SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Surgery

Subtrochanteric Fracture on a Pre-Existing Femoral Plate: A Case Report of Secondary Fracture Management with Dynamic Hip Screw Plating

Oualid Assouab[1*], Reda Bahij[1], Youssef Lahmadi[1], Souheil Kada[1], Fahd Benyoussef[1], Omar Aguenaou[1], Reda Fekhaoui[1], Reda Allah Bassir[1], Monsef Boufettal[1], Jalal Mekkaoui[1], Mohamed Khermaz[1], Moulay Omar Lamrani[1]

[1]Department of Orthopaedic Surgery and Traumatology, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco

DOI: https://doi.org/10.36347/sasjs.2026.v12i07.002 | **Received:** 01.05.2026 | **Accepted:** 11.06.2026 | **Published:** 03.07.2026

***Corresponding author:** Oualid Assouab
Department of Orthopaedic Surgery and Traumatology, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco

Abstract **Case Report**

Introduction: Secondary fractures occurring in the vicinity of pre-existing implants represent a challenging surgical entity. Retained hardware from prior osteosynthesis alters the mechanical environment of the bone, creating stress concentration zones that predispose to new fractures. We report the case of a 48-year-old man who sustained a subtrochanteric fracture of the left femur at the proximal end of a plate implanted 33 years earlier for a proximal femoral fracture, and who was successfully managed with removal of the pre-existing plate and dynamic hip screw (DHS) fixation. ***Case Presentation:*** A 48-year-old male patient, with a history of proximal femoral fracture treated in 1993 by internal fixation with a lateral plate, presented following a road traffic accident with a closed injury of the left lower limb. Clinical examination revealed a painful, functionally impaired left lower limb with intact distal neurovascular status. Plain radiographs demonstrated a subtrochanteric fracture of the left femur at the proximal extremity of the pre-existing plate, consistent with a periprosthetic pattern at the implant tip. The patient was managed surgically with removal of the pre-existing plate followed by dynamic hip screw (DHS) plate fixation. Intraoperative fluoroscopic control confirmed satisfactory reduction and implant positioning. ***Conclusion:*** Periprosthetic fractures at the tip of retained femoral plates are a well-recognised but underreported complication of long-standing implants. The stress-riser effect at the implant extremity significantly increases fracture risk following even minor trauma. Surgical management must account for the pre-existing hardware; in this case, removal of the retained plate followed by DHS plating provided stable fixation. Surgeons should maintain awareness of this complication pattern in patients with retained implants.

Keywords: periprosthetic fracture; femoral plate; subtrochanteric fracture; dynamic hip screw; stress riser; retained implant; road traffic accident.

INTRODUCTION

Fractures occurring at or adjacent to pre-existing orthopaedic implants — termed periprosthetic or peri-implant fractures — are an increasingly recognised clinical entity. While most literature focuses on periprosthetic fractures around joint arthroplasties, fractures at the tip of retained diaphyseal or metaphyseal plates constitute a distinct and mechanically well-defined subgroup [1]. The implant creates a stress-riser effect at its extremity: the abrupt transition from a rigid fixation zone to unprotected cortical bone concentrates mechanical stress at this level, rendering it susceptible to fracture even under relatively modest loading conditions [1].

Road traffic accidents remain a leading cause of high-energy skeletal trauma in low- and middle-income countries, and patients with retained implants are disproportionately vulnerable to secondary fractures at implant-bone interfaces. The surgical management of such fractures is complex, as it must address both the new fracture and the pre-existing hardware, which may interfere with implant placement, canal access, or load distribution.

We report the case of a 48-year-old male patient who presented with a subtrochanteric fracture of the left femur at the proximal tip of a lateral femoral plate implanted 33 years earlier, following a road traffic accident. Surgical management consisted of removal of the pre-existing plate and fixation with a dynamic hip

screw (DHS) construct, with satisfactory intraoperative fluoroscopic control. Written informed consent was obtained from the patient for publication of this case report and associated imaging.

Case Presentation

A 48-year-old male patient, resident of Sidi Bouknadal, with a significant past surgical history of proximal femoral fracture of the left femur treated in 1993 at CHU Souissi (Rabat, Morocco) by internal fixation with a lateral femoral plate, presented to the emergency department of CHP Moulay Abdellah, Salé, on 18 April 2026 following a road traffic accident.

The mechanism of injury was a closed trauma to the left lower limb sustained during a motor vehicle collision. The patient reported immediate onset of pain and inability to bear weight on the left leg. There was no history of prior symptoms at the previously operated site, no known metabolic bone disease, and no current medications.

On clinical examination, the left lower limb showed functional impairment with pain on mobilisation. There was no open wound, no neurovascular deficit, and distal pulses were present and symmetric bilaterally. No clinical signs of ipsilateral knee, hip, or pelvic injury were identified.

Anteroposterior plain radiographs of the pelvis and left femur demonstrated a transverse subtrochanteric fracture of the left femur localised at the proximal extremity of the pre-existing lateral femoral plate. The fracture line originated at the level of the most proximal screw hole of the retained plate, consistent with a stress-riser fracture pattern at the implant tip. The old plate appeared well-fixed distally with no evidence of loosening or cortical lysis along its length. The contralateral hip and the lumbar spine appeared radiographically normal.

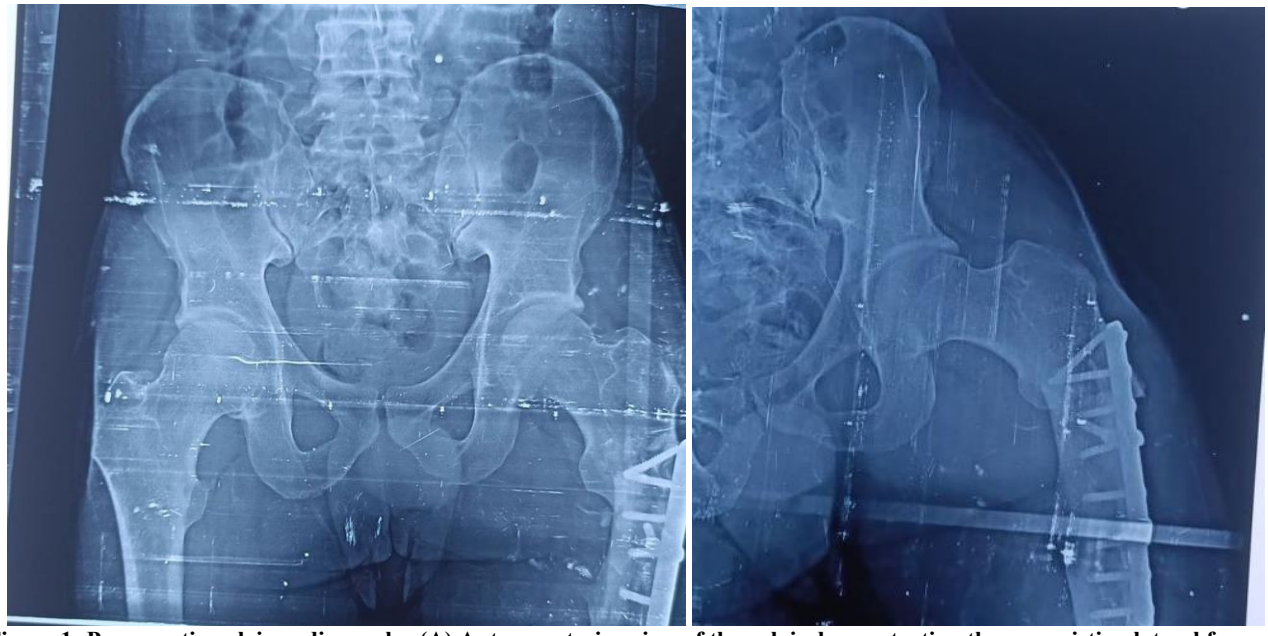

Figure 1: Preoperative plain radiographs. (A) Anteroposterior view of the pelvis demonstrating the pre-existing lateral femoral plate in situ on the left femur. (B) Closer view showing the subtrochanteric fracture line originating at the proximal screw hole of the retained plate, consistent with a stress-riser fracture pattern

Following clinical and radiological assessment, the decision was made to proceed with surgical fixation. Under general anaesthesia with the patient in the supine position on a fracture table, a standard lateral approach to the proximal femur was performed. The pre-existing lateral femoral plate was removed. Fracture reduction was then achieved under intraoperative fluoroscopic guidance. A dynamic hip screw (DHS) plate system was applied, incorporating the proximal femoral fragment with a lag screw directed into the femoral head and neck, and a lateral plate affixed to the femoral shaft. Intraoperative fluoroscopic images confirmed satisfactory reduction and appropriate positioning of the DHS construct relative to the femoral head and neck.

Figure 2: Intraoperative fluoroscopic image confirming satisfactory positioning of the dynamic hip screw lag screw within the femoral head-neck axis and adequate apposition of the DHS, Following removal of the pre-existing plate

Figure 3: Postoperative anteroposterior radiograph demonstrating the dynamic hip screw (DHS) construct with satisfactory reduction of the subtrochanteric fracture

The intraoperative and immediate postoperative course was uneventful. The patient was kept non-weight-bearing postoperatively, with wound surveillance and clinical monitoring ongoing at the time of this report. Outpatient radiological and functional follow-up has been planned at six weeks.

DISCUSSION

This case illustrates the well-described but clinically underappreciated phenomenon of stress-riser fractures at the tip of retained femoral plates. The mechanical basis of this complication is firmly established: a rigid metallic implant, by sharing load with the underlying cortex, reduces the adaptive remodelling stimulus along its length. At the implant extremity, the abrupt discontinuity in stiffness creates a focal stress concentration zone, and repetitive loading — or a single acute traumatic event — may produce a fracture precisely at this transition [1].

The interval of 33 years between the index procedure and the secondary fracture in our patient is notable. Several case series have documented peri-implant fractures occurring decades after the initial surgery, reinforcing the notion that retained hardware does not become inert with time [4]. In fact, cortical stress shielding beneath the plate may result in progressive osteoporosis in the protected segment, paradoxically rendering the bone at the plate extremity even more susceptible to fracture as the patient ages and bone mineral density declines [1, 4].

The classification of fractures around retained diaphyseal plates has not been universally standardised. Several authors have proposed adaptations and new systems to classify non-prosthetic peri-implant femoral fractures (NP-PIFFs), given that the Vancouver classification — originally developed for periprosthetic fractures around hip arthroplasties — does not fully apply to this entity [5, 6]. In our case, the fracture was

localised at the proximal tip of the implant, with intact distal fixation, consistent with a type at the implant extremity.

Surgical management of such fractures requires careful preoperative planning to account for the pre-existing hardware. Options include: revision plating with a longer construct, intramedullary nailing if canal geometry permits, or — as in our case — removal of the pre-existing implant followed by DHS plating when the fracture pattern involves the subtrochanteric or proximal femoral region. The choice of DHS in this patient was dictated by the subtrochanteric level of the fracture, the proximity to the femoral neck, and the need for proximal fragment fixation. Removal of the pre-existing plate was performed to allow optimal implant positioning and unobstructed lag screw trajectory [3, 7, 8].

The intraoperative fluoroscopic images confirmed satisfactory lag screw placement in the femoral head-neck axis and adequate DHS plate apposition to the lateral femoral cortex, providing stable fixation of the subtrochanteric fracture.

From a preventive standpoint, this case reinforces the rationale for implant removal in younger, active patients with retained plates — a decision that remains debated in the literature. In our patient, removal of the pre-existing plate was part of the surgical strategy and allowed unobstructed DHS placement. The long-term fracture risk at the implant tip must always be factored into the clinical decision regarding hardware removal, particularly in patients with a long life expectancy [4]. In resource-limited settings, patients with retained implants may also be unaware of this risk and fail to report antecedent trauma in a timely fashion, potentially delaying diagnosis and management.

Conclusion

Secondary subtrochanteric fracture at the proximal tip of a long-retained femoral plate is a mechanically predictable complication that may occur decades after the index procedure, often precipitated by relatively minor trauma. Clinicians managing patients with retained femoral implants should maintain awareness of this risk pattern. Dynamic hip screw plating, following removal of the pre-existing implant, represents an effective surgical option for proximal femoral fractures in this setting, allowing stable and unencumbered fixation. Long-term follow-up is warranted to assess fracture union and functional recovery.

Patient Consent

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

Conflicts of Interest: The authors declare no conflicts of interest.

Funding: No funding was received for this work.

Author Contributions

R.B. contributed to the conception and design of the study, data acquisition, and drafting of the manuscript. R.A.B., M.K., M.B., O.A., and M.O.L. contributed to critical revision of the manuscript for important intellectual content. All authors reviewed and approved the final version submitted for publication.

References

1. Yoo J, Ma X, Lee J, Hwang J. Research update on stress riser fractures. Indian J Orthop. 2021 ;55(3) :560–70. doi :10.1007/s43465-020-00291-4.
2. Arshad Z, Thahir A, Rawal J, Hull PD, Carrothers AD, Krkovic M, *et al.,* Dynamic hip screw fixation of subtrochanteric femoral fractures. Eur J Orthop Surg Traumatol. 2021 ;31(7) :1435–41. doi :10.1007/s00590-021-02895-4.
3. Scott CEH, Yapp LZ, Howard T, Patton JT, Moran M. Surgical approaches to periprosthetic femoral fractures for plate fixation or revision arthroplasty. Bone Joint J. 2023 ;105-B (6) :593–601. doi: 10.1302/0301-620X.105B6.BJJ-2022-1202.R1.
4. Gregory D, Small R, Milshteyn M, Vitale C. Peri-implant fracture following prior fixation of femoral neck fracture using the femoral neck system : a case report. J Orthop Case Rep. 2024 ;14(2) :82–7. doi :10.13107/jocr. 2024.v14.i02.4226.
5. Castillón P, Muñoz Vives JM, Aguado HJ, Cañas Merino A, Ortega-Briones A, Navarro-Jorge H, *et al.,* Consensus review on peri-implant femur fracture treatment: Peri-Implant Spanish Consensus (PISCO) investigators' recommendations. EFORT Open Rev. 2024 ;9(1) :40–50. doi :10.1530/EOR-23-0105.
6. Foster A, Beeharry MW. Periprosthetic proximal femoral fractures : à comprehensive review of epidemiology, risk factors, classification and management. Cureus. 2026 ;18(1): e100589. doi :10.7759/cureus.100589.
7. Bidolegui F, Pereira S, Munera MA, Garabano G, Pesciallo CA, Pires RE, *et al.,* Peri-implant femoral fractures : challenges, outcomes and proposal of a treatment algorithm. Chin J Traumatol. 2023 ;26(4) :211–6. doi: 10.1016/j.cjtee.2023.02.004.
8. Poroh M, Puha B, Gheorghevici TS, Constantin J, Norin F, Paul S, *et al.,*A retrospective analysis of peri-implant fractures : insights from a large volume clinical study. Int Orthop. 2023 ;47(11):2859–68. Doi :10.1007/s00264-023-05939-y.