Case Report

Delayed Open Reduction and Fixation of an Isolated Trapeziun Dislocation

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We report a case of a 49-year-old patient with an isolated dorsal radial dislocation of the right trapeziun that occurred in a context of polytrauma. At first, the lesion went unnoticed. The diagnosis was made 1 month later because of persistent pain in the thumb. An open reduction of the dislocation was carried out, and osteosynthesis using scaphoid-trapeziun and trapeziotrapeziun pinning was conducted under fluoroscopic control. The patient was immobilized for 3 months after surgery. After 4 years, the mobility of the thumb was complete and painless.

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Dislocations of the trapeziun are rare injuries, and isolated dislocations without fracture are even rarer. They occur in the aftermath of high-energy traumas such as road accidents or as a result of crushing. Two therapeutic options have been described for the treatment: (1) treatment of the trapeziun by reduction of the dislocation (it can be conducted by closed or open approach with Kirschner wire fixation), and (2) treatment by trapeziectomy.

The surgical treatment of trapeziun dislocations is sometimes delayed because of misdiagnosis. The clinical results are mostly satisfactory. The complications usually described include pain, decrease in joint motion, or decrease in the strength of the thumb.

The choice of treatment should take several parameters into account, particularly the integrity of the peritrapeziun articulatory surfaces, the presumed state of vascularization of the trapeziun, and any delay in treatment. Long-term complications to be avoided are posttraumatic arthritis and osteonecrosis. In the literature, treatment by reduction and osteosynthesis has only been conducted in cases diagnosed early. Treatment for cases with delayed diagnosis has been trapeziectomy. To our knowledge, the case presented here is the first report of an isolated dislocation of the trapeziun treated at a delayed time after the trauma by open reduction and stabilized using Kirschner wires, with a follow-up of more than 4 years.

Case Presentation

The patient was a 49-year-old right-handed gardener who was admitted to the intensive care unit after a motorbike accident involving high velocity and a fall on his right side. The patient had numerous traumas on the left-hand side: open fracture of the femur, open fracture of the distal part of the tibia, open fracture of the humeral diaphysis, and a closed fracture of the 2 bones in his forearm. On the right-hand side, a hemothorax and a fracture of the lateral tibia plateau were observed. Emergency medical treatment and surgery were performed, with stabilization of the vital parameters and control of the orthopedic injuries by external fixation. Open reduction and internal fixations were performed progressively after the general and local state (muscular and cutaneous) of the fracture sites had improved.

On the fourth day of hospitalization, the patient complained of pain in his right hand. Although a dislocation of the trapeziun was visible on the x-rays, they were interpreted as normal (Fig. 1).
After 5 days in the intensive care unit, the patient was transferred to the traumatology and hand surgery unit. A month later, he alerted the surgery team once again to his right hand because he had observed a decrease in the joint motion of his thumb. He had minimal pain.

A clinical examination of the thumb found 55° of palmar abduction, −40° of palmar adduction, a Kapandji score of 9 (the patient was able to touch the fifth metacarpophalangeal joint crease with the tip of his thumb), and 0° of extension of metacarpophalangeal joint. Further x-rays were, therefore, conducted. They confirmed a dorsal radial dislocation of the trapezium. A scan confirmed the absence of associated bone lesions (Fig. 2).

An attempt at reduction by external maneuver (by gripping the patient’s thumb and applying a distracting force, while simultaneously applying pressure on the radial aspect of the trapezium) was first made in the operating room under general anesthesia and fluoroscopic control. Because the reduction was impossible, it was decided to opt for dorsal surgical approach centered on the trapezium. A straight incision was made over the interval between the extensor pollicis longus and extensor pollicis brevis tendons. Scaphoid-trapezium and metacarpal-trapezium arthrotomies were conducted, and no major chondral damage was observed once the joint debridement was performed. Anatomical reduction of the scaphotrapezial joint was obtained by putting back the trapezium on the scaphoid.

![Figure 1](image1.png)  
**Figure 1.** Hand radiograph at 4 days showing the anteroposterior and lateral views with trapezium dislocation (white arrow).

![Figure 2](image2.png)  
**Figure 2.** A Anteroposterior and lateral radiographs and B computed tomography scan of the hand at 1 month showing interruption of the first Gilula arc (yellow line).
using a Joseph periosteal elevator to aid in distraction. The trapezium was stabilized using 2 scaphoid-trapezium Kirschner wires of 1.5 mm (0.059 in) and 1 trapeziotrapezoid Kirschner wire of 1.2 mm (0.047 in) (Fig. 3). The hand was immobilized after surgery with a thumb spica cast. The cast was discontinued, and Kirschner wires removed at 3 months. Physiotherapy sessions were initiated. At 4 months after surgery, the hand was painless. At the 4-year follow-up, the patient did not report any pain, the joint motion was 90° of palmar abduction, 20° of palmar adduction, 0° of extension at the metacarpophalangeal joint, opposition reached 9 according to Kapandji’s score, and the strength of the thumb was identical to that on the contralateral side. There were no signs of posttraumatic arthritis or osteonecrosis of the trapezium on the x-rays (Fig. 4). However, the patient did not resume work because of complications related to his tibia and femur fractures (pseudoarthrosis).

**Discussion**

Dislocations of the trapezium are rare; only 16 cases have been reported in the literature since the 1950s. They can either be isolated or associated with fractures of other bones in the hand and the wrist. They are mostly secondary to high velocity trauma (motorbike accidents) or trauma involving crushing of the hand. The stability of the trapezium and of the metacarpal-trapezium joint is controlled by a complex network of 16 ligaments. Clinically, a dislocation of the trapezium is usually diagnosed when a functional loss is reported in the thumb, such as pain or a decrease in range of motion, mandating a complete x-ray assessment of the hand. Diagnosis is made on the observation of an interruption of the first Gilula arc on the trapezium. Optimal surgical treatment is urgently required. In the literature, 14 (87.5%) cases have been reported with treatment within 7 days following the trauma, and 2 (12.5%) cases have been reported with...
treatment after more than 3 weeks (Table). Early treatments have consisted of a closed reduction of the dislocation with or without stabilizing Kirschner wires or open reduction with Kirschner wires. In 2 cases, a trapeziectomy was carried out early on because of a major damage to the metacarpal-trapezium joint, or the trapezium was found to be completely detached from soft tissues, which could have rapidly led to osteonecrosis.4 Trapeziectomies have also been conducted in cases of delayed treatment (more than 21 days), including 1 for failure to diagnose to be made by applying the criteria de.

**Table**

| Treatment Delay | Publication (Case) | Type of Treatment | Sequelae | Follow-Up |
|-----------------|-------------------|------------------|----------|-----------|
| Early treatment  | 1 d               | Brewood          | Closed reduction and percutaneous fixation | No | 7 wk |
|                 | Clarke and Raphael|                  | Open reduction and fixation | Scaphotrapeziotrapezoid arthritis | 20 mo |
|                 | Renyon et al      |                  | Closed reduction and percutaneous fixation | No | 8 wk |
|                 | Mckie et al       |                  | Closed reduction | Scaphotrapeziotrapezoid arthritis | Approximately 3 mo |
|                 | Sherlock et al (case 1) | Open reduction and fixation | No | Stiffness of the thumb with a decrease in opposition | 12 mo |
|                 | Sherlock et al (case 2) | Open reduction and fixation | No | Lateral subluxation of the trapezium, trapeziotrapezoid arthritis | 6 mo |
|                 | Siegel and Hertzberg | Open reduction and fixation | No | Reduction in articulatory amplitudes (interphalangeal flexion, abduction, and opposition of the thumb), adherence of the flexor pollicis longus | 34 mo |
|                 | Vente and de Ruiter | Closed reduction | No | Occasional mechanical pain during hard labor | 13 mo |
|                 | Wintman et al     | Closed reduction and percutaneous fixations | Decrease in opposition and abduction, destruction of the carpometacarpal articulation | 16 mo |
|                 | Seimon            | Open reduction and fixations | Decrease in opposition and abduction and interphalangeal flexion compared with the contralateral side, shortening of the thumb by 1cm | 8 mo |
|                 | Peterson et al (case 1) | Trapeziectomy | No | 4 mo |
|                 | Ichikawa and Inoue | Closed reduction and percutaneous fixation | 2 y |
|                 | 2 d               | Goldberg et al | Trapeziectomy | Decrease in opposition and abduction and interphalangeal flexion compared with the contralateral side, shortening of the thumb by 1cm | 8 mo |
|                 | 3 d               | Boe              | Open reduction and fixation | No | 2.5 y |
|                 | Harris et al      | Trapeziectomy | No | 3 mo |
|                 | Case presented    | Open reduction and fixation | No | 4 y |
|                 | 14 wk             | Peterson et al (case 2) | Trapeziectomy | No | 1 mo |

Delayed treatment

| 5 d             |                  |                  | No | 2.5 y |
| 21 d            |                  |                  | No | 3 mo |
| 1 mo            |                  |                  | No | 4 y |
| 14 wk           |                  |                  | No | 1 mo |

in cases of polytrauma, certain lesions of the extremities can go unnoticed if the x-ray analysis is not meticulous and methodical, as attention is given to more crucial vital parameters and osteoarticular damage. Once the diagnosis of dislocation of the trapezium was established on the basis of the second x-rays, we completed a scan of the hand to look for any associated lesions. Reduction associated with the fixation of an isolated dislocation of the trapezium is a viable therapeutic alternative, even in subacute cases when articular cartilage is preserved, and it can lead to anatomical and functional restoration of thumb function.

**References**

1. Harris AP, Goodman AD, Gil JA, Li N, Raducha J, Weiss AC. The trapezium dislocation: case presentation, review of the literature, radiographic analysis, proposed classification, and treatment. *Hand (N Y)*. 2019;14(3):299–304.
2. Peterson CL. Dislocation of the multangulum majus or trapezium (and its treatment in 2 cases with extirpation). *Arch Chir Neerl.* 1950;2(4):369–376.
3. Sherlock DA. Traumatic dorsoradial dislocation of the trapezium. *J Hand Surg Br.* 1987;12(2):262–265.
4. Goldberg I, Amit S, Bahar A, Seelenfreund M. Complete dislocation of the trapezium (multangulum majus). *J Hand Surg Am.* 1981;6(2):193–195.
5. Edmunds JO. Current concepts of the anatomy of the thumb trapeziometacarpal joint. *J Hand Surg Am.* 2011;36(1):170–182.
6. Leversedge FJ. Anatomy and pathomechanics of the thumb. *Hand Clin.* 2008;24(3):219–229.
7. Gilula LA. Carpal injuries: analytic approach and case exercises. *AJR Am J Roentgenol.* 1979;133(3):503–517.
8. Belcher HJ, Nicholl JE. A comparison of trapeziectomy with and without ligament reconstruction and tendon interposition. *J Hand Surg Br.* 2000;25(4):350–356.
9. Ganhewa AD, Wu R, Chae MP, et al. Failure rates of base of thumb arthritis surgery: a systematic review. *J Hand Surg Am.* 2019;44(9):728–741.e10.
10. Goubau JF, Benis S, Van Hoonacker P, Berghs B, Kerckhove D, Patonay L. Vascularization of the trapeziometacarpal joint and its clinical importance: anatomical study. *Chir Main.* 2012;31(2):57–61.