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Original Article

# An Easy Method to Reduce Complex Second Metacarpophalangeal Joint Dislocation

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## Abstract

**Introduction:** Dislocation of metacarpo phalangeal joint of index finger is an uncommon injury encountered in day today practice. Though closed reduction is tried, the head of the metacarpal bone is button holed within capsule- ligamentous attatchments resulting in the need of surgical intervention. In this study, we advocate a percutaneous dorsal approach to reduce the dislocation.

**Aim:** To evaluate the effectiveness of percutaneous dorsal incision over open surgical intervention in the patients with metacarpophalangeal joint dislocation.

**Materials and Methods:** This prospective study was done in Thanjavur medical college from 2010-2017 for a period of seven years after getting approval from the ethical committee. Twenty patients with complex MCP joint dislocation were included in the study. Informed and written consent is obtained from the participants. All the patients were subjected to X-ray examination of the hand to assess the bony injuries and joint status. Percutaneous dorsal incision was made to reduce the dislocation. All the patients were followed up for 3 months and the results were analysed.

**Results:** The final results showed good joint mobility without stiffness in 16 patients, stiffness of the joint in 4 patients and no recurrent dislocations were noted.

**Conclusion:** Complex dislocation of Metacarpophalangeal joint of index finger which is irreducible by closed manipulation is best approached by percutaneous incision. This technique is easier, simpler with minimal neurovascular injuries. Further clinical evaluation is to be done to assess the effectiveness of this method.

**Key words:** Complex MCP joint dislocation, Dorsal approach, Percutaneous incision, Volar plate

## INTRODUCTION

Hand injuries are very commonly encountered in orthopedic practice. Metacarpophalangeal joint dislocations are less common than interphalangeal joint dislocation because the MCP joint dislocation is prevented by the strong capsulo-ligamentous attachments. Kaplan's original description clearly indicates the pathoanatomy of metacarpophalangeal (MCP) dislocation - the fibrocartilaginous plate avulses from its weakest attachment, that is, the volar aspect of the metacarpal neck with the flexor tendons and the pre-tendinous band displaced ulnarly and the lumbricals displaced radially to the metacarpal head.[1]

Complex MCP joint dislocation is frequently seen in the index finger. Closed reduction under regional anesthesia often fails as the flexor tendons along with the pre-tendinous band of palmar fascia and the lumbricals form a tight constriction noose around the head, leading to irreducibility of the dislocation.

Therefore, open reduction is preferred in the majority of the cases. The common method of open reduction is Kaplan method when there is no associated fracture. If an associated fracture of the metacarpal head is present, then Becton's method of open reduction by dorsal method is preferred.

This study was conducted to evaluate the effectiveness of percutaneous dorsal incision over open surgical intervention in the patients with MCP joint dislocation.

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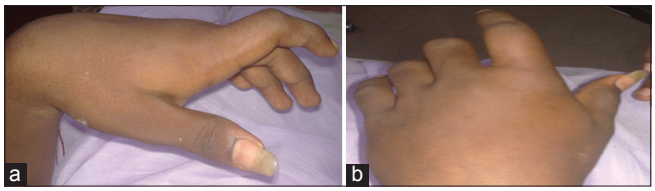


**Figure 1: (a and b) The clinical picture of a case**

**Figure 2: Pre-operative radiograph**

**Figure 3: Intraoperative picture showing incision over dorsal aspect**

## MATERIALS AND METHODS

This prospective study was conducted in Thanjavur Medical College from 2010 to 2017 for 7 years after getting approval from the Ethical Committee. 20 patients with complex MCP joint dislocation were included in the study. Informed and written consent is obtained from the participants before enrollment into the study.

Of the 20 cases, 14 were male and 6 were female patients. Time of presentation is between 0 and 18 days. 14 patients has history of alleged self fall on the outstretched hand. 6 patients has history of alleged RTA. The classical history of hyperextension of the MCP joint could not be made out even with specific leading question All the patients

**Figure 4: Post-reduction clinical picture after procedure showing reduced metacarpophalangeal joint**


**Figure 5: (a and b) Post-operative radiographs of the patient**

were subjected to X-ray examination of the hand to assess the bony injuries and joint status. All the cases were assessed for emergency reduction under regional anesthesia [Figures 1 and 2].

### Procedure

Under local anesthesia with sterile aseptic precautions, upper limb is painted and draped. Metacarpal dorsal surface is palpated with deep palpation. Using 11 size blade soft tissue that is present over the dorsal surface of metacarpal shaft is incised longitudinally till the neck of metacarpal bone. This incision will usually incise dorsally displaced volar plate which lies as a block. Once after incising the soft tissues, with gentle traction and corrective manipulation, dislocation is reduced by easy means [Figures 3 and 4] intraoperative post-reduction picture. The hand is immobilized in ball bandage with 2$^{nd}$ MCP joint in 90° flexion.

### Post-operative Protocol

The hand is immobilized in ball bandage for 1 week, later dressing is removed and active mobilization of hand is started. The patient regained full range of movements by 3 weeks. The patient is reviewed by 6 weeks and 12 weeks for evaluation regarding disability.

The patient's active range of motion of MCP joint hyperextension to 10° and 90° of flexion, proximal interphalangeal joint extension to 0° and flexion to 70°, and distal interphalangeal joint extension to 0° and flexion to 60° is evaluated.

Neurovascular evaluation was within normal limits. X-rays confirmed maintenance of reduction. Patients did not have any functional disability, collateral ligaments healed well by a period of 12 weeks and did not show any instability [Figure 5].

## DISCUSSION

Kaplan's lesion is a rare injury. This injury commonly involves the index finger at the MCP joint. Kaplan was the first to describe this injury, where the capsulo-ligamentous structures prevent the closed reduction necessitating the open reduction.

Two main approaches have been described for open reduction - volar and dorsal. In volar approach, it was required to extensively release the volar structures along with the volar plate. The risk to radial neurovascular bundle (digital nerve and vessel) is high[6]. In dorsal approach, the risk of injury to the neurovascular bundle is much less as it lies between the MC head and skin volar wards. It was Becton *et al*. who reported a series of 9 cases complex MP joint dislocations treated by both approaches.

A direct dorsal longitudinal incision through the skin and extensor tendon gives full exposure. The volar plate attached to the proximal phalanx and trapped over the dorsal aspect of the metacarpal head is in full view.[1]

He found that patients treated with volar approach had a sensory loss on the radial aspect of the injured 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.[1]

Kaplan also advocated the need to release the superficial transverse metacarpal ligament and distal transverse fibers (natatory ligament). The risk of iatrogenic dislocation following release of ligaments is also reported. The deep transverse metacarpal ligament is also an important impediment for reduction at times.[2] It was Murphy who reported the role of volar subluxation of deep transverse metacarpal ligament which forms a part of the noose around the head of MC and prevents reduction.[3] This needs release if it prevents reduction.

The structure which is blocking the reduction is the volar plate which dislocates dorsally and lies between the joint.[4,5]

Based on the above studies, we preferred the dorsal approach as it is less invasive. In this technique, the volar plate is released by the percutaneous method. The tip of the knife rests over the bone and release is made along the shaft till it reaches the neck of metacarpal bone. This incision releases the volar plate by splitting it in the middle. Once the blocking tissue is released, the reduction is attained with minimal manipulation.

Volar plate, as mentioned earlier, provides stability to the joint volar wards. Longitudinal splitting of this volar plate is usually criticized as it causes delay in the recovery, needs more immobilization, and leads to instability of the joint which may result in iatrogenic dislocation or subluxations later. [7] However, in our study, we did not encounter any of this complication. The final outcome did not change.

## CONCLUSION

Complex dislocation of MCP joint of index finger which is irreducible by closed manipulation is best approached by percutaneous incision. This technique is easier, simpler with minimal neurovascular injuries. However, extensive follow-up and clinical evaluation should be executed to thoroughly assess the effectiveness of this method.

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