

Unclassified Avulsion Injury of the Flexor Digitorum Profundus Tendon

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Abstract Traumatic avulsions of the flexor digitorum profundus tendon are usually presented in young adults engaged in athletic activities like football. Increased attention to injuries acquired during this form of activity is suggested. In this report the authors present a case of pure avulsion of the FDP with tendon retraction to the level of PIP (type II) and concomitant transverse fracture to distal phalanx secondary to injury during motor cycle accident.

Keywords: avulsion fracture, flexor digitorum profundus

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1. Introduction

Traumatic avulsions of the flexor digitorum profundus tendon are well known injuries that have been classified into 6 types [1,2] usually presented in young adults engaged in athletic activities, In this report the authors present a case of pure avulsion of the FDP with tendon retraction to the level of PIP (type II) and concomitant transverse fracture to distal phalanx secondary to injury during motor cycle accident, a case that was not presented in literature before.

Prompt recognition and surgical repair of FDP avulsions are critical in obtaining optimal return of function of DIP joint and avoiding long-term sequelae associated with these injuries.

2. Case Presentation

A 32-year-old, right-handed man who had motor cycle accident he was sitting behind the driver and

During the accident he grabs the driver forcefully with the tips of his fingers trying to hold himself from fall.



Figure 1. preoperatively

The patient presented to the emergency department with pain and tenderness over the volar aspect of the left ring finger, which was neurovascularly intact, mild ecchymosis was noted. He was unable to flex the DIP joint of his ring finger (Figure 1). In the resting position, there was fullness at the volar aspect of the PIP joint, with tenodesis of the ring finger when the hand was in extension.



Figure 2. Anterior plain radiographs of the injury taken at presentation

The X-rays revealed a displaced transverse fracture of the distal phalanx but no avulsion fragment was identified in the lateral view (Figure 2 & Figure 3). The need for surgery, risks and complications, postoperative splinting and occupational therapy and the prognosis were discussed, and surgery was performed the same day of presentation. A K-wire was used to fix the transverse fracture of the distal phalanx, keeping the DIP joint free to start early protected motion (Figure 4). The retracted flexor tendon was identified during the exploration through a Bruner incision at the level of the PIP joint without an osseous fragment (Figure 5). The periosteum was elevated in preparation of the region of

reinsertion of the tendon, a transverse dorsal incision at a point just less than 50% the distance between the DIP joint and a point half the distance to the nail to prevent inadvertent injury to the germinal matrix is made and two holes are drilled. A double-arm 3/0 polypropylene suture is passed through the tendon and the base of distal phalanx, and is tied dorsally. Both incisions are closed, leaving the repair entirely internal **Figure 6**, **Figure 7** & **Figure 8**.



Figure 3. oblique plain radiographs of the injury taken at presentation



Figure 4. lateral plain radiographs of the injury taken postoperatively



Figure 5. Intra operative picture showing the avulsed tendon



Figure 6. Post operative picture



Figure 7. Anterior plain radiographs of the injury taken postoperatively



Figure 8. lateral plain radiographs of the injury taken postoperatively

3. Occupational Therapy

The patient hand splinted with the IP joint in extension, the MCP joint in 90 degree flexion and the wrist in 30 degree of flexion. the k wire removed after 5 week.

After surgery, early motion in Kleinert splint was started .at the last follow-up 9 months postoperatively with normal total active range of motion of distal interpharangeal joint.

4. Discussion

Avulsion injury of FDP from insertion at base of distal phalanx is considered a Zone I flexor tendon injury, the Ring finger involved in ~75% of cases [3,4], because during grip the ring fingertip is 5 mm more prominent than other digits in ~90% of patients, this type of injury most of the time happens when the ring finger is exposed to greater average force than other fingers during pull-away where the muscle belly of FDP is in maximal contraction during forceful DIP extension as in this case.

Six types have been described in the literature [5].

The first three types were classified by Leddy and Packer in 1977 [7].

Type I: is avulsion without fracture with tendon retraction to the palm outside the fibro-osseous tunnel; the vincula longus and brevis are ruptured. Type II: avulsion, a small fragment of bone is avulsed with the tendon, which retracts to the level of the proximal interphalangeal joint; the long vinculum usually remains intact. Type III: the avulsed tendon attached to a large bony fragment that becomes caught in the A4 pulley at the DIP preventing further retraction. Both vincula remain intact. Type IV avulsion was first described by Robin and Dobyns in 1974. In 1981, Smith proposed that they be included in the Leddy and Packer classification. Type IV as type III but with simultaneous avulsion of the tendon from the bony fragment hence it is two injuries, type V (2001), VI (2004) was proposed by Al-Qattan [5,6]. Type V is as type III but with concomitant fracture of distal phalanx, type VI: is when you have missed avulsed bony fragment, type 3, 4 & 5

are further divided into subgroup a (extraarticular) or b (intraarticular) fracture of distal phalanx.

Type I, IV must be repaired early within 10 days, type II repair is possible within few weeks, type III possible within few months in general if the fracture is intraarticular it is recommended to repair it early to prevent joint incongruity and later osteoarthritis.

The current case reports do not match any of the previous types mentioned above. And it can be described as type II with associated extraarticular fracture of the distal phalanx or type (IIb). However, the treatment is the same as type II except that the distal phalanx needs to be fixed.

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