

Rupture of the Extensor Pollicis Longus Tendon Following Intramedullary Nailing for Radial Shaft Fracture

Sir,

The treatment choices for forearm shaft fractures vary greatly depending on the age of a patient and the unique characteristic of a fracture. In young patients, elastic stable intramedullary nailing (ESIN) has gained popularity for forearm injuries due to its minimal impact on soft tissues, low complication rate, and preservation of the growth plate.¹ Nonetheless, a rare risk of this procedure is rupture of extensor pollicis longus (EPL) tendon, with estimated incidence ranging between 0.2% and 5% based on current research.²

A 57-year woman presented with a one-month history of difficulty extending her right thumb. Three months earlier, she had undergone intramedullary nailing for a right radial shaft fracture in this department, providing good results. About two months after surgery, she noticed her right thumb did not extend without any apparent injury. Notably, she had no tingling and could not bend her thumb, and there was no trouble moving her wrist or elbow.

On examination, a 2 cm surgical scar was observed on her right forearm, with a detectable piece of hardware. The thumb joint showed a fixed bend. She could barely extend her thumb (from 45 degrees of bend to 0 degrees) and was unable to move it laterally. The wrist retained a good range of motion (70 degrees bending back, 65 degrees straightening out). The nerves and blood vessels of her hand were fine.

The patient was admitted with a diagnosis of ruptured right EPL tendon following surgical repair of a radial fracture. Preoperative imaging showed the intramedullary hardware remained securely positioned, with visible callus formation bridging the fracture site. However, a faint fracture line was still visible on scans, indicating incomplete healing. Ultrasound imaging definitively showed a full-thickness tear of the EPL tendon.

During surgery, three key issues came to light: the nail's end was properly seated beneath the cortex, the distal locking screw extended 3.5 mm past the radial bone surface, and the EP tendon was completely severed, with the proximal end retracted 15 mm and the distal portion showing signs of fibrotic degeneration (Figure 1). Given the clear link between the protruding screw and chronic tendon wear, along with radiographic signs of delayed healing (the fracture line remained visible three months postoperatively), the surgical team opted to proceed with hardware revision. The original intramedullary

nail was replaced with a narrower 2.0 mm ESIN, preserving fracture stability while reducing soft tissue irritation. With an 18 mm tendon gap and poor tissue quality precluding direct repair, an extensor indicis proprius to EPL transfer was performed. The Pulvertaft weave technique was used, securing the tendons with 3-0 FibreWire sutures under ideal tension to restore full thumb extension with the wrist in a neutral position. Postoperative care included immobilisation in a short-arm thumb spica cast and positioning the wrist at 30° extension and the thumb at 45° abduction for two weeks. After the cast removal, a tailored hand therapy programme, focused on progressive tendon-gliding exercises, was initiated.



Figure 1: Illustration of the surgical procedure examination.



Figure 2: Radiographic union of the radial shaft fracture with bridging callus across three cortices.



Figure 3: Graph depicting the patient's forearm mobility.

At twelve months post-revision surgery, imaging confirmed successful healing of the radial shaft fracture with callus bridging across three cortical surfaces, indicating bony union (Figure 2). The patient regained complete thumb extension strength (MRC grade 5), and dynamic ultrasound verified proper tendon integrity. Wrist mobility showed near-normal function, with 130° of flexion-extension, only 10° less than the unaffected side (140°). Forearm rotation reached 160° *versus* 170° contralaterally during combined pronation and supination movements. With a QuickDASH score of 12, the patient demonstrated outstanding functional outcomes, nearing full recovery (Figure 3).

Intramedullary nailing is a low-key approach to fixing broken bones in the middle of long bones, perfect for cases such as fractures from accidents, weak bones requiring support system, or unusual fractures demanding solid interval support.³ The EPL tendon, a real workhorse that powers the hinge of thumb, is vital for thumb positioning and the development of strong, cup-like grips. Injury to this tendon adversely affects the ability to pinch or grip things delicately.⁴ It is quite shocking that the breakage of this tendon after a nailing procedure is not talked about more, with only 17 cases being reported. It is likely linked to the heat caused by drills at the tip and the chronic wearing down from the hardware that protrudes. Recent studies show that locking the nails inside the bone is a solid fix for forearm fractures, offering great results with high scores (Mayo Wrist score ≥ 80 in 85% of patients) and less hiccups (8.2% overall).⁵ In this specific situation, although the bone healed without nerves or blood vessels damage or infection, an unexpected tendon tear occurred because a screw was protruding more than 3 mm on the back side of the bone. This highlights the need for highly precise control of screws depth, especially when they pass through the third area where the EPL tendon lies. The future of this type of implant should see sleeker locking systems, better-fitting pathways, and the use of technology during surgery.

Even though intramedullary nailing is effective for holding together broken radius bones, doctors must remain alert to the potential complications that can arise during their surgery.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

JWL: Drafting, revision, data collection, analysis, and interpretation.

SKW: Data collection, editing of the manuscript, surgical operation, and methodological guidance.

Both authors approved the final version of the manuscript to be published.

REFERENCES

1. Liu JC, Huang BZ, Ding J, Mu XJ, Li YL, Piao CD. Minimally invasive treatment of forearm double fracture in adult using Acumed forearm intramedullary nail: A case report. *World J Clin Cases* 2021; **9(11)**:2595-601. doi: 10.12998/wjcc.v9.i11.2595
2. Kizilay YO, Turan K. Acute bilateral extensor pollicis longus tendon rupture following bilateral displaced distal radius fracture: A case report. *Acta Orthop Traumatol Turc* 2023; **57(1)**:46-9. doi: 10.5152/j.aott.2023.22105
3. Roth KM, Blazar PE, Earp BE, Han R, Leung A. Incidence of extensor pollicis longus tendon rupture after nondisplaced distal radius fractures. *J Hand Surg Am* 2012; **37(5)**:942-7. doi: 10.1016/j.jhssa.2012.02.006.
4. Ganon S, Bellity J, Zbili D, Boccara D. Reconstruction strategies after rupture of the extensor pollicis longus tendon: A systematic review. *Hand Surg Rehabil* 2020; **39(6)**:502-7. doi: 10.1016/j.hansur.2020.07.005.
5. Yaradilmis YU, Tecirli A. Successful results obtained in the treatment of adolescent forearm fractures with locked intramedullary nailing. *Chin J Traumatol* 2021; **24(5)**: 295-300. doi: 10.1016/j.cjtee.2021.05.006.

Jiawei Li¹ and Shaoke Wu²

¹Graduate School of Guangdong Medical University, Zhanjiang, China

²Orthopaedic Centre, the Affiliated Hospital of Guangdong Medical University, Zhanjiang, China

Correspondence to: Dr. Shaoke Wu, Orthopaedic Centre, the Affiliated Hospital of Guangdong Medical University, Zhanjiang, China
E-mail: 70675681@qq.com

Received: April 18, 2025; Revised: May 24, 2025;

Accepted: May 25, 2025

DOI: <https://doi.org/10.29271/jcpsp.2025.11.1497>

• • • • •