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Case Report

# Flexor pollicis longus (FPL) tendon hypoplasia: A case report and literature review

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ABSTRACT

An 18-year-old female presented with long-standing inability to flex her left thumb. MRI of the left thumb revealed flexor pollicus longus (FPL) tendon hypoplasia, and subsequent ultrasound of the bilateral thumbs confirmed a left-sided hypoplastic FPL tendon. Structural integrity of the left FPL tendon was confirmed during surgical examination under anesthesia. Multiple congenital anomalies of the FPL have been described, but FPL tendon hypoplasia and its appearance on imaging are rarely reported. This case demonstrates the diagnosis of FPL tendon hypoplasia on MRI, ultrasound, and surgical examination under anesthesia; and demonstrates the importance of including this entity in the differential diagnosis for impaired thumb flexion.

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## Introduction

The flexor pollicus longus (FPL) muscle acts to flex the thumb at the interphalangeal joint and is innervated by the anterior interosseous nerve. Impaired function of the FPL can be caused by FPL tendon rupture, anterior interosseous nerve palsy, and congenital anomalies of the FPL [1,3].

## Case report

An 18-year-old, right-hand dominant, female presented with long-standing inability to flex her left thumb at the interphalangeal joint. She did not recall a history of recent, or remote prior, trauma. There was no pertinent history of connective tissue disorder, developmental, such as, radial-ray, anomaly, repetitive, or athletic activity. We suspected a chronic FPL tendon tear. An MRI of the left thumb was obtained and an intact, but markedly hypoplastic, FPL tendon was diagnosed (Fig. 1), measuring 1-2 mm in maximal cross-sectional diameter. There was absent tenosynovitis, peritendinous hemorrhage/edema, or muscle strain to suggest recent injury.

Based on the discordant MRI and physical examination results, a subsequent ultrasound (Fig. 2) of the bilateral thumbs was performed, confirming an intact, but hypoplastic, left-sided FPL tendon, measuring 1-2 mm in maximal diameter, and without associated tenosynovitis, soft tissue

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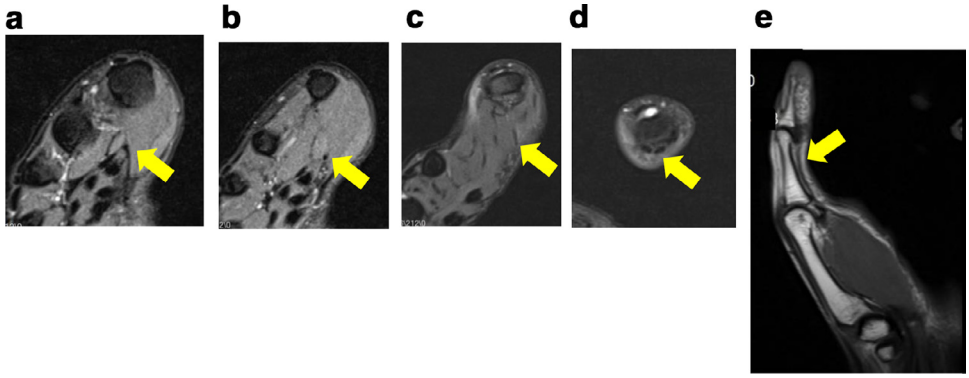


**Fig. 1 – Sequential axial, T2 weighted, fat saturated (a-d) and sagittal T1 weighted (e) MRI images of the thumb demonstrates a markedly developmentally hypoplastic FPL tendon (yellow arrows), measuring 1-2 mm in cross-sectional diameter, without evidence of tear. "(Color version of figure is available online.)"**

edema/hemorrhage, concordant with the preceding MRI. Ultrasound of the right FPL tendon, which measured 3-4 mm in diameter, was performed for purposes of comparison.

Surgical examination under anesthesia of the left thumb was performed and revealed an intact, hypoplastic FPL tendon, presumably with developmentally absent innervation. The structural integrity of the tendon was confirmed by pulling on the FPL, as depicted in Fig. 3. No surgical augmentation or repair of the FPL tendon was performed. Based upon these results, EMG evaluation and determination of atrophy or hypoplasia of the FPL muscle was recommended to the patient and is currently pending.

## Discussion

Congenital anomaly of the FPL tendon is a rare but important cause of impaired thumb flexion [2]. Uchida et al categorized congenital FPL anomalies into the following types: absence, anomalous insertion, abnormal connection, and malposition [3]. Furthermore, these can be further classified based on severity, other associated anomalies, and affected site of the flexor pollicis longus [3]. A survey of current literature revealed multiple cases of unilateral and bilateral congenital absence of the FPL were reported [3–7]. Other developmental variations, such as anomalous insertion of the FPL tendon and anomalous fibrous connections between the FPL tendon and other tendons, were also documented in a number of cases [3,8–12]. However, FPL tendon hypoplasia is seldom reported and was not included in the above categorization. Only 2 cases discussed FPL tendon hypoplasia, and of those, only the report by Alicioglu documented imaging, including MRI and ultrasound findings [2,13]. Furthermore, neither case demonstrated surgical correlation.

We present an additional instance of this rare developmental variation. In our case, we did not come to a conclusion

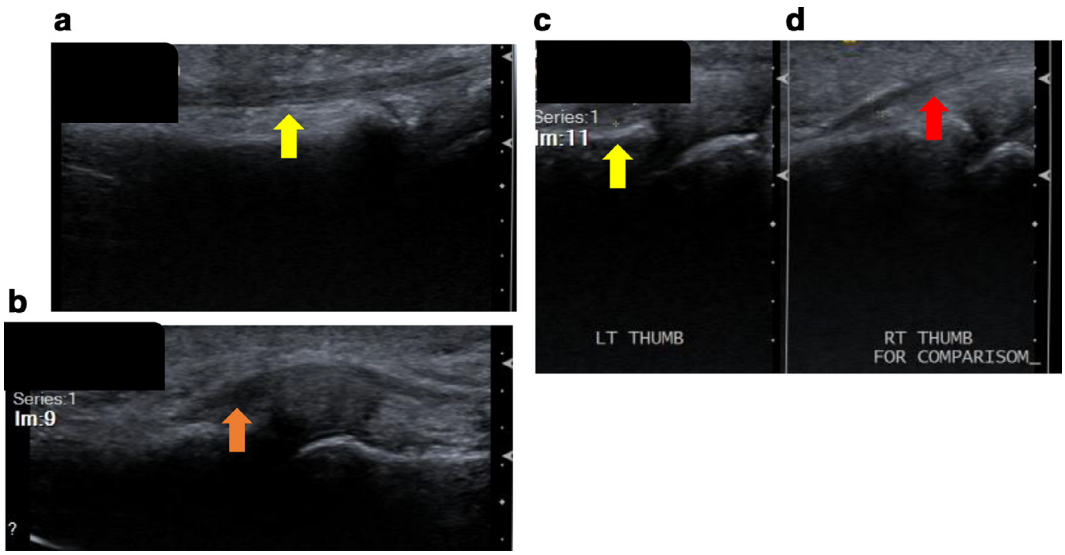


**Fig. 2 – Ultrasound of the hypoplastic, left FPL tendon: (a) left FPL tendon at the level of the first metacarpal, demonstrating a hypoplasia (yellow arrow), without tear or tenosynovitis; (b) at the first interphalangeal joint, showing the normal insertion (orange arrow); (c) a hypoplastic left FPL (yellow arrow, 1-2 mm in thickness), vs (d) a normal right FPL tendon (red arrow), 4 mm in thickness. "(Color version of figure is available online.)"**

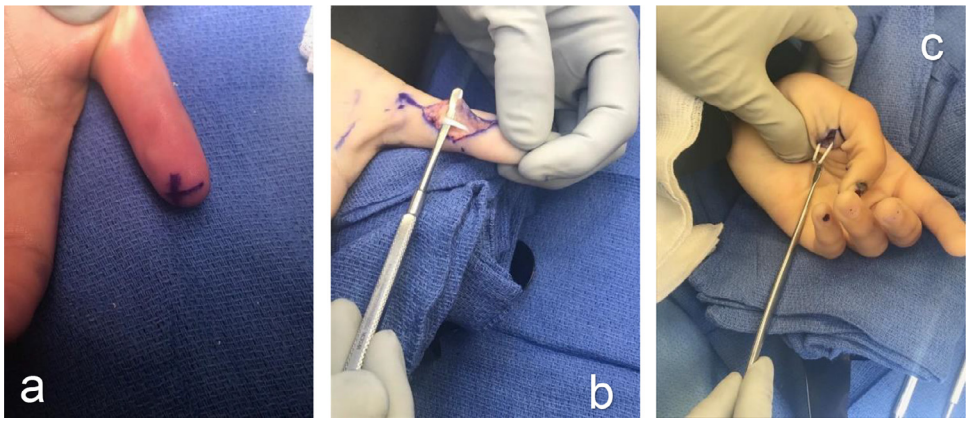


**Fig. 3 – Surgical examination under anesthesia, left thumb: (a) absence of skin creases suggests underlying developmental abnormalities; (b) the hypoplastic FPL tendon is isolated and the absence of a tear is confirmed; (c) applying traction to the tendon results in flexion of the IP joint, confirming structural integrity of the tendon. "(Color version of figure is available online.)"**

based on MRI and ultrasound findings alone, so we proceeded with surgery of the left thumb under the assumption of a FPL tendon rupture which was not apparent on imaging, possibly due to chronicity.

Intraoperatively, we discovered an intact hypoplastic FPL tendon which produced flexion at the interphalangeal joint of the thumb when pulled. Altogether, this unique case confirmed the diagnosis of FPL tendon hypoplasia due to developmentally absent innervation.

FPL tendon hypoplasia and FPL tendon rupture can present similarly with isolated impairment of thumb flexion. As such, FPL tendon hypoplasia can be mistaken for FPL tendon rupture and vice versa. Importantly, our case documents the appearance of FPL tendon hypoplasia on MRI and ultrasound, which can help to distinguish between the two diagnoses without the involvement of surgery. Accordingly, radiologists should include FPL tendon hypoplasia on the differential diagnosis for impaired thumb flexion and be able to recognize its appearance on imaging.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2019.02.014.

## REFERENCES

[1] Chaudhary V, Sehgal H, Bano S, Parmar PR, Kumar S. Bilateral congenital absence of flexor pollicis longus with thumb hypoplasia and thenar atrophy. Indian J Radiol Imaging 2014;24(3):268–70. http://doi.org/10.4103/0971-3026.137044.

[2] Alicioglu B. Radiologic findings of the flexor pollicis longus hypoplasia. Skelet Radiol, 2006;36(S1):120–3. http://doi.org/10.1007/s00256-006-0187-0.

[3] Uchida M, Kojima T, Sakurai N. Congenital absence of flexor pollicis longus without hypoplasia of thenar muscles. Plastic Reconstr Surg 1985;75(3):413–16. http://doi.org/10.1097/00006534-198503000-00021.

[4] Demirseren ME, Afandiyev K, Durgun M, Kilicarslan K, Yorubulut M. Congenital absence of flexor pollicis longus tendon without associated anomalies of thumb hypoplasia: a case report and review of the literature. Hand 2007;2(4):184–7. http://doi.org/10.1007/s11552-007-9045-3.

[5] Suresh SS, Abraham R, Kumar SS. Absent flexor pollicis longus: case report with review of literature. Hand 2009;4(1):74–7. http://doi.org/10.1007/s11552-008-9106-2.

[6] Köster G. Isolated aplasia of the flexor pollicis longus: a case report. J Hand Surg 1984;9(6):870–1. http://doi.org/10.1016/S0363-5023(84)80069-6.

[7] Shamsian N, Exton R, Shibu MM. Reconstruction of a congenitally absent flexor pollicis longus in an adult. Can J Plastic Surg 2010;18(4):143–4. https://doi.org/10.1177/229255031001800408.

[8] Blair WF, Orner GE. Anomalous insertion of the flexor pollicis longus. J Hand Surg 1981;6(3):241–4. https://doi.org/10.1016/S0363-5023(81)80077-9.

[9] Hagan HJ, Idler RS. Limitation of thumb flexion due to an unusual insertion of the flexor pollicis longus. J Hand Surg 1988;13(4):474–6. https://doi.org/10.1016/0266-7681(88)90184-2.

[10] Nakamura J, Kubo E. Bilateral anomalous insertion of flexor pollicis longus. J Hand Surg 1993;18(3):312–15. https://doi.org/10.1016/0266-7681(93)90049-L.

[11] Salama R, Weissman SL. Congenital bilateral anomalous band between flexor and extensor pollicis longus tendons: report of a case. Hand 1975;7(1):25–6. https://doi.org/10.1016/0072-968X(75)90030-3.

[12] Fitch RD, Urbaniak JR, Ruderman RJ. Conjoined flexor and extensor pollicis longus tendons in the hypoplastic thumb. J Hand Surg 1984;9(3):417–19. https://doi.org/10.1016/S0363-5023(84)80234-8.

[13] Sivrioglu N. Advanced hypoplasia of the flexor pollicis longus tendon in twins. J Clin Anal Med 2013;4(140):467–9.