ABSTRACT

Avulsion of the flexor digitorum profundus (FDP) and superficialis (FDS) tendons in the same finger as a result of closed trauma is very rarely seen. Here in, the radiological and functional results of 59-year-old male patient treated for avulsion fracture of the FDS tendon combine with avulsion of the FDP tendon in the 4th finger as a result of closed trauma are presented.

Key words: Flexor digitorum superficialis, flexor digitorum profundus, avulsion

Introduction

Closed flexor tendon ruptures develop as a result of traumatic avulsion, spontaneous midsubstance rupture, wear-related rupture, infiltrative tenosynovial rupture, or iatrogenic mechanisms [1]. Flexor tendon avulsions are seen mostly in males and athletes [2]. They develop as a result of forces pushing to extension during maximum active flexion of the finger [3]. Although they may be seen in all the fingers, they are generally (75%) seen in the 4th finger flexor digitorum profundus. Closed traumatic avulsion of the flexor digitorum profundus (FDP) and flexor digitorum superficialis (FDS) together in the same finger is very rarely observed [1]. The aim of this paper was to present the radiological and functional results of a 59-year-old male patient treated for FDP and FDS avulsion in the 4th finger which developed as a result of closed trauma.

Case Report

A 59-year-old male presented at the Emergency Department with complaints of pain and swelling in the 4th finger of the left hand following a fall when he was holding a rope attached to a cow, which suddenly pulled away. The 4th finger of the left hand was swollen and ecchymotic and in extension. Passive movements of the proximal interphalangeal (PIP) joint and the distal interphalangeal (DIP) joint were painful and restricted and there was no active movement. The neurovascular examination was evaluated as normal. PA and lateral

Ibrahim Avsin Ozturk\(^1\), Mehmet Baydar\(^2\), Ahmet Kose\(^1\), Osman Orman\(^2\), Kahraman Ozturk\(^2\)

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Radiographs were taken of the 4th finger. On the direct radiograph a midphalanx avulsion fracture extending to the joint was seen. Surgical treatment was applied for the avulsion fracture showing intra-articular extension and the FDS and FDP tendon avulsion. When entry was made with a volar z-plasty incision, the FDS was observed to be avulsed together with a bone fragment at the attachment area in the midphalanx. After preparation of the fracture ends, osteosynthesis was applied with a phalanx plate. The type 2 FDP tendon avulsion was repaired with a pull-out suture (Figures 1 and 2). Perioperatively, PIP and DIP joint range of movement was obtained. A short-arm brace was applied with the fingers and wrist in flexion for 4 weeks. On the 5th day...
postoperatively, exercises were started with the modified Duran method. In the 5th week, the brace was removed. At the 6-month follow-up examination, full range of DIP and PIP joint movement was observed (Figure 3). Hand grasp powers were measured as left hand 30 kg and right hand 32 kg (SAEHAN Hydraulic Hand Dynamometer (SH5001), Gyeongnam, South Korea). The patient had no subjective complaints.

**Discussion**

FDP terminal avulsions generally occur during sporting activities. They are often seen in males and in the 4th finger. Isolated FDP traumatic avulsions are usually seen at the insertion point and often occur in zone 2. FDS traumatic avulsions are seen less often than FDP avulsions and occur most in the 3rd and 4th fingers. Isolated FDS avulsions usually occur in the tendon origin and the musculotendinous junction. In the case presented here, the FDS was seen to be avulsed together with a bone fragment at the attachment site. Very few cases have been reported in literature of traumatic avulsions of the FDS and FDP together [1-3].

FDP avulsion injuries are separated into 3 types. In type 1, the tendon is retracted as far as within the palm. In type 2, a small bone fragment is at the level of the PIP joint associated with being caught in the A3 pulley. In type 3, retraction occurs as far as the distal midphalanx due to a large bone fragment caught in the A4 pulley [1]. In the current case, there was type 2 avulsion fracture. In the FDS tendon, there was an avulsion with a fragment showing intra-articular extension at the midphalanx insertion point. Even if the etiology is different, the trauma mechanism is similar. Just as there could be isolated tendon rupture as a result of excessive extension applied to the DIP and PIP joints forced into flexion, avulsion can occur together with a bone fragment relative to the severity of the trauma. As FDS traumatic avulsions are rarely observed, there is no classification report [4]. FDP avulsion injuries with concomitant injury of FDS can be considered as a new type (type IV).

In cases of closed traumatic avulsion fracture and ruptures of the FDS and FDP tendons together, surgical treatment and early postoperative physiotherapy must be applied. In the surgical treatment, primary repair or repair with graft is applied [5,6]. Primary repair is almost impossible in cases of wear-related ruptures and infiltrative ruptures. In these cases, treatment with single or staged graft is recommended [7]. There is, however, no consensus for closed traumatic ruptures [6]. In the current case, pull-out suture was applied to the FDP avulsion and a phalanx plate was applied to the FDS avulsion which included a bone fragment. As the number of cases reported in literature increases, it could be possible to reach a consensus on classification and the treatment to be applied.

On the 5th day after primary treatment, passive movements were started with the modified Dunn method. From the 5th week, active movements were started. With the surgical treatment and physiotherapy applied to this patient, full range of joint movement was achieved in the early stage.

**Conclusion**

With stable fixation and early physiotherapy, very good results can be obtained in the primary treatment of FDP and FDS traumatic avulsions, which are an uncommon occurrence together.

**Conflict of Interests**

The authors have no conflict of interests to declare.

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