Irreducible volar dislocation of the proximal interphalangeal (PIP) joint: A case report

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R Cartotto. Irreducible volar dislocation of the proximal interphalangeal (PIP) joint: A case report. Can J Plast Surg 1995;3(1):49-50. Volar dislocation of the proximal interphalangeal (PIP) joint is an uncommon injury. Typically, one condylar head of the proximal phalanx perforates the extensor mechanism, thus becoming entrapped in a 'buttonhole'. Closed reduction is frequently unsuccessful due to the presence of extensor mechanism trapped within the joint, necessitating surgical reduction. This case report describes an irreducible volar PIP joint dislocation, which required open reduction. At operation, the classic pathologic disruption was identified and repaired.

Key Words: *Open reduction, Proximal interphalangeal (PIP) joint, Volar PIP dislocation*

Dislocation plantaire irréductible de l'articulation interphalangienne proximale : Rapport de cas

RÉSUMÉ : La dislocation plantaire de l'articulation interphalangienne proximale est peu commune. De façon typique, une tête condylienne de la phalange proximale perce le mécanisme extenseur, et se retrouve alors coincé en «boutonnière». La réduction fermée est souvent inutile à cause du mécanisme extenseur coincé dans l'articulation qui nécessite une réduction chirurgicale. Ce rapport de cas décrit une dislocation plantaire irréductible de l'articulation interphalangienne proximale qui a nécessité une réduction ouverte. Lors de la chirurgie, l'anomalie classique a été confirmée et réparée.

A healthy 18-year-old male student presented to the emergency department after sustaining an injury to the right long finger while playing football. He described forced hyperflexion and axial compression of the digit when he fell on his own hand. On examination, the digit was grossly deformed with a volar and radial dislocation at the proximal interphalangeal (PIP) joint (Figure 1). An attempt at closed reduction under digital block produced only partial correction. The PIP joint remained subluxed volarly, with a 40° extension lag, and marked rotational deformity (Figure 2). Further attempts at closed reduction, by application of gentle traction with the metacarpophalangeal (MCP) and PIP joints flexed, were unsuccessful. The patient was taken to the operating room for open reduction. A final attempt at closed reduction under general anaesthesia failed.

Through a curvilinear ulnar mid axial incision, the ulnar condylar head of the proximal phalanx was found to be herniated through a large tear in the extensor mechanism between the intact central slip and the ulnar lateral band. The lateral band had subluxed anteriorly over the volar flare of the condylar head, with the distal lateral band rerouted through the PIP joint as it merged with the extensor mechanism distally (Figure 3). The ulnar collateral ligament was also ruptured. The lateral band was gently liberated from the joint, resulting

in immediate relocation of the finger (Figures 4 and 5). The lateral band was sutured to the central slip with interrupted 4-0 Dacron, and the PIP joint remained stable through full passive range of motion. There was no lateral instability and therefore the collateral ligament was not repaired. The wound was closed and the digit was immobilized in extension. The patient was subsequently managed one week later with a dynamic extension splint, and has regained full range of motion at the PIP joint.

DISCUSSION

Volar dislocation of the PIP joint is relatively uncommon. The mechanism of injury involves a combination of valgus or varus force, with flexion and axial compression on the digit (1). One collateral ligament ruptures and as the middle phalanx is forced volarly, part of the volar plate tears, on the side of the ruptured collateral ligament. As the middle phalanx is forced further in a palmar direction, the condylar head of the proximal phalanx ruptures through the extensor apparatus, usually between the central slip and the lateral band (1,2). While Spinner (3) maintains that the central slip tears, this case and others (1,4) suggest that this does not always happen. Finally, the lateral band on the side of the injury subluxes volarly over the volar flare of the condylar head, thus becoming entrapped within the joint. Effectively, the involved condylar head becomes trapped in a 'button hole'

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Figure 1) *Volar and radial dislocation of proximal interphalangeal (PIP) joint*

Figure 2) *Failed closed reduction with persistent PIP joint subluxation*

Figure 3) *Herniation of ulnar condylar head through extensor mechanism*

fashion (1,3-5). It is this trapped lateral band that blocks reduction. Less often, the central slip can become entrapped, similarly blocking reduction (3).

Attempts at reduction by simple traction only tighten the 'noose' encircling the herniated condylar head (1). The preferred method of closed reduction involves applying gentle traction with the MCP and PIP joints flexed, to relax the volarly subluxed lateral band (1).

With an entrapped extensor mechanism, closed reduction is usually unsuccessful, necessitating surgical intervention. The mid axial incision on the side of the injured collateral ligament provides good exposure. Gentle liberation of the entrapped extensor apparatus results in immediate reduction of the joint (1). Repair of the collateral ligament is controversial, but the rent in the extensor apparatus should be sutured (1,3,5). The PIP joint is then immobilized in extension for five to seven days, and then early motion with a dynamic extension splint is initiated (1). Complications of this injury include recurrent dislocation and chronic PIP joint pain and stiffness.

REFERENCES

1. Dray GJ, Eaton RG. Dislocations and ligament injuries in the digits. In: Green DP, ed. *Operative Hand Surgery*, 2nd edn. New York: Churchill Livingstone, 1988:777-804.
2. Murakami Y. Irreducible volar dislocation of the proximal interphalangeal joint of the finger. *Hand* 1974;6:87-9.
3. Spinner M, Bok YC. Anterior dislocation of the proximal interphalangeal joint. *J Bone Joint Surg* 1970;52A:1329-36.
4. Posner MA, Wilenski M. Irreducible volar dislocation of the proximal interphalangeal joint of a finger caused by interposition of an intact central slip. *J Bone Joint Surg* 1978;60A:133-4.
5. Johnson FG, Greene MH. Another case of irreducible dislocation of the proximal interphalangeal joint of a finger. *J Bone Joint Surg* 1966;48A:542-4.

Figure 4) *Ulnar lateral band (in forceps) mobilized from under volar flare of condyle*

Figure 5) *Ulnar lateral band reapproximated to central slip with relocation of joint*