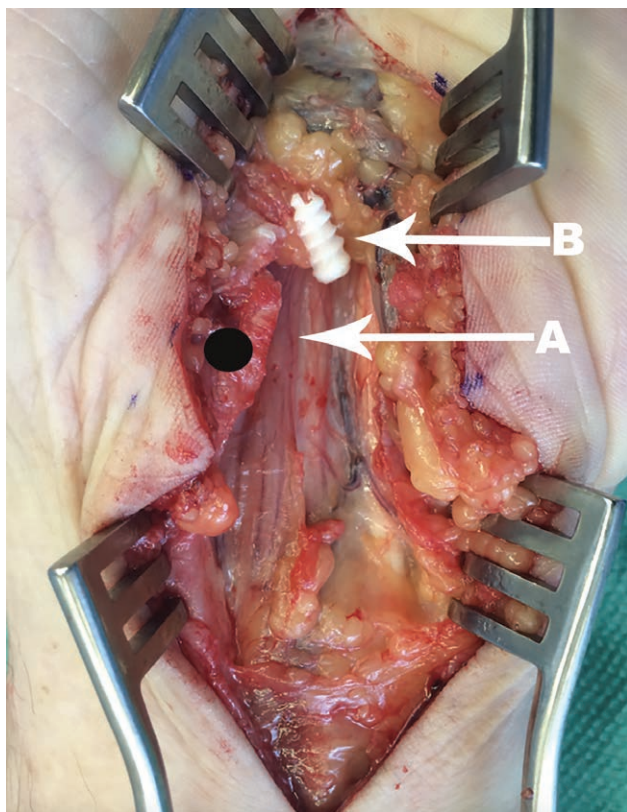
## DISCUSSION

Here, we profile a previously undescribed complication of LRTI surgery: foreign body-mediated CTS as a result of interference screw malposition. Although LRTI is not new, novel methods of metacarpal suspension continue to emerge. Various implantable materials may be utilized, each with its own reported advantages.<sup>7,8</sup> Potential pitfalls of implantables (eg, interference screws) for metacarpal suspension during LRTI include the potential device failure and surgeon misuse. As such, their application introduces additional variables that, when not precisely controlled, may compromise the result. In this case, the precise etiology of implant malposition was not elucidated, though steps may be taken to optimize outcomes. The surgeon should have familiarity with hardware application, systematically perform inspection of any and all implantables, and perform in-situ confirmation of the hardware position and stability. In the event of hardware complication, alternative techniques for fixation should be performed.

Thus far, long-term outcome studies on hardware in CMC arthroplasty are scarce in the literature. A recent review of 31 consecutive CMC arthroplasties with interference screw fixation of the flexor carpi radialis to the first metacarpal reported favorable outcomes, low subsidence (mean 1.4mm), and no hardware complications.<sup>7</sup> Although as-of-yet unreported, hardware complications during interference screw placement into the thumb metacarpal during LRTI surgery are certainly conceivable: when utilized in anterior cruciate ligament repair, fractures of the interference screw have been reported to occur upon insertion, and interference screw migration has been reported.<sup>7,9</sup> A proposed advantage of interference screw fixation is increased load to failure, compared with traditional fixation devices such as suture anchors or suture tied over a bone-bridge or button.<sup>7</sup> Recent cadaveric studies suggest that the suture-button suspensionplasty may provide greater load-bearing



**Fig. 2.** Preoperative MRI of the left hand. Coronal T1 (A) demonstrating retained threaded interference screw in the palm (arrows). Axial T1 MRI (B) depicts the retained interference screw immediately palmar to the transverse carpal ligament (dark line between red dots).



**Fig. 3.** Intraoperative photograph of a left hand demonstrating a retained interference screw (arrow B) that was lost in the hand during CMC arthroplasty. The median nerve is labeled (arrow A). The transverse carpal ligament (black dot) has been transected, and the direction of the thumb is indicated with a white arrow.

resistance and less metacarpal subsidence when compared with LRTI with or without the use of a biotenodesis interference screws.<sup>10</sup> Although the potential advantages of interference screw suspensionplasty have been established in animal studies, there are no mid- or long-term outcome studies in vivo, and further investigation of this technique is warranted.

As the use of hardware in CMC arthroplasty becomes more prevalent, it is important that nonorganic etiologies are considered when diagnosing a seemingly “common” hand malady (eg, carpal tunnel) in patients who have recently undergone LRTI. CTS is quite common and presents concomitantly in 30% of patients with basal thumb arthritis.<sup>5</sup> As such, it is important to perform a thorough history and physical examination to accurately elucidate the etiology. Additionally, the surgeon should critically review all available patient documentation, including

operative reports, to help ensure proper preparation for any required revision surgery.

## CONCLUSIONS

CMC arthroplasty is a common operation encompassing a variety of techniques, but no single approach has been accepted as a gold standard. This case report highlights the previously unreported complication of CTS presenting after LRTI caused by a malpositioned interference screw. In patients with focal neuropathy or pain after hand surgery, hardware complications should be considered in the differential diagnosis. Physical examination and advanced imaging may help clarify the diagnosis.

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