

Bilateral Carpometacarpal Joint Dislocations of the Thumb

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A traumatic carpometacarpal joint dislocation of the thumb accounts for less than 1% of all hand injuries. Optimal treatment strategies for this injury are still a subject of debate. In this article, we report a case of bilateral thumb carpometacarpal joint dislocations: a unique combination of injuries. We believe our case is the second report of bilateral carpometacarpal joint dislocation regarding the thumb in English literature. It was successfully treated with closed reduction and percutaneous K-wires fixation on one side, and an open reduction and reconstruction of the ligament on the other side.

Keywords: *Bilateral, Carpometacarpal joint, Dislocation, Thumb*

A carpometacarpal joint (CMCJ) of the thumb is important for the function of the thumb and in the performance regarding strong pinch and grasp. The dislocation of the CMCJ in the thumb accounts for less than 1% of all hand injuries.¹⁾ Mechanical instability for the CMCJ of the thumb is an important factor, which may lead to articular degeneration of the joint and thus interfere with the normal function of the hand. Recommended treatment for this injury has ranged from closed reduction with or without percutaneous K-wire fixation to reconstruction of the ligaments. We report a case of bilateral thumb CMCJ dislocations: a unique combination of injuries. It was successfully treated with closed reduction and percutaneous K-wires fixation on one side, and an open reduction and reconstruction of the ligament in the other side. Our patient was informed that the data concerning this case would be submitted for publication.

CASE REPORT

A 50-year-old man was taken to the emergency room as

a result of a motorbike accident. At the time of impact, he was firmly grasping the handlebars with both hands. A physical examination revealed severe tenderness and dorsal prominence at the CMCJ regarding both thumbs. There were no neurovascular injuries or skin lesions. The radiographs showed dorsal dislocation of the CMCJ for both thumbs with a tiny fracture fragment in the right hand (Fig. 1). His accompanying injuries were a bilateral haemothorax, nasal bone fracture, and right distal tibia fracture. Under lidocain block, a closed reduction was performed by gentle longitudinal traction. After the reduction, 3-dimensional computed tomography showed that the dislocations of both CMCJs still remained.

Due to a bilateral haemothorax, surgery was per-



Fig. 1. Radiographs of both hands showed a dislocation of the carpometacarpal joint in both thumbs with a tiny fracture fragment in the right hand.

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Fig. 2. Closed reduction and percutaneous K-wires fixation were performed in the right hand (A). Also, open reduction and ligamentous reconstruction were performed in the left hand (B).

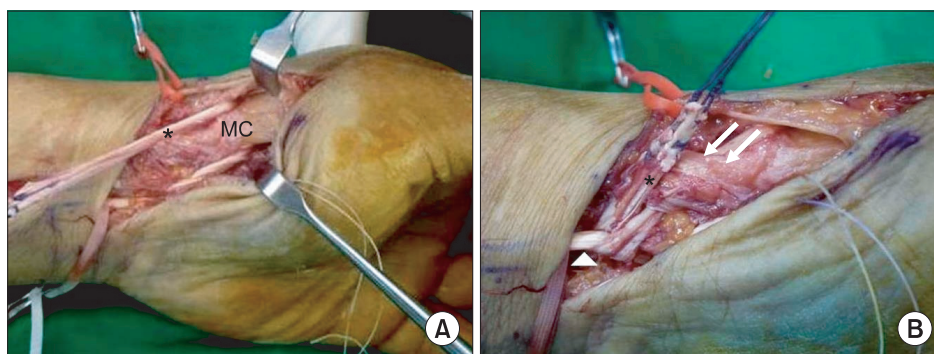


Fig. 3. Intraoperative photographs for the reconstruction of the volar oblique ligament according to the Eaton and Littler technique. (A) Radial half of the flexor carpi radialis (black star) was passed through a drill hole in the base of the first metacarpal bone (MC). (B) It was placed beneath the abductor pollicis longus (white arrow) and then passed around the remaining flexor carpi radialis (white arrow head) and secured over the dorsal capsule.

formed 2 weeks after the injury. His right hand was treated with a closed reduction and percutaneous K-wires fixation under fluoroscopic guidance. However, his left hand was significantly unstable, so an open reduction with ligamentous reconstruction was performed (Fig. 2). During the operation, the dorsal capsule and volar oblique ligament were ruptured, making it impossible to suture securely. Some small cartilage fragments and remnants of ligament interposed in the joint space were removed. Reconstruction of the volar oblique ligament was performed with the radial half of the flexor carpi radialis remaining in continuity at its insertion on the second metacarpal base. It was routed through a drill hole in the base of the metacarpal in the sagittal plane perpendicular to the thumb nail, using a 28-gauge stainless steel wire, passed deep to the abductor pollicis longus insertion, and then passed around the remaining flexor carpi radialis and secured over the dorsal capsule (Fig. 3). Both thumbs were immobilized in a thumb spica cast for 6 weeks. Routine activities were recommended immediately upon removal of the cast. The K-wires were removed 7 weeks after surgery. At the 16-month follow-up, the patient complained of mild stiffness of the left thumb.

However, there was no pain or chronic instability.

DISCUSSION

A CMCJ of the thumb is a biconcave saddle joint: the trapezium is convex on anteroposterior views and concave on lateral views, whereas the thumb metacarpal is the opposite. This unique configuration provides a wide range of motion varying from abduction to opposition while the joint remains stable.²⁾ Furthermore, it is supported with a thickened joint capsule composed of sixteen ligaments, although stability is primarily provided by 4 main ligaments: the anterior oblique, the intermetacarpal, the dorsoradial, and the posterior oblique ligament.³⁾ Controversy concerning which ligaments are damaged in joint dislocation and which ligaments are the true key stabilizers for joint stability still exists. However, for years the volar oblique ligament has been believed to be the key stabilizer for CMCJ of the thumb. In this case, the dorsal capsule and volar oblique ligament were ruptured from the base of the first metacarpal bone.

This intrinsic joint stability makes a dislocation of the thumb CMCJ quite a rare injury. Mueller¹⁾ reported that the

CMCJ dislocation of the thumb accounts for less than 1% of all hand injuries. Bilateral CMCJ dislocation of the thumb was first described by Khan et al.⁴⁾ in 2003. In their report, both joints appeared stable after closed reduction and the patient was treated with a thumb spica cast for 6 weeks. At a 15-month follow-up, the functional result was good. We believe this is the second case described regarding a bilateral CMCJ dislocation of the thumb in the English literature.

Two mechanisms have been reported for a traumatic dislocation of the CMCJ of the thumb.⁵⁻⁸⁾ The first is a longitudinally directed force along the axis of the metacarpal with the joint in full flexion. The second is a force driven into the first web space of the thumb. This force separates the base of the first and second metacarpal joints and produces a CMCJ dislocation. It commonly occurs when motorcycle drivers grip the handlebars before an impact and the traumatic event of our case suggested that the injury was caused by the second mechanism.

There is some controversy regarding which treatments are optimal for acute thumb CMCJ dislocations. The treatments have ranged from a closed reduction and immobilization to a closed or open reduction and K-wire fixation with or without the reconstruction of the capsule and ligaments.²⁾ It is believed that the most important point in the management of acute CMCJ dislocations is to assess the stability of the joint after reduction.⁹⁾ If the first metacarpal bone was not well seated radiographically or was loose or sloppy clinically following the reduction, surgical reduction was indicated. Simonian and Trumble¹⁰⁾ advocated thumb spica casting if stable closed reduction

was obtainable, but suggested early ligament reconstruction for an unstable thumb CMCJ. They reported that early reconstruction might decrease the incidence of recurrent instability and posttraumatic arthritis. Similarly, Shah and Patel⁸⁾ reported that open reduction and internal fixation alone were not adequate for an unstable thumb CMCJ dislocation and that the reconstruction of the capsular as well as ligamentous structures are needed. We performed a closed reduction and percutaneous K-wires fixation on the right hand. Although the extent of ligamentous injury was not determined, we believed that the volar oblique ligament was intact since the avulsion of the first metacarpal base was seen. On the other hand, an open reduction and reconstruction of the volar oblique ligament according to Eaton et al.⁷⁾ were performed on the left hand due to severe instability. This had the advantage of reconstructing the joint in two planes, reconstituting the volar oblique ligament and also creating a new ligament radially in a part of the joint capsule, which was weak and membranous. At the 16-month follow-up, the patient demonstrated a normal range of motion, strength and no joint instability. Overall, he was satisfied with the outcome. Although the follow-up period is short in order to allow a comment on the development of posttraumatic arthritic changes, this positive result would encourage us to adopt this technique in future cases.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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