

Reduction of Fifth Metacarpal Neck Fractures With a Kirschner Wire

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This article reports on a percutaneous joystick technique for reduction of fifth metacarpal neck fractures. The technique was performed in 76 hands. Reduction was achieved in all cases. The technique is a useful reduction maneuver in the treatment of fifth metacarpal neck fractures. (*J Hand Surg Am.* 2015;40(6):1225–1230. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.)

Key words Angulation, fifth metacarpal neck fracture, Jahss maneuver, reduction Kirschner wire, percutaneous pinning.

FIFTH METACARPAL NECK FRACTURES are among the most common fractures of the hand.^{1,2} Patients with fractures angulated more than 45° in whom reduction is not performed have less grip strength and poorer function.³

Closed reduction is commonly performed by the Jahss maneuver.⁴ Flexion of the metacarpophalangeal (MCP) joint to 90° relaxes the deforming intrinsic muscles and tightens the collateral ligaments. The physician then applies a dorsally directed force on the metacarpal head through the flexed proximal phalanx. However, the Jahss maneuver is not always successful at achieving reduction. Possible reasons include lack of physician experience, impaction of the fracture fragments, and certain oblique fracture patterns that counteract the reduction force. In addition, the maneuver produces compression force on the fracture site, which may shorten the metacarpal. Strauch et al⁵ demonstrated that every 2 mm of shortening results in 7° of extensor lag of the fifth MCP joint. An alternative reduction technique was reported by King and

Beckenbaugh⁶ but that method is even more complex. We have employed a percutaneous pin technique to reduce fifth metacarpal neck fractures.

The objective of this report is to describe a percutaneous joystick technique for reduction of fifth metacarpal neck fractures, followed by transverse percutaneous pinning. We also provide the results in patients treated with the technique. This reduction technique can also be a backup option when other closed reduction maneuvers have failed.^{7,8}

INDICATIONS AND CONTRAINDICATIONS

Indications

An indication for our percutaneous joystick reduction technique is a fifth metacarpal neck fracture with apex dorsal angulation over 45°, with or without a rotational deformity (Fig. 1).⁹ Patients who have failed Jahss or other reduction maneuvers are candidates, as well. The technique can also be used during open reduction, although our report includes only patients treated by percutaneous pin fixation.

Contraindications

Contraindications are severe comminuted fractures in which no fulcrum point exists for the reduction using a Kirschner wire. Closed reduction of fifth metacarpal neck fractures more than 2 weeks after injury often fails because fracture healing has already begun. Fractures in association with infection, rheumatoid arthritis, or gout may also be contraindicated. A fracture with palmar angulation is rare. A reduction Kirschner wire must then be placed in a reversed maneuver.

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FIGURE 1: Radiograph showing fifth metacarpal neck fracture.

SURGICAL TECHNIQUE

The surgeon uses a lateral radiograph to evaluate the fracture angulation of the fifth metacarpal. The operation is performed under local anesthesia without

pneumatic tourniquet control. The surface anatomy of extensor digiti minimi is marked with a pen. A 2-mm Kirschner wire is secured to a powered drill. There are 2 principles for wire placement (Fig. 2A, B). First, the skin insertion point is selected at the ulnar border of the extensor digiti minimi. The tendon is easily palpated as the patient actively extends the little finger. Injury or transfixion of the tendon must be avoided. Second, the Kirschner wire is tilted approximately 10° ulnarward in the dorsovolar sagittal plane.

Under fluoroscopic guidance, the operator holds the unpowered drill and inserts the reduction Kirschner wire manually into the dorsal fracture line of the metacarpal (Fig. 3A). A feeling of slight resistance indicates that the wire has traversed the fracture line. If the fracture line cannot be negotiated precisely, the wire is simply driven to engage into the palmar cortex of the metacarpal head but not to injure the articular surface (Fig. 3B, C). The drill is then disengaged (Fig. 3D). The reduction Kirschner wire is left in place and serves as a lever (Fig. 4). Digital leverage is applied to reduce the fracture (Fig. 5A). If rotational deformity persists, it can be corrected with the MCP joint flexed at 90°, as described by Jahss.⁴ We use fluoroscopy to check the accuracy of the reduction (Fig. 5B, C). Maintaining reduction, the assistant transfixes the metacarpal head with 2 Kirschner wires into the fourth metacarpal. An additional wire is used to transversely penetrate the fifth and fourth metacarpals proximal to the fracture. The wires are left protruding above the skin. Care is taken not to injure the dorsal branch of the ulnar nerve that runs a course on the dorsoulnar aspect of the fifth metacarpal. Once satisfactory reduction and pin seating are

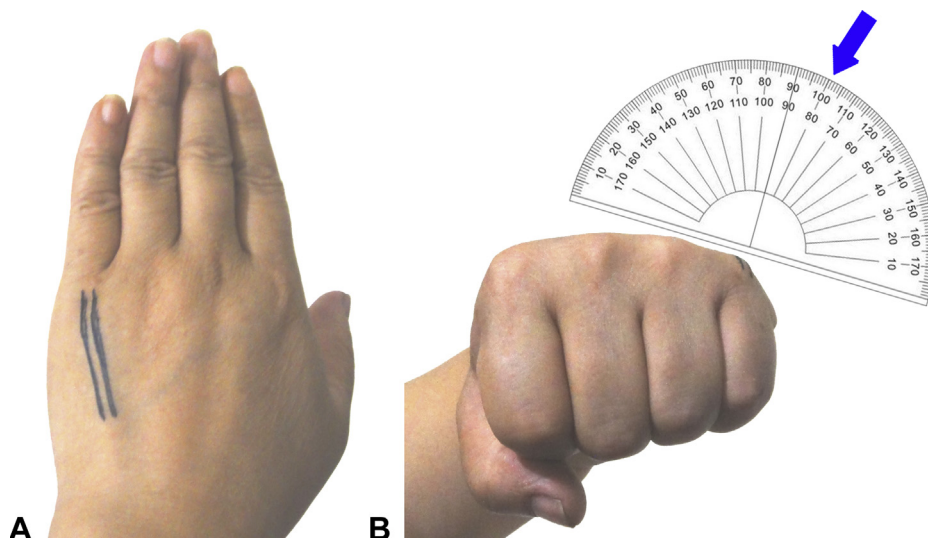


FIGURE 2: **A** The extensor digiti minimi is marked. **B** Insertion of the reduction Kirschner wire is tilted approximately 10° ulnarward.

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