

Treatment of Proximal Interphalangeal Joint Contracture



Sami H. Tuffaha, MD, W.P. Andrew Lee, MD*

KEYWORDS

- Proximal interphalangeal joint • Contracture • Contracture release • Trauma • Dynamic splinting
- Serial splinting

KEY POINTS

- Proximal interphalangeal joint contracture can involve many structures, including the accessory collateral ligaments, volar plate, checkrein ligaments, retinacular ligaments, flexor and extensor tendons, and articular surfaces.
- Results with treatment are unpredictable and often modest.
- Treatment typically begins with conservative modalities, including dynamic splinting and serial casting.
- Surgery typically requires stepwise release of affected structures, with extent of release determined intraoperatively, under local anesthesia, with patient participation.

INTRODUCTION

Proximal interphalangeal joint (PIPJ) flexion contracture is a challenging and often frustrating problem commonly faced by patients, hand surgeons, and therapists. With a wide arc of motion, the PIPJ is responsible for 85% of total finger motion.¹ As such, patients with PIPJ contracture often experience significant functional impairment.² Normal PIPJ function depends upon adequate bony support, intact articular surfaces, and competent periarticular stabilizers. Damage to any of these critical structures resulting from trauma or other disease processes can lead to diminished joint motion and fixed contracture. Several conservative and surgical approaches are available to treat PIPJ contracture, the choice of which depends upon the severity and etiology of the contracture. The multiple described treatment options for PIPJ contracture and lack of consensus regarding the optimal approach speak to the unpredictable and often

unsatisfactory outcomes that are achieved, regardless of which treatment approach is chosen. This article briefly reviews the pertinent anatomy and pathologic processes that can result in PIPJ contracture and then describes the various treatment options that can be used to address this difficult problem.

ANATOMY

The PIPJ is a hinge joint with a flexion/extension arc of 90° to 100° and minimal motion in the coronal plane.³ The articulation of the intercondylar eminence of the middle phalanx within the intercondylar sulcus of the proximal phalanx provides some lateral stability in full extension. However, joint stability and integrity, particularly during flexion, depend heavily upon the periarticular capsuloligamentous and tendinous structures, including the volar plate, collateral and checkrein ligaments, flexor tendons, and extensor hood. The fibrocartilaginous volar plate is the primary

Department of Plastic and Reconstructive Surgery, Johns Hopkins School of Medicine, Baltimore, MD, USA

* Corresponding author. 601 North Caroline Street, Suite 8152F, Baltimore, MD 21287.

E-mail address: wpal@jhmi.edu

Hand Clin 34 (2018) 229–235

<https://doi.org/10.1016/j.hcl.2017.12.012>

0749-0712/18/© 2018 Elsevier Inc. All rights reserved.

restraint against hyperextension and glides across the bony surfaces with flexion and extension.^{4,5} The checkrein ligaments extend from the proximal volar plate and anchor it to the proximal phalanx, also serving to prevent hyperextension. Bony adhesions of the volar plate or contracture of the checkrein ligaments can result in diminished range of motion and flexion contracture. The collateral ligaments are primarily responsible for radial and ulnar stability. The proper collateral ligaments originate from the head of the proximal phalanx and insert into the middle phalanx, whereas the accessory collateral ligaments also arise from the proximal phalanx and insert onto the volar plate and flexor sheath. Because the accessory collateral ligaments do not insert into the middle phalanx, they remain lax in full flexion, rendering them susceptible to fibrosis and contracture if immobilized for a prolonged period of time in this position.² The relatively weaker dorsal stabilizers of the PIPJ include the thin dorsal capsule and overlying central slip, lateral bands, and transverse retinacular ligaments of the extensor hood. Disruption of any of these delicate structures can result in joint imbalance and contracture.⁶ See **Fig. 1** for illustrations of pertinent PIPJ anatomy.

PATHOGENESIS

Traumatic PIPJ contracture can occur as a result of lacerations, fractures, dislocations, stress injuries, burns, traumatic nerve palsies, and ischemic insult. PIPJ contracture following trauma typically develops in a delayed fashion as a

sequela of the physiologic injury response and prolonged joint immobilization owing to the injury itself or treatment of the injury. Soon after injury occurs, edema fluid and blood tend to accumulate within and around the tendons, ligaments, sheaths, and articular space of the joint, resulting in swelling of the digits and hand that mechanically limits joint motion.^{7,8} The swollen, injured hand tends to assume a characteristic posture, with the metacarpophalangeal joint (MPJ) extended and the interphalangeal joints (IPJ) flexed 30° to 40°, serving to maximize joint space and reduce pressure and discomfort.^{9–11} Prolonged immobilization of the PIPJ in a flexed posture, whether because of swelling and discomfort or as part of injury management, can cause contracture. The mechanisms by which this occurs include secondary contracture of the skin envelope, joint capsule, collateral and checkrein ligaments, tendon sheath, and superficial fascia, as well as adherence of the retinacular ligaments and volar plate to the proximal phalanx and collateral ligaments.¹² Contractures following proximal phalangeal fracture are most likely to occur initially as a result of flexor tendon adhesions, which typically occur at the site of the fracture but can also extend proximally and distally.^{13,14} Following fractures involving the articular surfaces, exostoses, arthrosis, and bony block can also cause joint contracture.¹⁵ Regardless of injury mechanism, the final common pathway for most PIPJ contractures involves contraction and fibrosis of the volar plate-checkrein ligament complex.^{16,17} It should also be noted that there are many nontraumatic causes

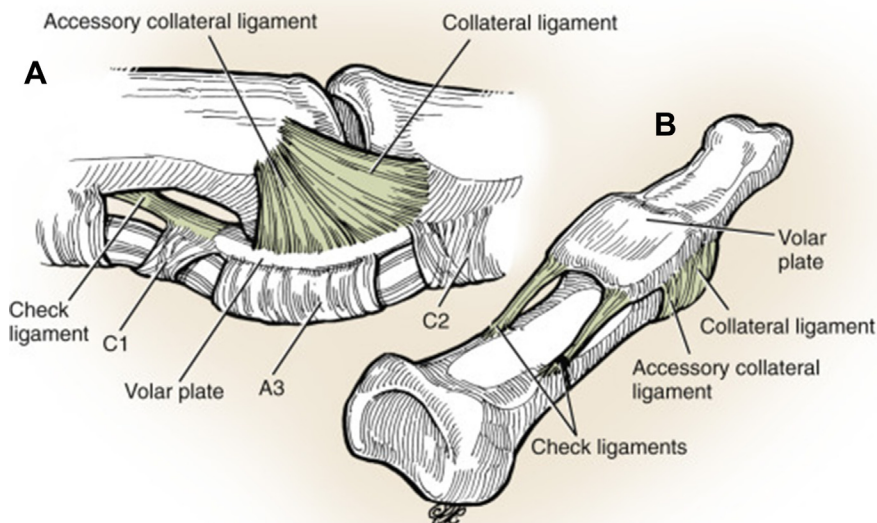


Fig. 1. Illustration of PIP joint anatomy. (A) Lateral view. (B) Volar view. (Courtesy of Elizabeth Martin MA, FAMI, Waynesville, NC; with permission from Green's Operative Hand Surgery, 7th edition.)

Download English Version:

<https://daneshyari.com/en/article/8798793>

Download Persian Version:

<https://daneshyari.com/article/8798793>

[Daneshyari.com](https://daneshyari.com)