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Spontaneous, isolated rupture of the flexor digitorum superficialis tendon in zone II and annular pulley ruptures

Dear Sir,

A 29-year-old right-hand dominant healthy man who was employed as an animal nurse attempted to restrain a large dog involved in an altercation. Afterwards, he noticed local pain and an inability to flex the right ring finger at the proximal interphalangeal joint, which was confirmed on clinical examination 10 days later. An MRI demonstrated an intra-substance disruption of the flexor digitorum superficialis (FDS) tendon near the distal insertion, with concomitant ruptures of the A2, A3, and A4 pulleys (Figure 1A).

A standard zigzag Bruner incision was made over the ring finger to identify the flexor apparatus. The

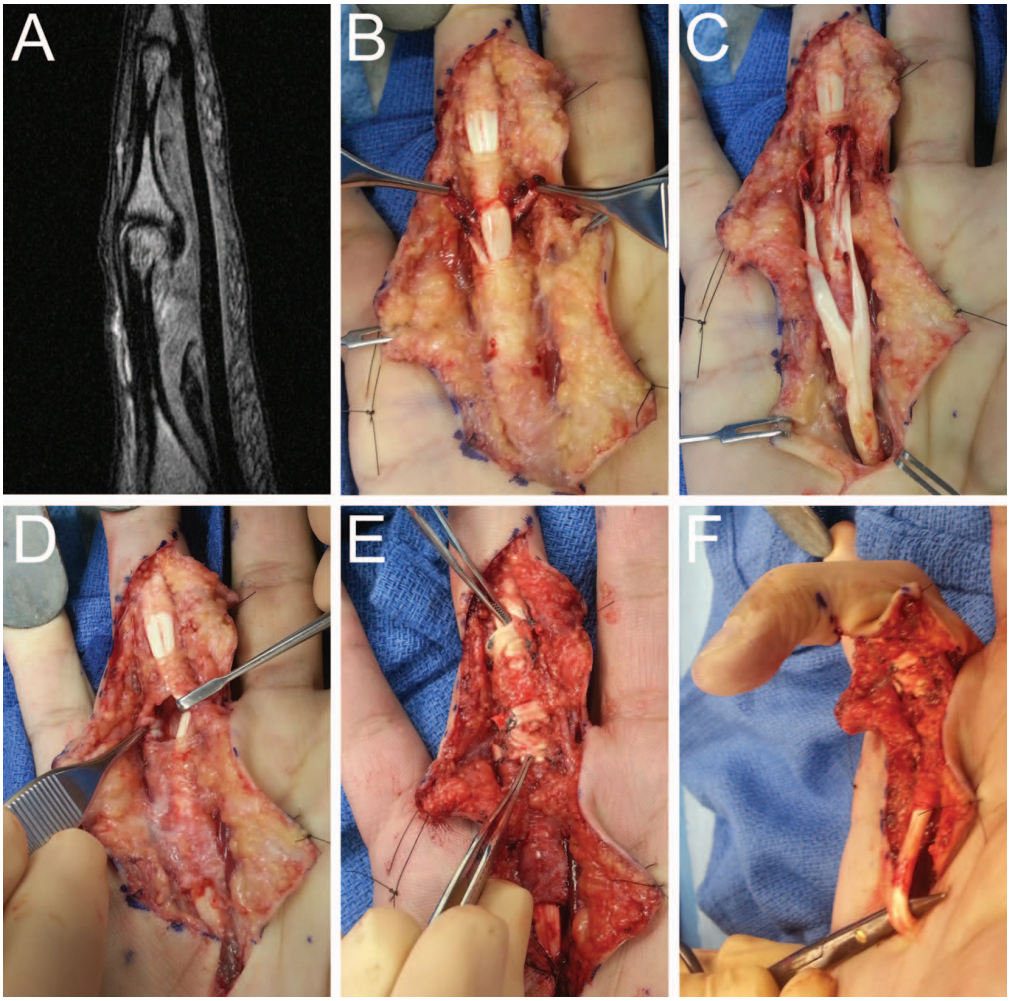

Figure 1. (A) MRI of the ring finger showing disruption of the FDS tendon in zone II and palmar displacement of the FDP consistent with pulley disruption. (B) Intra-operative photograph showing ruptured FDS tendon in zone II with A2, A3, and A4 pulley ruptures. (C) FDS tendon placed superficial to the flexor pulley apparatus and harvested. (D) FDP tendon retracted to demonstrate the remaining rim. (E) After pulley reconstruction. (F) Demonstration of the absence of bowstringing with FDP retraction.

scar tissue that had formed over the flexor tendons was removed, and the A2, A3, and proximal A4 pulleys were found to be ruptured, as were both slips of the FDS tendon proximal to their distal insertions. The entire FDS tendon was harvested to serve as a graft for pulley reconstruction. The A2 pulley was reconstructed using one half of the FDS tendon secured to the remaining rim of the pulley. The other half of the FDS tendon was used to reconstruct the A3 and A4 pulleys in a similar fashion (Figure 1B–F).

Rehabilitation began 4 days post-operatively using tendon gliding exercises to regain active range of motion with avoidance of strengthening until 6 weeks after surgery. Active motion of the operative digit at 9 months after operation was metacarpophalangeal joint, 0–90°; proximal interphalangeal joint, 0–90°; and distal interphalangeal joint 0–50°, with a tip-to-palm distance of 11 mm. He returned to work without limitations.

Flexor tendon ruptures have been termed "spontaneous" when they occur within the tendon itself and are not directly related to intrinsic or extrinsic pathological processes (Boyes et al., 1960). Bois et al. (2007) summarized reports on spontaneous tendon ruptures and identified 50 such cases. There was an isolated rupture of the flexor digitorum profundus (FDP) tendon in 82% of cases, with 80% of all ruptures occurring in the palm at the location of the lumbrical muscle origin (zone III). Only 14% of ruptures occurred in zone II. They found only 12% of cases to be isolated FDS injuries and none occurred in zone II. The combination of an isolated rupture of the FDS tendon in zone II with multiple closed ruptures of tendon sheath pulleys would appear to be unique.

Closed flexor pulley injuries are relatively uncommon injuries, with data on aetiologies and outcomes limited to case reports and small case series (Dy and Daluiski, 2013). The typical mechanism is a rapidly applied extension force to an acutely flexed digit. Partial or single pulley ruptures can be managed conservatively with immobilization and taping (Schöffl and Schöffl, 2006). When multiple pulleys are involved, surgical repair is indicated. Options include primary repair, encircling techniques in which the graft is looped around the phalanx, or non-encircling techniques with a graft woven into the remnant of the pulley rim (Dy and Daluiski, 2013; Schöffl and Schöffl, 2006). Our non-encircling interweave repair technique using an FDS autograft to reconstruct the A2, A3, and A4 pulleys was an effective treatment approach that provided good range of motion at the latest follow-up.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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