



# Traumatic Isolated Thumb Carpometacarpal Joint Dislocation - Report of Two Clinical Cases\*

## *Luxação traumática isolada da articulação trapézio-metacárpica - Relato de dois casos clínicos*

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### Abstract

Isolated thumb carpometacarpal joint dislocation is a rare lesion that accounts for less than 1% of all hand lesions.

The authors present two cases of traumatic isolated thumb carpometacarpal joint dislocation. One of them was treated with closed reduction and cast immobilization, and the other was treated with closed reduction, Kirschner-wires pinning, and cast immobilization.

The first patient had a good functional outcome and showed no signs of thumb carpometacarpal instability. The patient treated with Kirschner wires presented signs of clinical instability and radiological subluxation.

Isolated thumb carpometacarpal dislocation is a rare lesion that can cause joint instability, which interferes with the normal function of the hand and can lead to articular degenerative changes.

The best management of this lesion is still controversial, since there is lack of evidence in the literature showing superiority of one treatment over the other.

### Keywords

- ▶ joint dislocations
- ▶ thumb
- ▶ hand

### Resumo

A luxação traumática isolada da articulação trapézio-metacárpica é uma lesão rara que faz parte de menos de 1% de todas as lesões de mãos.

Os autores apresentam dois casos de luxação traumática isolada da articulação trapézio-metacárpica. Um dos casos foi tratado com redução fechada e imobilização com gesso, e o outro foi tratado com redução fechada, fixação com fios Kirschner, e imobilização com gesso.

O primeiro paciente teve um bom resultado funcional e não mostrou sinais de instabilidade trapeziometacarpal. O paciente tratado com fios Kirschner apresentou sinais de instabilidade clínica e subluxação radiológica.

A luxação isolada da articulação trapeziometacarpal é uma lesão rara que pode causar instabilidade articular que interfere com a funcionalidade normal da mão e pode resultar em mudanças articulares degenerativas.

O melhor manejo dessa lesão ainda é controverso, já que ainda faltam evidências na literatura que mostrem a superioridade de um tratamento em relação ao outro.

### Palavras-chave

- ▶ luxação articular
- ▶ polegar
- ▶ mão

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## Introduction

Isolated thumb carpometacarpal joint dislocation is a rare lesion that accounts for less than 1% of all hand lesions.<sup>1-4</sup> The most common mechanism of injury involves an axial force applied on a partially flexed thumb.<sup>1-3,5,6</sup>

The gold standard treatment remains unclear. Treatment choices range from closed reduction and cast immobilization and closed reduction and pinning with Kirschner wires (K-wires) to open reduction with capsular repair and ligament reconstruction.<sup>1-10</sup>

The first carpometacarpal joint is a saddle-shaped joint that is responsible for the extraordinary mobility and important function of the thumb.<sup>1</sup> If this dislocation is misdiagnosed or inadequately treated, it can lead to chronic mechanical instability, hand disability, and articular degenerative changes.<sup>4,9</sup>

The authors present two cases of traumatic isolated thumb carpometacarpal joint dislocation. One of them was treated with closed reduction and cast immobilization, and the other was treated with closed reduction, K-wires pinning, and cast immobilization.

## Case Report 1

A 25-year-old male fell while riding a bicycle and injured his left hand.

He presented to the emergency department complaining of pain, deformity, and edema in his left thumb.

Oblique and anteroposterior hand X-rays revealed an isolated carpometacarpal dislocation of the thumb (►Fig. 1).

Closed reduction was easily performed, and the joint was immobilized with a cast splint for 4 weeks.

At the 3 months follow-up, the patient was asymptomatic, showed no instability signs, and presented total range of motion and normal grip strength.

The 6-months follow-up X-ray showed no signs of subluxation or articular degenerative changes (►Fig. 2).



**Fig. 1** Isolated carpometacarpal dislocation of the thumb.



**Fig. 2** Six-month follow-up.

## Case Report 2

A 56-year-old male was admitted in the emergency department after falling and injuring the left hand while playing soccer.

He complained of pain and deformity in his left thumb. Anteroposterior, lateral and oblique hand radiographs showed a trapeziometacarpal dislocation, without fracture signs (►Fig. 3).

Closed reduction, K-wire pinning, and cast immobilization were performed under general anesthesia (►Fig. 4). The immobilization device was removed 5 weeks later, and the patient started functional rehabilitation.

The 1-year follow up X-ray showed a trapeziometacarpal subluxation, and dorsal-volar instability was evident on clinical examination (►Fig. 5). Open reduction with capsular-ligament reconstruction was advised, but the patient refused surgical treatment.

## Discussion

The first carpometacarpal joint presents a unique configuration that allows a wide range of stable motion, including flexion/extension, abduction/adduction and opposition/retropulsion.<sup>1,5</sup> A screw-home torque mechanism (metacarpal internal rotation, tightening of the dorsoradial ligaments and locking of the metacarpal volar beak into trapezium) is responsible for the dynamic force that transforms a lax static joint to a stable congruent joint in opposition, permitting a strong pinching and grasping.<sup>1</sup> Joint stability depends on articular congruency, capsule integrity, and volar/dorsal ligaments function.<sup>4</sup>

There is much controversy in the literature about which of the 16 exiting ligaments is the most important stabilizer of trapeziometacarpal joint. First, the anterior oblique ligament was thought to be the primary stabilizer, but later, Harvey and Bye<sup>11</sup> and Pagalidis et al<sup>12</sup> defended that the most important ligament was the posterior oblique ligament. The biggest cadaveric study conducted by Strauch et al<sup>13</sup> showed that the dorsoradial ligament complex is the main responsible for the joint stability, confirming what Shah and



**Fig. 3** Isolated trapeziometacarpal dislocation.



**Fig. 4** Postoperative X-ray.



**Fig. 5** Trapeziometacarpal subluxation at the 1- year follow-up.

Patel<sup>14</sup> said in 1983. Both patients discussed presented dorsal dislocation, but the authors could not specify which ligament was ruptured because they used closed treatment techniques.

Hand or thumb X-rays are usually sufficient to diagnose carpometacarpal dislocations, but associated lesions must be ruled out carefully. Computed tomography could be used to exclude bone associated lesions. Ultrasonography and magnetic resonance imaging are useful for evaluating ligamentous injuries and for surgical planning.<sup>9</sup>

The treatment of choice in this kind of lesion is still in debate (→ **Table 1**).<sup>1,4-10,14-21</sup> Closed reduction and immobilization is advocated by some authors, such as Kahn et al<sup>20</sup> and Bosmans et al,<sup>1</sup> who showed good functional outcome without recurrence of instability, like the authors described in the first clinical

case. Closed reduction and pinning with K-wires is a technique that presents variable results, with some cases of follow-up subluxation and instability, similar to the patient referred in clinical case 2. Open reduction and repair or reconstruction of the capsule and ligaments are described by numerous authors with different techniques, but they are insufficient for primary surgical treatment recommendation.<sup>22</sup>

The authors think that a careful instability evaluation after closed reduction is essential for the treatment choice. Khan et al<sup>20</sup> defend that failure to maintain closed reduction, acute instability, significant swelling, or delayed presentation are surgical treatment indications.

A surgical step-wise approach may be a wise choice, selecting ligament reconstruction in case of loss of reduction after K-wire pinning.

**Table 1** Literature references

| Literature references              | Treatment | Patient complains                            | Radiographs       |                                       |
|------------------------------------|-----------|--|-------------------|---------------------------------------|
| Shah and Patel <sup>14</sup>       | 1983      | 2 open reductions and K-wires pinnings       | No                | Subluxation                           |
|                                    |           | 1 closed reduction and K-wires pinning       | No                | –                                     |
|                                    |           | 1 open reduction                             | No                | –                                     |
| Chen <sup>15</sup>                 | 1987      | 1 ligament reconstruction                    | No                | –                                     |
| Watt and Hopper <sup>16</sup>      | 1987      | 9 closed reductions and cast immobilizations | 3 mild symptoms   | 2 subluxations, 1 persistent luxation |
|                                    |           | 3 closed reductions and K-wires pinnings     | 2 mild discomfort | 1 subluxation                         |
| Jakobsen and Elberg <sup>17</sup>  | 1988      | 1 closed reduction and K-wires pinning       | No                | Subluxation                           |
| Simonian and Trumble <sup>18</sup> | 1996      | 8 closed reductions and K-wires pinnings     | 3 pain            | 4 subluxations                        |
|                                    |           | 9 ligament reconstructions                   | 1 mild discomfort | 3 joint narrowings                    |
| Kural et al <sup>19</sup>          | 2002      | 1 closed reduction and cast immobilization   | No                | –                                     |
| Khan et al <sup>20</sup>           | 2003      | 2 closed reductions and cast immobilizations | No                | –                                     |
| Bosmans et al <sup>1</sup>         | 2008      | closed reduction and cast immobilization     | No                | –                                     |
| Fotiadis et al <sup>6</sup>        | 2010      | 1 ligament reconstruction                    | No                | –                                     |
| Jeong et al <sup>4</sup>           | 2012      | 1 closed reduction and K-wires pinning       | No                | –                                     |
|                                    |           | 1 ligament reconstruction                    | Stiffness         | –                                     |
| Chan <sup>8</sup>                  | 2013      | 1 closed reduction and cast immobilization   | No                | –                                     |
| Iyengar et al <sup>10</sup>        |           | 1 closed reduction and K-wires pinning       | Pain              | Subluxation                           |
| McCarthy and Awan <sup>7</sup>     | 2014      | 1 closed reduction and cast immobilization   | No                | –                                     |
| Ansari et al <sup>9</sup>          | 2014      | 3 ligament reconstructions                   | 1 Mild pain       | –                                     |
| Annappa et al <sup>3</sup>         | 2015      | 1 ligament reconstruction                    | No                | –                                     |
| Lahiji et al <sup>5</sup>          | 2015      | 5 ligament reconstructions                   | No                | –                                     |
|                                    |           | 1 closed reduction and cast immobilization   | No                | –                                     |
| Slocum et al <sup>21</sup>         | 2019      | 1 closed reduction and cast immobilization   | No                | –                                     |

Abbreviation: K-wires, Kirschner wires.

## Conclusion

Isolated thumb carpometacarpal dislocation is a rare lesion that can cause joint instability, which interferes with the normal function of the hand and can lead to articular degenerative changes.

The current literature is insufficient to choose one treatment option over the other and therefore; thus, the best management of this lesion is still controversial. The authors believe that the treatment of choice depends on anatomic restoration and joint instability degree.

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### Conflict of Interests

The authors have no conflict of interests to declare.

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