



## Isolated Fracture of the Trapezium: A Case Report

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### Abstract

*Trapezium fractures are rare injuries which should not be taken casually. We report a case of a 30 year old left hand dominant housewife who sustained a left sided closed transverse trapezium fracture without any carpometacarpal joint dislocation which was treated with closed reduction and Percutaneous External Fixation, a technique. Two frames were made and connected with the help of a connecting rod. Satisfactory functional outcome was achieved at final follow-up.*

**Key Words:** Trapezium Fracture, External Fixator, Closed Reduction

### Introduction

Isolated fracture of the trapezium is an uncommon injury accounting for only 3-5% of all carpal fractures<sup>[1]</sup>. They are rare fractures, hence at times

difficult to detect and treat early. It is very important to not miss a trapezium fracture given the importance of it in the carpometacarpal joint in actions such as grip and pinch. The

carpometacarpal joint of the thumb contributes to opposition and circumduction of the thumb. Any damage to articular surface of the trapezium or base of thumb leads to restriction of all range of motion from extension through abduction to flexion. Of these 20% are vertical sagittal fractures and coronal split fractures occur rarely in isolation. Occasionally there may also be associated ligament damage (anterior oblique ligament, dorsoradial ligament, intermetacarpal ligament, posterior oblique ligament)<sup>[2]</sup>. Several methods have been described in the literature for treatment of this rare fracture, from conservative treatment in plaster to open reduction and internal fixation. We report a case of a fracture of the trapezium which was treated with closed manipulation under anaesthesia and percutaneous external fixator application with two frames with good functional outcome at 6 months follow-up.

### Case History

A 30 yr old left hand dominant housewife came to the Orthopaedic OPD with history of fall of heavy object over her left hand 24 hours ago. On clinical examination, she had swelling & tenderness at base of left thumb. There was crepitus. The range of motion of the left thumb was restricted. There was no neurovascular deficit.

Plain radiographs of the left thumb, Anteroposterior, Lateral and Oblique views were taken.(Fig. 1,2) It Revealed an isolated transverse fracture of the trapezium with no carpometacarpal joint dislocation.



Fig 1

Fig 2

Proper immobilization in a plaster slab and limb elevation were given. After 2 days when the swelling had considerably subsided, the patient was posted for surgery. Under anaesthesia, evaluation with Image Intensifier was done in the operating room. On giving manual traction, an acceptable reduction was achieved. To maintain reduction an external fixator was applied by passing two 2.5 mm threaded K wires in the radius and two 1.5 mm threaded K wires in the 1<sup>st</sup> metacarpal, using Image Intensifier as a guide. These two constructs were connected by connecting rods and clamps. (Fig. 3, 4)



Fig 3

Fig 4

Post Operatively, the patient was taught, active mobilization of remaining 4 fingers, elbow and shoulder from immediate post op period. Patient was discharged after 5 days of surgery and was

taught pin tract dressing. Patient was called for periodic evaluation on OPD basis and evaluation was done to assess:

- A. stability of fixation
- B. tenderness at fracture site
- C. pin tract infection
- D. residual stiffness

The External Fixator & K-wires were removed after 6 weeks. And active mobilization of the first ray was done.

At a 6 month follow-up, radiographs showed normal articular relationship of the trapezium with the base of first metacarpal and scaphoid(Fig 5, 6). The anatomic relationship of the bases of the first and second metacarpal was also maintained. She had a complete range of motion of the left thumb, when compared to the uninjured side. Her grip strength was normal.



**Fig 5**

**Fig 6**

### Discussion

Trapezium fractures, with or without other associated injuries, are a rare but important diagnosis. The mechanism of injury usually are either an indirect trauma due to a fall on the outstretched hand, where the wrist goes into hyperextension & radial deviation, the trapezium

getting compressed between the base of the 1<sup>st</sup> metacarpal & radial styloid or a direct trauma to the dorsoradial aspect of the hand. Different types of trapezium fractures have been documented in the literature which includes avulsions, vertical, sagittal, comminuted, coronal, and transverse fractures. Walker *et al.* classified fractures of the body of the trapezium into five types based on the articular surface involved.<sup>[3]</sup> Walker's classification distinguishes trapezium ridge from body fractures. Longitudinal injuries of the CMC joint of the thumb are unstable and may be associated with subluxation of the thumb metacarpal, leading to disability if not treated properly. The clinical presentation can be quite variable depending on the displacement of the fracture and the involvement of the carpometacarpal joint. Some patients only complain of minor pain at the base of the thumb without any gross swelling or deformity and terminal restriction of movements, whereas others, as in this case report, have swelling and severe restriction of movement. Thus, it is important to have a high clinical suspicion based on history and mechanism of injury. Standard anteroposterior, lateral and oblique views of the wrist sometimes fail to detect the fractures, especially the fracture of the ridge of the trapezium. Here a carpal tunnel view may be helpful.<sup>[4]</sup> Trapezium body fractures are difficult to detect on routine radiographs because of the overlap by the trapezoid shadow.<sup>4</sup> A Robert's AP view which is done with the hand in full pronation, outlines the trapezium and the base of the first metacarpal clearly. If the diagnosis is still in question Computerised Tomography or bone

scintigraphy is recommended<sup>[5]</sup>. It is important to determine the stability of the joint before treatment. Especially in cases with associated dislocation, rupture of the surrounding ligaments and the dorsal joint capsule may result in instability even if the fracture itself is appropriately stabilised and these may require repair. Reconstruction of the inter-metacarpal and capsular structures, such as an inter-metacarpal abductor pollicis longus augmentation, as described by Brunelli et al<sup>[6]</sup> may be required, especially in isolated dislocations. This may not be necessary in fracture-subluxations, where the metacarpal base and dorsal trapezium fragment remain connected by the dorsal capsule.

The literature reports several management options. However, as it is the universally accepted orthopaedic principle that fractures involving an articular surface require accurate reduction, most authors adhere to treatment involving accurate restoration of the articular surface. This is supported by two series<sup>[3,7]</sup> which highlighted the need for accurate reduction of the articular surface with displacement > 2mm. One article<sup>[8]</sup> reported successful conservative treatment of most undisplaced trapezium fractures in plaster cast only. However, another article<sup>[9]</sup> demonstrated dismal results in three patients with comminuted fractures treated this way.

There are few reports of external fixation with distraction applied for comminuted fractures of the trapezium, where internal fixation was not possible. The authors found external fixation as the suitable method since the trapezium fracture was found comminuted and slightly collapsed, in

their reported open injury. Since the base of the first metacarpal exerts pressure on the trapezium, there should be continued distraction across the CMC joint to relieve the pressure on the joint and the cartilaginous surface of the trapezium.<sup>[2]</sup> An external fixator neutralizes the action of the abductor pollicis longus and the adductor pollicis longus on the first metacarpal. In our patient since the fracture became fragmented at attempted screw fixation, we thought ligamentotaxis with a mini-fixator would reduce the articular surface pressures. Trapezium fractures could be easily overlooked in the emergency room due to its rarity and due to the complex arrangements of the carpal bones.

### Conclusion

The trapezium fracture has to be accurately reduced and fixed to prevent contracture of the joint web space and stiffness of CMC joint otherwise it results in impairment of function due to pain, limitation of movements or weakness of thumb. External fixation helps to keep the CMC joint distracted and relieve the pressure on the joint and cartilaginous surface of trapezium and keep the 1<sup>st</sup> metacarpal in wide abduction. Hence we have reported a case of an isolated trapezium fracture fixed with an external fixator showing good results on post operative followup.

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