Finger Joint Injuries

Roni B. Prucz, MD, Jeffrey B. Friedrich, MD*

KEYWORDS

• Finger joint injury • Finger dislocation • Finger sprain • Intra-articular finger fracture • Athletic hand injury

KEY POINTS

- Surgical indications for fractures or fracture-dislocations include displaced articular fragments, rotational misalignment, significant digit angulation or shortening, irreducible dislocation, and significant injury to the joint supporting structures.
- Surgical treatment options include Kirschner wire fixation, traction, tension bands, interosseous wiring, plates, screws, intramedullary hardware, external fixation, volar plate reduction, volar plate arthroplasty, and hemi-hamate arthroplasty.
- Proximal interphalangeal joint treatment depends on the degree of joint surface involvement and joint stability, and improper treatment of this joint leads to significant loss of digit function.
- Collateral ligament injuries and other joint supporting structures (ie, volar plate) should be repaired when significantly injured to ensure joint stability.

INTRODUCTION

Athletic hand injuries continue to increase as the speed, power, and size of athletes improves with advances in training and conditioning. Hand and wrist injuries account for 9% of athletic injuries and up to 15% of all injuries in collision athletes. Approximately 50% of sports-related hand injuries involve the fingers.[1–3] Among the most common athletic sport injuries are sprains and contusions, digit collateral ligament tears, interphalangeal (IP) joint dislocations, metacarpal fractures, scaphoid fractures, and wrist ligamentous injuries.[4] Football, gymnastics, wrestling, lacrosse, and basketball have the highest rates of hand injuries,[5] with football accounting for 50%. In contact sports, 66% of injuries are metacarpal fractures and collateral ligament tears with volar and dorsal dislocations of the proximal interphalangeal joint (PIPJ) and distal interphalangeal joint (DIPJ) being the most common joint injuries.[4]

Caring for athletes requires a special focus on a quick recovery, whereby definitive treatment may often be delayed to allow completion of the season. The treatment of this unique patient population requires extra consideration of the patient's age,

Harborview Medical Center and the University of Washington, Seattle, Washington, USA
* Corresponding author.
E-mail address: jfriedri@uw.edu

Clin Sports Med 34 (2015) 99–116
http://dx.doi.org/10.1016/j.csm.2014.09.002 **sportsmed.theclinics.com**
0278-5919/15/$ – see front matter

player's position, performance level, status for the remainder of the season, and career longevity. Athletes often require detailed treatment time frames and guidelines with a heavy focus on expected outcomes.[5,6]

When considering a therapeutic approach, the treating surgeon must recognize that the athletic demands of the hand and wrist exceed those of daily life. For instance, while most routine daily activities require 40° of wrist extension, flexion, and radial/ulnar deviation, sports such as basketball require more than 50° of extension and 70° of flexion. These requirements are even higher for flexion in the throwing athlete.[2] Given that residual deformities and loss of joint motion can affect the livelihood of elite athletes, the expectations for treatment outcomes are inherently higher.[7] However, this patient population often has better access to therapy, allowing surgeons to perform more extensive repairs such as complex ligamentous reconstructions.[5]

This article focuses on the treatment of sprains, dislocations, and fracture-dislocations of the metacarpophalangeal and IP joints in this unique patient population.

ANATOMY REVIEW

The IP joints of the fingers provide flexion and extension of the digits to allow for reaching, pinching, and grasping. The middle phalanx arc of motion at the PIPJ is approximately 100° to 110° and accounts for 85% of the flexion of the fingertip during grasping.[8] Motion at the PIPJ and DIPJ allows only for flexion and extension, while the motion at the metacarpophalangeal joint (MCPJ) allows for flexion/extension in addition to adduction, abduction, and circumduction.[9]

Each joint is supported in its motion by several static and dynamic stabilizers. Static stabilizers include the volar plate, the dorsal capsule, the deep transverse metacarpal ligament, the sagittal band, the flexor pulley system, and the ulnar and radial collateral ligaments (UCL and RCL) (**Fig. 1**). Dynamic stabilizers include the extrinsic and intrinsic tendons and muscles.[9] The static supporting structures are complexly linked. The volar plate is a particularly important fibrocartilaginous structure that attaches to both phalanges at a finger joint to prevent hyperextension.[10] The checkrein ligaments are proximal extensions of the volar plate onto the phalanx, and the volar plate also has lateral attachments to the accessory collateral ligaments. Sagittal bands, which primarily serve to stabilize the extensor mechanism at the MCPJ, extend to the volar plate and the deep intermetacarpal ligament to prevent ulnar subluxation of the extensor tendons.[10]

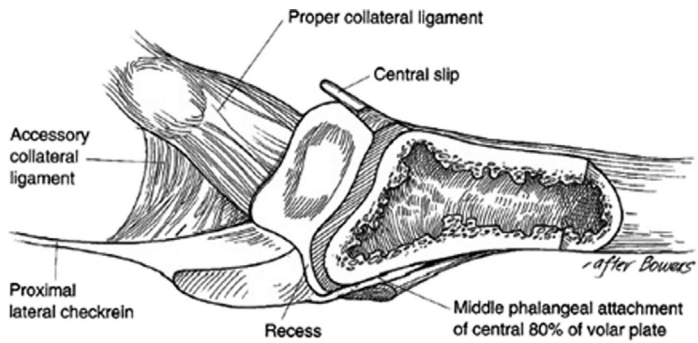

Fig. 1. PIPJ anatomy demonstrating joint with supporting structures. (*From* Bowers WH. The anatomy of the interphalangeal joints. In: Bowers WH, editor. The interphalangeal joints. New York: Churchill Livingstone; 1987. p. 11; with permission.)