

Unstable Proximal Phalangeal Fracture of the Hand

Case Report and a Technical Note

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Abstract:

The current technique using K wires for the fixation of unstable proximal phalangeal fracture of the hand provides a stable construct without compromising joint mobility and soft tissue. These features are otherwise very difficult to fix. The technique involved antegrade introduction of K-wires from the proximal part aiming to the condyles and crossing the wires with the wire from the other condyle beyond the fracture plane to avoid distraction. The wires will then be pulled until the proximal end is buried in the condyles. The exit of the wires is proximal to the proximal interphalangeal joint.

Key words: Phalanx, Hand, Fracture, K. wire, Proximal, Metacarpophalangeal, Proximal interphalangeal, Joint, Unstable.

Introduction:

Stable fractures can be successfully treated non-operatively, whereas unstable injuries benefit from surgery. Regardless of the surgical intervention employed, the overriding goal is to restore anatomy and impart enough stability to allow for early motion. The surgical dissection contributes to soft tissue scarring and should be minimized. The goal of proximal phalangeal fracture management is to allow for fracture healing occurring in acceptable alignment while maintaining gliding motion of the extensor and flexor tendons⁽¹⁾.

Various techniques with different outcomes have been reported. Some of the techniques are percutaneous K-wires immobilizing the metacarpophalangeal

joint and open reduction and interosseous loop wire fixation, the results of the latter is reported to be better; however, the procedure is performed after open reduction⁽²⁾. The preference of subcutaneous K wire fixation is to leave the MCP and PIPJ free to move^(2, 3). Mini-fragment plate fixation is an attractive option; however, the soft tissue damage leaves the finger stiff⁽⁴⁾.

Material: 56 years old right handed handyman sustained an injury to left hand, when heavy object fell on it. He developed 10 cm palmar skin and subcutaneous wound without injury to the underlying tissues. He also sustained unstable proximal third, proximal phalangeal fracture of the ulnar three fingers; which was a closed injury.



Figure (1): Preoperative hand x-ray showing fracture of the proximal phalanx of the middle, ring and little fingers.

The patient underwent debridement and closure of the palm wound and the following technique for the fixation of

the phalangeal fractures. The outcome was satisfactory.

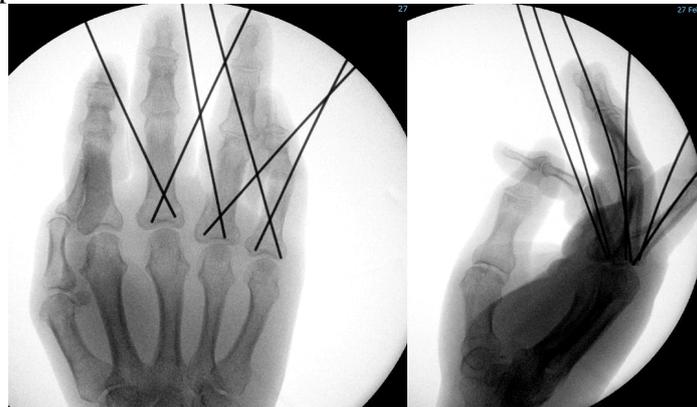


Figure (2): Anteroposterior and lateral radiographs of the hand after fixation.

The following technique achieves the required goal:

Under anaesthetics, the affected hand of the patient is put on arm table **closed manipulation** **guided by fluoroscopy** until **anatomical reduction is seen on anteroposterior and lateral views**. 1.2-1.6 K wire is chose and according to the age and the size of the phalanx. The K wire is slides at the side of metacarpal head from dorsum of the hand toward the affected finger. The Metacarpophalangeal (MCP) and proximal interphalangeal joints (PIPJ) are kept flexed after reduction of the fracture. The goal is for the K-wire to engage in the condyle of the proximal part of the phalanx

eccentrically. It is inserted across the fracture in an oblique cross fashion with the 2nd wire inserted from the other side. The site of the cross is planned to be located either proximal or distal to the facture site to avoid distraction of the fracture. The wires are then withdrawn from the phalangeal side until the proximal end is within the proximal condyles of the phalanx in order to avoid impingement of the collateral ligaments and allow MCP J movement. The distal end of the wires is left outside (or just inside) and bent. The tip of the wire is then sealed with the plunge of 2mls syringe on each side to avoid friction with their fingers.

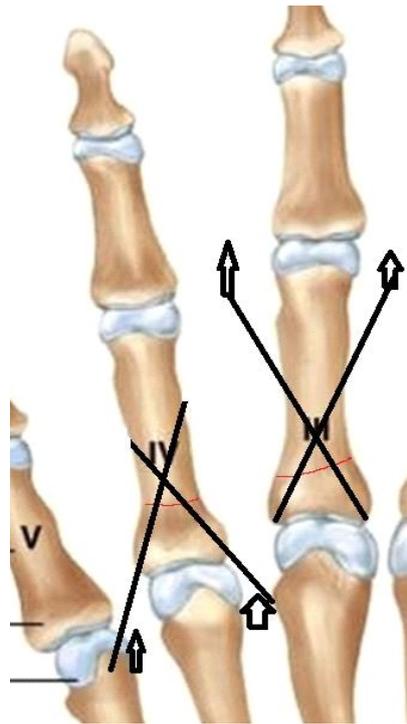


Figure (3): demonstrating the technique of fixation.

The finger web spaces are padded with dressing gauze. Edinburgh type back slab is applied and is removed with the wires between **3-5 weeks** after surgery, during this period, flexion of the finger is allowed and a **radiograph is obtained to ensure reduction and healing**. Free active movement of the finger is allowed. Follow-up at 5 months remained satisfactory with the patient regaining 90% of hand movement. Figure (2).

Discussion:

Unstable proximal phalangeal fracture often requires surgery when conservative management fails to reduce or maintain the reduction. Surgical fixation can be a challenging one. There are attempts to find a good fixation method (if any) in the literature. Attempts has been made to use headless intramedullary screws, these technique however evidenced in patient review studies (4, 5).

Open reduction and internal fixation using screw(s) or mini-plates; allow early movement, however, there often are stiffness, difficulty in the excursion of the tendon. Despite the development of new implant designs, significant problems persist. Adhesions of extensor tendons leading to limited range of finger motion are still the most frequent complications after open reduction and internal fixation of proximal phalangeal fractures, even in absence of significant soft-tissue (4, 6).

Closed reduction and K wire fixation is popular, however often the wire(s) interfere with the metacarpophalangeal joint (Trans articular wires) or the proximal interphalangeal joint for when cross wires are used (2). The current technique note of a method of fixation which spares both MCPJ and the PIPJ joint is expected to be associated with good functional outcome following these difficult fractures.

References:

- [1]. Al-Qattan MM. Phalangeal neck fractures of the proximal phalanx of the fingers in adults. *Injury*. 2010 Oct; 41(10):1084-9.
- [2]. Al-Qattan MM. Displaced unstable transverse fractures of the shaft of the proximal phalanx of the fingers in industrial workers: reduction and K-wire fixation leaving the metacarpophalangeal and proximal interphalangeal joints free. *J Hand Surg Eur* 2011 Sep; 36(7):577-83.
- [3]. Lögters TT, Lee HH, Gehrman S, Windolf J, Kaufmann RA. Proximal Phalanx Fracture Management. *Hand (N Y)* 2017 Oct 1:1558944717735947.
- [4]. Del Piñal F, Moraleda E, Rúas JS, de Piero GH, Cerezal. Minimally Invasive Fixation of Fractures of the Phalanges and Metacarpals With Intramedullary Cannulated Headless Compression Screws. *J Hand Surg Am*. 2015 Apr; 40(4):692-700.
- [5]. Borbas P, Dreu M, Poggetti A, Calcagni M, Giesen T. Treatment of proximal phalangeal fractures with an antegrade intramedullary screw: a cadaver study
J Hand Surg Eur Vol. 2016 Sep; 41(7):683-7.
- [6]. Beri-Thoma, Vogelin E, Franz T. Plate fixation of extra-articular fractures of the proximal phalanx: do new implants cause less problems? *Arch Orthop Surg*. 2015 Mar; 135(3):439-45.