

Beyond Pipkin IV: Management of Femoral Head-neck Fracture-dislocation with Posterior Acetabular Wall and Peritrochanteric Fracture in an Adolescent Using a Modified Kocher-Langenbeck Approach

Niraj Narain Singh¹

Learning Point of the Article:

Complex femoral head–neck fracture-dislocations that exceed the Pipkin classification necessitate prompt surgical intervention, precise anatomical reconstruction, and a strategy adapted to the specific fracture pattern rather than a uniform technique. In younger patients, preserving the native hip should be prioritized when stable fixation is achievable. Conversely, arthroplasty is a more suitable option for certain elderly patients with limited reconstructive potential.

Abstract

Introduction: Femoral head–neck fracture-dislocation with associated posterior acetabular wall and per-trochanteric fractures represents an extremely rare and severe “beyond Pipkin IV” injury pattern.

Case Report: A 14-year-old boy sustained posterior hip dislocation with femoral head, neck, acetabular, and trochanteric involvement following a road traffic accident. Emergency open reduction and internal fixation was performed using a modified Kocher–Langenbeck posterior approach with trochanteric flip.

Results: Radiological union was achieved by 3 months. At 1-year follow-up, the patient had good hip motion without avascular necrosis or implant failure.

Conclusion: Early anatomical reconstruction using a posterior approach can produce excellent outcomes in young patients with this rare injury.

Keywords: Femoral head fracture, Pipkin IV, hip dislocation, Kocher–Langenbeck approach, adolescent, acetabular fracture, trochanteric fracture.

Introduction

The prevalence of femoral head fracture (FHF)-dislocation ranges from 8% to 26%. FHF are uncommon fractures that typically result from high-energy trauma. They generally arise following posterior dislocation, with around 5–15% of posterior hip dislocations linked to FHF [1,2]. FHF may simultaneously occur with acetabular fractures, with an anticipated occurrence of 29.2% [1,2]. Incidence of ipsilateral femoral head and neck fractures (iFHNf) was negligible. Nonetheless, iFHNf, a

unique classification of fracture, demonstrate the least favorable prognostic for every FHF.

Alignment of the head as well as the hip during axial stress typically dictates the nature of damage [3]. Timely diagnosis and immediate intervention are essential to avert future problems encompassing avascular necrosis (AVN) of the femoral head as well as arthritis [4].

Essential imaging modalities, such as X-ray as well as computed tomography (CT) scan, should be conducted before reduction

Author's Photo Gallery



Dr. Niraj Narain Singh

Access this article online

Website:
www.jocr.co.in

DOI:
<https://doi.org/10.13107/jocr.2026.v16.i08.7800>

¹Department of Orthopaedics, ESIC Medical College and Hospital, Patna, Bihar, India.

Address of Correspondence:

Dr. Niraj Narain Singh,
Department of Orthopaedics, ESIC Medical College and Hospital, Patna, Bihar, India.
E-mail: dnirajnsingh@gmail.com

Submitted: 14/05/2026; Review: 09/06/2026; Accepted: July 2026; Published: August 2026

DOI: <https://doi.org/10.13107/jocr.2026.v16.i08.7800>

© The Author(s). 2026 Open Access. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated.





Figure 1: (a) Pre-operative X-ray – Pre-operative anteroposterior radiograph of the pelvis showing posterior dislocation of the left hip with associated femoral head and neck fracture. (b) Pre-operative computed tomography scan – Pre-operative computed tomography with three-dimensional reconstruction demonstrating femoral head and neck fracture with posterior acetabular wall involvement and per-trochanteric extension.

attempt due to increased danger of an iatrogenic FHF after closed reduction.

The appropriate treatment technique in such circumstances remains contentious. The irreducible FHF-dislocation was treated employing a flip trochanteric at fracture as well as the extended Kocher-Langenbeck method.

Femoral head lesions are classified according to Pipkin (four classes) [5] and Chiron (five grades, further categorized as A if isolated, B with acetabular fracture, and C in the event of FHF) [6].

Case Report

A 14-year-old male presented following a road traffic accident with pain, swelling, deformity, and inability to bear weight on the left lower limb. After initial trauma stabilization, clinical examination revealed shortening, external rotation, and flexion of the left hip, with a palpable femoral head in the gluteal region, suggesting posterior hip dislocation. All hip movements were painful and restricted.

Radiological evaluation included anteroposterior (AP) radiographs of both hips and CT with three-dimensional reconstruction, which confirmed a femoral head and neck fracture with associated posterior acetabular wall

involvement. The pre-operative radiographic and CT findings are shown in Fig. 1. AP pelvic radiographs were obtained preoperatively and postoperatively and at regular follow-up intervals.

Surgical intervention was performed in the lateral decubitus position using a modified Kocher–Langenbeck approach with a trochanteric flip at the fracture site. Intraoperatively, the femoral head was fractured in the anteroinferior region and displaced posteriorly against the ilium, with an associated posterosuperior acetabular rim fracture and labral avulsion. The femoral head fragments were fixed using headless compression screws. After removal of incarcerated intra-articular fragments, the hip was reduced, and the femoral neck and peritrochanteric fracture were stabilized using a dynamic hip screw with an additional anti-rotation screw. The posterior acetabular wall was fixed with cortical screws. Intraoperative assessment confirmed a stable and concentric reduction. The intraoperative findings and fixation construct are shown in Fig. 2.

Postoperatively, range of motion (ROM) exercises was initiated on the 3rd day. The patient was kept non-weight-bearing for 6 weeks, followed by partial weight bearing, and progressed to full weight bearing at 12 weeks after radiographic evidence of fracture union.

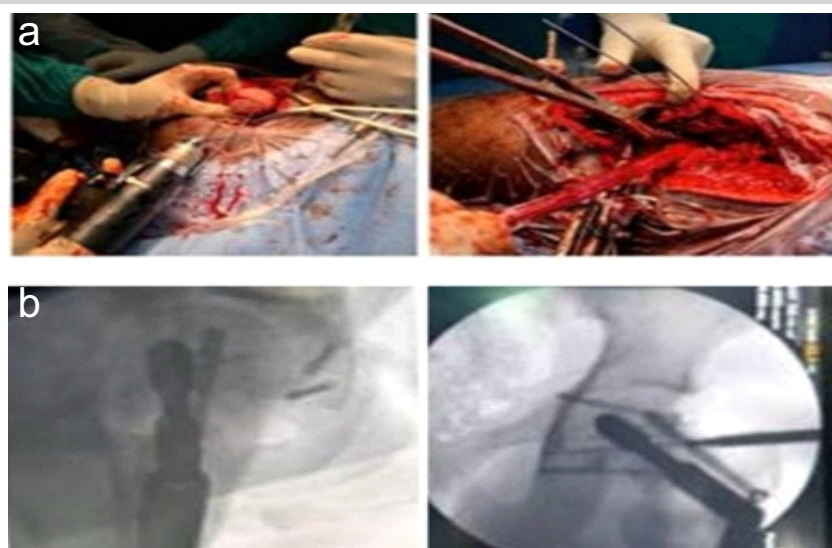


Figure 2: (a) Intra-operative. (b) Intraoperative c-arm image–Intra operative pictures and anteroposterior C-arm image showing anatomical reduction of the hip with fixation of the femoral head using headless screws, femoral neck and trochanteric region with dynamic hip screw and anti-rotation screw, and posterior acetabular wall fixation.

Discussion

FHFs associated with posterior hip dislocation are rare, high-energy injuries and represent true orthopedic emergencies. Although femoral neck fractures and posterior dislocations result from different biomechanical forces, they often coexist due to the magnitude and direction of trauma. Femoral neck fractures are typically produced by direct impact over the greater trochanter or rotational forces, whereas posterior dislocation occurs from an axial load applied to a flexed, abducted, and internally rotated hip [1].

Prompt reduction is critical, as delayed management significantly increases the risk of femoral head AVN. Previous studies have demonstrated that the incidence of AVN rises to approximately 14–15% when reduction is delayed beyond 12 h, reflecting disruption of the extra-osseous blood supply following traumatic dislocation. Therefore, urgent reduction followed by stable fixation remains the cornerstone of management [7,8].

Selection of the optimal surgical approach in such complex injuries is challenging. Although the Ganz surgical dislocation with trochanteric flip osteotomy provides excellent intra-articular exposure and

preserves femoral head vascularity in isolated FHFs, it is not suitable in the presence of associated femoral neck or trochanteric extension, as the integrity of the medial femoral circumflex artery and trochanteric fragment cannot be reliably preserved [9,10].

In the present case, an extended posterior (modified Kocher–Langenbeck) approach was preferred as it allows simultaneous access to the femoral head, neck, posterior acetabulum, and trochanteric–subtrochanteric region, enabling comprehensive fracture fixation or arthroplasty when required. Anterior approaches were avoided due to their limited access to posterior and trochanteric components and their higher risk of further compromising femoral head vascularity. This approach provided stable fixation, adequate visualization, and a biologically favorable environment for healing in this complex fracture-dislocation pattern [11,12,13,14].

Conclusion

Femoral head–neck fracture–dislocations with associated

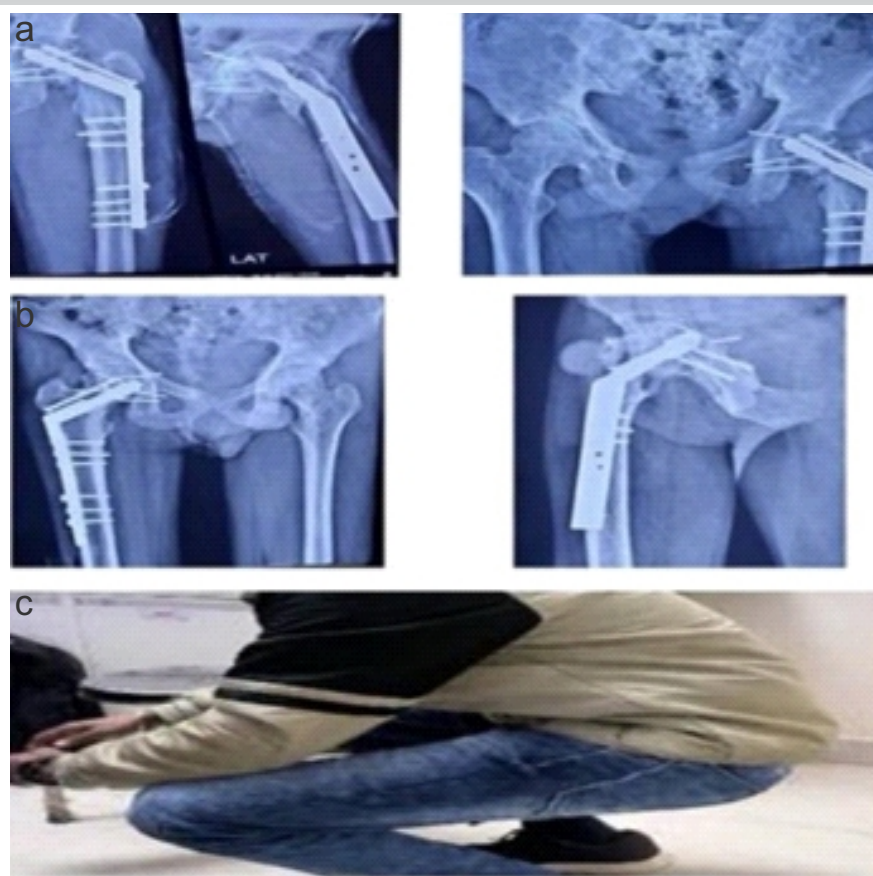


Figure 3: (a) 6-week follow-up – Radiograph at 6-week follow-up showing evidence of fracture uniting and maintenance of joint congruity. (b) 2-year follow-up – Radiograph at 2-year follow-up showing evidence of fracture union and maintenance of joint congruity. (c) 2-year follow-up: Follow-up at 2-year follow-up demonstrating healed fractures, maintained hip alignment, and absence of avascular necrosis or implant failure with functional hip.

The patient was followed up at 6 weeks, 3 months, 6 months, and 2 years with clinical and radiological evaluation. At final follow-up, there was no implant failure, femoral head collapse, or radiological evidence of AVN or post-traumatic arthritis. The patient had a painless ROM from 0° to 110°, with only mild activity-related discomfort.

Results

Patient operated within 24 h of injury and admitted for 3 weeks in hospital. 1st post-operative week started with ROM of hip exercise, and static quadriceps exercise started after 2 weeks. Follow-up after 6 weeks shows signs of union. The patient was non-weight-bearing for a period of 6 weeks. Fracture got united after 3 months. Partial weight-bearing is allowed after 3 months. At the 2-year follow-up, the patient demonstrated a good functional outcome with a satisfactory range of motion (ROM). There is no evidence of deep vein thrombosis/AVN till 1 year follow-up. Serial follow-up radiographs at 6 weeks and 2 years, along with the final functional outcome, are shown in Fig. 3.

acetabular and trochanteric fractures with subtrochanteric extension involvement represent a rare and complex injury pattern that lies beyond conventional Pipkin classification. Early reduction and an appropriately selected surgical approach are critical to preserving femoral head vascularity and optimizing outcomes. The modified Kocher–Langenbeck approach with trochanteric flip osteotomy provides comprehensive exposure while minimizing additional soft tissue and vascular compromise, making it a valuable option in managing such challenging fracture-dislocations.

Clinical Message

This case illustrates that achieving early anatomical reduction and ensuring stable internal fixation of a highly uncommon femoral head–neck fracture-dislocation, which is linked with posterior acetabular wall and peritrochanteric fractures, can lead to outstanding functional and radiological results in adolescents. The use of a modified Kocher–Langenbeck approach allowed for sufficient exposure to reconstruct all fracture components simultaneously while maintaining the viability of the femoral head.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

- Dunseath OA, Al-Obaidi I, Ignatius L, Rudran B, Jordan C. Femoral head fractures: Anatomy, diagnosis and management. *EFORT Open Rev* 2026;11:175-82.
- Ompusunggu IH, Putra YY, Auliya A. Articular femoral head fracture management: A comprehensive systematic review. *J Adv Res Med Health Sci* 2024;10:57-63.
- McKee MD, Garay ME, Schemitsch EH, Kreder HJ, Stephen DJ. Irreducible fracture-dislocation of the hip: A severe injury with a poor prognosis. *J Orthop Trauma* 1998;12:223-9.
- Hougaard K, Thomsen PB. Traumatic posterior fracture-dislocation of the hip with fracture of the femoral head or neck, or both. *J Bone Joint Surg* 1988;70:233-9.
- Pipkin G. Treatment of grade IV fracture-dislocation of the hip. *J Bone Joint Surg* 1957;39-A:1027-42.
- Golovakha M, Lisunov M, Braunsteiner T, Orljanski W. Fractures of the femoral head (clinical lecture). *Orthop Traumatol Prosthet* 2024;4:86-94.
- Giannoudis PV, Gonzalez Edery E, Nemade P, Bagaria V. Femoral head impaction fracture: A new technique for closed reduction and biological stabilisation. *BMJ Case Rep* 2025;18:e264269.
- Milenkovic S, Mitkovic M, Mitkovic M. Avascular necrosis of the femoral head after traumatic posterior hip dislocation with and without acetabular fracture. *Eur J Trauma Emerg Surg* 2022;48:613-9.
- Hassan M, Elnosh HA, Khidir Mohamed EN, Adam YA, Ahmed AE, Mohamedal Hassan Abbas DM, et al. Evaluating the outcomes of surgical hip dislocation for femoral head trauma: A systematic review. *Cureus* 2025;17:e97152.
- Iglesias CJ, García BE, Valarezo JP. Controlled ganz dislocation. *EPRA Int J Multidiscip Res* 2025;11:1410-3.
- Mukhopadhyaya J, Bhadani JS, Shyam A. Functional outcome of Pipkin type III fracture managed by osteosynthesis through trochanteric flip osteotomy in a young patient after 5 years follow-up - a case report and literature review. *J Orthop Case Rep* 2021;11:101-6.
- Konda SR, Solasz SJ, Pean CA, Lowe DT, Ganta A. Repair of a femoral head fracture dislocation with an associated posterior wall acetabular fracture (Pipkin 4) via a Kocher–Langenbeck approach. *J Orthop Trauma* 2022;36:S19-20.
- Staresinic M, Lindtner RA, Krappinger D, Gänsslen A. Posterior approaches to the acetabulum. *Arch Orthop Trauma Surg* 2024;144:4633-40.
- Liu D, Yu X, Chen L, Wang Z. Ipsilateral femoral neck, intertrochanteric and acetabular fractures with posterior dislocation of the hip: A case report and literature review. *Medicine (Baltimore)* 2023;102:e36275.

Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this article

How to Cite this Article

Singh NN. Beyond Pipkin IV: Management of Femoral Head–Neck Fracture–Dislocation with Posterior Acetabular Wall and Peritrochanteric Fracture in an Adolescent Using a Modified Kocher–Langenbeck Approach. *Journal of Orthopaedic Case Reports* 2026 August;16(08):92-95.

