Cureus
Part of SPRINGER NATURE

Open Access Case Report

Pediatric Extensor Pollicis Longus Rupture After Distal Radius Fracture: A Case Report

Carson B. Twiss [1], Max Jiganti [1], Robert Umberhandt [2], Shelby Mills [3]

1. Orthopedic Surgery, Good Samaritan Regional Medical Center, Corvallis, USA 2. Pediatric Orthopedics, Mary Bridge Children's Hospital, Tacoma, USA 3. Orthopedic Surgery, Western University of Health Sciences, Lebanon, USA

Corresponding author: Carson B. Twiss, ctwiss@samhealth.org

Review began 05/21/2025
Review ended 06/19/2025
Published 07/22/2026

© Copyright 2026
Twiss et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.113165

Abstract

Extensor pollicis longus (EPL) tendon rupture is a significant complication following a distal radius fracture that is well reported in the adult patient population but rarely seen in the pediatric patient population. We present a delayed EPL tendon rupture in a skeletally immature patient with a minimally displaced distal radius fracture and aim to highlight the importance of prompt diagnosis and appropriate management of this uncommon complication. We report a case of a 14-year-old female who presented with a Salter-Harris type II fracture of the distal radius with 10 degrees of dorsal angulation. Following non-operative treatment with brace immobilization, the patient presented at four weeks with an atraumatic rupture of her EPL tendon. Subsequently, she underwent extensor indicis proprius (EIP) transfer. She underwent follow-up at two months, five months, and one year. Only two other cases of a delayed EPL rupture following a minimally displaced distal radius fracture in a skeletally immature patient managed non-operatively have been reported. This case illustrates a successful outcome in a pediatric patient managed with an EIP tendon transfer.

Categories: Pediatrics, Orthopedics
Keywords: extensor pollicus longus rupture, pediatric distal radius fracture, pediatric orthopedic surgery, salter harris type 2, tendon transfer

Introduction

Distal radius fractures are one of the most common musculoskeletal injuries, and the most common fracture type in the pediatric population [1]. Pediatric skeletal immaturity allows for significant bone remodeling to occur, and many of these fractures can be treated conservatively when operative criteria are not met. There is no clear consensus regarding operative criteria; however, some guidelines have suggested tolerances for non-operative management with up to 20 degrees of dorsal-volar angulation for kids older than 10 [2]. A rare complication of distal radius fracture includes extensor pollicis longus (EPL) rupture, reported in up to 5% of cases in adults [3-5]; however, this complication is rarely seen in the pediatric population [6,7]. A 2020 literature review found only one case of an EPL rupture in a minimally displaced distal radius fracture in a skeletally immature patient managed non-operatively [8]. A proposed mechanism of tendon rupture is due to attritional tears as the EPL passes over callus from healing fractures or from hardware that is prominent if surgical fixation is used. Risk factors for attritional EPL rupture in distal radius fractures include inflammatory conditions (e.g., rheumatoid arthritis), corticosteroid use, or surgical fixation with plating [4,9]. EPL rupture causes loss of extension of the thumb at the interphalangeal (IP) joint that, without surgical intervention, is not otherwise restored.

There are multiple methods of treatment for EPL rupture, including direct repair, tendon grafting, or tendon transfer. This study focuses on management of an atraumatic EPL rupture with tendon transfer of extensor indicis proprius (EIP) [10,11]. EIP tendon transfers have been shown to have high rates of patient satisfaction, and while there have been reports of patients with residual loss of strength with extension of the index finger following EIP transfer, this does not cause disruption to daily activities [12-15].

Few reports exist involving pediatric patients with delayed rupture of EPL following a distal radius fracture. Most studies involved either a significantly displaced fracture pattern or management with surgical fixation. Brooker et al. report a case series of nine pediatric patients who sustained EPL ruptures following dorsal entry flexible nailing of radial shaft fractures [16]. A study by Patel et al. reports a skeletally immature patient with an isolated EPL rupture following surgical fixation of a Salter-Harris II distal radius fracture [17]. To our knowledge, only two studies by Song et al. and Munaretto et al. involve a delayed EPL rupture following a minimally displaced, non-operatively managed Salter-Harris II fracture, though overall similar reports remain limited [8,18,19].

This case report of a pediatric patient with an EPL rupture after a conservatively treated Salter Harris II distal radius fracture aims to add to the paucity of literature surrounding this complication.

Case Presentation

How to cite this article
Twiss C B, Jiganti M, Umberhandt R, et al. (July 22, 2026) Pediatric Extensor Pollicis Longus Rupture After Distal Radius Fracture: A Case Report. Cureus 18(7): e113165. DOI 10.7759/cureus.113165

A 14-year-old female presented to the emergency department after falling off a horse and landing on her right arm. X-rays confirmed a Salter-Harris type II fracture of the distal radius with 10 degrees of dorsal angulation (Figure *1*), and the patient was reduced and splinted in the emergency department. The splint was then exchanged for a removable wrist brace at her first follow-up appointment. Four weeks later, the patient experienced a pop in her wrist when playing in the yard. She presented to the clinic several days later with the inability to extend the interphalangeal joint of her right thumb. X-rays were taken at that visit and revealed a healed fracture with dorsal callus formation (Figure *2*). The patient was diagnosed with an EPL tendon rupture, and the decision was made to proceed with surgical management for an EIP tendon transfer.



FIGURE 1: Initial injury films, anteroposterior (AP) and lateral views of the right wrist.



FIGURE 2: Plain films obtained in clinic at time of evaluation, when EPL rupture was diagnosed.

EPL, extensor pollicis longus

In the operative suite, a linear vertical incision over Lister's tubercle was made, and the EPL was found to be frayed proximally and adherent to surrounding tissue, with the distal stump just distal to Lister's tubercle. Dorsal incisions were made to identify and transect the EIP. With the wrist extended approximately 30 degrees and the thumb fully extended, the EIP was approximated to the distal aspect of the proximal EPL tendon limb using a Pulvertaft weave secured with 4-0 non-absorbable braided suture. The tenodesis exam was performed, confirming thumb IP joint extension with wrist flexion and thumb IP joint flexion with wrist extension (Figure 3). The patient was placed in a thumb spica cast.



FIGURE 3: Intraoperative photo demonstrating appropriate tenodesis effect, with extension of the thumb interphalangeal (IP) joint during passive wrist flexion.

The patient followed up in clinic for cast removal at four weeks and was transitioned to a removable Velcro brace, with instructions to continue bracing for an additional four weeks. Occupational therapy was started, and at two months, she noted significant subjective improvements as well as full thumb IP joint flexion and extension. Immobilization was discontinued at this time. At five-month follow-up after the tendon transfer surgery, the patient was using her thumb normally and had returned to her regular daily activities, including playing piano and participating in sports. A final follow-up was conducted via telemedicine conference one year out from surgery, and the patient was overall happy with the results from surgery; however, she reported no longer playing basketball due to wrist discomfort on the operative side.

Discussion

EPL rupture in a non-operatively managed distal radius fracture in a pediatric patient is a rare complication with few cases reported in the literature. This paper aims to present this rare complication in a patient without typical risk factors, the subsequent operative management, and a report of the outcomes. Given the dorsal callus formation seen both radiographically and intraoperatively, the proposed mechanism of this patient's EPL rupture was attritional compromise of the integrity of the tendon with repetitive sliding over the dorsal callus. It is possible the removable wrist brace provided to this patient at initial follow-up allowed more motion compared to cast immobilization, contributing to more callus formation and tendon irritation. While there is no literature we are aware of that addresses differences in callus formation between removable bracing or casting of pediatric distal radius fractures, the literature does support non-inferiority of bracing in minimally displaced fractures with less than 10 degrees of angulation [20].

Successful management of this complication relied on prompt recognition and surgical reconstruction. EPL rupture treatment with EIP tendon transfer has proven to be a successful treatment method, with well-reported patient satisfaction scores and return of strength and function following surgery [12-15]. While there are no specific recommendations in the literature regarding timing to surgical correction, successful outcomes have been reported in cases up to 15 months out from the initial injury [21]. Our patient underwent surgery with EIP tendon transfer within two months of the injury and had full return to activity three months after surgery with continued positive results one year out.

Conclusions

We propose that, while rarely reported in the literature, EPL rupture in conservatively managed distal radius fractures in the pediatric patient is a serious complication that requires surgical intervention to restore extension at the thumb IP joint. Further studies, such as a pediatric registry or multi-center study looking at a larger cohort of patients with this complication, could better identify common risk factors, management options, and outcomes.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Carson B. Twiss, Max Jiganti, Robert Umberhandt, Shelby Mills

Acquisition, analysis, or interpretation of data: Carson B. Twiss, Max Jiganti, Robert Umberhandt

Drafting of the manuscript: Carson B. Twiss, Max Jiganti, Shelby Mills

Critical review of the manuscript for important intellectual content: Carson B. Twiss, Max Jiganti, Robert Umberhandt

Supervision: Robert Umberhandt

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** Study won 2nd place "Resident Research" award at the Oregon Association of Orthopedic Surgeons conference in 2024 with a $500 prize awarded to the authors. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Rennie L, Court-Brown CM, Mok JY, Beattie TF: The epidemiology of fractures in children . Injury. 2007, 38:913-22. 10.1016/j.injury.2007.01.036
2. Truong WH, Howard AW, Georgiadis AG: Displaced distal radius fractures in children: to reduce or not to reduce? To pin or not to pin?. J Pediatr Orthop Soc North Amer. 2020, 2:2. 10.55275/JPOSNA-2020-77
3. McKay SD, MacDermid JC, Roth JH, Richards RS: Assessment of complications of distal radius fractures and development of a complication checklist. J Hand Surg Am. 2001, 26:916-22. 10.1053/jhsu.2001.26662
4. Khan IA, Varacallo M: Anatomy, Shoulder and Upper Limb, Hand Extensor Pollicis Longus Muscle . StatPearls, Treasure Island, FL; 2023.
5. 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, 37:942-7. 10.1016/j.jhsa.2012.02.006

6. Stahl S, Calif E, Eidelman M: Delayed rupture of the extensor pollicis longus tendon following intramedullary nailing of a radial fracture in a child. J Hand Surg Eur Vol. 2007, 32:67-8. 10.1016/j.jhsb.2006.08.017
7. Cheema TA, De Carvalho AF, Bosch P, Saleh E: Calamities of the extensor pollicis longus following wrist fractures in children. J Hand Surg Br. 2006, 31:578-9. 10.1016/j.jhsb.2006.04.025
8. Truong P, Kuklova K, Halpern A, Hunter M, Heidemann E, Stanziola F: Pediatric extensor pollicis longus tendon rupture after nondisplaced distal radius fracture: a literature review. Adv Orthop Sports Med. 2020, 2020:10.37722/AOASM.202041
9. Bogart R, Vidlock K: Ruptured extensor pollicis longus tendon after a nondisplaced distal radius fracture in a young adult soccer player. Clin J Sport Med. 2020, 30:e23-4. 10.1097/JSM.0000000000000708
10. 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, 39:502-7. 10.1016/j.hansur.2020.07.005
11. Wilbur D, Hammert WC: Principles of tendon transfer . Hand Clin. 2016, 32:283-9. 10.1016/j.hcl.2016.03.001
12. Altmann S, Damert HG, Schneider W: Results of extensor indicis transfer for reconstruction of the extensor pollicis longus tendon. Handchir Mikrochir Plast Chir. 2008, 40:153-5. 10.1055/s-2007-989388
13. Gelb RI: Tendon transfer for rupture of the extensor pollicis longus . Hand Clin. 1995, 11:411-22.
14. Sperati G, Ceri L: Transposition of the extensor indicis proprius (EIP) for inveterate post-traumatic rupture of the extensor pollicis longus (EPL) of the hand: 12 clinical cases. Acta Biomed. 2019, 90:147-51. 10.23750/abm.v90i12-S.8884
15. Stirling PH, Ng N, Duckworth AD, McEachan JE: Extensor indicis transfer improves function in patients after rupture of the extensor pollicis longus tendon. Hand Surg Rehabil. 2021, 40:343-6. 10.1016/j.hansur.2020.12.005
16. Brooker B, Harris PC, Donnan LT, Graham HK: Rupture of the extensor pollicis longus tendon following dorsal entry flexible nailing of radial shaft fractures in children. J Child Orthop. 2014, 8:353-7. 10.1007/s11832-014-0605-0
17. Patel HA, Lee MC, Chaudhry S: Extensor pollicis longus tendon rupture after a pediatric distal radius fracture: A case report and literature review. JBJS Case Connect. 2020, 10:e20.00022. 10.2106/JBJS.CC.20.00022
18. Song D, Evans R, Arneja JS: Delayed extensor pollicis longus tendon rupture following nondisplaced distal radius fracture in a child. Hand (N Y). 2013, 8:242-4. 10.1007/s11552-013-9494-9
19. Munaretto N, Clark NJ, Kakar S: Delayed extensor pollicis longus rupture after distal radius fracture in a pediatric patient. J Hand Microsurg. 2023, 15:240-1. 10.1055/s-0041-1727298
20. Boutis K, Willan A, Babyn P, Goeree R, Howard A: Cast versus splint in children with minimally angulated fractures of the distal radius: a randomized controlled trial. CMAJ. 2010, 182:1507-12. 10.1503/cmaj.100119
21. Noorda RJ, Hage JJ: Extensor indicis proprius transfer for loss of extensor pollicis longus function . Arch Orthop Trauma Surg. 1994, 113:327-9. 10.1007/BF00426181