

# Treating Proximal Interphalangeal Joint Dislocations



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## KEYWORDS

• PIP joint • Dislocation • Volar plate • Irreducible

## KEY POINTS

- Proximal interphalangeal (PIP) joint dislocations are a common hand injury, especially in the athlete, and have good outcomes if treated properly.
- Soft tissue interposition can prevent concentric reduction and is an indication for acute surgical intervention.
- Prolonged splinting or self-immobilization can lead to PIP joint contracture.
- Subluxation or neglected dislocations typically require open reduction and stabilization.

## INTRODUCTION

Dislocations of the proximal interphalangeal (PIP) joint are among the most common injuries of the hand, particularly in athletes.<sup>1</sup> In a study of hand injuries in the National Football League, the incidence of PIP joint dislocations was second only to metacarpal fractures.<sup>2</sup> These finger dislocations are often treated by onlookers, athletic trainers, and emergency department personnel, often without oversight or intervention by a hand surgeon.<sup>3,4</sup> Outcomes can vary from minimal disability to contracture, deformity, or chronic subluxation. This article defines the epidemiology, etiologic factors, and nonoperative and operative management of these injuries, stratified by dislocation type.

### **Epidemiology**

Though PIP joint dislocations are common,<sup>4</sup> there are very little data about their prevalence. According to Chinchalkar and Gan,<sup>3</sup> the lack of hard data

is explained by a tendency for bystanders to perform reduction before radiographic evaluation and diagnosis, with another subset being reduced in the primary care or emergency room setting. Many PIP joint dislocations are known as coach's finger because they are commonly reduced on the field of play.<sup>4</sup>

Hindle and colleagues<sup>5</sup> evaluated all dislocations presenting to the Royal Infirmary of Edinburgh between November 2008 and October 2009. Dislocations involving the small joints of the hand were found to have a bimodal distribution, occurring most frequently in

- A younger cohort between 40 to 44 years of age
- An older cohort averaging 90 years of age
- Men more commonly than women (2.9:1 male to female ratio)
- At the PIP joint (10% of all dislocations).

In this study, PIP joint dislocation by joint occurred in a distribution as follows:

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- 5% at the index finger
- 10% at the middle finger
- 14% at the ring finger
- 24% at the small finger.

The frequency and distribution of PIP joint dislocations was similar to the findings of Joyce and colleagues.<sup>6</sup> The investigators reported that 69% of dislocations were reduced in the emergency room, with 19% treated in the community, and 8% in the operating room.

### ***Etiologic factors***

PIP joint dislocations are defined by the position of the middle phalanx in relation to the proximal phalanx.<sup>1</sup> These are classified as

- Dorsal
- Volar
- Lateral.

Each has a specific mechanism, findings, associated soft tissue injury, management, and complications.

Dorsal dislocations represent almost all PIP joint dislocations. They are characterized by the following:

- Mechanism: forced hyperextension, axial load,<sup>7</sup> and radial or ulnar deviation<sup>8</sup>
- Volar plate rupture at its distal attachment
- A split between the accessory collateral ligament and proper collateral ligament with detachment of the proper collateral ligament from its proximal attachment<sup>9</sup>
- The volar plate is maintained beneath the condyle, held by intact attachment to the accessory collateral ligament<sup>1</sup>
- When a torsional mechanism is involved, soft tissue interposition can block reduction.<sup>10</sup>

Lateral dislocations (**Fig. 1**) are less common and characterized by

- Mechanism: direct radial or ulnar stress on the PIP joint with axial load
- The collateral ligament on the side of the force fails under tension, avulsing from its proximal attachment
- Continued force causes disruption of the volar plate on the side of the force.<sup>1,7</sup>

The least common is dislocation in the volar direction, with or without a rotatory component (**Fig. 2**). This was described in 1970 by Spinner and Choi<sup>11</sup> in a series of 5 cases. Their cadaveric study demonstrated that volar dislocation required force in 2 vectors:



**Fig. 1.** Lateral dislocation of the small finger PIP joint. Failure of the collateral ligament and volar plate on the side of force results in lateral angulation and translation of the middle phalanx.

- Ulnar or radial deviation causing rupture of the collateral ligament and volar plate
- A second vector with volar force against the middle phalanx.

Volar PIP joint dislocation can result in 1 of 2 patterns of soft tissue injury:

- Volar dislocation without torsion
  - Direct volar translation of middle phalanx, resulting in central slip rupture
  - Accompanied by rupture of volar plate and 1 collateral ligament
- Volar dislocation with torsion
  - 1 condyle of the proximal phalanx slides past the central slip
  - Longitudinal tear forms between intact central slip and intact lateral band
  - Attenuation of triangular ligament<sup>12</sup>
  - The proximal phalanx subluxates between central slip and lateral band
  - The middle phalanx dislocates volarly and rotates around the intact collateral ligament.

Both mechanisms result in extensor lag at the PIP joint.

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