

## Case Report

### A Case Report of Three Major Joint Dislocations: Is It Possible?

Giuseppe Maccagnano, Moretti Lorenzo, Vittorio Saverio Nappi\*, Angela Notarnicola, Biagio Moretti

Orthopaedics Unit, Department of Basic Medical Science, Neuroscience and Sensory Organs, Faculty of Medicine and Surgery, University of Bari, General Hospital, Place G. Cesare, 11, 70124 Bari, Italy

\***Corresponding author:** Vittorio Saverio Nappi, Orthopaedics Unit, Department of Basic Medical Science, Neuroscience and Sensory Organs, Faculty of Medicine and Surgery, University of Bari, General Hospital, Place G. Cesare, 11, 70124 Bari, Italy. Tel: +39-3295654369; Email: vittorion23@gmail.com

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#### Abstract

**Introduction:** Traumatic knee dislocation is a serious lesion which represents an orthopaedic emergency. It is a rare condition that requires appropriate diagnosis - therapeutic iter.

**Case presentation:** A 63-year-old male was admitted to the emergency department after an agricultural vehicle accident in which his lower limbs were caught in a tractor. Clinical examination showed bilateral exposed knee dislocation. In addition, there emerged right hip dislocation and composed acetabular fracture. There were no vascular arteries injuries, whilst there emerged an external popliteal sciatic nerve palsy to the left site. The orthopedic surgeon performed the reduction manoeuvre revealing bilateral joint instability. For this reason, there was performed bilateral stabilization by external fixators. Due to right knee severe valgus instability, the Authors performed medial collateral ligament reconstruction by intraosseous suture anchor using Leeds-Keio artificial implant.

**Conclusion:** In our case, due to the involvement of three major joints and nerve palsy, we had to perform the reduction manoeuvre, exploration and suture of peroneal nerve and stabilization by the external fixator. The opportuneness of ligament reconstruction may be evaluated at a second step in relation to functional expectancy and skin condition of the donor site.

**Keywords:** Case Report; Joint Instability; Knee Dislocation; Nerve Palsy

#### Introduction

Traumatic knee dislocation is a serious lesion which represents an orthopedic emergency. It is a rare condition that requires appropriate diagnosis - therapeutic iter. The incidence has been reported as approximately 0.02-0.2% of orthopedic lesions [1]. The variability in epidemiologic data maybe due to spontaneous reduction before arriving at the emergency department thus leading to missed diagnosis [2]. This injury is caused by high energy trauma which is responsible for forces in the antero-posterior direction, varus-valgus angulation and rotational component [3]. Knee dislocation, on the one hand, causes ligaments lesions and, on the other hand, leads neurovascular complications involving

common peroneal or tibial nerve (19%) and /or popliteal artery (20%) [4].

In the literature, the Authors suggest surgical management for irreducible dislocations or those in which there is joint instability and/or vessels-nerve complications onset. For the other cases, conservative treatment is recommended [5].

#### Case Presentation

A 63-year-old male was admitted to the emergency department after an agricultural vehicle accident in which his lower limbs were caught in a tractor. Clinical examination showed bilateral exposed knee dislocation. In addition, the left leg was internally rotated and slightly shortened. The skin was interrupted on both sides of the limbs but for the left leg there was an extension to the popliteal region (Figure 1).



**Figure 1:** Clinical photo of bilateral knee exposed dislocation.

There were no vascular arteries injuries, whilst there emerged an external popliteal sciatic nerve palsy to the left site. On the basis of these clinical elements we performed x-rays. The exams confirmed the bilateral anterior knee dislocation. In addition, there emerged right hip dislocation and composed acetabular fracture (Figures 2,3,4).



**Figure 2:** X-ray revealed right hip dislocation.



Figure 3



Figure 4

**Figure (3,4):** X-ray revealed left knee dislocation, X-ray revealed right knee dislocation.

Immediately afterwards the patient underwent surgery to reduce the three dislocations and to stabilize the joint.

The orthopaedic surgeon performed the reduction manoeuvre revealing bilateral joint instability. For this reason, there was performed bilateral stabilization by external fixators. Furthermore, due the right severe valgus instability, we performed medial collateral ligament reconstruction by intraosseous suture anchor using Leeds-Keio artificial implant to reinforce the antero-medial compartment (Figure 5A,5B).



Figure 5A



Figure 5B

**Figure 5A-5B:** AP and LL view of right Knee after medial collateral ligament reconstruction by intraosseous suture anchor and external fixator.

A clinical and duplex ultrasound vascular evaluation was carried out in order to exclude arterial injury. Furthermore, the surgeon completed the debridement of skin lesion and the suture of external popliteal sciatic nerve interruption. He was not allowed any weight bearing for four weeks. After 1 month, the patient underwent another operation in order to remove external fixators and to test knee joints stability. As regards the left knee, we removed completely the external fixator, allowing full weight bearing using a knee hinged brace. As for the right knee, a hinged knee brace locked in 30° of flexion was used to avoid instability onset and to protect the suture. The patient was allowed to perform isometric exercises. 1 week later, the brace was unlocked and the knee was brought through a full range of motion passively and he began physical therapy. 4 weeks later, he was able to use partial weight bearing with crutches. At 4 months after the accident, he could walk without crutches. His nerve palsy persisted notwithstanding there emerged an improvement in neurological skills. At 1 year after the trauma, we reported a development of heterotopic ossification (Figure 6A,6B). At one-year follow-up the patient recovered a full knee range of motion while a partial neurological motor deficit of

the SPE persisted as confirmed by Electromyogram (EMG) with a complete sensitive neurological recovery.

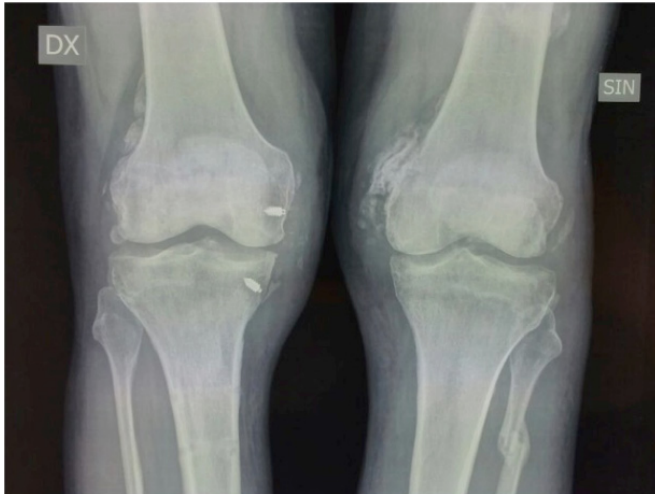


Figure 6A-6B: AP and LL view at 1 year of follow-up.

## Discussion

Knee dislocations are caused by high energy trauma. These injuries are a rare condition. Following initial trauma management, which involves the reduction manoeuvre, the attention may return to clinical evaluation. At the beginning the examination has to document vascular and /or neurological impairment. Afterwards, it is necessary to evaluate joint stability performing different tests, though these are difficult to carry out in the acutely and are potentially unreliable [6]. After the initial management, the surgical decision making process has to consider different factors. The first is the vascular integrity of the limb which requires the surgical repair and then bone stabilization [7]. The second factor is the association between knee dislocation and open fractures [8]. The third factor is represented by irreducible dislocation of the knee [9]. Knee dislocation is usually treated in a cast or brace for weeks. According to recent bibliography, the surgical option plays the main role in dealing with complications associated to immobilization and in restoring joint stability [10].

According to literature, the surgical option has to represent the main strategy in terms of recovery times and the restoring of range of motion [11,12]. In our case, we had to consider operative management the first option in consideration of tissue exposition and nerve palsy. In fact, we performed the knee dislocations reduction stabilizing the joints by external fixator to manage the joint instability and we done the medial collateral ligament reconstruction to resolve the severe valgus instability. The synthetic implant was used to augment the medial collateral ligament. On the one hand, there emerged a critical soft tissue situation associated to external debris; on the other hand, the laxity tests are not reliable

in the acute phase. For this reason, we decided to postpone the definitive treatment in order to allow the wound and soft tissue to recover and to assess the subsequent joint stability. The Authors were in agreement with literature as regards stabilizing emergently knee joints with external fixation after reduction manoeuvre and delaying the management of ligamentous associated injury to obtain better results [13].

The synthetic implant was used to augment the medial collateral ligament in order to cope with degenerative tissue of medial compartment and collateral structure rupture [14]. Furthermore, in consideration of previous scars and in order to avoid any eventual skin necrosis, the Authors preferred not to perform another skin incision in the donor site of the semitendinosus tendon. Another consideration was that semitendinosus tendon might well be needed at later date to reconstruct the anterior ligament. According to literature, the choice of artificial ligament is linked to age, functional requirements of the patient, time of surgery and size of anatomic structure. Hamido et al. analyzed the results obtained by comparison of synthetic implant versus a four strand hamstring tendon graft in chronic cruciate ligament. The Authors reported the better early results of short and small sized artificial reinforcement system [15]. Although an anterior right knee instability at follow-ups emerged, we did not treat it due to advanced age and reduced functional requirements of the patients, and in order to avoid skin necrosis.

Moreover, according to literature the reduction of the right hip joint dislocation was done within six hours. In fact, this is important to reduce the incidence of femoral head osteonecrosis whose rate is described among 5%-40% with an increasing of this complication if the joint relocation is done over 6 hours after the trauma [16]. The aim of our article is to report a case of open traumatic bilateral knee dislocations with unilateral hip dislocation, which is a rarity. According to the literature, there emerge only one case report of three major joints dislocations (Voos et al) [17]. The differences that the Author underlined respect to the case report described by Voos et al. are that our patient was affected with left knee external sciatic popliteal nerve palsy and right knee joint medial collateral injury that the Author had to reconstruct by intraosseous suture anchor using Leeds-Keio artificial implant in the acute phase simultaneously with knee dislocations stabilizing.

The limitation is the uniqueness of the case, a devastating orthopedic injury which requires specific management and rehabilitation. The strength point is that this case is the first treated in this way, and its particularity consists that there was also an exposure associated to the external sciatic popliteal nerve palsy on the left knee, that make unique this case. Fortunately, the hip dislocation played a not relevant role because after reduction the hip joint shown a good stability and there were no other hip dislocation incidents. The nerve palsy, instead, has influenced

the patient's rehabilitation and persisted at one year follow up notwithstanding an improvement in neurological skills.

## Conclusion

Knee dislocation is a rare a severe condition. In our case, due to the involvement of three major joints and nerve palsy, we had to perform the reduction manoeuvre, exploration and suture of peroneal nerve and stabilization by the external fixator. The opportuneness of ligament reconstruction may be evaluated at a second step in relation to functional expectancy and skin condition of the donor site.

## Competing Interests

The authors declare that they have no competing interests.

## Authors' Contributions

GM and AN cared for our patient during his hospital stay. DV and VS reviewed our patient's diagnostic history, signs, laboratory data and investigations, and made the diagnosis. GM, AN and BM wrote the manuscript and performed a literature search. All authors have read, edited and approved the final manuscript.

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## Availability of Data and Materials

The datasets supporting the conclusions of this article are included within the article.

## Consent for Publication

Written informed consent was obtained from our patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

## Ethics Approval and Consent to Participate

The study was approved by the Institutional Board of the University Hospital of Bari Medical University. Written informed consent was obtained from the patient involved in this study.

## References

1. Chhabra A, Cha PS, Rihn JA, Cole B, Bennett CH, et al. (2005) Surgical management of knee dislocations. Surgical technique. *J Bone Joint Surg Am* 87 Suppl 1(Pt 1): 1-21.
2. Swenson TM (2000) Physical diagnosis of the multiple-ligament-injured knee. *Clin Sports Med* 19: 415-423.
3. Urgüden M, Bilbaşar H, Ozenci AM, Akyıldız FF, Gür S (2004) Irreducible posterolateral kneedislocation resulting from a low-energy trauma. *Arthroscopy* 20 (Suppl 2): 50-53.
4. Merrill KD (1994) Knee dislocations with vascular injuries. *Orthop Clin North Am* 25: 707-713.
5. Howells NR, Brunton LR, Robinson J, Porteus AJ, Eldridge JD, et al. (2011) Acute knee dislocation: an evidence based approach to the management of the multiligament injured knee. *Injury* 42: 1198-1204.
6. Alper Deveci, Deniz Cankaya, Serdar Yılmaz, Güzelali Özdemir, Emrah Arslantaş, et al. (2015) "The arthroscopical and radiological correlation of lever sign test for the diagnosis of anterior cruciate ligament rupture" *Springer plus* 4: 830.
7. Wascher DC, Dvirnak PC, DeCoster TA (1997) Knee dislocation: initial assessment and implications for treatment. *J Orthop Trauma* 11: 525-529.
8. Green RN, Pullagura MK, Holland JP (2014) "Irreducible fracture-dislocation of the knee." *Acta Orthop Traumatol Turc* 48: 363-366.
9. Giuseppe Solarino, Angela Notarnicola, Giuseppe Maccagnano, Andrea Piazzolla, Biagio Moretti (2015) "Irreducible posterolateral dislocation of the knee: a case report" *Joints* 3: 91-96.
10. Wong CH, Tan JL, Chang HC, Khin LW, Low CO (2004) Knee dislocations-a retrospective study comparing operative versus closed immobilization treatment outcomes. *Knee Surg Sports Traumatol Arthrosc* 12: 540-544.
11. Dedmond BT, Almekinders LC (2001) Operative versus non operative treatment of knee dislocations: a meta-analysis. *Am J Knee Surg* 14: 33-38.
12. Peskun CJ, Whelan DB (2011) Outcomes of operative and nonoperative treatment of multiligament knee injuries: an evidence-based review. *Sports Med Arthrosc Rev* 19: 167-173.
13. Levy BA, Dajani KA, Whelan DB, Stannard JP, Fanelli GC, et al. (2009) Decision making in the multiligament-injured knee: an evidence-based systematic review. *Arthroscopy* 25: 430-438.
14. Mascarenhas Randy, Peter B MacDonald (2008) "Anterior cruciate ligament reconstruction: a look at prosthetics-past, present and possible future." *McGill Journal of Medicine* 11: 29-37.
15. Hamido F, Al Harran H, Al Misfer AR, EIKhadrawe T, Morsy MG, et al. (2015) "Augmented short under sized hamstring tendon graft with LARS® artificial ligament versus four-strand hamstring tendon in anterior cruciate ligament reconstruction: preliminary results." *Orthop Traumatol Surg Res* 101: 535-538.
16. Graber M, Johnson DE (2019) Anterior Hip (Femur) Dislocation. *StatPearls* [Internet]. Treasure Island (FL): StatPearls.
17. Voos, J.E., Heyworth, B.E., Piasecki, D.P. et al. (2009) Traumatic Bilateral Knee Dislocations, Unilateral Hip Dislocation, and Contralateral Humeral Amputation: A Case Report. *HSS Journal* 5: 40-44.