



## Occult fracture of the trapezoid bone : A report on two cases

Stefaan NIJS, Thomas MULIER, Paul BROOS

The authors report two cases of isolated, undisplaced, fractures of the trapezoid bone. Because of its well-protected position in the wrist, traumatic lesions of the trapezoid bone are rare. Dislocation of the trapezoid has been reported in 30 patients ; fractures are seen even less frequently and usually go with dorsal displacement. To our knowledge and based on a Medline literature review, only two cases of acute and isolated, undisplaced or minimally displaced fractures of the trapezoid have been previously described. We believe that the lesion has often been missed in the past and modern diagnostic tools will make its diagnosis far more frequent.

### INTRODUCTION

The trapezoid bone is considered to be the cornerstone of the carpal arch ; its wedge shape is perfectly adapted to this role (3).

Strong ligaments connect the trapezoid to the adjacent bones, creating the “monolith of the distal carpal row”. As a result of this well-protected position, an isolated lesion of the trapezoid occurs only exceptionally (6). The mechanism leading to fracture of the trapezoid bone is – because of its exceptional occurrence – not well understood. Of course a direct impact can cause an isolated fracture. However, an axial or bending flexion force acting over the second metacarpal is more often the causative factor (3).

### CASE REPORTS

#### Case 1

A 30-year-old female patient consulted at the emergency department after hitting a ball with her clenched fist. The impact was located over the second metacarpophalangeal joint. The patient complained of pain at the radial side of the carpus, causing limited mobility. No swelling was noted. Initial radiographs, including standard wrist and scaphoid views, showed no obvious fractures. Because of the clinical suspicion of a hidden carpal fracture, the patient was immobilised in a short arm-thumb spica for nine days.

After nine days of immobilisation, all complaints had disappeared, the patient had normal active and passive range of motion and showed no swelling and no haematoma. Standard radiographs

---

*From the Gasthuisberg Hospital, Leuven, Belgium.*

Stefaan Nijs, MD, Surgeon, Associate Clinical Head.

Thomas Mulier, MD, Consultant Orthopaedic Surgeon.

Paul Broos, MD, PhD, Surgeon, Head of Department.

*Department of Traumatology, University Hospital Gasthuisberg, Leuven, Belgium.*

Correspondence : Stefaan Nijs, Department of Traumatology, U.Z. Gasthuisberg, Herestraat 49, 3000 Leuven (Belgium).  
E-mail : stefaan.nijs@uz.kuleuven.ac.be.

© 2004, Acta Orthopædica Belgica.

---



**Fig. 1.** — Plain radiographs and CT scan showing the trapezoid fracture (case 1).

showed no evidence of scaphoid fracture and cast immobilisation was discontinued.

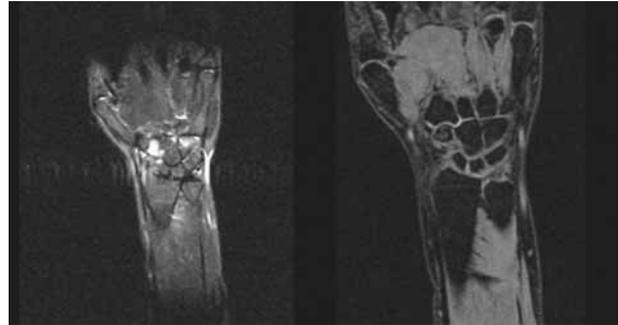
A few days later, the patient presented again with pain and mild swelling located over the scapho-trapezoidal joint (STT). Magnetic resonance imaging (MRI) showed an isolated undisplaced fracture of the trapezoid bone with accompanying mild synovitis of the STT joint (fig 1).

Again a short arm-thumb cast was applied for four weeks, following which an elastic brace was worn for another four weeks. Because of synovitis, a nonsteroidal anti-inflammatory drug was given for two weeks. The patient regained a pain free full range of motion and normal working ability.

### Case 2

A 32-year-old motorcycle driver presented at the emergency department three days after a fall. He complained of pain on the radial side of his left wrist. Initial standard radiographs and additional scaphoid views did not reveal any fracture. Because of the suspicion of a hidden carpal fracture, the patient was immobilised using a scaphoid type plaster cast. Cast immobilisation was discontinued after one week because of complete absence of complaints on reevaluation.

Two weeks later, the patient re-presented because of radial sided swelling and pain, without any new trauma. A CT scan revealed a non-dis-



**Fig. 2 a-b.** — MRI images of the wrist showing the trapezoid fracture, bone oedema and reactive synovitis (case 2).

placed, isolated fracture of the trapezoid (fig 2). The wrist was immobilised again for four weeks. Pain disappeared, and six weeks later the patient resumed his occupation without further complaints.

### DISCUSSION

Razemon (6) reported fractures of the trapezoid to be the rarest among carpal fractures, only representing 0.2% of all carpal fractures. In the literature, we found 30 cases of isolated fractures of the trapezoid reported.

Because of its anatomy, its wedge shape, with the dorsal part being twice as broad as the volar part, and its tight ligamentous connections to the other carpal bones, the trapezoid is extremely well protected (4). In some of the cases reported, the fracture resulted from a direct impact. Most lesions of the trapezoid however seem to be the result of an axially transmitted force or a bending force acting over the second metacarpal. Most often, these forces result in dorsal dislocation of the trapezoid (1, 7). After a thorough Medline search, we found only two previous reports on a non-displaced acute fracture of the trapezoid. Jeong *et al* (4) reported on a 31-year-old man sustaining the fracture while throwing a punch and Miyawaki *et al* (5) reported a fracture in a 40-year-old man who fell on his right hand in palmar flexion while walking.

Neither in these cases nor in our cases, was the diagnosis made on the initial radiographs. Jeong *et al* (4) demonstrated the fracture on a trispiral tomo-

gram after obtaining a positive Tc <sup>99m</sup> MDP bone scan. Miyawaki (5) used an axial tomographic scan to evaluate the wrist, because of unexplained wrist pain after trauma.

In the previously reported cases and in our own cases, the patients recovered complete function without residual complaints. The treatment was conservative and based on a short arm-thumb cast immobilisation.

As we saw two non-displaced fractures within a couple of months and only two previous cases of undisplaced fracture have been documented, we strongly believe that the lesion is far more frequent than thought before. The shape of the trapezoid and its relation to the adjacent bones not only protect it against lesions, but also make radiographic diagnosis of undisplaced fractures extremely difficult. We believe that a high index of suspicion after trauma in patients with a positive clinical image, and the prescription of a CT-scan or MRI are necessary to reveal the fracture in an early stage and prevent complications such as avascular necrosis, nonunion or delayed union and malunion. We therefore advocate liberal use of other diagnostic aids such as axial tomography, Tc <sup>99m</sup> MDP bone scan and MRI in the patient with clinical suspicion of a carpal fracture. The ability of MRI to demonstrate occult fractures has been well documented.

Filloux *et al* (2) reported on a missed fracture

necessitating reconstructive surgery because of persisting pain and decreased range of motion due to malunion. The use of a dorsal direct approach is advocated for open reduction of displaced fractures (1, 6).

## REFERENCES

1. **Benoit O, Polvèche G, Barbier J, Théry D.** Fracture-dislocation carpométacarpienne du deuxième rayon : à propos d'un cas et revue de la littérature. *Chir Main* 2001 ; 20 : 397-402.
2. **Filloux JF, Morfaux V, Jarde O, Vives P.** Cal vicieux du trapézoïde diagnostiqué par scanner tridimensionnel. *Acta Orthop Belg* 1996 ; 62 : 180-182.
3. **Garcia-Elias M.** Carpal bone fractures (excluding scaphoid fractures). In : Watson K, Weinzweig J, eds. *The Wrist*. Lippincott Williams & Wilkins, Philadelphia, 2001, pp 173-186.
4. **Jeong GK, Kram D, Lester B.** Isolated fracture of the trapezoid. *Am J Orthop* 2001 ; 30 : 228-230.
5. **Miyawaki T, Kobayashi M, Matsuura S, Yanagawa H, Imai T, Kurihara K.** Trapezoid bone fracture. *Ann Plast Surg* 2000 ; 44 : 444-446.
6. **Razemon JP.** Fracture des os du carpe à l'exception des fractures du scaphoïde carpien. In : Tubiana R, ed. *Traité de Chirurgie de la Main*. Masson, Paris, 1984, pp 683-692.
7. **Watanabe H, Hamada Y, Yamamoto Y.** A case of old trapezoid fracture. *Arch Orthop Trauma Surg* 1999 ; 119 : 356-357.