Journal of Orthopaedics, Trauma and Rehabilitation 19 (2015) 44–46

Contents lists available at ScienceDirect

Journal of Orthopaedics, Trauma and Rehabilitation

Journal homepages: www.e-jotr.com & www.ejotr.org

Case Report

An Unusual Case of Volar Dislocation of Thumb Metacarpophalangeal Joint
病例報告—拇指掌指關節掌側脫位的罕見病例

Man Ho-Yin*, Ip Ka-Chun, Lee Kin-Bong

Department of Orthopaedics and Traumatology, Queen Elizabeth Hospital, Kowloon, Hong Kong

ARTICLE INFO

Article history:
Received 15 August 2013
Accepted 18 September 2013

Keywords:
collateral ligament
dislocation
metacarpophalangeal joint
thumb

ABSTRACT

Thumb metacarpophalangeal joint dislocation is an uncommon injury. Most of the dislocations are dorsal, and volar dislocation is rare. Only a total of 18 cases of volar dislocation of thumb metacarpophalangeal joint are published in English and other international languages. Successful closed reduction was uncommon. The majority of these volar dislocations required open reduction. In this paper, an unusual case of volar dislocation of the thumb metacarpophalangeal joint that finally required arthrodesis was reported.

中 文 摘 要

拇指掌指關節脫位是一種不常見的創傷，大部分的脫位是背側脫位。掌側脫位很少見，一共只有18例掌側脫位發表在英語和國際文獻上，而成功進行閉合復位是很少的。大部分這些掌側脫位需要開放性復位。在本文中，我們報告了一個不尋常的拇指掌指關節掌側脫位的案例，最終需要接受融合手術。

Introduction

Volar thumb metacarpophalangeal (MCP) joint dislocation is rare. There are only a total of 18 cases of volar dislocation of thumb MCP joint published in English and international literature. Most of the cases need open reduction. Nevertheless, by identification of features for difficult reduction and the correct technique, closed reduction in volar dislocation may be successful.

Case report

A 37-year-old right-handed, heavy laboured, male mechanic was involved in a road traffic accident, where he fell from his motorcycle that was at a low speed. He landed on the right side of his body. His left hand was also injured. On examination, he was fully conscious and haemodynamically stable. There were multiple abrasions over his right shoulder, hand, and knee. A 10 cm superficial laceration was noted over his right knee, with preservation of the extensor mechanism. On his left hand, there was an abrasion over the radial side of the pulp. Both the metacarpophalangeal (MCP) joint and the interphalangeal joint were swollen, and the MCP joint was held in flexion (Figure 1).

Neurovascular examination was normal. Prominent metacarpal head was palpable dorsally, and the extensor pollicis longus (EPL) was slightly deviated radially. X-rays of the left hand showed volar dislocation of the MCP joint, together with a comminuted minimally displaced fracture over the distal phalanx of the left thumb. There were no obvious interposing sesamoids in the MCP joint (Figure 2). An emergency operation for debridement and suturing of the knee laceration and reduction of thumb MCP joint was performed under general anaesthesia. An attempt of closed reduction of the thumb dislocation by hyperflexing the dislocated MCP joint with a gentle push on the volar base of the proximal phalanx over the metacarpal head was successful. The radial collateral was stable. The ulnar collateral ligament was found lax but with a solid endpoint. There was no palpable Stener lesion. A thumb spica slab was applied. Postreduction X-ray showed congruent reduction of the MCP joint (Figure 3). The slab was changed to a thumb spica splint the next day, and the patient was discharged.

On follow-up at 3 weeks' postinjury, there was tenderness over both the MCP joint and the distal phalanx of his left thumb. The

* Corresponding author. *E-mail:* manhy@live.hk.

http://dx.doi.org/10.1016/j.jotr.2013.09.005

Figure 1. Volar dislocation of the left thumb metacarpophalangeal joint, with the thumb held in flexion with the prominent metacarpophalangeal head. Abrasion and swelling were also noted over the distal phalanx.

range of motion was limited over both the MCP and the interphalangeal joints. The ulnar collateral was tender with no laxity. X-rays showed that the MCP joint remained congruent, and distal phalanx fracture healing was in progress. The thumb splint was removed, and a short mallet splint was applied for the distal phalanx fracture. Physiotherapy and occupational therapy for active mobilisation of both the MCP and the interphalangeal joints of the thumb were commenced.

However, upon follow-up at 3 months, there was residual pain and stiffness at the MCP joint despite good compliance to the rehabilitation programme. X-rays showed volar subluxation of the MCP joint (Figure 4). Unhealed extensor pollicis brevis (EPB) rupture was suspected. Arthrodesis was suggested to the patient in view of his heavy labour work, but the patient refused. Mobilisation exercise was continued, but there was residual pain and the range of motion of the MCP joint was limited (40–60°). He finally agreed to undergo arthrodesis, and the operation was performed uneventfully at around 1 year postinjury. Intraoperatively, the EPB was found ruptured, with attenuation at the insertion site. There was volar subluxation of the MCP joint, and the cartilage at the base of the proximal phalanx was worn out. Arthrodesis of the MCP joint was performed. The arthrodesis healed well, and the patient was pain free. He resumed his previous duty without difficulties.

Discussion

Most dislocations of the thumb MCP joint are dorsal. They can usually be managed with good results by closed means. Complex

Figure 2. Anteroposterior and lateral X-rays of the left thumb showing volar dislocation of the metacarpophalangeal joint and comminuted fracture of the distal phalanx.

dislocation is not common, and the majority of them require open reduction. By contrast, although volar dislocations of the MCP joint are rare, most of them require open reduction. Out of 18 cases of thumb MCP joint dislocations published so far, only five cases that were treated successfully with closed reduction were published in English.[1–6]

Soft-tissue interposition remains the culprit for failure of closed reduction of MCP Joint dislocation. In complex dorsal dislocation, McLaughlin[7] reported that 22 of 132 dorsal dislocations were irreducible due to interposition involving the flexor pollicis longus tendon and the volar plate. In volar dislocation, dorsal capsule, EPL, EPB, sesamoids, and volar plate have been reported to be jammed and hence prevent the reduction. Other common intraoperative findings include herniation of the metacarpal head through the dorsal capsule and extensor aponeurosis, rupture of ulnar or radial collateral ligaments, and trapping of EPL and/or EPB under metacarpal head.[1,4] The dorsal approach is more commonly used for open reduction because it is more direct, has lower risk of neurovascular injury, and is more versatile to use for repairing the associated injured structures, e.g., dorsal capsule, extensor apparatus, and collateral ligaments.

Clinical and radiological findings are important to predict the likelihood of a successful closed reduction. Beck et al[6] suggested that a closed reduction is unlikely to be successful when there is evidence of interposed sesamoids on X-rays along with one of the three following clinical signs: no palpable EPL on initial examination, radial or ulnar displacement of the EPL or/and EPB, and paradoxical MCP joint flexion with interphalangeal joint extension on attempted MCP extension. The absence of all these predictors warrants an attempt of closed reduction in our case. We believe that a proper technique is crucial for a successful closed reduction, as in the case of a dorsal dislocation. Reduction should be performed under adequate anaesthesia. With hyperflexion of the volarly dislocated MCP joint, the base of the proximal phalanx should be gently pushed over the metacarpal head to free the interposed tissue. Longitudinal traction must be avoided.

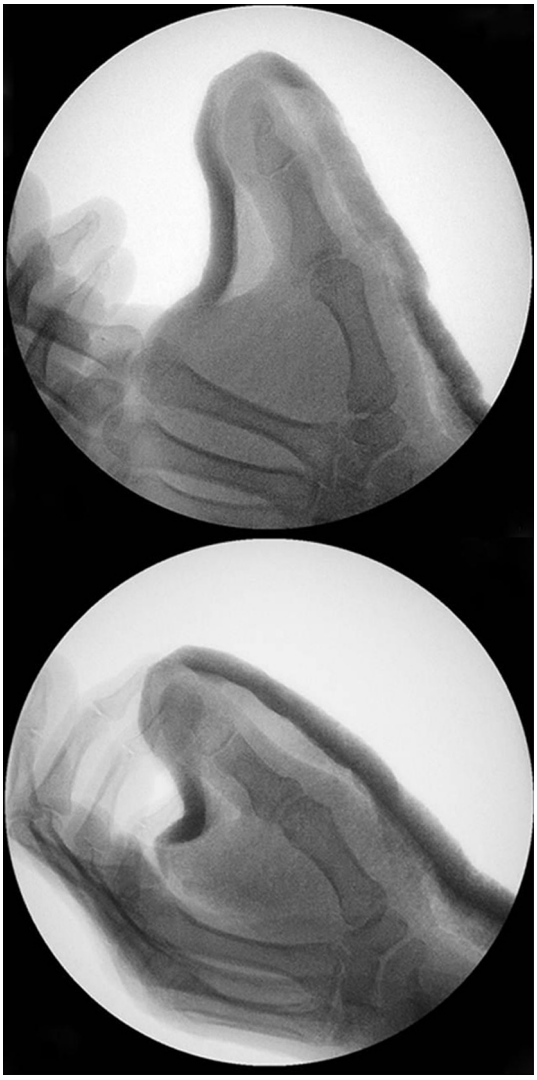

Figure 3. Concentric joint reduction achieved after closed reduction.

MCP dislocations have been found to be associated with collateral ligament injuries in all previous reports. Ulnar collateral ligament injury is found more commonly than its radial counterpart. Therefore, collateral stability should be examined meticulously after a successful closed reduction. The choice between operative and nonoperative treatment for ulnar collateral injury is made on the basis of the degree of instability. Most authors recommend nonoperative treatment for Grade I or II injuries and operative treatment of Grade III injuries, especially if it is associated with a Stener lesion.[8]

Beck et al[6] reported volar subluxation of the MCP joint in the final X-rays of all his patients. This is also present in most of the X-rays in the other published papers. They suggested that residual volar subluxation may be a sequela of the injury. However, most of these patients had good clinical outcomes.

In our case, there was evidence of volar subluxation, and the clinical outcome was suboptimal. The missed EPB rupture may contribute to the volar subluxation and the poor outcome. We cannot find any documentation on the association between EPB rupture and closed volar dislocation of the MCP joint. However, few papers reported concomitant collateral injuries and EPB rupture. All authors recommend operative repair in the presence of joint instability.[9,10] There is no consensus on the method and the period of immobilisation. From 2 weeks to 8 weeks of immobilisation with a thumb spica cast or splint had been reported. Nevertheless, a tailor-made splintage and rehabilitation programme that suits the patient's injury pattern is more important.

Figure 4. X-rays at 3 months' postinjury showing volar subluxation of the metacarpophalangeal joint.

Conclusion

Volar dislocation of the thumb MCP joint is rare and usually requires open reduction. However, closed reduction performed with a proper technique can be successful in selected cases after careful clinical and radiological assessments. It is important to examine the integrity of collateral ligaments, extensors, and neurovascular structure after reduction. Close monitoring and a customised rehabilitation programme are important for good outcomes. Early exploration should be considered in cases of poor progress with the evidence of volar subluxation.

Conflicts of interest

The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

References

1. Perez-Aguilar D, Sendino M, Domenech J, et al. Palmar dislocation of the metacarpophalangeal joint of the thumb: a case report. *J Hand Surg* 1996;**21A**:687–92.
2. Tung TC, Chen HC, Hsiao CW, et al. Chronic volar dislocation of the metacarpophalangeal joint of the thumb: a case report and review of the literature. *J Trauma* 1996;**41**:561–4.
3. Qiu YQ. Complex volar dislocation of the metacarpophalangeal joint of the thumb. *Ann Plast Surg* 1999;**42**:225–6.
4. Hirata H, Takegami K, Nagakura T, et al. Irreducible volar subluxation of the metacarpophalangeal joint of the thumb. *J Hand Surg* 2004;**29A**:921–4.
5. Grawe KR, Griesser M, Cook PA. Palmar fracture-dislocation of the metacarpophalangeal joint of the thumb. *J Hand Surg Eur Vol* 2011;**36**:79–80.
6. Beck JD, Klena JC. Closed reduction and treatment of 2 volar thumb metacarpophalangeal dislocations: report of 2 cases. *J Hand Surg Am* 2011;**36**:665–9.
7. McLaughlin HL. Complex 'locked' dislocation of the metacarpophalangeal joints. *J Trauma* 1965;**5**:683–8.
8. Rhee PC, Jones DB, Kakar S. Management of thumb metacarpophalangeal ulnar collateral ligament injuries. *J Bone Joint Surg Am* 2012;**94**:2005–12.
9. Failla JM. Combined extensor pollicis brevis and radial collateral ligament injury: three case reports. *J Hand Surg Am* 1996;**21**:434–7.
10. Wright JM, Crockett HC, Weiland AJ. Ulnar collateral ligament tear with concomitant extensor pollicis brevis and extensor pollicis longus disruptions: a case report. *J Hand Surg Am* 1998;**23**:536–40.