Fracture Dislocation of the Finger Joints

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Fracture dislocations of the hand are difficult and often unforgiving injuries. Keys to treatment include early recognition, stable concentric reduction, and protected early active range of motion maintaining joint stability. The balance between stability and mobility is difficult to manage; therefore, surgeons need a wide array of treatments to tailor management to the specific fracture pattern. With appropriate treatment, residual stiffness and pain can be minimized. This Current Concepts review aims to provide up-to-date management for proximal interphalangeal, distal interphalangeal, and metacarpophalangeal joint fracture dislocations. *(J Hand Surg Am. 2014;39(4):792–802. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

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The following Current Concepts reviews review the fracture dislocations of the proximal interphalangeal (PIP) joint, distal interphalangeal (DIP) joint, and metacarpophalangeal (MCP) joint. We give an initial brief overview of these injuries and then discuss the most up-to-date treatment options and their respective outcomes.

PROXIMAL INTERPHALANGEAL JOINT DORSAL FRACTURE DISLOCATIONS

Proximal interphalangeal fracture dislocations are difficult, unforgiving injuries. Dorsal fracture dislocations are most common, with an associated volar fracture of the middle phalangeal base. The etiology of these injuries is usually an axially directed force to a fully extended digit. The relatively long lever arm of energy transmission from the fingertip, and the fixed uniplanar motion of the joint, result in this frequently seen injury pattern. Although many treatment options exist for these injuries, long-term complications are common, including stiffness, pain, and swelling.

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Assessment

Initial assessment of dorsal PIP fracture dislocations involves a careful history and clinical examination followed by radiographic or fluoroscopic evaluation. Fracture chronicity and previous treatments must be clarified, because these have a role in determining ultimate treatment.

Classification of these injures is based on joint stability as well as fracture configuration. Specifically, injured joints are classified as stable versus unstable, which helps to guide nonsurgical versus surgical treatment options. Dorsal fracture dislocations are inherently more stable in flexion and unstable in full extension, which therefore allows the practitioner to determine stability using fluoroscopy coupled with range of motion examination. Those joints, with concentric reduction with 30° flexion or less, as well as those with less than 20% articular involvement of the middle phalanx base, are considered stable. Those with 30% to 50% joint involvement or those requiring increased flexion to provide stability are considered tenuous, whereas those with greater than 50% articular involvement are considered generally unstable (Fig. 1).

Radiographs or fluoroscopy can be used for fracture assessment and lateral images are often the most useful. Complete dislocation is usually obvious; however, subtle joint subluxation can often be missed.

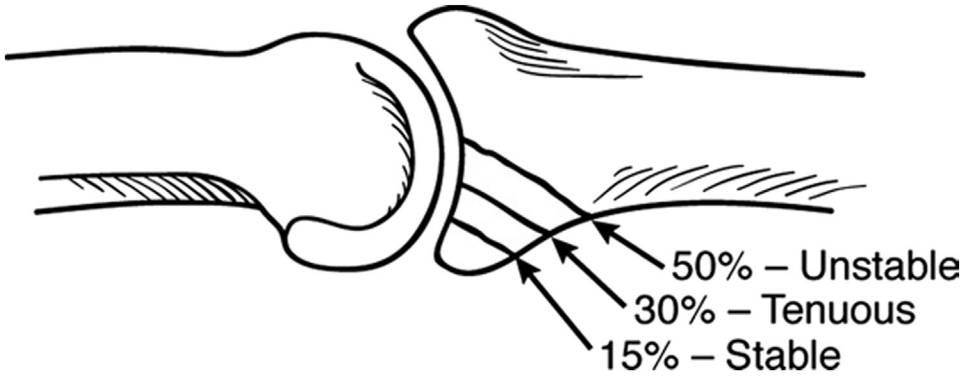

FIGURE 1: Anticipated fracture stability according to joint surface involvement as seen on a lateral view of the PIP joint.

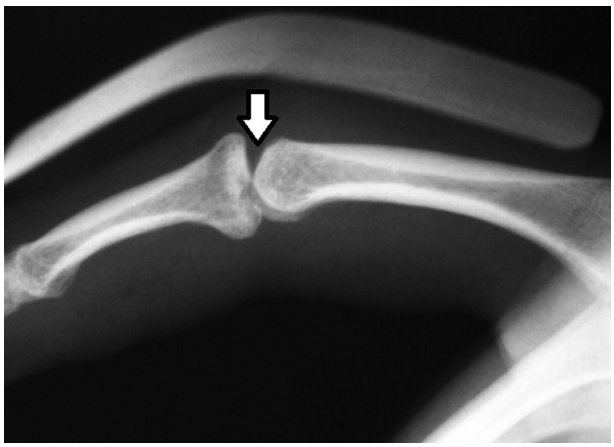

FIGURE 2: Dorsal V sign (arrow) on a lateral radiograph of a PIP joint fracture subluxation.

The radiographic V sign is a finding on the lateral radiograph that results from dorsal subluxation of the middle phalanx articular surface, producing a radiolucent V sign indicative of the subtle instability (Fig. 2).

Along with static radiographic examination, fluoroscopic evaluation can be invaluable in determining injuries that will be amenable to operative versus nonsurgical treatment. Joints that have concentric gliding motion about the rotational axis of the head of the proximal phalanx are likely to be amenable to nonsurgical treatment. Those that have motion that hinges on the fracture edge are more likely to fail nonsurgical treatment and to result in late posttraumatic arthrosis and associated stiffness and pain.

A combination of these assessment tools will help guide the hand surgeon to treat PIP dorsal fracture dislocations appropriately with the best possible outcomes.

Treatment options and outcomes

Injury pattern and surgeon preference have key roles in determining treatment options for PIP fracture-dislocations. The goals of treatment have remained unchanged over the years. They include a stable, concentric reduction of the PIP joint to allow smooth gliding motion as early as possible in the postinjury period. In addition, edema control has been a mainstay of treatment regardless of other interventions.

Treatment options include extension block splinting, extension block pinning, external fixation, dynamic traction, Kirschner wire joint transfixation, open reduction internal fixation (ORIF), volar plate arthroplasty, and hemihamate arthroplasty. These treatment modalities have been described in previous reviews; we will provide a general overview as well as recent updates.[1]

Extension block splinting and pinning

As noted previously, dorsal fracture dislocations of the PIP joint that are stable, in slight flexion ($< 30°$) can be managed nonsurgically. The mainstay of treatment for these patients is to maintain a concentric reduction by preventing full extension at the PIP joint. This can be achieved via extension block splinting or extension blocking pinning in the compliant patient.

Splints can be fabricated to allow full flexion and limit extension to prevent reaching the point of instability, as noted during the initial assessment of the patient. This can be achieved through dorsal blocking splints and figure-of-eight splints. The amount of extension can slowly be increased over a period of 3 weeks, as determined by fracture stability. Serial weekly radiographs are imperative to detect subsequent loss of reduction, which can lead to poor outcomes.

In a prospective study of 27 patients treated with extension block splinting, Hamer and Quinton[2] found that 70% had good results and that poor results occurred in those who lost reduction in the splints. They concluded that most of these fractures could be treated by splinting; however, those authors