

# Ipsilateral Hip and Knee Dislocation with Open Tibial Fracture: A Case Report of a Limb Threatening Injury

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## What to Learn from this Article?

The sequence of fixations and the use of hand doppler in such a case scenario.

## Abstract

**Introduction:** Hip or knee dislocations are usually treated as a surgical emergency, but ipsilateral hip and knee dislocation should be considered a dual emergency that must be addressed immediately and reduced at the earliest. We present here the sequence of events and the final functional outcome of one such rare injury managed by us.

**Case Report:** A 22-year-old male was involved in a road traffic accident. He presented to the emergency department in 4 h injury time with painful deformities of the right hip and knee, along with Type I open wound right leg with abnormal mobility suggestive of fracture in the ipsilateral leg.

**Conclusion:** Simultaneous ipsilateral hip and knee fracture-dislocation with open tibial fracture is a rare injury that should be approached as limb-threatening injury and dual orthopedic emergency. We report this case for its rarity and to document that good results can be achieved with early appropriate treatment.

**Keywords:** Hip dislocation, knee dislocation, open tibia.

## Introduction

The dislocation of hip or knee is usually treated as a surgical emergency, but ipsilateral hip and knee dislocation should be considered as dual emergency that must be addressed immediately and reduced at the earliest. When it presents along with neurovascular compromise, it threatens the limb survival and the outcome may be poor. We report a case who presented to us with an ipsilateral hip and knee dislocation with Type I open fracture distal fourth both bones of the same leg and absent pulse with common peroneal nerve palsy. We present here the sequence of events and the final functional outcome of this rare injury.

## Case Report

A 22-year-old male, driver of the car was involved in a road traffic accident when his car hit against a bridge with his ipsilateral hip and knee in flexion. He presented to the emergency department in 4 h injury time with painful deformities of the right hip and knee, along with Type I open wound right leg with abnormal mobility suggestive of fracture in the ipsilateral leg. On examination, he was drowsy and disoriented with a Glasgow Coma Scale 8/15 and found to be hemodynamically unstable. Physical examination of the extremities revealed a flexed and adducted right hip with the right knee flexed to 30° and with posterior dislocation (Fig. 1). Neurovascular examination revealed common peroneal nerve palsy and absent distal

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## Author's Photo Gallery



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pulses. However, the Doppler showed weak signals over posterior tibial and dorsalis pedis artery, and the toes were found to be warm with delayed capillary filling. Computed tomography (CT) brain showed acute hemorrhagic contusion. Radiographs showed a posterior dislocation of the right hip and posterior dislocation of right knee with comminuted fracture right distal tibia (Fig. 2).

The patient was intubated and hemodynamically stabilized and immediate closed reduction was attempted. The Firstly, an ankle spanning exfix was applied to address the distal tibial fracture, and the knee dislocation was reduced by gentle traction given to the leg. Further traction on the right hip with the hip in 90° flexion with an assistant stabilizing the pelvis reduced the right hip dislocation, which was found to be stable after reduction. Then, ankle spanning external fixator extended to span the knee. Immediately following the procedure, distal pulses were clinically not palpable but relatively good flow was noted in the Doppler both in the posterior tibial and dorsalis pedis artery. The foot continued to be warm with good capillary filling of the toes. The patient was on continued ventilator support for 48 h in Intensive Care Unit and serial



Figure 1: Posterior dislocation of the right knee.



Figure 2: Posterior dislocation of the right hip and knee with comminuted distal tibial fracture.

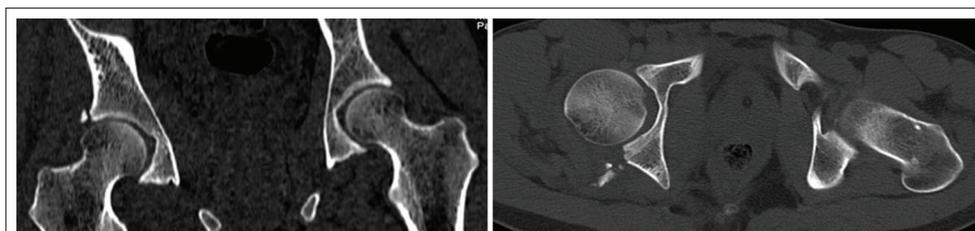


Figure 3: Postreduction computed tomography pelvis shows minor posterior wall fracture with congruent hip.

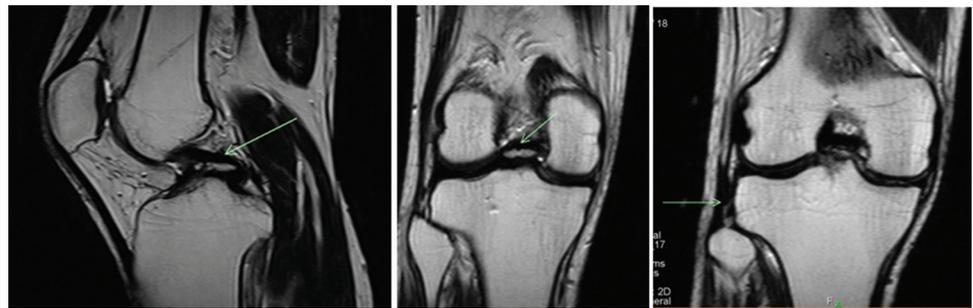
monitoring of the right lower limb vascularity was done using Doppler. Post reduction CT of the pelvis showed only a minor posterior wall fracture with congruently reduced hip joint (Fig. 3) allowing conservative management. Distal pulses were felt clinically from 4<sup>th</sup> day following which locking compression plate fixation of distal tibia was done. The patient general condition improved and discharged after 3 weeks.

At 6 weeks, external fixator was removed and bone grafting was done for the distal tibial fracture and the right knee gently manipulated. The distal tibial fracture healed in 4 months with good recovery of common peroneal nerve. The knee flexion was 0-130° with posterior sagging and multidirectional instability. Magnetic resonance imaging (MRI) of right knee showed posterior cruciate ligament (PCL) avulsion fracture and lateral collateral ligament avulsion fracture (Fig. 4). It was planned arthroscopic evaluation which showed a torn PCL at tibial attachment and torn anterior cruciate ligament (ACL) at anterolateral bundle but the continuity maintained with posterolateral bundle. Arthroscopic PCL reconstruction using bio screws and open posterolateral corner repair using hamstring graft and endobutton was done. Post-operative rehabilitation included the protocol for multi-ligament instability. At 2 years follow-up, he had full range of movements at the right hip and knee. Radiographs of the pelvis showed a viable femoral head without signs of avascular necrosis. There was complete recovery of the common peroneal nerve (Fig. 5, 6). The knee was stable and he returned to his preinjury level of activity.

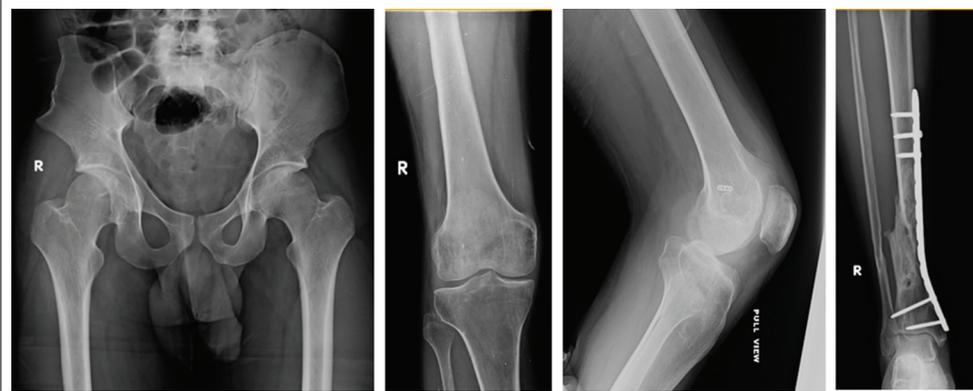
### Discussion

The patients presenting with hip or knee dislocation are usually treated as true orthopedic emergencies, as they usually occur following very high energy violence. When hip and knee dislocation presents simultaneously, it should be approached as dual emergency as other associated systemic injuries may be present. The general physical examination with appropriate X-rays of the injured part should be performed on the arrival to the emergency room. The neurovascular status of the injured lower limb should be documented and it should be serially monitored.

Hip dislocations in these injuries occur following axial forces acting on the flexed hip and are often associated with acetabular fractures, particularly posterior wall. Hip dislocations should be reduced as early as possible to decrease the incidence of avascular necrosis of the femoral head, secondary arthritis of hip and nerve injury. The extent of acetabular involvement and the stability of hip following reduction determines the management. When it involves >65% of the posterior wall reconstruction of the acetabular wall is essential for the stable hip. Post reduction CT scan is sensitive in planning the post reduction management. In our case, post reduction CT showed a posterior wall rim fracture involving <10% with congruent containment of hip. Hence, it was planned for conservative



**Figure 4:** Magnetic resonance imaging shows posterior cruciate ligament avulsion fracture at tibial attachment, posterolateral corner injury, and lateral collateral avulsion fracture.



**Figure 5:** X-ray pelvis shows viable femoral head, and X-ray of knee and leg shows stable knee and healed tibial fracture.



**Figure 6:** Good range of movements at right hip and knee.

management. But in some cases of irreducible or unstable hip following closed reduction may require open reduction [1, 2, 3, 4]. Some authors have used Schanz screws in the proximal femur in aid reduction of hip to minimize further injury to neurovascular injury at knee [1, 5].

A knee dislocation can be accompanied by popliteal artery injury. Peter *et al.* [6] analyzed eight studies of knee dislocation with vascular injury. Overall of 26% (82/313) of patients had popliteal artery injury. Of these three studies had no surgical requirement for patients with normal pulses [7, 8, 9]. The investigation modalities have been followed with different opinion are ankle-brachial index, angiography, color duplex scan, CT angiography, and recently MRI angiography. The most appropriate vascular evaluation for a patient with a knee dislocation without signs of ischemia and palpable or weak pulses continues to be controversial. In our case, we used serial Doppler along with pulse oximeter waveform for monitoring and the Doppler signals were compared to the uninjured side.

MRI provides critical information regarding ligament injuries, meniscal injuries, chondral injuries, and fractures to guide treatment, particularly after an acute knee dislocation. In patients who present 6 weeks or later, MRI may not provide as clear a picture of the injury pattern. Therefore, in chronic injuries, it is important to rely on the clinical examination findings in addition to the MRI findings to determine the pattern of injury. Approximately, 50% of knee dislocations are associated with tears of the ACL, whereas 75% are associated with tears of the PCL [10].

The management of multi-ligament injured knee is controversial. Many authors have debated about the timing of intervention, the type of reconstruction and operative versus nonoperative treatment. However, recent studies have shown that improved functional and clinical outcomes in operative treatment compared with nonoperative treatment [11]. Immediate surgical intervention is absolutely indicated for irreducible knee by closed reduction or an unstable knee, which requires a vascular repair and open

knee dislocation [12]. In these instances, avulsion fractures or cruciate and collaterals can be fixed with nonabsorbable sutures [13]. If there are no injuries that need to be addressed acutely, the timing of surgery is largely dependent on the patient general condition, the condition of the knee and surgeon preference [12]. Levy *et al.* [11] analyzed five studies that compared early versus delayed surgery. Among them, two studies showed no statistical difference in outcome scores and found a statistical difference in higher sports activities in another three studies. In our case, because of head injury and open tibial fracture on the same leg, it was planned for late reconstruction. However, the functional outcome was excellent at final follow-up.

Neurological involvement in hip dislocations occurs in approximately 10% and partial recovery can be expected in 60-70% cases. The peroneal branch is most commonly involved [14]. In knee dislocations, nearly 20-40% is complicated by common peroneal nerve palsy and prognosis is fairly poor as recovery is incomplete in 50% of the patients. In our case, common peroneal nerve was injured at the level of the knee and full recovery was observed in 6 months.

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## Conclusion

Simultaneous ipsilateral hip and knee fracture-dislocation with open tibial fracture is a rare injury that should be approached as limb-threatening injury and dual orthopedic emergency. We report this case for its rarity and to document that good results can be achieved with early appropriate treatment.

## Clinical Message

Hip and knee dislocations are emergencies which should be treated immediately. In this case report, we have discussed the technique for reduction of ipsilateral hip and knee dislocations with ipsilateral open both bones fracture leg. When you are unable to feel distal pulses clinically, we can use Doppler for vascularity monitoring. Ligament injury of the knee also should be addressed, and ACL can also be intact in knee dislocations.

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