

Isolated Comminuted Fracture of the Trapezium: A Case Report and Review of the Literature

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Citation

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Abstract

Carpal fractures are poorly recognised by junior and non-orthopaedic medical staff due to the small size and the complex arrangement of carpal bones. Scaphoid fractures comprise 70%^{1,2} of all carpal fractures. In contrast, trapezial fractures represent only 0.4% of all carpal injuries³. This is a case of a major trauma where the trapezial fracture could easily have been overlooked.

INTRODUCTION

Carpal fractures are poorly recognised by junior and non-orthopaedic medical staff due to the small size and the complex arrangement of carpal bones. Scaphoid fractures comprise 70%^{1,2} of all carpal fractures. In contrast, trapezial fractures represent only 0.4% of all carpal injuries³. This is a case of a major trauma where the trapezial fracture could easily have been overlooked.

CASE PRESENTATION

A 31 year-old, right-handed, on duty police officer was struck by a van whilst riding his motorcycle at 50km/hr. There was loss of consciousness for an unknown period of time and the patient was amnesic of the events of the accident.

The patient presented to a tertiary trauma centre with a right sided pneumothorax and bruising over the thenar eminence of his left hand. A chest drain was inserted in Emergency Department. Initial radiographs (Figure 1) were interpreted by Emergency Department staff as normal. A short-arm volar plaster slab was applied for treatment of a soft-tissue injury. A computerized tomography (CT) scan of the left hand was performed on the following day and a comminuted, intra-articular fracture of the left trapezium was identified (Figures 2 & 3).

The patient underwent surgery for his left trapezial fracture five days post-injury. A dorso-radial approach was performed under general anaesthesia. Branches of the superficial radial nerve were identified and protected. The

radial artery was then identified and protected. The trapeziometacarpal joint was exposed via a longitudinal arthrotomy. The fracture was debrided and the articular surface was reconstructed. Temporary fixation was achieved with 1mm Kirschner wires. Definitive fixation was achieved with three 1.3mm screws. Fluoroscopy was used to check the position of the fracture and the screw lengths. The joint capsule was repaired and the trapeziometacarpal joint was held in distraction with a 1.2 Kirschner wire inserted across the thumb metacarpal into the index metacarpal (Figure 4). The skin was closed with interrupted Nylon sutures. The thumb was protected and rested in a plaster splint.

The patient was reviewed at on the 2nd post-operative week. The wound was healing well and the sutures were removed. There was altered sensation and dysaesthesia in the radial nerve distribution.

The 1.2mm Kirschner wire was removed at the 4th post-operative week. Fluoroscopy under anaesthesia demonstrated that the trapeziometacarpal joint was stable.

The patient was reviewed after another week for removal of sutures. The dysaesthesia had improved significantly following removal of the Kirschner wire. Range of motion and graded strengthening exercises were commenced with the hand therapist.

Review was undertaken 10 weeks following open reduction internal fixation. The patient was comfortable and had excellent range of motion. Radial abduction of the left thumb was almost the same as the right. The main limitation was

flexion of the MCP joint of the thumb (Figure 5). Scar sensitivity had resolved. Progress x-rays showed that the fracture was uniting well. The joint surface was smooth. One of the screws had backed out slightly, but did not require any intervention.

Final review was undertaken 1 year following injury. The patient was back to work on pre-injury duties and had resumed playing basketball. Radial abduction of the thumb was 70%, Opposition to the little finger was normal. There was no local tenderness. Grind test of the trapeziometacarpal joint did not cause any crepitus or discomfort. Progress radiographs (Figure 5) showed that the fracture had united in good position. The prominent screw had not migrated any further.

Figure 1

Figure 1 – Pre operative x-rays

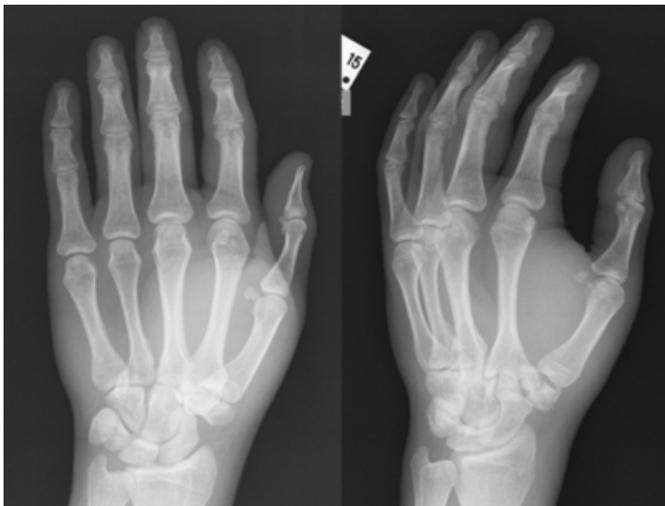


Figure 2

Figure 2 – Pre operative axial CT image

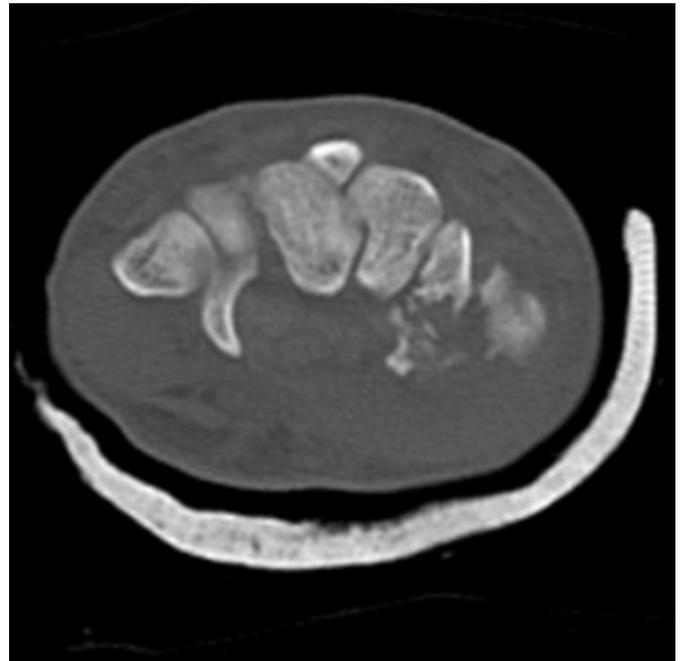


Figure 3

Figure 3 – Pre operative coronal CT images

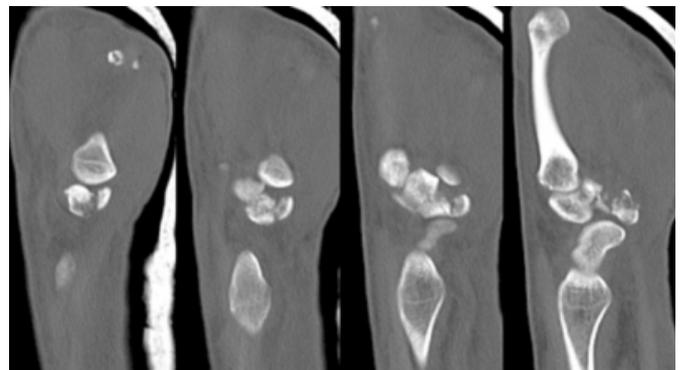


Figure 4

Figure 4 – Intra-operative x-ray



Figure 5

Figure 5 – Thumb radial abduction at 10 weeks



Figure 6

Figure 6 – Thumb opposition at 10 weeks

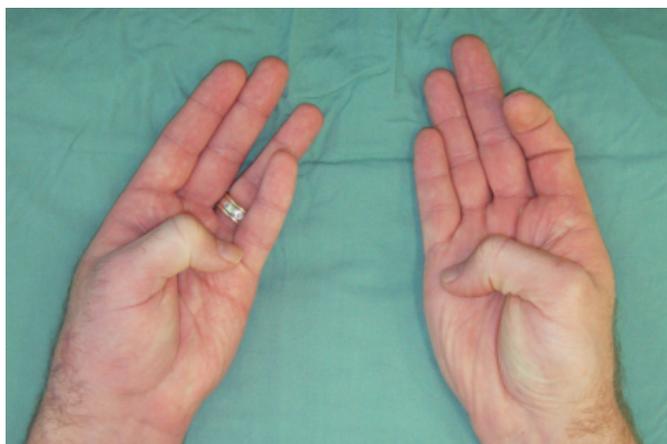


Figure 7

Figure 7 – 1 year x-rays



DISCUSSION

Trapezium fractures are a rare event and can easily be

overlooked. In all cases where a trapezium fracture is suspected, a computed tomography (CT) scan should be performed.

It has been shown that trapezium fractures can occur as an isolated injury or as part of a concomitant pattern of injuries⁴. Such injury patterns can include scaphoid fracture, hamate fracture, metacarpal fractures, trapezium dislocation, ligamentous injury and injury to the radial artery⁴. When trapezium fractures occur in isolation, they have been shown to have two common fracture patterns: a longitudinal vertical or a comminuted crush fracture⁵.

Laboratory studies performed by Pointu et al.⁶ suggest that the two common mechanisms of injury are:

- fall onto the hand with the wrist extended and the hand in radial deviation.
- direct commissural trauma combined with varying degrees of shearing.

The former mechanism would describe the force imparted onto a rider's hands from the handlebars of a motorcycle. This would be a plausible explanation for the fracture in our case presentation.

In a case series of trapezium fractures (McGuigan et al.⁵), 5 of the 11 patients suffered their injury as a consequence of a motorcycle accident. Furthermore, all patients were involved in high energy trauma. It is therefore possible that there is an association between motor bike accidents and fractures of the trapezium.

Treatment of trapezium fractures ranges from non operative techniques (thumb immobilisation in a plaster cast^{3,6} or thumb spica splint for 6 weeks or until union occurs) to open reduction and internal fixation^{5,7} as in this case, to newer arthroscopic methods of internal fixation⁴. One technique has not been found to have significantly better outcomes than the other.

CONCLUSION

Trapezium fractures are uncommon injuries and can be easily missed. Pain and swelling at the swelling at the base of the thumb, especially in the context of a motorcycle accident, should alert one to the possibility of a trapezium fracture, and not just to a scaphoid fracture. A CT scan is often useful for diagnosis and also for pre-operative assessment.

Comminution can make reconstruction of the joint surface

difficult.

The senior author (SPC) proposes the use of a Kirschner wire to reduce the axial load of the thumb metacarpal during the early phase of trapezium fracture healing. A buried wire tip can cause irritation of the superficial radial nerve and result in dysaesthesia. This should resolve after removal of the wire.

The trapeziometacarpal joint is a common site for primary osteoarthritis. Patients with trapezium fractures should be made aware of this. They should also be advised that they are at risk of developing post-traumatic arthritis of this joint.

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