



# International Journal of Orthopaedics Sciences

ISSN: 2395-1958  
IJOS 2018; 4(4): 181-184  
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www.orthopaper.com  
Received: 02-08-2018  
Accepted: 03-09-2018

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## Study of cross pinning of metacarpal and proximal phalangeal fracture of the hand

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DOI: <https://doi.org/10.22271/ortho.2018.v4.i4d.32>

### Abstract

**Introduction:** A majority of metacarpal and proximal phalynx fracture can be effectively managed with closed reduction and cast and buddy taping. However a group metacarpal and proximal phalynx fractures are unstable and reducible, but difficult to put in reducible position within plaster cast or buddy taping till union of the fractures, for those fractures cross pinning with 'k' wires is required. Lots of other technique i.e. external fixation, miniplate, L pinning for fixation of metacarpal and proximal phalynx fracture are also available.

**Aim:** Aim of this study is Functional outcome of cross pinning of metacarpal and proximal phalanges fracture of the hand.

**Material and method:** 25 patients with metacarpal and phalynx fracture were treated with cross intramedullary 'k' wire fixation between June 2016 – 2018 in Pravara rural hospital-loni (Maharashtra).

Out of 25 patients 18 are males and 7 are females, of which 14 were having metacarpal fracture and 11 were having proximal phalynx fracture.

**Result:** All 25 patients were followed up for more than 3 months. 1 patient (female) developed sudecks osteodystrophy. At final follow up 4 patients had residual pain measuring 2-3 on visual analogue scale. All patients regained full range of motion at metacarpo-phalyngeal and interphalyngeal joints.

Fracture union was evaluated at each x-ray and patient satisfaction was evaluated as excellent, good, fair or poor.

**Discussion:** In our study early mobilisation of the joint to reduce the stiffness k wires used for fixation are cheap, easily available and doesn't require costly instrumentation.

Clinicoradiological confirmation was done at the end of every surgery to confirm acceptable reduction.

There was no clinical shortening of metacarpals and phalanges.

**Conclusion:** Comminuted fractures and intra-articular fractures, k wire not suitable.

It is relatively simple, cost effective and definite advantages over other techniques for fracture stabilisation.

**Keywords:** Hip fracture; Bone turnover markers; CTX; PINP; Vitamin D

### Introduction

A majority of metacarpal and proximal phalynx fracture can be effectively managed with closed reduction and cast and buddy taping. However a group metacarpal and proximal phalynx fractures are unstable and reducible, but difficult to put in reducible position within plaster cast or buddy taping till union of the fractures, for those fractures cross pinning with 'k' wires is required. Lots of other technique i.e. external fixation, miniplate, L pinning for fixation of metacarpal and proximal phalynx fracture are also available.

### Material and method

25 patients with metacarpal and phalynx fracture were treated with cross intramedullary 'k' wire fixation between June 2016 – 2018 in Pravara rural hospital-loni(Maharashtra).Out of 25 patients 18 are males and 7 are females, of which 14 were having metacarpal fracture and 11 were having proximal phalynx fracture.

**Commonest cause:** Mannual work related accident sport injuries.

### Technique

The patient was informed about surgical procedures and a written consent was obtained for metacarpal fractures brachial block was used and for proximal phalynx digital block was used Tourniquet was not required Under c- arm image guidance closed reduction of metacarpal fracture was achieved and two k wire of diameter 1.0 mm were used.

Two k wires are passed retrogradely on both sides of metacarpal head and pp.

The position of the finger in flexion and extension are checked to determine the rotation. Final x-ray conformation of adequacy of fracture was carried out. K wire were cut and bend and burried under the skin. Below elbow slab was applied in functional position for ten days in order to assist healing of soft tissues and to avoid post-op fracture displacement. Patients were advised to come for dressing and discharged on tha same day and followed on 10<sup>th</sup> day, 3<sup>rd</sup>

week, 4<sup>th</sup> week, 6<sup>th</sup> week after surgery with x-ray assessment at 3<sup>rd</sup>, 6<sup>th</sup> and 9<sup>th</sup> week.

Active assisted flexion and extension exercises of the fingers were started on 10<sup>th</sup> day after slab removal.

### Results

All 25 patients were followed up for more than 3 months.

All patients were given slabs and removed after 10 days and exercises were started, besides that 1 patient (female) developed sudecks osteodystrophy.

There was no measurable shortening or angulation or detectable rotational deformity post-op clinically. At final follow up 4 patients had residual pain measuring 2-3 on visual analogue scale. All patients regained full range of motion at mp and ip joints.

Fracture union was evaluated at each x-ray and patient satisfaction was evaluated as excellent, good, fair or poor.



Fig 1: Pre-op



Fig 2: Post-op



Fig 3: Pre-op



Fig 4: Pre-op

Passive range of motion started at 3-4 weeks when clinical and radiological union started achieving. Early mobilisation of the hand allowed us to avoid stiffness. At 6 weeks radiological assessment of fracture healing and alignment was done and k-wires were removed in opd.

Pain was evaluated at each visit using a visual analogue scale from 0 to 10. 0 was no pain and 10 was worst pain. Active and passive range of motion was measured using goniometer.

**Discussion**

Conservative treatment for undisplaced metacarpal and phalangeal fracture with slab and buddy taping gives excellent results. But for metacarpal fractures with dorsal angulation 72 degree and shortening about 5 mm and angulation in phalangeal fractures surgical treatment is needed.

Metacarpal fractures angulated dorsally because of unbalanced pull of interosseous muscles and extrinsic digital

flexors on distal fragment.

Inter carpal ligaments prevents more than 3-4 mm shortening, 2<sup>nd</sup> and 5<sup>th</sup> metacarpal likely to shorten more as they have suspensory effect of only one inter-carpal ligament.

7 degree extensor lag develops in a finger for each 2 mm of residual metacarpal shortening after bone healing. Metacarpals are very intolerant to malrotation.

5 degree malrotation may translate into 1.5 cm digital overlap during finger flexion.

Proximal phalynx fractures typically exhibit palmar angulation because of muscle imbalance.

Proximal fragment flexed by intossei insertion and distal fragment is extented by central extensor slip.

Palmar angulation causes shortening of pp. 1 mm shortening causes extensor lag averaging 12 degree.

1. Open reduction and internal fixation of metacarpal and phalangeal fractures with mini plates have many

complications like infection, stiffness, painful implant which needs removal.

2. External fixation leads to over distraction leading to delayed union or nonunion, pintrack infection and some time cause fractures through pin hole.

In our study early mobilisation of the joint to reduce the stiffness k wires used for fixation are cheap. Easily available and doesn't require costly instrumentation.

Clinicoradiological confirmation was done at the end of every surgery to confirm acceptable reduction.

There was no clinical shortening of metacarpals and phalanges.

### **Conclusion**

Comminuted fractures and intra-articular fractures, k wire not suitable.

It is relatively simple, cost effective and definite advantages over other techniques for fracture stabilisation.

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