Trauma Case Reports 18 (2018) 31–36

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

# Indication for CT following index finger metacarpophalangeal joint dislocation – A case report

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ARTICLE INFO

*Keywords:*
Dorsal MCPJ dislocation
Index finger
CT

ABSTRACT

Currently Kaplan's criteria on examination are used as the gold standard diagnostic tool for complex dorsal dislocations of the index finger Metacarpophalangeal joint. Our case report reveals a situation when the diagnosis was obscure and when conventional X-rays were not beneficial.

With the use of CT imaging we were able to confirm the diagnosis of complex dorsal dislocation of the index finger Metacarpophalangeal joint and also reveal multiple other injuries. We feel that CT imaging should be performed on every individual who has been diagnosed with this injury or where the diagnosis cannot be confirmed with conventional methods.

CT can be useful in diagnosis of index finger Metacarpophalangeal joint dislocations and also in diagnosing other fractures that may have been sustained in this high energy/impact injury.

## Introduction

Complex dorsal dislocation of the Metacarpophalangeal joint (MCPJ) of the finger is an uncommon injury. Most often, it is caused by the patient falling on an outstretched hand hyperextending the joint. A large force is required to cause this injury.

Kaplan described the mechanism of injury, pathological anatomy, clinical features and method of treatment in 1957 [1]. He suggested that diagnosis could be reached on the basis of clinical examination (puckering of the palmar skin over the joint), and X-rays which show widened joint space on AP view and dorsal dislocation of the proximal phalanx the on lateral view [2]. These criteria are still used today in clinical practice and would be the indication for operative management.

We present our case report of a patient who sustained a complex dorsal dislocation of the MCPJ of the index finger. The patient presented 10 days after injury when the diagnosis could not be made by Kaplan's criteria. A CT scan was performed which aided, not only in reaching the diagnosis, but also revealing other injuries which were not suspected.

## Case

### *History*

63-year-old right handed patient, fell whilst working abroad. Injuries were sustained to the left hand. The patient was initially

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https://doi.org/10.1016/j.tcr.2018.11.014
Accepted 23 November 2018
Available online 27 November 2018

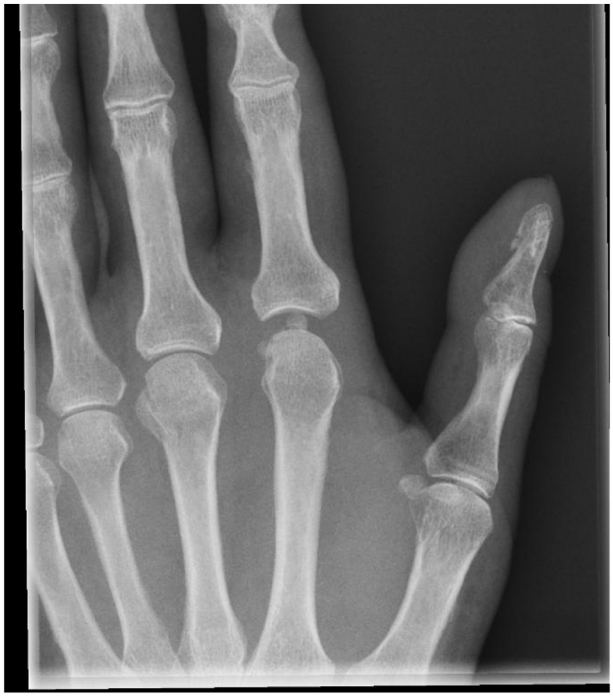

**Image 1.** AP view of the 2nd MCPJ which reveals widening of the joint space.

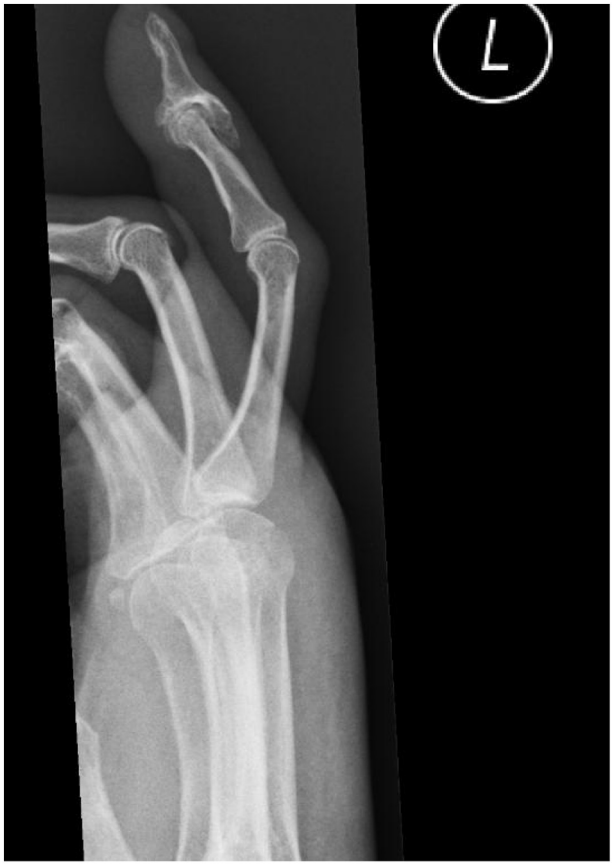


**Image 2.** Lateral view of the index finger, which does not determine if dislocation present.

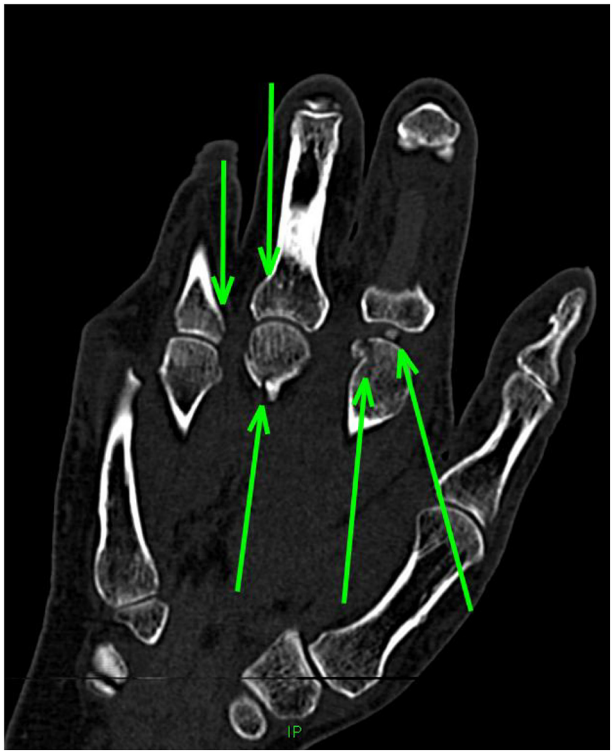


**Image 3.** Coronal view of the hand. Reveals fractures of the head of the 2nd metacarpal, head of the 3rd metacarpal, 3rd proximal phalanx and 4th proximal phalanx. Opacity in the 2nd MCPJ is sesamoid bone.

taken to the nearest hospital, where an X-ray revealed an MCPJ dislocation. A reduction of the injury was attempted under gas/air and ring block. After repeat X-rays it was thought that the injury was not successfully reduced as there was widening of the joint space. The patient's case was discussed with a hand unit in the same area as the injury and it was decided to transfer the patient for further management. The patient decided against transfer so that management could be continued at a local hospital closer to home.

The patient presented to the senior author 10 days post injury. Complaints included, swelling of the hand, pain in the index, middle and ring fingers with inability to move them. Unfortunately, the notes and images from the presenting hospital were not available for us to view.

*Examination*

Examination confirmed marked swelling of left middle, ring and index fingers. The index finger was held in 20 degrees flexion at the proximal interphalangeal joint (PIPJ) with mild ulnar deviation. No puckering on the volar aspect of the MCPJ was seen. There was tenderness of the MCPJ and PIPJ of the index finger, more marked at the MCPJ. Flexor Digitorum Superficialis and Profondus tendons were found to be intact. There was numbness of the radial border of the index finger.

*Investigations*

X-rays of the fingers showed widening of the MCPJ of the index finger (Image 1). Lateral views did not show any abnormality (Image 2). After discussion with a radiologist, a CT scan was organised as a dislocation was not obvious.

The CT scan revealed a dorsally subluxed proximal phalanx of the MCPJ (Image 4). Within the MCPJ 3 mm well corticated loose body (dislocated sesamoid) was seen. Another dislocated sesamoid was seen on the ulnar aspect of the MCPJ. In addition, intra-articular fracture of the head of the index finger metacarpal, bases of the proximal phalanges of the middle and ring fingers and impacted fractures of the metacarpal heads of the middle and ring fingers were seen (Image 3). These fractures were not seen on plain X-ray.

The patient was informed of the various injuries and told about the severity of the injury to the MCPJ of the index finger. It was decided to reduce the dislocation surgically using a volar approach because of the delay in presentation which may make reduction difficult. In addition, it was felt that the radial neurovascular bundle should be inspected because of the numbness elicited on examination [3,4].

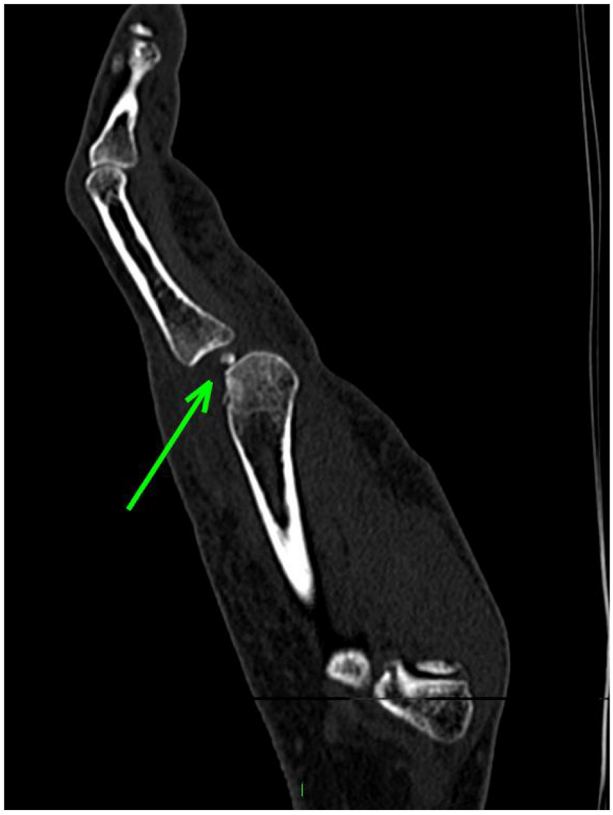

**Image 4.** Sagittal view of the index finger. Sesamoid bone within the MCPJ can be seen. There is dorsal subluxation of the proximal phalanx on the head of the 2nd metacarpal.

*Management*

At exploration, radial neurovascular bundle was found to be superficial, intact but stretched over the metacarpal head which was prominent.

Flexor tendon was subluxed on the ulnar side of the metacarpal head with the lumbrical present on the radial side. Volar plate was found in the MCPJ.

A1 pulley was divided to mobilise the flexor tendon. Volar plate and a fragment of bone was removed from the joint and which was then reduced. The other fractures noted on CT were treated non-operatively with early mobilisation.

*Follow-up*

The patient was reviewed postoperatively and referred for physiotherapy but the patient's compliance was poor. 2-week post-op X-rays were taken which confirmed that there was no gap in the MCPJ (Image 5 and Image 6).

3 months post-injury, the patient had lost all the pain, was distally neurovascularly intact and had started to use the hand normally. Repeat x-rays showed normal joint alignment.

## Discussion

Dorsal dislocation of the MCPJ of the index finger has been described in case reports and small case series. Kaplan described the clinical features and diagnostic criteria for this injury [1]. X-ray is used to confirm and make the diagnosis.

In our case report, the patient presented 10 days after the injury. The patient had one radiological feature of MCPJ dislocation according to Kaplan criteria.

In the literature displacement of the radial neurovascular bundle over the metacarpal head has been described [4] but neuropraxia as experienced by our patient has not been described.

Sesamoid entrapment in MCPJ dislocation has previously been noted by Baltas D's case report [5]. The case report suggested that sesamoid entrapment was visible on plain X-rays. In our case, CT imaging confirmed that one sesamoid was inside the MCPJ causing subluxation. The CT scan also revealed multiple other fractures which were not noted on plain films.

On review of the literature, we have found one other case report of MCPJ dislocation where CT scan was used [6]. The scan

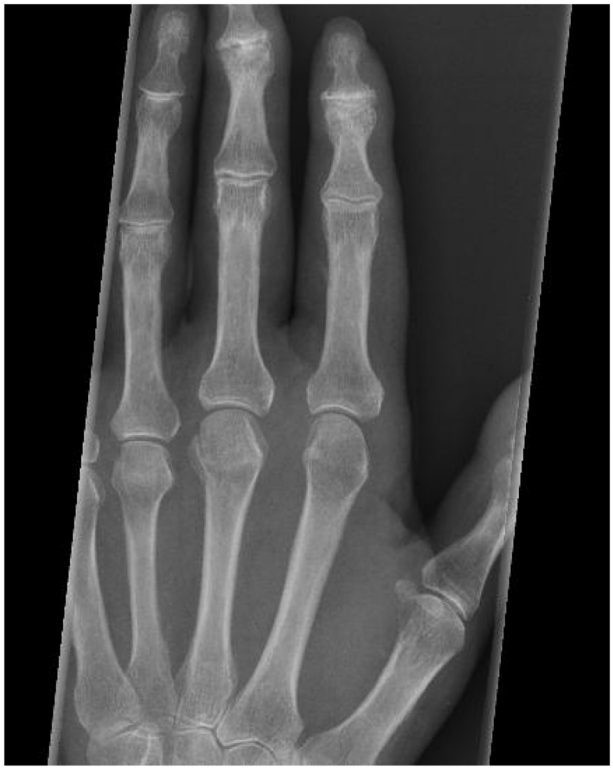

**Image 5.** 2-Week post-operative AP view of the left. The pre-operative MCPJ gap is no longer present. There is no sesamoid bone within the joint.

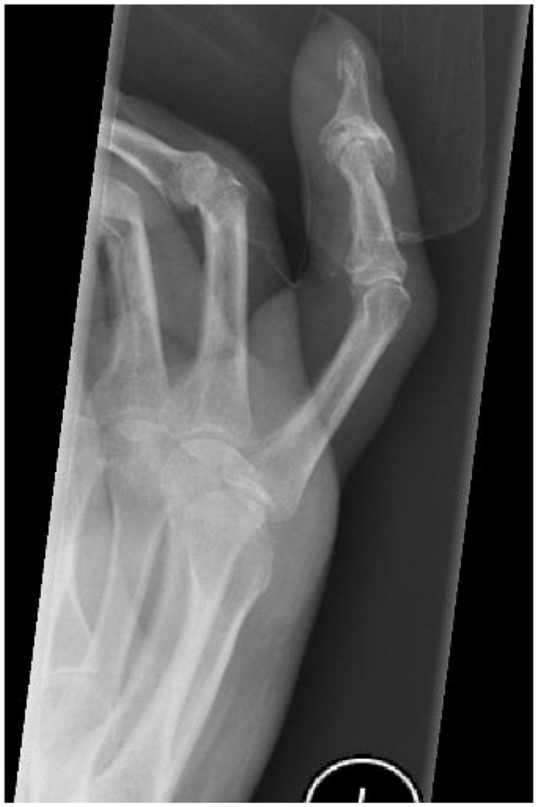

**Image 6.** 2-Week post-operative lateral view of the index finger. Subluxation at the MCPJ is no longer evident.

revealed an avulsion fracture of the metacarpal head which locked the joint. This differs from our case, in that the patient had a palmar dislocation of the little finger rather than the index finger. However, it highlights the usefulness of CT scan in diagnosing the cause of irreducible dislocation. At surgery, we noted that lumbrical and flexor tendon interposition was present and this could be a contributory factor as stated by Orozco et al. [7].

Dorsal approach has been described as being quicker and less invasive as only one incision is likely to be required [8]. However, we favoured the volar approach to make the reduction easier as the offending structures (lumbricals, flexor tendon and volar plate) were all volar. In addition, as the patient had neuropraxia we felt it was necessary to inspect the neurovascular bundle.

## Conclusion

Cause of irreducible dislocation of the MCPJ of the index finger cannot always be made by characteristics described by Kaplan. A CT scan may be necessary especially in late presentation. The CT scan can also reveal other injuries which can affect management.

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