



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

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Systematic Review on Antegrade Intramedullary Pinning versus Retrograde Intramedullary Pinning in Boxer`s Fracture

(A systematic review)

*Submitted for Partial Fulfillment of Master Degree
in Orthopedic Surgery*

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List of Abbreviation

Abb.	Full term
AIMN	Antegrade intramedullary nailing.
DASH score.....	Disabilities of the arm, shoulder and hand score.
DIP	Distal interphalangeal.
K-wire	Kirschner wire.
MCP	Metacarpophalangeal.
PIP	Proximal interphalangeal.
RCT	Randomized controlled trial.
PRIMA.....	Preferred Reporting Items for Systematic Reviews and Meta-Analyses.
MOOSE.....	Meta-analysis Of Observational Studies in Epidemiology
RIMN	Retrograde intramedullary nailing.
VAS.....	Visual Analogue Scale.

ABSTRACT

Background: The literature is limited concerning the issues of fracture in the fifth metacarpal bone with no robust evidence for the best treatment practice for metacarpal neck fractures. The purpose of this review was to investigate whether the antegrade intramedullary k-wires compared to retrograde intramedullary k-wires results in good clinical and radiological outcomes for displaced metacarpal neck fractures.

Aim of the Work: To perform a comparative systematic review to determine whether there is a significant difference in the clinical outcome and complication between antegrade and retrograde intramedullary nailing of fracture neck in Boxer's fracture.

Patients and Methods: We searched in four different databases for the relevant articles including PubMed, SCOPUS, and Cochrane Central Register of Controlled Trials (CENTRAL) till October 2020. We included randomized controlled trials (RCTs), comparative studies, prospective cohort, or retrospective charts studies that compared antegrade intramedullary k-wires to retrograde intramedullary k-wires in displaced fifth metacarpal bone. Our primary outcome was ROM, Grip strength, DASH and VAS. Our secondary outcomes were complication rates and other outcomes that were consistently reported across studies.

Results: From a total 224 screened citations, three studies met our inclusion criteria. All three studies reported that antegrade intramedullary pinning was superior to retrograde intramedullary pinning in term of ROM, VAS, grip strength, DASH scores and early return to work. Also antegrade intramedullary pinning had better satisfaction in terms of comfort and tenderness. But some theses clinical parameters become statistically non-significant between both methods with long duration of follow up. Both techniques had similar radiographic outcomes and improvement in preoperative angulation and shortening. We highlighted the need for a standardization of the outcomes across studies and the need for larger studies the compare between both techniques.

Conclusion: Antegrade intramedullary k-wires is superior to retrograde intramedullary k-wires regarding early restoration of hand movement in the short term follow up.

Keywords: Antegrade Intramedullary Pinning, Retrograde Intramedullary Pinning, Boxer`s Fracture



Introduction



Boxer's fracture

Metacarpal neck fractures account for 40% of all hand fractures. A fracture of the neck of the fifth metacarpal, or Boxer's fracture [1] (figure 1), named for the classic mechanism of injury in which direct trauma is applied to a clenched fist, is the most common, representing 10% of all hand fractures [2].

Etiology:

The most common mechanism of injury for Boxer's fracture is punching, e.g., the axial pressure applied to the metacarpal bone when the fist is in a clenched position. Direct trauma to the dorsum of the hand may also cause a fracture of the fifth metacarpal neck [3].

Pathophysiology:

Direct trauma to a clenched fist transfers energy to the metacarpal bone axially, causing fractures most commonly at the neck, and typically resulting in apex dorsal angulation due in part to the forces exerted by the pull of the interosseous muscles. The interosseous muscles, responsible for adduction and abduction of the fingers, originate from the metacarpal shafts and insert onto proximal phalanges. The collateral ligaments also join the metacarpal bones to the proximal phalanges and must be taken into consideration during splinting to minimize the risk of loss of motion due to shortening of the ligaments. The ligaments are taut in flexion, and more slack in extension [4].

Diagnosis:

History and physical examination:

Patients with Boxer's fractures present with complaints of dorsal hand pain, edema, and possible deformity in the setting of one of the mechanisms typically associated with this injury involving direct trauma to the hand. Complete physical exam of a potential Boxer's fracture should include an examination of the entire hand, comparison to the contralateral (presumably un injured) hand, with special attention to the following:

- **Neurovascular exam :** A neurovascular exam should test for sensation, motor function, and blood flow distal to the injury.
- **Angulation :** Boxer's fractures are typically associated with apex dorsal angulation, thereby resulting in depression of the MCP joint and loss of the normal knuckle contour.
- **Skin :** Closely inspect the skin for any breaks.
- **Malrotation :** can be detected by examining the hand with the MCPs flexed, and PIPs and DIPs extended. The finger nails should point towards the scaphoid tubercle [5].

Radiological Evaluation:

Plain radiographs are the standard of care to diagnose Boxer's fractures and determine a degree of angulation.

posteroanterior, lateral, and oblique views should be obtained. The lateral view should be used to measure the degree of angulation of the shaft of the metacarpal as compared to the mid-point of the fracture fragment. Normal angulation of the metacarpal head to the neck is 15 degrees [6].



Figure (1): A boxer's fracture is diagnosed using X-ray[7].

CT is generally not used for the diagnosis of metacarpal fractures; however occult fractures may be detected via CT [8].

Conservative management:

Closed reduction is required for a Boxer's fracture with significant angulation. The fifth metacarpal can tolerate angulation of up to 30 degrees. Closed reduction and immobilization is indicated for fractures with angulation greater than 30 degrees. Fractures with pseudo-clawing should also undergo closed reduction. Analgesia options for the procedure include a hematoma block or an ulnar nerve block [9].

Closed reduction of a Boxer's fracture by using the "90-90 method." The MCP, DIP, and PIP joints should all be flexed to 90 degrees. The clinician should then apply volar pressure over the dorsal aspect of the fracture site while applying pressure axially to the flexed PIP joint. This axial pressure to the PIP applies dorsal force to the distal fracture fragment. The injury should be immobilized with an ulnar gutter splint, and post- reduction films should be taken to assess for adequate reduction [10].