Stručni članak
Professional paper

ISSN 0351-0093
Coden: MEJAD6 44 (2014) 1-2

Bilateral perilunate dislocation of the wrist

Obostrano iščašenje polumjesečastoga zgloba

Mario Malović, Damir Starčević, Tomislav Vlahović, Roman Pavić, Tatjana Beker, Igor Krpan*

Summary

Carpal instability is a rare injury of the wrist, but it can cause adverse disability and morbidity of the patient. Lunate dislocation is the fourth and last stage of perilunate dislocation. Bilateral perilunate dislocation is an even more uncommon injury, and only several cases have been reported in literature. We are presenting a case of bilateral perilunate dislocation of wrists in 27-year-old men who sustained injury of both wrists falling from a 7-meter-high tree.

Key words: perilunate dislocation, bilateral, wrist, carpal instability

Sažetak

Nestabilnost pešća predstavlja rijetku ozljedu ručnoga zgloba koja može uzrokovati značajnu nesposobnost i morbiditet pacijenta. Iščašenje polumjesečaste kosti je četvrti i zadnji stadij perilunatne dislokacije. Obostrano iščašenje polumjesečaste kosti je još rjeđe stanje, te je svega nekoliko sličnih slučajeva opisano u literaturi. Ovdje prikazujemo slučaj obostranog iščašenja polumjesečaste kosti ručnoga zgloba kod 27-godišnjeg muškarca, koji je zadobio ozljede oba ručna zgloba prilikom pada s drveta visokog 7 metara.

Ključne riječi: iščašenje polumjesečaste kosti, obostrano, ručni zglob, nestabilnost pešća

Med Jad 2014:44(1-2):59-62

Introduction

The mechanism of dislocation and fractures of carpal bones is usually the result of a fall on outstretched hands with wrists in dorsiflexion and axial impaction of the carpal bones on the forearm bones with lunar deviation and supination of the wrist over the fixed pronated forearm. Intercarpal supination is the main factor responsible for capsulo-ligamentosus lesion resulting in posterior perilunate dislocation.[1,2,3,8] Mayefield showed that most carpal dislocations are due to a similar injury pattern – perilunate instability. Lunate dislocation occurs when all perilunate ligaments are torn, and represents the fourth and last stage of perilunate dislocation. Stage four is divided into three types according to the degree of lunate rotation: type I – rotation less than 90 degrees, type II – rotation more than 90 degrees, and type III – complete enucleation of the lunate with rupture of the palmar capsule.

For many cases closed reduction is possible but it is difficult to retain anatomical reduction. For that reason open reduction and ligament repair is the best method of treatment and it is considered to be a "gold standard".[1,7,8,9]

Volar luxation of lunate can lead to compression of the median nerve, according to some authors in 16 to 25 % of all cases with perilunate dislocation.[1,2,3,4,7] With the tear of perilunate ligaments and dislocation of lunate, the vascular supply is often compromised, and even after anatomical reduction of dislocation, avascular necrosis can occur consequently leading to lunate deformation and collapse.[1,2,4,7,8]

* **University Hospital of Traumatology,** Department of Hand Surgery (Mario Malović, MD, Tomislav Vlahović MD ,prof. Roman Pavić MD PhD, Tatjana Beker MD, Igor Krpan MD), **Special hospital for orthopedic surgery and traumatology „Akromion"** (Damir Starčević, MD)

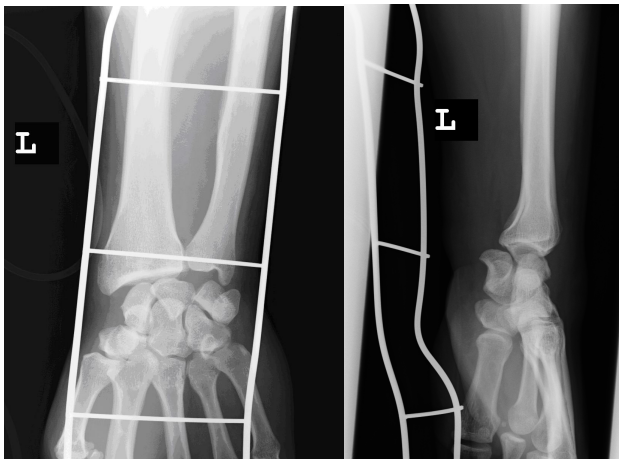
Adresa za dopisivanje / *Correspondence address*: Mario Malović, MD, Department of Hand Surgery, University Hospital of Traumatology, Draškoviceva 19, 10000 Zagreb, Croatia, e-mail: mario1968@net.hr

Primljeno / *Received* 2013-09-09; Ispravljeno / *Revised* 2013-12-08; Prihvaćeno / *Accepted* 2013-12-23

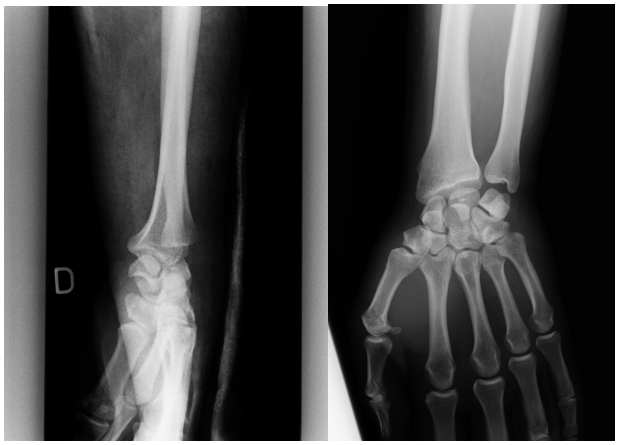
We present the case of a patient with bilateral perilunate dislocation. We found only a few cases of bilateral perilunate dislocation published in literature so far.[1,2,3,7,10,11]

Case report

A 27 year-old man, fell from a 7-meter-high tree directly on both outstretched hands with wrists in dorsiflexion. He received emergency medical attention on the site of the accident, immobilization and analgesia were administered and he was transported to our hospital in an ambulance. During examination in our emergency unit, the wrists were swollen and deformed and the skin and neurovascular status on both hands were good. Anetroposterior and lateral X rays of both hands showed volar lunate dislocation (Picture 1 and 2).

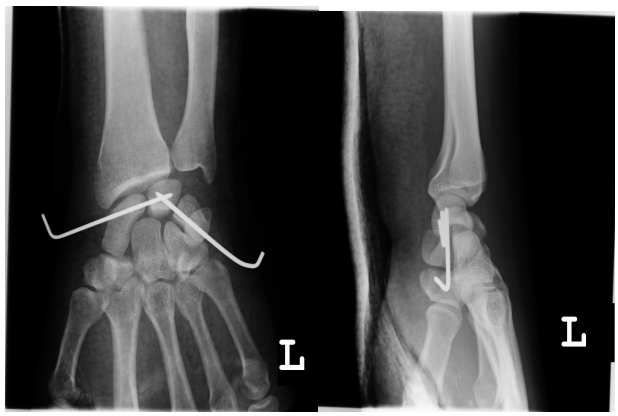


Picture 1 Lunate dislocation of left wrist
Slika 1. Dislociranost mjesečaste kosti desnog zgloba

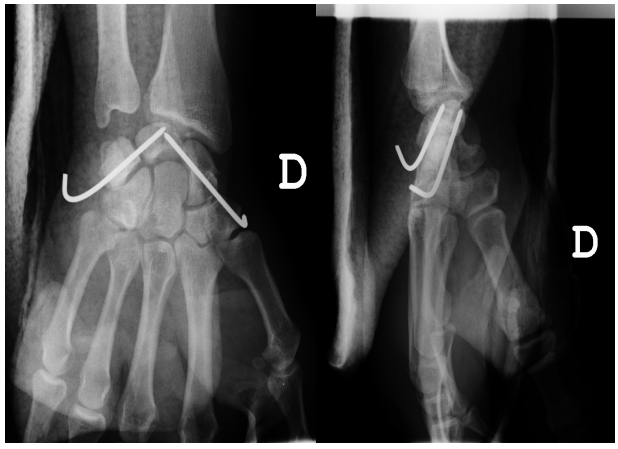


Picture 2 Perilunate dislocation of right wrist
Slika 2. Dislociranost perilunarne kosti desnog ručnog zgloba

We decided to perform open reduction and intercarpal ligament repair. An operation was performed under general anaesthesia and we used tourniquet. Standard dorsal approach was used for the left wrist first. We found minimal cartilage damage of the head of the left wrist capitate bone which was not seen in the initial X ray. After reduction of carpal bones and inserting two K wires under control with C-arm, we performed the repair of the dorsal scapholunate ligament using suture anchor (Picture 3). The same procedure was repeated on the right hand (Picture 4).



Picture 3 Left wrist after open reduction and fixation with K wires
Slika 3. Lijevi ručni zglob nakon redukcije i fiksiranja K žicama

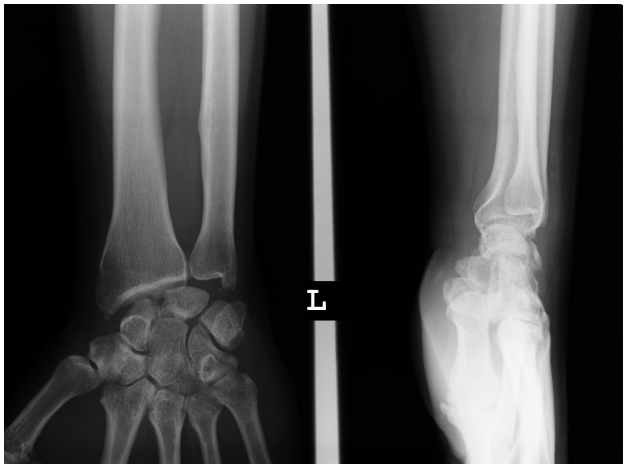


Picture 4 Right wrist after open reduction and fixation with K wires
Slika 4. Desni ručni zglob nakon otvorene redukcije i fiksacije K žicama

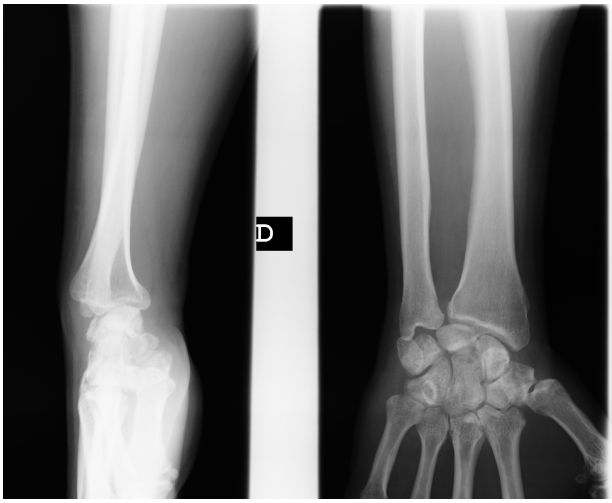
Postoperatively, both hands were immobilized with a short arm cast. The K-wires and short arm cast were removed after six weeks and physical therapy started.

Table 1 Active range of motion in both wrists on the first day after cast removal, after three and after six month
Tablica 1. *Aktivan domet obaju ručnih zglobova prvog dana nakon uklanjanja gipsa, nakon tri te nakon 6 mjeseci*

	Flexion *Fleksija*	Extension *Ekstenzija*	Ulnar deviation *Ulna devijacija*	Radial deviation *Radijalna devijacija*	Supination *Supinacija*	Pronation *Pronacija*
Right wrist – *Desni zglob*						
1st day – *Prvi dan*	30º	10º	10º	0º	30º	10º
After 3 months *Nakon 3 mjeseca*	60º	30º	20º	10º	45º	30º
After 6 months *Nakon 6 mjeseci*	80º	45º	30º	10º	75º	60º
Left wrist – *Lijevi zglob*						
1st day – *Prvi dan*	30º	10º	10º	0º	30º	10º
After 3 months *Nakon 3 mjeseca*	50º	10º	20º	10º	60º	45º
After 6 months *Nakon 6 mjeseci*	70º	30º	20º	10º	80º	70º



Picture 5 Left wrist 1 year after surgery
Slika 5. Lijevi ručni zglob godinu dana nakon kirurškog zahvata



Picture 6 Right wrist 1 year after surgery
Slika 6. Desni ručni zglob godinu dana nakon kirurškog zahvata

The wrists regained almost full range of motion in about 6 months time with only mild pain (Table 1).

One year after the injury and operation there were no signs of instability, collapse of lunatum or osteoarthritis in control X rays (Picture 5, 6).

Discussion

Bilateral perilunate dislocation is an extremely rare injury of the wrist, we have found only four cases in medical literature.[1,3,7,11]

Most dorsal perilunate dislocations are the result of an indirect mechanism of trauma, hyperextension of the wrists with ulnar deviation and radiocarpal or midcarpal supination, often owning to violent trauma such as that sustained in falls from heights.[1,6,7] These injuries can occur as lesser-arc perilunate dislocations which are characterized by pure ligamentous injuries around the lunate or greatather-arc perilunate dislocations with fractures of one or more bones around the lunate. When perilunate ligaments are torn, only the dorsal capsule and palmar ligaments can hold the lunate in place.[1,3,7,9,10]

The first report of bilateral dislocation was described in 1950 by Fitzgerald. The patient was a ship carpenter and the mechanism of injury was a fall and the injury was treated by manipulation and immobilization with a short plaster cast. After that case, we found only three cases which have been reported in literature. In all these cases the mechanism of injury was the same - fall on outstretched hands in dorsiflexion position. Patients were treated with open reduction, internal fixation and ligament repair.[1,3,7,10,11]

As it is recommended in literature, we believe that the best treatment for these injuries is open reduction, restoration of carpal bones anatomy and ligament repair.

We used dorsal approaches in this case to achieve anatomical reduction and reconstruction of ligaments. Some authors recommend the combined dorsal-volar approach, especially in stage four of perilunate dislocation – lunate dislocation. With that approach, reduction is easier and a surgeon can address possible median nerve compression.[7]

In this case, the patient returned to work after 6 months of injury with an acceptable range of motion and minimal pain in lay long activity. But as reported in literature, instability and degenerative joints diseases are the major complication of these injuries so long-term follow up is mandatory with re-evaluation of treatment results.[8,10,11]

References

1. Fitzgerald HW. Bilateral perilunar dislocation of the carpus; report of a base. J Bone Joint Surg Br. 1950; 32-B:386.
2. Mayfield JK, Johnson RP, Kilcoyne RK. Carpal dislocations: pathomechanics and progressive perilunar instability. J Hand Surg Am. 1980;5:226-41.
3. Spar I. Bilateral perilunate dislocations: case report with review of literature and anatomic study. J Trauma. 1978;18:64-5.
4. Watson JR. Fractures and other bone and joint injuries. Baltimore: Williams and Wilkins Company; 1940.
5. Allieu Y, Asencico G. In: The hand. Tubiana R, editor. Vol. 2. Philadelphia: Saunders Company; 1985.
6. Mouchet A. Deux ces-de luxation medio-carpienne en avant. Bull Soc Chir. 1918;44:1736.
7. Dimitriou CG, Chalidis B, Pournaras J. Bilateral volar lunate dislocation, J Hand Surg Eur Vol. 2007;32: 447-9.
8. Garcia-Elias M, Geissler WB. Carpal instability. In: Green D, Hotchkiss R, Pederson W, Wolfe S, editors. Green's operative hand surgery. Philadelphia: Churchill Livingstone; 2005. pp. 535-604.
9. Gaebler C. Carpal instability. In: Bucholz RW, Heckman JD, Court-Brown C, Tornetta P, Koval KJ, editors. Rockwood and Green's fractures in adults. Philadelphia: Lippincott Williams & Wilkins; 2005. pp. 857-908.
10. Zonoozi E, Mazhar FN, Khazai M, Nejadgashti N. Bilateral volar lunate dislocation- a rare case report. J Res Med Sci. 2009;14:187-90.
11. Chari PR. Bilateral dorsal perilunate dislocation of wrist. Indian J Orthop. 2010;44:230-2.