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Short Communication

# A New Fixation Technique for Oblique Metacarpal Fractures

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Hand fractures are prevalent in the general population, with manual workers and athletes who participate in contact sports (such as boxers and football players) showing a relative propensity [1]. A metacarpal fracture is a fracture in one of the five metacarpal bones of the hand. They are classified as head, neck, shaft, and base fractures (from the metacarpophalangeal joint distal to the wrist proximal) [2]. One of the most frequent metacarpal fractures is known as a boxer fracture and affects the fourth or fifth metacarpal. These injuries can occur as a result of direct strikes to the dorsal hand or axial loading pressures, among other mechanisms [3].

The metacarpals are a group of long, thin bones that are situated between the phalanges of the fingers and the wrist's carpal bones. Each has a base, a shaft, and a head. The metacarpals' proximal bases articulate with the carpal bones. The proximal phalanges and distal heads of the metacarpals join to produce the knuckles [4].

The shortest and thickest of these bones is the first metacarpal. A styloid feature on the lateral side of the base distinguishes the third metacarpal from its neighbours. Usually, soft tissues such cartilage, joint capsules, ligaments, fascia, and dorsal hood fibres are implicated with fractures. The tendons and nerves close to the fracture may also be damaged in cases of severe polytrauma [5].

Metacarpal fractures frequently follow a direct blow to the hand or a direct fall onto the hand. These fractures frequently take place during athletic activities, especially in contact sports [1]. Nearly one-fourth of incidents happen at sporting events. Younger patients typically have sports-related injuries as the root reason. Injuries sustained at work are also frequently the cause in middle-aged patients, while falls are typically the cause in older patients. The term "boxer's fracture" refers to the fifth metacarpal fractures that frequently follow hitting a wall or another solid object [6].

Metacarpal fractures generally affect people between the ages of 10 and 40. Men are more susceptible than women to being impacted. Young males who punch or are struck directly in the hand often suffer metacarpal fractures as a result. These injuries are caused by low-energy falls in elderly women [7].

From the radial to the ulnar side, there are more fractures that are associated with each digit's metacarpal bone. Second metacarpal fracture incidence is lower than fifth metacarpal fracture incidence. The most frequent fracture affecting the base of the thumb is the Bennett fracture. This fracture is an intra-articular fracture that separates the remaining first metacarpal from the palmar ulnar portion of the first metacarpal base [8].

The three types of metacarpal fractures are as follows

- The first, neck fractures, frequently happen when someone punches someone or something. The majority of the time, treating this issue does not require surgery.
- Longitudinal compression, torsion, or direct impact are common causes of fractures in the metacarpal shaft. They are classified as transverse, oblique, spiral, and comminuted based on how each of their individual fracture patterns appears.
- Because the joint moves very little, metacarpal base fractures are uncommon and have little impact. The fifth digit's base fractures, which are more frequent and are caused by a force that is directed longitudinally, are more common [9,10].

Closed reduction percutaneous pinning (CRPP) or open reduction internal fixation (ORIF) using plates and screws are used to treat metacarpal fractures. However, the management of metacarpal fractures with intramedullary screw fixation has been thoroughly described [11].

Nonunion, malunion, hardware migration, overcompression, and difficulties in managing rotational stability and translation of oblique fractures are risks associated with intramedullary fixation. A guide wire is retrogradely placed into the metacarpal head in the centre on a PA view and into the dorsal aspect of the metacarpal head in

line with the intramedullary canal on a lateral view to achieve intraoperative reduction of metacarpal fractures. The guide wire can then be covered with screws in either a retrograde or anterograde method. Screws can then be inserted in an anterograde or retrograde fashion over the guide wire Intramedullary fixation can also be performed via an anterograde approach using the dorsal metaphyseal cortex as the starting point [12].

The guide wire can then be covered with screws in either a retrograde or anterograde method. The dorsal metaphyseal cortex can be used as the starting point for an antegrade approach to intramedullary fixation [12].

Intramedullary device fixation may cause malreduction with sagittal or coronal displacement of the fractures in the case of oblique long bone fractures, particularly those not involving the isthmus [13].

In order to stop the translation of both the fracture fragments and implants, poller or blocking screws have been utilised as an additional form of fixation in lengthy bone fractures. Blocking screws are used to guide the intramedullary implant and restrict the effective size of the medullary canal, inhibiting translation [14].

This new technique showed better results regarding stability and early range of motion.

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