CASE REPORT

Irreducible dorsal dislocation of the distal interphalangeal joint

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Introduction

Dislocations of the distal interphalangeal (DIP) joint are very uncommon injuries. The DIP joint is firmly supported by the flexor digitorum profundus (FDP) tendon, extensor tendon, palmar plate and collateral ligaments. Nevertheless, there are several reports of dorsal dislocation of the DIP joint. However, this injury in which the distal end of the middle phalanx became entrapped in a longitudinal split in the FDP tendon is extremely rare, and, to our knowledge, has only been reported once. We encountered a case demonstrating this rare pattern. We report this rare dislocation of the DIP joint.

Case report

A 14-year-old adolescent girl sustained hyperextension injury of the right middle finger while playing softball. She presented to the emergency room complaining of pain and swelling of the DIP joint as well as a laceration over the flexion crease (Fig. 1). Examination and radiologic evaluation demonstrated an open dorsal dislocation of the DIP joint of the middle finger (Fig. 2). The digit was neurovascularly intact. An attempted closed reduction under digital block failed, and she underwent surgery for open reduction, debridement, and irrigation. The condyles of the middle phalanx were found to have split the FDP tendon and become entrapped in a buttonhole in the tendon (Fig. 3). The dorsally dislocated volar plate easily relocated and did not prevent reduction. The longitudinal split in the tendon was sutured (Fig. 4); however, it was not necessary for the volar plate to be repaired. The DIP joint was splinted to prevent hyperextension for 3 weeks. Ten weeks after surgery, she returned to playing softball. At 2-year follow-up, she was still playing softball and the range of motion of her DIP joint was 5–45° (Fig. 5).

Figure 1 Middle phalanx condyles were seen through the laceration over the flexion crease at the distal interphalangeal joint.
Dislocation of the DIP joint is a rare injury due to the inherent stability provided by the strong collateral ligaments, palmar plate, and tendinous insertions. DIP joint dislocations are usually the result of hyperextension at the DIP joint. Furthermore, such dislocations are often open injuries, due to the tightness of the skin and surrounding soft tissues in this area.\textsuperscript{3,4} Dorsal dislocations of the DIP joint are usually reducible by closed methods. Rarely, however, these injuries may be irreducible, requiring open reduction.

Four causes of irreducible dorsal dislocation of the DIP joint have been described. Four causes are (1) entrapment of the flexor digitorum profundus (FDP) tendon behind one condyle of the middle phalanx,\textsuperscript{1,2,5,7–9} (2) palmar plate

\textbf{Discussion}

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avulsion off the middle phalanx with interposition in the joint,\(^5\)–\(^8\) (3) buttonhole tear through the palmar plate,\(^10\) and (4) the distal end of the middle phalanx entrapped in a longitudinal split in the FDP tendon.\(^4\) There is only one report describing this type of DIP dislocation (4). We have encountered a case showing this type (4) dislocation of the DIP joint. This is the second report of the distal end of the middle phalanx becoming entrapped in a longitudinal split in the FDP tendon.

Radiologic evaluation is important in the diagnosis of this entity. With FDP interposition, there is ulnar or radial dislocation of the distal phalanx as well, depending on which condyle has been trapped by the tendon.\(^1\)–\(^2\),\(^5\)–\(^7\),\(^9\) Straight dorsal dislocation on plain X-ray has been considered to indicate that reduction is blocked by either palmar plate interposition or buttonholing through the palmar plate.\(^5\)–\(^8\),\(^10\)

In our case, radiography showed straight dorsal dislocation, and it was apparent that dislocation of the DIP joint was caused by a buttonhole entrapment in the FDP tendon detected intraoperatively. Open reduction was performed easily, and stability of the DIP joint was obtained by suturing the FDP tendon. The patient was followed by early active and passive range of motion exercises; she regained good functional results and returned to playing softball.

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