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Case report

Trapezium nonunion: A rare case report

Pseudarthrose du trapèze : un cas clinique exceptionnel

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ABSTRACT

Trapezium fracture is a rare clinical situation that several authors have described through clinical case reports. Nevertheless, there is currently no consensus on the best treatment. We report a case of trapezium nonunion, a situation which, to our knowledge, has never been described before.

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R É S U M É

La fracture du trapèze est une situation clinique rare que plusieurs auteurs ont décrite à travers des cas cliniques. Néanmoins, il n'existe à ce jour aucun consensus pour la prise en charge. Nous rapportons le cas d'un patient de 20 ans avec une pseudarthrose du trapèze, situation qui, à notre connaissance, n'a jamais été décrite auparavant.

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1. Introduction

Though several cases of trapezium fracture have been reported in the literature [1–3], this condition remains rare when it occurs in isolation [4]. However, there are no reports of nonunion of this bone. In this article, we report a case of trapezium nonunion in a 20-year-old male.

2. Case report

A 20-year-old right-handed, male patient, with no medical history, non-smoking, was referred to our clinic for nonunion of a right trapezium fracture after 7 months of follow-up at another medical facility. The fracture occurred following a gunshot during the Fantasia (traditional equestrian show simulating military assaults with powder guns) due to recoil of the weapon; the patient was not used to handling firearms. The fracture was

initially treated with a thumb spica cast for 8 weeks without healing being achieved.

Clinical examination revealed atrophy of the thenar eminence and moderate pain on palpation of the anatomical snuffbox. The trapeziometacarpal (TM) joint had motion of 40° in abduction and 40° in anteponition. Opposition was evaluated at 8/10 and counter-opposition at 3 according to Kapandji [5]. The pinch grip test [6] was negative. The DASH Score was 28.3.

X-rays of the hand showed lack of bone union at the trapezium fracture initially classified IV according to Walker et al. [1] without associated lesions (Fig. 1). CT confirmed the presence of a nonunion of the trapezium, but also the presence of a subchondral lesion of the first metacarpal base (Fig. 2a). MRI confirmed this bone had good viability (Fig. 2b).

Given that the patient was a young, active student whose main complaints were pain and fatigability during writing, surgical treatment was proposed to him. The patient was operated by an orthopedic surgeon under regional anesthesia using an open approach (Fig. 3). The procedure consisted of resection of the fibrosis, revitalizing the bone edges, autograft taken from the distal end of the ipsilateral radius, and then fixation with a 1.3 mm mini-screw (Fig. 4). Capsular repair was also performed. Post-operative

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Fig. 1. X-rays of the hand showing nonunion of the trapezium.

antibiotic prophylaxis (cefixime) was administered for 48 hours. Analgesics were prescribed during the first 2 weeks.

Immobilization by removable splint was maintained for 4 weeks, followed by functional rehabilitation, initially passive and then active, which continued for 4 months.

At the 11-month follow-up visit, TM motion was 50° in abduction and 50° in ante-position. Opposition was rated at 10/10 and counter-opposition at 4 (Fig. 5a). The pinch grip test was negative. The DASH score was 4.2. Follow-up X-rays showed union of the trapezium bone (Fig. 5b).

3. Discussion

Trapezium fracture is a rare lesion, accounting for only 0.4% of hand fractures [7] and 0.7% of carpal bone fractures [4]. Other



Fig. 3. Intra-operative view showing the incision and protection of the superficial branch of the radial nerve.

authors have reported rates between 3% and 5% [3,8]. However, isolated fracture of the trapezium is rarer, since in 80% of cases, the trapezium fracture is associated with a fracture of another carpal bone or the first metacarpal bone [4]. Trapezium nonunion as a pathological entity has, to our knowledge, never been described in the literature. This can be explained by its group III vascularization according to Gelberman and Gross [9]. Its vascular network is rich and has multiple pedicles and anastomoses between them. The risk of osteonecrosis is almost nil.

Road traffic accidents, more specifically motorcycle accidents, are responsible for almost half of the trapezium fracture cases [10]. The occurrence of a trapezium fracture following a firearm-related accident is a unique feature of our case.

Two mechanisms have been implicated in trapezium fractures [11]. The first corresponds to direct commissural trauma combined with varying degrees of shearing; this was the mechanism responsible for the fracture in our patient. The second corresponds to an indirect mechanism by falling on the extended hand and radial deviation – the fracture occurs while the trapezium is wedged between the base of the first metacarpal bone and the radial styloid process.

Fracture of the trapezium body – rarer than that of the tubercle – has been classified by Walker et al. [1] into five types: vertical fractures, transverse fractures, comminuted fractures, dislocations, and fractures of the tubercle. In our patient, the nonunion follows a vertical fracture of the trapezium body.

Several treatments have been described in the literature. Van Schil and De Smet [12] reported a good outcome following



Fig. 2. CT image showing nonunion and subchondral lesions of the base of the first metacarpal bone (a) and MRI image showing good bone viability (b).

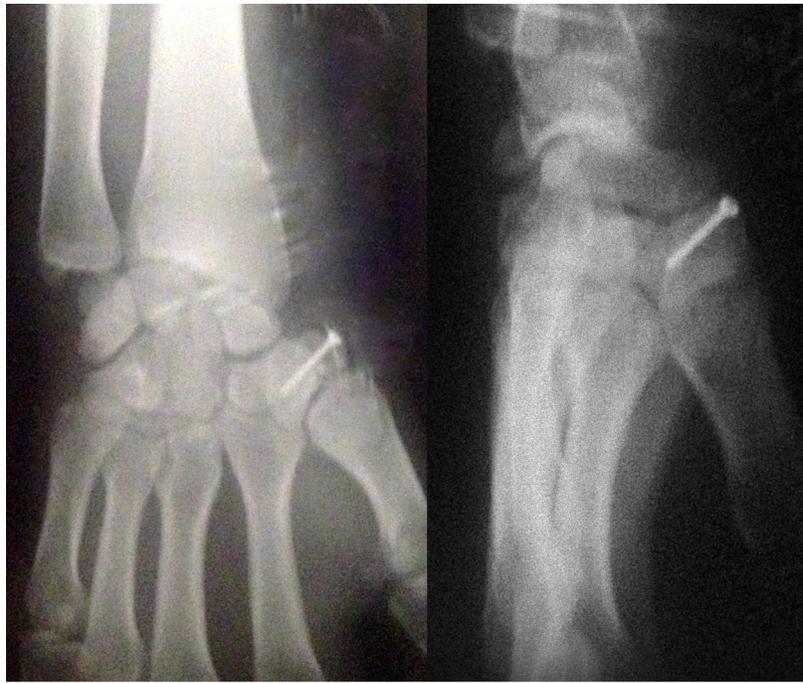


Fig. 4. X-rays using an AP view (on the left) and lateral view (on the right) to show the immediate post-operative outcome.



Fig. 5. Clinical condition of the hand at the last follow-up visit (a) and X-rays at 11 months showing union of the trapezium (AP view on the left; lateral view on the right) (b).

6 weeks of cast immobilization. However, Jones and Ghorbal [2] reported that three patients had poor outcomes following the same treatment. In addition, two series of 10 and 11 cases, reported by Walker et al. [1] and McGuigan et al. [3] suggest that greater than 2 mm displacement requires restoration of the articular surface and therefore surgical treatment.

The literature describes several surgical procedures ranging from open reduction to arthroscopic treatment and percutaneous fixation, with the aim of achieving early stability of the TM joint and avoiding progression to osteoarthritis. Some authors attribute dysesthesia to open surgery in the territory of the superficial branch of the radial nerve, despite particular attention being placed on this nerve during the surgical procedure; these dysesthesia cases usually disappear after the 5th day. Others have gone so far as to associate open surgery with a high risk of nonunion and thus advocate percutaneous fixation [13]. But percutaneous fixation has been blamed for imperfect reduction. Trapezium fractures were treated arthroscopically with good results by Wiesler et al. [14]. In our case, we chose to perform open surgery because of the nonunion, which necessitated revitalization of the bone edges, and also our limited experience in wrist and hand arthroscopy.

4. Conclusion

Trapezium nonunion is a rare complication that requires surgical treatment to relieve the patient's complaint, restore hand function and thus improve quality of life.

Disclosure of interest

The authors declare that they have no competing interest.

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