



MANAGEMENT OF UNCOMMON INJURY OF 2ND METACARPOPHALANGEAL JOINT (KAPLAN'S DISLOCATION) BY OPEN DORSAL APPROACH: A CASE REPORT

Orthopaedics

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ABSTRACT

Introduction: The first Metacarpophalangeal (MCP) joint is among the most commonly injured joints in the hand, it is because of the significant contribution of the thumb to overall hand function and its amenability to injury in work and sporting activities. In contrast to MCP dislocation of the thumb, dislocation of the other MCP joint is an uncommon. Kaplan dislocations following trauma are of rare occurrence. An uncomplicated MCP joint dislocation can be managed by closed reduction but complicated dislocation always needs open reduction for better outcome. **Case Report:** Here, we present a case of 26 year old male with 3 months old fracture dislocation of 2nd MCP joint Right hand, which was managed by open dorsal approach with proper reduction, k wire fixation and good functional outcome. **Conclusion:** We experienced when dislocation is complete, with the head of the metacarpal displaced towards the volar side and the base of the phalanx towards the dorsal side, the dorsal approach of is found to be safe and simple with good visualization, negligible injury to Neurovascular structure and better fixation

KEYWORDS

Kaplan fracture, dorsal approach, fibrocartilagenous Volare plate, k wire

INTRODUCTION

The first Metacarpophalangeal (MCP) joint is among the most commonly injured joints in the hand, it is because of the significant contribution of the thumb to overall hand function and its amenability to injury in work and sporting activities.

In contrast to MCP dislocation of the thumb, dislocation of the other MCP joint is an uncommon. Kaplan dislocations following trauma are of rare occurrence. An uncomplicated MCP joint dislocation can be managed by closed reduction but complicated dislocation always needs open reduction for better outcomes [1, 2]

Most MCP joint dislocations occur as a result of hyperextension of the joint, figure 1 [3].

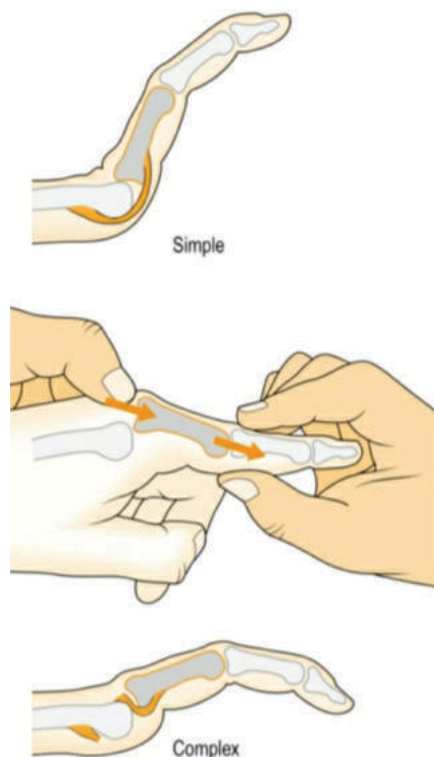


Figure 1: Technique for closed reduction

The dislocation can be reduced easily by giving a metacarpal block and by applying gentle traction, flexion of the wrist and finger, and pressure over the metacarpal base, allowing it to slide back into position.

Failure to reduce the dislocation may result from interposition of an avulsed volar plate within the joint or 'button-holing' of the metacarpal head between the flexor tendons and lumbricals [3].

The term complex dislocation was first coined by Farabeuf and later Kaplan in his article described the numerous anatomical interposing structures which prevent reduction by closed methods which necessitates open reduction [4, 5]

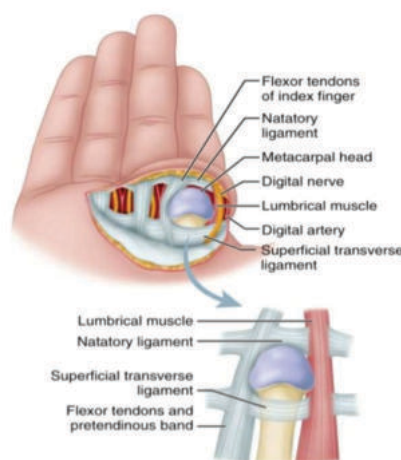


Figure 2: Anatomy of Volar Pad

Normally, the MCP joint dislocation prevented by the strong capsulo-ligamentous attachments. The capsule on the volar side anchored to the metacarpal proximally and proximal phalanx base distally is strengthened by the volar plate. On the radial side, the deep transverse metacarpal & collateral ligaments provide protection, while ulnar wards it is the extrinsic & intrinsic tendons along with the sagittal bands providing additional support thus preventing dislocation. However, due to extra force of injury the volar plate & capsule which has a thin attachment to the metacarpal; breaks & dislocation eventually occurs. The culprit is usually the volar plate which prevents relocation by closed methods. A fall on hyperextension of the finger is

usual mode of injury. The volar plate snap from its proximal attachment of metacarpal neck most often maintaining its attachment to deep transverse ligament. It then lie between the metacarpal head & proximal phalanx, which cause impediment and difficult closed reduction. Further the ulnar side flexor tendons along with the pretendinous band of palmar fascia & the lumbricals radial ward form a dense constriction noose or a button hole like phenomenon for the head of the metacarpal preventing its reduction Attempt to do closed reduction in these situations will tighten the noose around the head and vigorous multiple attempts may lead to fracture of metacarpal head. Hence open reduction is imperative in this condition. The index finger is most commonly affected followed by the little finger. However the ring & the middle fingers escape isolated injuries due to support from neighbouring digits & strong deep transverse metacarpal ligaments. Proper clinical examination & radiological assessment is a must to identify this condition & treat with accordance. For open reduction - the dorsal & the Volar, are the two primary approaches described. Though, the right approach to treat such lesions is still a debate it is the volar approach which is widely used & described more in literature. Some prefer dorsal approach. Volar approach is precarious to injure the neurovascular structures [6,9]

Pathognomonic Of Complex MCP Dislocation

Puckering of palmar skin over metacarpal head [7] Pain and loss of motion are seen in cases presenting early whereas osteonecrosis and arthritis are seen as late complications of MCP joint dislocation [8].

Ligamentous injuries without dislocation are relatively rare in the MCP joints of the fingers, owing to their inherent stability. The radial collateral ligaments (RCLs) are often the most commonly injured structures when compared to ulnar collateral ligaments (UCLs) of each MCP joint. There is an especially high propensity for injury to the RCL of the index finger. As with all ligamentous injuries, splinting, and rehabilitation are necessary. With complete dislocation and recurrent instability, surgery is often indicated and provides better outcomes. [1]

CASE REPORT

A 26 year old male labourer by profession presented to Orthopaedic OPD with pain and deformity over right hand, around index finger for 3 months after slip and fall on outstretched hand while running.

Deformity made it difficult for him to perform his day to day activity. According to patient he underwent closed reduction multiple times, at another institute, but with no success.

Getting no acceptable outcome, patient came to ELMC and Hospital after 3 months of injury, for further investigation and management.

On examination visible swelling of around 2x2cm present at the radial aspect of proximal palmar crease with hyperextension at 2nd MCP joint. The distal and proximal interphalangeal joints were flexed.

On palpation no local rise of temperature was there, smooth round shaped bony mass due to displaced 2nd metacarpal head on volar aspect was formed Range of Motion was restricted and Neurovascular status was intact.



Figure 3. Clinical Picture



Figure 4. Digital X-Ray Right Hand AP/Oblique View Xray suggestive of dorsal displacement of proximal phalanx

Based on number of days of injury and x-ray findings, dorsal open reduction and k wire fixation was done under c-arm guidance and post operatively cockup slab was given for 6 weeks

Surgical Procedure

Patient was placed in supine position with arm abducted and placed on side bar, brachial block was given and tourniquet was applied. Surgical site was painted with 10% Povidine Iodine solution and draped with sterile sheets. The midline incision of 5cm was given over 2nd Metacarpophalangeal joint, skin and subcutaneous tissue was exposed along with extensor tendon and joint capsule was split longitudinally.

Fibrocartilagenous volar plate was identified and split longitudinally, traction was given and by flexing the metacarpophalangeal joint reduction was achieved.

2mm k wire was placed vertically from head of proximal phalanx to shaft of 2nd metacarpal bone.

The capsule was sutured and extensor tendons was reconstructed using vicryl 5-0. The wound was washed with normal saline and incision was closed taking simple sutures. Dressing was done under all aseptic precautions and a cockup slab was applied. No neurovascular damage was noted post-operatively



Figure 5: Puckering of skin on volar side disappears as dislocation relocated

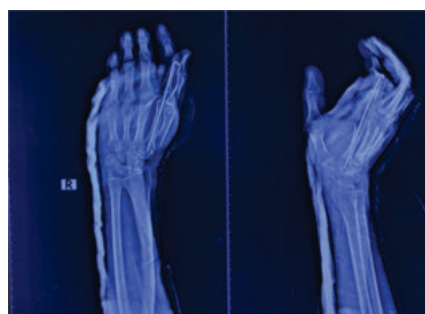


Figure 6 : Immediate postoperative X-rays show reduced second metacarpophalangeal joint

Follow-up

On Post operative day 2 dressing was done and patient was discharged with advice for follow-up on Post-operative day 5, day 10 and day 12. On Post-operative day 12 suture was removed.

Patient was followed weekly for first 6 weeks and k wire was pulled out at 6th week. Physiotherapy was started after slab removal at 6th week in the form of joint flexion and extension exercises.

As follow-up after 6 weeks, the patient's active range of motion consisted of metacarpophalangeal joint hyperextension to 10° and 75° of flexion, proximal interphalangeal joint extension to 0° and flexion to

70°, and distal interphalangeal joint extension to 0° and flexion to 60°. Neurovascular status was intact. X-rays confirmed maintenance of reduction.

DISCUSSION

It was Becton et al who reported a series of 9 cases complex MP joint dislocations treated by volar and dorsal approaches. He found that few patients treated with volar approach had a sensory loss on the radial aspect of the affected finger while those treated with dorsal approach had full recovery with normal function. He concluded that dorsal approach was the right approach to treat such lesions [10].

CONCLUSION

Dorsal and volar both approaches can be used for the complex dislocations of MCP joint. As discussed earlier the Dorsal approach is best in view of reducing the possibility of neurovascular compromise. Though, extensive follow-up and clinical evaluation should be executed so as to thoroughly assess the radiological and functional outcome.

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