Journal of Multidisciplinary Orthopaedic Surgery
2025;1(3):70–72
doi: 10.64575/d3h8p251
https://jomdos.org
Clinical Image

High-energy open femur fracture

Yusuf Cennet[1]*

[1]Department of Orthopedics and Traumatology, University of Health Sciences Kayseri City Training and Research Hospital, 38080, Kayseri, Turkey

*__Corresponding author:__ Yusuf Cennet, MD, Department of Orthopedics and Traumatology, University of Health Sciences Kayseri City Training and Research Hospital, 38080, Kayseri, Turkey; dr.yusufcennet@gmail.com

Received: 21 November 2025; Accepted: 22 November 2025; Published: 01 December 2025

Abstract

This study presents the multidisciplinary management of a Winquist-Hansen Type 4 femoral shaft fracture and a Gustilo-Anderson Type IIIA open fracture consistent with high-energy trauma.

Keywords: Femur fracture, high-energy trauma, open fracture, management, complication

Description

Femoral shaft fractures are a common consequence of high-energy trauma, particularly in the young male population. The incidence is reported to be approximately 37/100,000 person-years [1-5]. Open fractures account for 2-9% of all femoral fractures and occur in males, with a mean age of 25 ± 15.6 years, with a rate of 84.8% [1-5].

A 19-year-old patient was brought to the emergency room due to a motorcycle accident. He had no history of chronic disease. Physical examination revealed tenderness in the left hip and left shoulder. A Type IIIA open fracture of the left femur was detected according to the Gustilo-Anderson classification (Figure 1). The patient's vascular and neurological examination was normal. Radiographs revealed a Winquist-Hansen Type 4 fracture (Figure 2). The wound was irrigated with sterile saline solution, gross contamination was removed, and a sterile dressing was applied. Skeletal traction was initiated. The patient was consulted with infectious diseases, and prophylactic antibiotic therapy was prescribed. He underwent surgery within 24 hours, and osteosynthesis was performed with double-plated fixation of the distal, medial, and lateral femur (Figure 3). The patient was followed in a long-leg splint for 2 weeks. No complications were observed at the open fracture site during follow-up. Three weeks after the trauma, the patient was referred to a physical medicine and rehabilitation center. At 6 months follow-up, the patient was fully mobilized independently and had no complications at the incision or open fracture site. Radiographs showed good union at the fracture site. However, while knee range of motion was full in extension, flexion remained at 90-100 degrees. This case summarizes the multidisciplinary management of a Winquist-Hansen Type 4 femoral shaft fracture and a Gustilo-Anderson Type IIIA open fracture consistent with high-energy trauma. The Gustilo-Anderson classification is essential for determining infection risk and selecting antibiotics [3]. Studies recommend initiating antibiotic therapy within the first 66 minutes following injury in open fractures [4]. In general, the risk of infection in

Figure 1. Appearance of the patient's left femur open fracture.

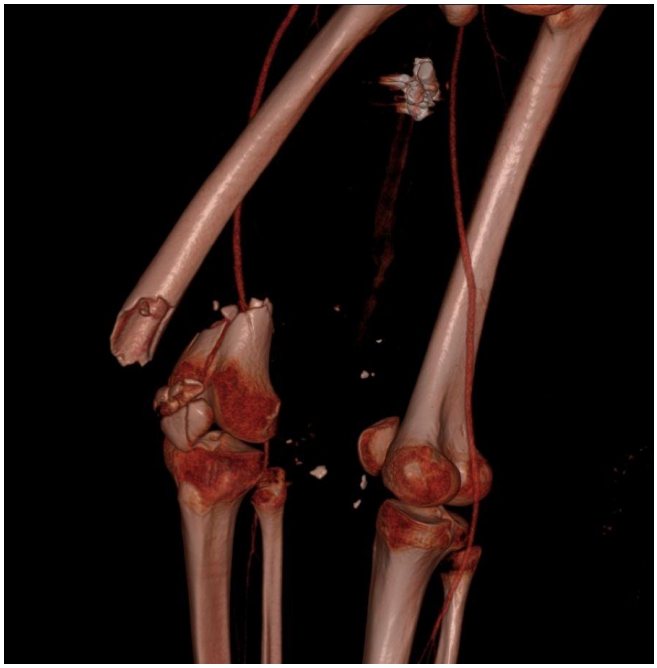

Figure 2. In the patient's three-dimensional computed tomography imaging, a comminuted fracture extending to the joint in the distal femur is observed.

Figure 3. Radiographic appearance of the fracture after double plate fixation.

open femoral fractures is 3-10%, while this rate is < 1% in closed fractures [3,4].

The management of surgical wounds in open fractures is a controversial issue. However, both clinical and experimental data highlight the time-dependent increase in infection rates [5]. Therefore, early antibiotic therapy and surgical debridement performed by an experienced team on a semi-elective basis within the first 24 hours appears advantageous [5].

The gold standard treatment for femoral shaft fractures is antegrade intramedullary nailing [1,2,5]. However, in comminuted fractures such as Winquist-Hansen Type 4, when the intramedullary canal is unsuitable, and in comminuted fractures of the distal or proximal metaphyseal diaphyseal region, plate-and-screw osteosynthesis is a valid alternative [1,2,5]. Double-plating of the distal, medial, and lateral femur, as in this patient, is a preferable method to increase rotational and external stability.

Although we did not encounter any problems with osteosynthesis during follow-up, the inability to achieve full range of motion in the knee joint, a problem caused by high-energy trauma, remained as a sequela in the patient.

Learning points

- Femur fractures are caused by high-energy injuries in young patients and by low-energy mechanisms, such as falls from a standing height, in older patients.
- The risk of infection after an open fracture depends on multiple factors, including the initial severity of the injury, the degree of wound contamination, and patient factors.
- A well-planned approach is essential to improve clinical outcomes in open comminuted femoral fractures.
- In high-energy open femoral fractures, thorough wound debridement, early appropriate antibiotic prophylaxis, and timely stable osteosynthesis appropriate to the fracture morphology are critical for minimizing the risk of infection and achieving functional recovery.

Author contributions

Author contributed to the study conception and design. Material preparation, data collection and analysis were performed by YC. The first draft of the manuscript was written by YC and the author commented on previous versions of the manuscript. The author read and approved the final version of the manuscript.

Statements and declarations

Funding

The authors received no financial support for the research and/or authorship of this article.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical statement

The authors confirm that this retrospective study was conducted in accordance with the ethical standards set forth in the Declaration of Helsinki and its later amendments.

ORCID iD

Y.C. 0009-0005-3924-1367

Cite this article as

Cennet Y. High-energy open femur fracture. J Multidiscip Orthop Surg. 2025;1(3):70–72. doi: 10.64575/d3h8p251

References

1. Kişioğlu AB, İştahlı M, Karagöz Z. Bent intramedullary femoral nail: a rare injury following high-energy trauma. J Multidiscip Orthop Surg. 2025;1(2):22–6. doi: 10.64575/wpd2px86
2. Winquist RA, Hansen ST, Clawson DK. Closed intramedullary nailing of femoral fractures: A report of five hundred and twenty cases. Journal of Bone and Joint Surgery. 1984;66(4):529–39. PMID: 6707031
3. Gustilo RB, Anderson, JT. Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones: retrospective and prospective analyses. Journal of Bone and Joint Surgery. 1976;58(4):453–8. PMID: 773941
4. Lack WD, Karunakar MA, Angerame MR, Seymour RB, Sims S, Kellam JF, et al. Type III open tibia fractures: immediate antibiotic prophylaxis minimizes infection. J Orthop Trauma. 2015;29(1):1–6. doi: 10.1097/BOT.0000000000000262.
5. Reinhard J, Schindler M, Straub J, Baertl S, Szymski D, Walter N, et al. Timing in orthopaedic surgery - Rethinking traditional myths with a critical perspective. Injury. 2025;56(3):112165. doi: 10.1016/j.injury.2025.112165.