



# A Rare Case of Floating Hip Treated Successfully with Open Reduction and Internal Fixation: A Case Report and Literature Review

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## Abstract

Floating hip describes a rare combination of fractures/dislocation and is usually seen in multiple injured patients, more often in young males involved in high-energy automotive/motorcycle trauma. These fractures are often associated to chest trauma, other skeletal fractures or polytrauma. A “floating hip” injury is rare but a surgical challenging. Each case needs to be planned and addressed. We present a case of floating hip injury in a male patient, treated successfully with ORIF, followed by an uneventful postoperative period.

**Keywords:** Floating hip; Acetabular fracture; Femoral fracture; Surgical treatment; ORIF

## Introduction

A ‘floating hip’ is defined as a fracture of the pelvis or acetabulum with a concomitant femoral fracture [1]. All fracture types of the pelvis, acetabulum, and femur can occur in various permutations and combinations with each other [2]. The ‘floating hip’ is a rare and severe combination of fractures and is usually seen in multi-trauma patients [3,4]. This uncommon combination of injuries has been documented to occur once in every 10,000 fractures [5,6]. Is a devastating injury with an important impact on a patient's quality of life. This injury poses high complication rates and several treatment dilemmas, and the optimal treatment sequence is not agreed upon in the literature [3]. We present our experience with a femur-first treatment approach and one-stage simultaneous treatment of the acetabulum.

## Case Presentation

A 45-year-old man was referred to the emergency department of our hospital 3 h after he was crushed by his tractor. Initially, the patient was treated elsewhere and resuscitated according to the ATLS protocol. He was transferred to our hospital, due to the severity of these fractures for appropriate treatment. On arrival, he was conscious and all his vital parameters were within normal limits. Radiological examination revealed a right-side posterior acetabular wall fracture with concomitant hip dislocation and ipsilateral femoral diaphyseal fracture (Figure 1, 2). He also had rib cage fractures and a fracture in the left ring finger. During the clinical examination, the patient presented peroneal nerve palsy, with acute partial drop foot and numbness in his foot. The medical history, reveals treatment for diabetes mellitus and in the past, he underwent a craniotomy due to an epidural hematoma after a road accident.

Immediately after the admission to the hospital, at the emergency operating room, closed reduction of the hip dislocation under anesthesia was achieved and skeletal traction was placed to the supracondylar distal femur area. The following day, the patient was estimated hemodynamically stable and scheduled for surgery. He was placed in the left lateral position and a combined lateral approach for the femur along with a Kocher-Langenbeck approach to the acetabulum was conducted. Initially, the femoral fracture was reduced internally and fixated using a plate and screws (Figure 3). The acetabular fracture was originally stabilized with three lag screws across the posterior aspect of the fracture and a neutralization plate with screws was applied (Figure 4). The reduction of both fractures was confirmed by C-arm. The operating time was 3 h and the intraoperative blood loss was 500 ml.

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**Figure 1:** AP X-ray of the right hip, demonstrating a posterior wall acetabular fracture with ipsilateral hip dislocation.



**Figure 2:** AP X-ray of the right femur, demonstrating a diaphyseal femur fracture.



**Figure 3:** AP X-ray of the femur 7 days postoperative.

The postoperative period was uneventful. In addition, the peroneal nerve recovered. Soft touch-down weight bearing was suggested starting from the first post-op day. After five days, the patient was fit to discharge from our hospital.

## Discussion

Disruption of the skeletal continuity above and below an articulation can be considered a floating joint and can be associated with neurovascular and or soft tissue injuries [7]. The floating hip refers to the concomitant fracture of the acetabulum, pelvis, and femur [4,7]. Floating hip describes a rare combination of fractures/dislocation and is usually seen in multiply injured patients, more often in young males involved in high-energy automotive/motorcycle trauma. These fractures are often associated with chest trauma, other skeletal fractures, or polytrauma [1,4,8-11].



**Figure 4:** AP X-ray of the hip 7 days postoperative.

In 1999 Mueller classified floating hips into 3 types based on the location of the fractures. According to this classification type A include a combination of acetabular and femoral fractures, type B is a combination of pelvic and femoral fractures, while type C was a combination of fractures of the acetabulum pelvis and femur [1,2]. Liebergall et al. in 2002 classified floating hips into two groups and correlated them with their mechanism of action. The first group (A), defined as posterior type injury, includes a posterior type acetabular fracture and an ipsilateral diaphyseal femoral fracture and is found among front seat passengers [2,8]. This pattern combines also a possible knee injury, which can present as a patellar fracture, knee instability, or a simple knee effusion [12]. The second group B is the central type injury, which includes a central-type acetabular fracture and an ipsilateral proximal femoral fracture [2,8]. According to Liebergall, our case is a posterior type injury, regarding the pattern. Although the mechanism of the fractures differs from those described above.

In a patient with a floating hip, there are three main issues to be planned before the surgery. The first issue is concerning the time of the surgery, the second with which fracture will be addressed first, and the last issue is about the implant to be used. Whereas the management of individual fractures of the pelvis and the femur has been thoroughly discussed in the literature and well-accepted treatment guidelines have been established, the optimal treatment sequence for a floating hip is not agreed upon in the literature [13]. These decisions have to be made based on a case-to-case basis [1,3,7]. According to Liebergall et al. in the case of posterior type “floating hip injury”, acetabular and femoral fractures can be fixed both in the same session starting with the femoral fracture. They suggest that femoral fractures can be fixed first with an intramedullary nail and then the acetabular fracture through a Kocher Langenback approach. When it is not feasible to operate on both fractures in one session it is possible to use a retrograde inserted IMN for the femoral fracture. Traction is applied for the acetabular fracture and in the second stage the surgeon can fix the acetabular fracture. On the other hand, in the central type of floating hip femoral and acetabular fractures can be operated at different times. Liebergall suggests the use of the anterior ilioinguinal approach for the acetabular fracture and the lateral approach for the femoral fracture. It is also possible for both fractures to be addressed at the same time by an extensive iliofemoral approach [3,7,13]. Wu et al. suggested that in case of an unstable pelvis fracture with concomitant femur shaft fracture, external fixation of the pelvis and traction of the femur should be the initial approach because the external fixator can be inserted emergently and improve bedside care [14]. Kregor recommended three different strategies, fixation of the acetabulum followed by antegrade nailing of the femur, fixation of the

acetabulum followed by plating of the femur, and retrograde nailing of the femur followed by the fixation of the acetabulum [15].

Regarding the complications, nerve injuries, infection, DVT/PE, fat embolism, arterial injury, avascular necrosis, heterotopic ossification, and hip osteoarthritis are referred [1,3,7,8]. Nerve injury can be either traumatic or iatrogenic. In a meta-analysis by Giannoudis et al. nerve injury was found traumatic in 16.4% and iatrogenic in 8% of patients [16]. Mueller in his study had a 35% occurrence of sciatic nerve injury. The recovery rate established for his sciatic nerve injuries was 25% [1]. The neurological injuries documented by Suzuki et al. in their paper on floating hips were 3 cases at presentation out of 5 cases in total. The other two cases developed lateral cutaneous nerve palsy postoperatively [3]. In our case, the patient had peroneal nerve palsy, documented upon arrival at our hospital.

Zamora et al. published 3 cases of traumatic popliteal artery injury out of 11 floating hips. They associated this injury with the femur fracture pattern at the supracondylar level [17]. The type C floating hip, (pelvic ring and acetabulum), shows a high risk of bleeding. There is a need for specialized multidisciplinary management according to hemodynamic status and type of floating hip (A, B, or C) [18].

## Conclusion

A “floating hip” is a rare and surgically challenging injury. There are a lot of difficulties in the management of these injuries and the treatment of choice is still controversial. Each case needs to be planned and addressed differently based on the complexity of the fracture and the associated complications of the injury. We hope that our case report throws light on tackling this complex injury.

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