Injuries to the proximal interphalangeal (PIP) joint are common. Although many PIP injuries are treated nonsurgically, some require special attention or surgical management for good outcomes. The mechanism of injury in PIP fracture-dislocations commonly involves axial loading to the digit, often with a flexion or an extension moment imparted to the digit. PIP joint fracture-dislocations can be divided into three types based on the character of the middle phalanx articular fracture fragment; further subdivision based on joint stability is helpful to outline treatment. Volar fracture-dislocations can occur, with a fragment avulsing off the dorsal edge of the middle phalanx and usually including the central slip insertion. Pure axial loading injuries result in a pilon-type fracture, in which the dorsal and volar cortices are disrupted with impaction of the central articular portion of the bone. Dorsal fracture-dislocations are the most common injuries. When the joint is hyperextended, the volar plate ruptures, typically with a fragment avulsing from the middle phalanx insertion of the volar plate. This chapter focuses on the treatment of dorsal and pilon injuries.

Patient Evaluation

The patient evaluation includes obtaining an appropriate history and performing a physical examination. Radiographs, including three views (PA, lateral, and oblique) of the finger (not...
the hand) are needed. Occasionally, a subtle joint subluxation or dislocation may be missed when the radiographs include overlapping digits or do not focus on the injured digit. The so-called V sign is seen with subtle instability as the middle phalanx slips relatively dorsal to joint alignment (Figure 1). Unfortunately, PIP fracture-dislocations are often deemed by the patient or the physician to be a jammed finger or a sprain and may not be properly evaluated.

**Treatment Principles and Classification**

Kiefhaber and Stern outlined important treatment principles with respect to PIP fracture-dislocations. Most importantly, it is necessary to restore a congruent and stable joint throughout the arc of motion, without hinging or joint subluxation. Second, early motion is desirable. Last, anatomic reduction of the articular surface is of secondary concern.

A classification system for PIP joint injuries is based on clinical stability (stable, tenuous, or unstable) after reduction and prior work that establishes stability based on fracture size (Figure 2). Stable fracture-dislocations are those that generally involve less than 30% of the articular surface of the middle phalanx and remain congruently reduced throughout the arc of motion. By obtaining a lateral plain radiograph in full extension, it can be confirmed that subluxation is not present in these patients. These injuries are treated by encouraging early motion. Patients may present with a tendency to hyperextend the PIP joint. These patients may benefit from buddy taping, dorsal blocking, or figure-of-8 splinting if hyperextension is a problem.

Tenuous fracture-dislocations involve 30% to 50% of the articular surface and reduce when the joint is flexed less than 30°. Patients with this type of injury may be treated with dorsal block splinting with close serial follow-up radiographs to ensure that a congruent reduction is maintained. The digit is flexed to achieve congruent reduction and gradually extended weekly by 10°, ensuring that the joint remains reduced.

Unstable fracture-dislocations include those involving more than 50% of the articular surface or 30% to 50% of the surface but requiring more than 30° of flexion to maintain reduction. The treatment options for tenuous and unstable fracture-dislocations include splinting, pinning the joint, dorsal block pinning, fracture fixation, external fixation, volar plate arthroplasty, or hemihamate arthroplasty.

**Extension Block Splinting**

Extension block splinting is an option for tenuous fracture-dislocations but requires vigilant monitoring to ensure that recurrent subluxation does not occur. McElfresh et al. described using extension block splinting in 17 patients with unstable PIP joints. A gauntlet cast was applied with an outrigger that limited terminal extension to 10° to 15° short of the position of instability but allowed full flexion of the digit. The digit was allowed progressive extension with a decrease in the extension block.
of 25% per week. Although the results described in this series were satisfactory, this technique requires close follow-up to ensure that the splint remains well fitting and subluxation of the joint does not occur. Extension block splinting is used with caution in swollen or thick fingers. An alternative to the outrigger is a finger-based splint, such as a figure-of-8 splint, a silver ring splint, or two portions of alumifoam splinting each aligned over the dorsum of the middle and proximal phalanges with an angled portion so that terminal extension is limited.

### Dynamic Traction, External Fixation Techniques, and Force-Couple Devices

Dynamic traction or external fixation techniques (Figure 3) and force-couple devices rely on the principle of ligamentotaxis and allow early range of motion (ROM) while maintaining a congruent reduction at the PIP joint. These techniques are very useful for pilon fractures (except for force-couple devices), tenous fractures, and unstable fractures.

Various constructs have been described with two or three Kirschner wires (K-wires) and rubber bands, purpose-made devices, or force-couple constructs. For these techniques to work, a closed reduction should be possible. If closed reduction is not possible, an open reduction is necessary, at which time the construct may be applied.

Agee described using a force-couple device that consists of a threaded 0.062-inch K-wire directed from dorsally to volarly through the proximal half of the middle phalanx, two smooth K-wires (one through the head of the proximal phalanx and a second through the middle phalanx just dorsal to midline), and a rubber band. The fixator was maintained for 5 to 8 weeks, allowing full digital flexion. Importantly, if this technique is considered, the dorsal cortex must remain intact. In his series, Agee noted complications that included loss of terminal dorsal interphalangeal flexion secondary to adhesions, recurrent subluxation, infection, and stiffness. Loss of terminal extension is common, as is radiographic evidence of arthrosis, which is typically asymptomatic. The average arc of motion after treatment was 95° in acute injuries, whereas chronic injuries had a disappointing arc of motion of 68°. Agee suggested caution when considering this treatment option for patients with chronic injuries.

Others have described purpose-made or fabricated constructs that include two or three K-wires with or without rubber bands (Figure 3). Usually, most constructs involve three 0.045-inch K-wires (or two 0.045-inch and one 0.035-inch K-wires) and dental rubber bands. These constructs are typically applied with one smooth K-wire through the head of the proximal phalanx, a second through the head of the middle phalanx, and often a third lever K-wire through the middle phalanx. The most proximal and distal K-wires are bent at either side of the digit to a 90°-angle distally and then into hooks. The middle K-wire acts as a lever over which the proximal K-wire passes. Distally, tension is obtained and maintained by applying dental rubber bands so that traction is applied and the joint is congruently reduced. Early motion is encouraged, and the patient is followed weekly with serial examination and radiographs to ensure that congruent reduction is maintained. In most cases, the fixator can be removed during the office visit 3 to 6 weeks after injury. For such constructs, it is advisable to remove the rubber bands first and then perform fluoroscopic imaging to ensure that the joint remains congruently reduced before the wires are removed. The complication rate in the literature has been reported as 29%; however, pin tract infections are among the most common complications but usually respond to oral antibiotics.

As is the
case with force-couple devices, radiographic evidence of arthritis is common but usually asymptomatic. The average are of motion described in the literature ranges from 74° to near normal.9–30

**Transarticular and Dorsal Block Pinning**

Transarticular and dorsal block pinning techniques have successfully been used in unstable dorsal fracture-dislocations of the PIP joint to reduce and stabilize the dislocated PIP joint. When used as the sole fixation method, the volar middle phalangeal fracture fragments may not be completely reduced. Transarticular pinning was first described by Bunnell31 and later by other authors.32–35 Newington et al36 performed manual closed reduction followed by a transarticular smooth K-wire inserted through the PIP joint dorsally in 20° to 40° of flexion; the K-wire was removed at 3 weeks. At 16-year follow-up, they reported a mean PIP joint ROM of 85°.

A variation of this technique is to place a K-wire into the head of the proximal phalanx while skiving dorsal to the middle phalangeal base to direct the subluxated middle phalanx volarly, a technique termed dorsal block pinning. First described by Sugawa et al,36 full PIP joint flexion is obtained before K-wire insertion to transfix the extensor tendon in a position that theoretically allows active PIP flexion postoperatively with the wire in place, in contrast to transarticular pinning in which the joint is statically fixed until K-wire removal. Small series have reported good short- to medium-term results.37,38 Inoue and Tamura39 described dorsal block pinning in 14 patients with injuries involving up to 50% of the joint surface. K-wires were removed at 3 weeks, with therapy starting 1 week later to initiate active flexion and extension. A mean PIP joint ROM of 94° was achieved at final follow-up.

**Closed Reduction and Percutaneous Pinning**

Different methods using percutaneously placed K-wires for reduction and/or fixation of the displaced volar fracture fragments have been described with success. Lahav et al40 described a technique using a 0.035-inch K-wire placed through the dorsal cortex of the middle phalanx to percutaneously reduce impacted articular fragments, followed by the insertion of two volar-dorsal and two radial-ulnar 0.028-inch K-wires for fragment fixation. They reported excellent interphalangeal ROM; however, it should be noted that this technique was used to treat middle phalanx volar lip fractures and PIP joint impaction fractures without dislocation, not true PIP fracture-dislocations.

Waris and Alanen41 described a method of percutaneous fracture reduction and dorsal block pinning in 15 dorsal PIP fracture-dislocations. This technique involves first performing a closed reduction and dorsal block pinning. A prebent 1.0-mm K-wire is then inserted percutaneously through a 2.0-mm cortical hole in the distal portion of the middle phalanx and passed through the intramedullary canal to disimpact and reduce the volar articular fragments under fluoroscopic guidance. This wire is removed intraoperatively, leaving only the dorsal blocking wire in place. The authors recommended passive ROM exercises at the PIP joint within the limits of the dorsal blocking K-wire, with active ROM of the metacarpophalangeal and dorsal interphalangeal joints started immediately postoperatively. After 2 to 4 weeks, the dorsal blocking wire is removed, and therapy is started with free passive and active joint mobilization. At 5-year follow-up, reduction of the joint was maintained, articular step-off was reduced, and PIP joint ROM averaged 83°.

Vitale et al42 described a technique using volar to dorsal directed closed reduction and percutaneous pinning of the volar fracture fragments and dorsal block pinning (Figure 4). Closed reduction of the volar base of the middle phalanx is achieved with a pointed towel clamp followed by the insertion of two or three 0.028-inch K-wires in a volar to dorsal direction across the fracture site immediately lateral to either side of the volar limb of the towel clamp. The K-wires are withdrawn from the digit dorsally until they are nearly level with the volar aspect of the volar fracture fragment. A dorsal blocking 0.035-inch K-wire is then used to maintain PIP joint reduction. All K-wires are removed at 3 to 4 weeks, after which active PIP flexion is performed in the office setting under a digital block to help lyse any early tendon adhesions. Temporary dorsal block splinting following pin removal is tapered off by 6 to 8 weeks. At final follow-up, there were no subluxations or dislocations, mean PIP joint ROM was 89°, and patient-based outcome measures indicated high levels of function and little or no pain.

The benefit of closed reduction and percutaneous pinning is the avoidance of an open approach to the joint that may promote scarring of the joint capsule and tendons, but truly anatomic reduction of fracture fragments may not be possible. It has been reported that reduction of joint subluxation, not anatomic reduction of articular fragments, is the most important determinant of
outcome, making closed reduction and percutaneous pinning an attractive option.42,43

Open Reduction and Internal Fixation

Open reduction and internal fixation (ORIF) of unstable dorsal PIP fracture-dislocations has been performed with K-wire, screw, cerclage wire, or volar miniplate fixation. Wilson and Rowland44 and later McCue et al45 reported results using a midlateral approach over the PIP joint, with distal reflection of the collateral ligament and the volar plate and ORIF of the volar fragment with one or more volar to dorsal K-wires, followed by a transarticular K-wire transfixing the PIP in flexion for 3 weeks or more. Weiss46 described successful open cerclage wire fixation for this injury.

ORIF with interfragmentary screws via a volar or a dorsal approach is a viable option when there are sufficiently large fracture fragments amenable to screw fixation.47-50 (Figure 5). Hamilton et al50 described a technique using a volar Bruner incision, division of the A3 pulley, proximal reflection of the volar plate, collateral ligament release for a “shotgun” exposure of the joint as needed, and fixation with one to three mini-screws. Postoperative therapy was started within 2 to 9 days after surgery. Terminal extension was blocked by using a figure-of-8 splint and full active flexion. At a follow-up of 42 months, PIP joint ROM averaged 70°, with seven of nine patients reporting no pain at latest follow-up.

Grant et al48 described the results of ORIF using a volar approach to the PIP joint in 14 patients. Joint reduction was achieved with either a dorsal blocking K-wire or a transarticular K-wire, and a single 1.2-mm interfragmentary screw was used for fixation. The dorsal blocking or transarticular K-wire was removed at 12 days, on average, when passive and active-assisted flexion was initiated in a dorsal blocking splint, with extension of the PIP joint started at 4 weeks. At 3-year postoperative follow-up, average active PIP joint ROM was 100°. Three patients sustained dislocation or substantial subluxation postoperatively, and radiographs demonstrated minor residual dorsal subluxation and joint incongruity in 12 of 14 patients, although good clinical results were achieved overall.

Lee and Toeh51 described a dorsal approach with ORIF using interfragmentary screws in 12 unstable dorsal PIP fracture-dislocations. dorsally, the central slip and lateral bands were reflected to expose the joint and the volar fracture fragments. The volar fragments were disimpacted, and fixation was performed with 1.5- or 1.3-mm interfragmentary screws inserted dorsally. Immediate postoperative active flexion was allowed, with passive extension and flexion initiated at week 2. At final follow-up, mean ROM at the PIP joint was 85°.

ORIF with a low-profile volar miniplate has recently been described.52,53 Ikeda et al52 reported on a series of 19 unstable PIP
fracture-dislocations treated with volar application of a miniplate and early active motion, with a mean of 85° of PIP joint ROM at final follow-up. The authors reported a 39% complication rate, with four patients requiring eventual implant removal.

ORIF may allow for restoration of articular congruity and rigid fixation and permit immediate mobilization, with the disadvantage of potentially greater soft-tissue trauma that may promote adhesions and postoperative stiffness. To date, no benefit in ROM has been demonstrated clinically with early ROM permitted by ORIF techniques because the results obtained with simple transarticular pinning have been shown to be equivalent to or better than those with ORIF with either screws or cerclage wiring. ORIF may be most helpful when there are one or two large volar fragments, but substantial comminution or small volar fragments are relative contraindications to ORIF. In addition, it is often difficult to discern from preoperative radiographs the true number of fragments and the extent of comminution. What may appear to be a single large fragment may, in fact, represent several comminuted fragments; thus, it is prudent to have a backup plan in case ORIF is not possible. In addition, one series demonstrated more frequent complications and poorer motion in patients treated with ORIF who had more than one fracture fragment compared with patients with only one fragment.

**Volar Plate Arthroplasty**

First published by Eaton and Little in 1976 and validated by a long-term follow-up study in 2000, volar plate arthroplasty is a useful treatment option for dorsal fracture-dislocations of the PIP joint.

As contemporary fixation techniques have improved and alternatives such as hemiamate reconstruction have been developed, the indications for volar plate arthroplasty have narrowed. The ideal indication is a dorsal fracture-dislocation, in which 30% to 50% of the articular surface is fractured and comminuted, and, therefore, is not amenable to internal fixation. Preoperative evaluation must include PA and lateral views of the finger. It must be determined if there is any angulation or impaction of the remaining dorsal articular surface, which must be addressed at the time of surgery. The outcomes of volar plate arthroplasty are technique driven.

Although the fundamental features of volar plate arthroplasty remain the same, the classic technique has been modified in several useful ways during the past three decades. A volar zigzag approach centered over the PIP joint is used to preserve the A2 and A4 pulleys. The flexor sheath is opened directly over the PIP joint, and the flexor tendons are retracted to one side to expose the volar plate and the fracture. Some fracture fragments are usually attached to the volar plate and, if they are small, are excised. If large, they can be left in place to enhance bone-to-bone healing.

Full visualization of the fractured base of the middle phalanx is a critical step in volar plate arthroplasty, which is achieved by fully releasing both PIP joint collateral ligaments with a No. 15 blade. The joint is then shotgunning (fully hyperextended), and the fractured bone must be removed to achieve this. (This minimizes the risk of malrotation with PIP joint flexion.) If any articular impaction is identified, and if volar plate arthroplasty will be performed, then this should be disimpacted, teased open, and held reduced with a single small crouton of allograft or autograft. This technique helps to reconstitute the remaining arc of the middle phalangeal base and diminish the likelihood of resubluxation.

A 2-0 or 3-0 monofilament suture is then placed through the radial and ulnar borders of the volar plate. Next, two Keith needles are passed through the lateral edges of the cancellous bed of the fractured base of the middle phalanx immediately adjacent to the remaining articular surface. As the PIP joint is reduced, the suture limbs are drawn through the middle phalanx base, keeping the volar plate spread as broadly as possible over the proximal phalangeal condyles.

The PIP joint is flexed sufficiently to allow full contact of the volar plate into the trough at the level of the joint cartilage. After making a small dorsal incision to prevent the lateral bands from being bound down by the suture limbs, the suture is tied over the periosteous. (Alternatively, suture anchors can be used to attach the volar plate to the base of middle phalanx.)

Fluoroscopic evaluation is used to verify that joint congruency has been reestablished with no residual subluxation (Figure 7). The arc of passive motion is then assessed. If full extension is
lacking, the checkrein ligaments of the volar plate are feathered and stretched to allow full extension. If flexion is lacking, the dorsal capsule is released, and an extensor tenolysis performed as needed.

Postoperatively, the PIP joint is transfixed with a 0.045-inch K-wire in 30° to 35° of flexion for 3 weeks and then removed. Active flexion with an extension block splint is then started, followed by active extension at 4 weeks and dynamic passive extension at 5 weeks.

Careful technique and intraoperative assessment minimize the risk for resubluxation and malrotation, two important complications of volar plate arthroplasty. A flexion contracture is quite common; if mild, it does not affect functional outcomes.42,55

The limited reports in the literature reveal mean motion arcs between 62° and 90°.42,55,57,58 Less motion can be anticipated for revision or delayed cases. Stability of the PIP joint is uniformly good if the reduction is maintained without any resubluxation. Patient satisfaction is high but not uniform.

Hemihamate Arthroplasty

In 1999, Hastings et al59 first described hemihamate arthroplasty as a treatment of otherwise unreconstructable dorsal fracture-dislocations of the PIP joint. This procedure takes advantage of the similar coronal plane morphology of the distal articular surface of the hamate and the proximal articular surface of the middle phalanx. When treating acute or chronic injuries to the volar PIP articular surface of the middle phalanx that are not amenable to internal fixation and do not reduce acceptably with ligamentotaxis, hemihamate arthroplasty provides a treatment option. In essence, this procedure replaces comminuted bone and bony fragments that have been deformed over time with a single osteochondral autograft to restore the volar buttress of the PIP joint, which resists persistent dorsal subluxation and is sufficient for early joint mobilization.

Indications and Contraindications

Hemihamate arthroplasty is indicated to treat the unstable dorsal PIP fracture-dislocations that are not amenable to ORIF or volar plate arthroplasty. It also is indicated for chronic injuries in which bony fragments can no longer be reduced and maintained either internally or with external fixation. Ideally, this procedure is applied to fractures involving more than 50% of the articular surface of the middle phalanx that have compromised the entire volar buttress for the PIP joint.12

Hemihamate arthroplasty is contraindicated in PIP fracture-dislocations that involve both the volar and dorsal articular surfaces. In these instances, there is no solid dorsal cortex to which the hamate autograft can be fixed. Relative contraindications include near-complete fractures of the middle phalanx that leave only a small dorsal rim of intact surface and those injuries
with additional sagittal fracture lines visualized on AP imaging. In such cases, there is little remaining bone dorsally and, provided that the articular surface radius of curvature of the native middle phalanx is only 45% to 61% of the hamate, the replacement of the entire articular surface cannot be expected with the relatively flatter hamate. Fractures with substantial extension into the volar diaphysis of the middle phalanx should be approached with caution because of the large bony void likely to be encountered and the potential involvement of the insertion of the flexor digitorum superficialis.

**Surgical Technique**

The surgical technique for hemihamate arthroplasty has been described previously. Surgical exposure for hemihamate arthroplasty can be identical to that used for ORIF and volar plate arthroplasty. A large volar V-shaped incision is centered at the PIP joint, extending distally and proximally to the dorsal interphalangeal flexion crease and the metacarpal-phalangeal flexion crease, respectively. Both neurovascular bundles should be exposed and isolated. In chronic injuries, these bundles are encased in fibrotic tissues, and release is necessary to prevent traction injury during joint exposure. With the flexor pulley system exposed, a surgical window is opened between the A2 and A4 pulleys. The flexor tendons are retracted to either side while the lateral border of the volar plate and its distal insertion are released. The collateral ligaments are released off the proximal phalanx. The most efficient release of these collateral ligaments is done with a scalpel, starting within the joint and then passing proximally deep to the collateral ligament along the proximal phalanx medially and laterally to obtain a complete release. The PIP joint can then be hyperextended (or shotgunned) to visualize both articular surfaces as the flexor tendons fall to one side. In chronic cases, tenolysis of the extensor tendon is accomplished at this point by passing a Freer elevator along the proximal phalanx just deep to the extensor mechanism. Comminuted bony fragments are excised to leave a smooth surface to receive the hamate autograft, leaving small bony lips on the medial and lateral surfaces of the middle phalanx if possible. The remaining articular surface is débrided as needed to provide a transverse base on which to place the autograft. The ideal bony defect after preparation is somewhat triangular and becomes less deep moving distally away from the joint; this facilitates canting the graft appropriately during insetting. The remaining defect is measured for its width, depth, and length (Figure 8). The PIP joint is taken out of hyperextension during hamate harvest.

The hamate harvest can be accomplished through a transverse or a longitudinal skin incision over the fourth and fifth carpometacarpal (CMC) joint. Care should be taken in the subcutaneous tissues to preserve the sensory branches of the dorsal cutaneous branch of the ulnar nerve. The CMC capsule should be sharply incised longitudinally and elevated subperiosteally.
off the dorsal hamate and the base of the fourth and fifth metacarpal. This exposure should allow centering of the harvested hamate on its central ridge between the fourth and fifth metacarpal. The desired graft size is then marked, and initial bony cuts can be planned with K-wire puncture followed by an osteotome or simply cutting with an oscillating saw (Figure 8). Before harvesting the actual graft, it is helpful to remove a rectangular portion of the dorsal hamate just proximal to the intended graft to allow entry of a small curved osteotome to divide the deep portion of the graft. This deeper entry point will allow harvest of a more rectangular graft compared with a triangular graft. The CMC capsule may be closed after harvest.

The graft is then placed in the defect of the middle phalanx (dorsal hamate cortex now forming volar middle phalanx cortex), with the PIP joint hyperextended, taking care to cant the graft such that the volar buttress is restored compared with creating a flat volar surface for the PIP joint. The graft may be held provisionally with a K-wire before definitive fixation with two to three screws, typically 1.3 mm or 1.5 mm in size (Figure 9). The joint is then reduced, and stability is checked through a range of motions. Fluoroscopy should be used to demonstrate that the volar buttress was restored and the screw lengths are appropriate. The articular cartilage on the distal hamate is often thicker than that on the proximal middle phalanx, which results in a radiograph that demonstrates a graft that is slightly depressed, although direct vision will confirm appropriate alignment of the articular cartilage between the hamate and the native middle phalanx. The palmar-distal prominence of the graft in the metaphyseal region can be contoured gently with a rongeur. The distal corners of the volar plate are then repaired to the surrounding periosteum and the pulley remnant. The skin is closed in routine fashion, and a dorsal blocking splint applied.

### Postoperative Care and Outcomes

Patients are started on early active ROM within 1 week, with a dorsal blocking splint preventing the final 15° of extension at the PIP joint. Elastic garments are helpful for edema control. The patient pursues active motion within the confines of the splint, with more aggressive passive ROM done at 6 weeks or coinciding with radiographic union.

Outcomes of hemihamate arthroplasty are documented in only small series. Hastings et al originally described five cases with a resultant 77° of PIP joint ROM. In a series of 22 patients followed at a mean of 4.5 years, these joints had an average 19° flexion contracture and mean PIP flexion of 89° (PIP arc 70°). The PIP joint is expected to be somewhat larger than the contralateral side with well-preserved dorsal interphalangeal joint motion. Patient-rated outcomes are generally positive, with Disabilities of the Arm, Shoulder and Hand scores less than 10, which indicate minimal upper extremity disability, and visual analog pain ratings less than 2 of a possible 10. Potential complications—including lack of motion, iatrogenic fracture of the dorsal middle phalanx, and flexor pulley insufficiency—are possible and may necessitate salvage procedures. These outcomes are consistent with another small series from Switzerland, although revision procedures were performed in 4 of their 10 patients (PIP arthrolysis, screw shortening, and neurolysis of the dorsal cutaneous ulnar nerve). When PIP joints are treated on a chronic basis, outcomes
can be quite acceptable, although they are expected to be slightly more modest than in acute cases. Notably, in the three chronic cases that lost PIP motion after hemihamate arthroplasty, all had preoperative PIP motion arcs greater than 45°. Series by Calfee et al30 and Afendras et al31 have documented radiographic outcomes with joint space narrowing frequently observed at 4 to 5 years, with advanced arthritis in two of eight patients, although this finding failed to correlate with patient-rated outcomes.

To date, donor-site morbidity in the form of CMC joint instability or arthrosis requiring salvage has not been reported after harvest of the dorsal hamate. This is likely secondary to the large articular surface of the hamate relative to that needed for hemihamate arthroplasty (such that only 26% of the hamate articular surface is routinely required) and the CMC joints have retained mechanical stability after harvest in cadaver investigations.64,67

Summary
Dorsal PIP fracture-dislocations can be challenging to treat. There are many treatment options, with the choice depending on the characteristics of the fracture and the preferences of the treating surgeon. Patient outcomes may be improved with careful attention to fracture patterns, an understanding of the biomechanical issues associated with instability, and restoration of joint stability.

References


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**Video Reference**