

Outcomes of Closed Reduction and Periarticular Pinning of Base and Shaft Fractures of the Proximal Phalanx

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Purpose To review the results of periarticular pinning of extra-articular fractures of the proximal phalanx base and shaft.

Methods A retrospective review was performed of the senior author's practice (C.S.M.) from 2006 to 2012. The inclusion criteria were patients older than 18 years of age who underwent periarticular pinning of base or shaft fractures of the proximal phalanx. Age, sex, fracture location, fracture pattern, and time to surgery were recorded. Outcome measures were range of motion, time to healing, and complication rate.

Results A total of 43 patients with 50 fractures were identified. There were 19 men and 24 women with 16 shaft and 34 base fractures. Five fractures were open. The little finger was involved in 62%, the ring finger in 30%, and the index and middle fingers in 4% each. Most fractures were transverse or oblique, and just over half had comminution and/or impaction. Average follow-up was 17 weeks, and average time to clinical union was 35 days. Nine patients (18%) were lost to follow-up. Twenty-six fingers had excellent results (63%), lacking less than 10° of total motion. Seven patients (17%) had good results, lacking less than 20° of motion; 7 patients had fair results (17%); and 1 patient had a poor result. Three patients (7%) developed stiffness requiring tenolysis. There were 2 pin-site infections, 1 of which resulted in a loss of reduction. Results for shaft and base fractures were not significantly different.

Conclusions Percutaneous periarticular pinning is an acceptable option for unstable base and shaft fractures of the proximal phalanx. Most fractures healed within 4 weeks. The majority of patients had excellent or good results. (*J Hand Surg Am.* 2014;39(8):1524–1528. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Therapeutic IV.

Key words Base, percutaneous pinning, proximal phalanx, shaft.

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FRACTURES OF THE PROXIMAL phalanx are common and are typically caused by a fall on the outstretched hand or by a direct blow.^{1,2} Management depends on myriad factors including the mechanism of injury, fracture pattern, functional requirements of the patient, and surgeon experience. Operative intervention may involve closed reduction and percutaneous pinning or open reduction and internal fixation.³ There are theoretical benefits to each technique; closed reduction and percutaneous fixation

avoids the need for extensive soft tissue mobilization and dissection, whereas open reduction and internal fixation provides interfragmentary compression and the option for earlier mobilization.

Treatment with closed reduction and percutaneous pinning can be performed using a transarticular or periarticular technique and has disparate results in the literature. Some reports have described good results with bony union and minimal loss of motion.^{4,5} Others have reported marked resultant morbidity from surgical management requiring secondary procedures such as corrective osteotomy, tenolysis, or capsulotomy.^{6,7} Pin track infections, pin loosening, and nonunion can also occur.^{8,9} Such fractures can cause short- and long-term morbidity, with stiffness being the most common untoward outcome.¹⁰

It has been our experience that most patients do well following operative treatment of these fractures, although some patients require additional intervention for stiffness. The purpose of this study was to look retrospectively at our experience with periarticular percutaneous pinning of base/shaft fractures of the proximal phalanx and to determine the complication rate and need for subsequent procedures.

MATERIALS AND METHODS

A retrospective review was performed for the senior author's practice (C.S.M.) at a tertiary care academic hospital for patients presenting between June 2006 and September 2012. This study was reviewed and approved by the hospital's institutional review board. All patients who presented to the emergency department or to the senior author's clinic with a fracture of the base or shaft of the proximal phalanx, and who were treated with closed reduction and periarticular percutaneous pinning, were included in this study. The Current Procedural Terminology code 26727 was used to identify such patients through a search of the electronic medical record system, and operative reports and plain radiographs were reviewed to confirm the procedure performed.

Patients 18 years of age and older with open or closed fractures of the base or shaft of the proximal phalanx were included. Patients were excluded if they had other injuries or presented more than 2 weeks after injury. Recorded demographic information included the date of injury, sex, laterality of injured hand, specific digit(s) involved, location of fracture (base or shaft), fracture pattern (transverse, oblique, or spiral), presence of rotational or angulation deformity, presence of other associated injuries, and date of surgery.

All patients underwent closed reduction and periarticular pinning by the senior author (C.S.M.) (Fig. 1). Longitudinal traction was placed on the affected finger, and reduction was obtained and confirmed via fluoroscopy. The finger was placed in the intrinsic-plus position, and 2 Kirschner wires, either 0.9 or 1.1 mm, were placed from the radial and ulnar base of the proximal phalanx. The size of Kirschner wires was based on the caliber of the proximal phalanx and the fracture pattern. After proximal wire placement was deemed to be satisfactory, the fracture was held reduced, and the wires were drilled into the intramedullary canal of the distal fragment to obtain purchase in the subchondral bone of the head of the proximal phalanx, thereby obtaining bicortical fixation. The Kirschner wires were left outside the skin. Patients were immobilized in a plaster splint, which was changed to a thermoplastic splint in an intrinsic-plus position with the interphalangeal joints free 4 to 5 days later. At this time, patients began gentle active motion of the interphalangeal joints. Pins were removed 3 to 4 weeks after surgery, and patients started actively moving the metacarpophalangeal joints. Night splinting was continued for an additional 7 to 10 days, after which all splinting was discontinued and progressive strengthening of the hand was initiated.

After surgery, patients were followed in clinic with serial examinations. They were evaluated for total active range of motion, time until clinical healing as measured by absence of tenderness at the fracture site, complications such as pin track infection or loss of reduction, duration of follow-up, and need for additional procedures. We determined motion to be excellent (260° – 270° of total active motion), good (250° – 259° total active motion), fair (200° – 249° total active motion), or poor ($< 200^{\circ}$ total active motion).

RESULTS

A total of 43 patients with 50 fractures were identified as having undergone periarticular percutaneous pinning of proximal phalangeal fractures using the aforementioned inclusion criteria. The mean age was 44 years (range, 18–78 y), and there were 19 men (44%) and 24 women (56%). The mean duration from time of injury until surgery was 7 days (range, 1–16 d).

The little finger was the most commonly affected ($n = 31$, 62%) followed by the ring ($n = 15$, 30%), the index finger ($n = 2$, 4%), and the middle finger ($n = 2$, 4%). There were 16 shaft (32%) and 34 basilar (68%) fractures, and 5 fractures were open (10%). Most fractures were transverse ($n = 28$, 56%), followed by oblique ($n = 21$, 42%), and spiral ($n = 1$, 2%).

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