MedCrave
Step into the World of Research

MOJ Orthopedics & Rheumatology

Short communication

Open Access

CrossMark

Impact of using the C-arm without traction table in the reduction of lateral hip fractures with locked cephalomedullary nail fixation

Abstract

This study investigates the impact of the use of the C-arm without a traction table, proposing an alternative patient positioning for the reduction of hip fractures that require reduction and fixation with a cephalomedullary nail. The motivation arises because in our institution the tool available has limitations regarding patient height, which consequently generates the need for a new technique to achieve optimal results, as it creates an exclusion criterion. The proposed technique seeks to improve anatomical alignment and fracture stability, with the goal of improving clinical outcomes and reducing postoperative complications. Effectiveness was examined through the evaluation of traditional and emerging methods for measuring reduction quality.

Keywords: Lateral hip fractures, traction table, C-arm, cephalomedullary nail

Volume 17 Issue 5 - 2025

Ernesto Bertoni, Marcos Del Vecchio, Efren Andrés Moreno, Esteban David Ortega Acosta

Department of Orthopaedic and Traumatology, Hospital Carlos Bocalandro, Argentina

Correspondence: Ernesto Bertoni, Department of Orthopaedic and Traumatology, Hospital Carlos Bocalandro, Argentina

Received: August 26, 2025 | **Published:** October 14, 2025

Level of Evidence

IV

Introduction

Hip fracture is a frequent injury, especially in elderly patients with poor bone quality. Its surgical treatment is crucial for recovery and restoration of quality of life.[1,2] The use of the C-arm with traction table, when available, are practical and efficient tools that are significant in this procedure. However, the choice of the optimal position of the fluoroscope without the use of the table during surgery may significantly influence clinical outcomes. This analytical, longitudinal, retrospective research focuses on determining the feasibility of performing an adequate anatomical reduction and fixation of a lateral hip fracture without the use of the traction table, using an alternative positioning of the C-arm and the patient, with the aim of showing the results, intraoperative and postoperative complications, and patient recovery. Understanding how the positioning of the image intensifier without table affects fracture reduction, implant stability, and hip biomechanics is essential to improve surgical practices and optimize clinical outcomes.

By addressing this issue, the aim is not only to improve surgical care and patient recovery, but also to contribute to the advancement of knowledge in the field of orthopedic surgery and provide evidence for clinical decision-making based on best practices and available resources within an institution. Optimizing surgical technique to improve clinical outcomes is essential. Lateral hip fracture surgery is common and carries risks. Investigating and determining fluoroscope and patient positions, without the use of traction table, to facilitate the intervention and minimize risks.[3] Likewise, to provide a solution in those institutions where a traction table is not available, is broken or presents limitations, as in ours when trying to achieve an optimal patient positioning.

Materials and methods

An analytical, retrospective, longitudinal, and observational study was conducted evaluating patients operated between November 2022 and March 2025, who underwent surgical reduction and fixation with a cephalomedullary nail for lateral hip fracture using the C-arm technique without traction table with an alternative patient and fluoroscope positioning.

Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Age > 50 years	Age < 50 years
Height < 1.65 m	Height > 1.65 m
Lateral fractures	Medial fractures
Closed fractures	Open fractures
Tronzo III fractures	Tronzo I, II, IV, and V fractures
Seinsheimer fractures	Multiple fractures
Single lesion	First consultation after 72h
First consultation within 72h of trauma	Operated after 21 days of diagnosis
Operated within 21 days of diagnosis	
Indoor walker or greater	
Postoperative follow-up: 10 days after discharge, monthly until 3 months, at 6 months and annually	

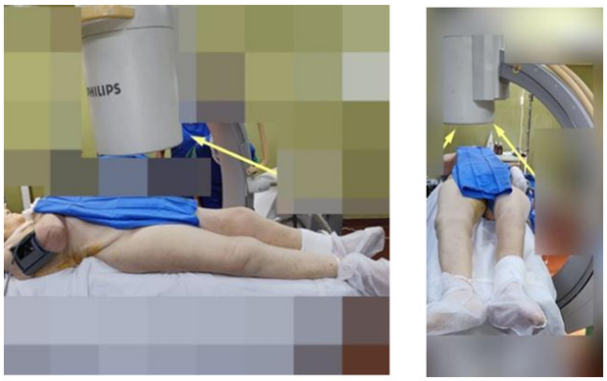
Surgical technique

The patient was positioned supine under spinal anesthesia, preferably, with a support placed under the gluteal region ipsilateral to the fracture in order to achieve a 15° pelvic elevation to align the femoral neck. According to consulted bibliography, this generates a pathway that correlates with the anatomical curvature of the femur, which must be followed by the guidewire. As counter-traction, a sheet loop was placed around the contralateral groin, secured to the table. The C-arm was positioned at 90°, perpendicular to the axial axis of the body, obtaining a strict anteroposterior hip view. Once correct positioning was achieved, it was fixed with specific floor markings and then rotated approximately 60° relative to the patient to obtain an optimal lateral profile for surgery. During the procedure, it was essential to maintain axial traction of the lower limbs during guidewire insertion. In our case, this traction was performed by the assistant, together with abduction

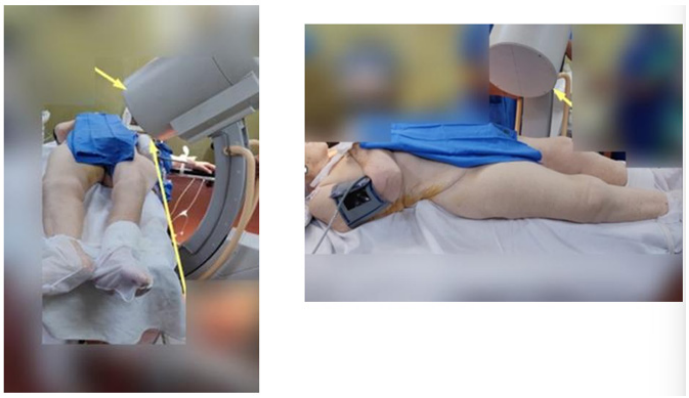
and internal rotation to achieve reduction, placement of the cephalic guidewire, and central positioning of the cephalic screw. An incision from the greater trochanter distally (average 5–8 cm) was performed. Access to bone was achieved by retracting the vastus lateralis anteriorly. Under fluoroscopic control, the guidewire was placed, the canal was reamed, and subsequently the cephalic screw inserted. For distal locking, a 15 cm radiolucent box was used, and the fluoroscope was rotated to 180° to visualize the distal hole of the nail. The site was marked with a guide, drilled, and the locking screw inserted accordingly. Clinical and radiological data were collected before and after treatment. Conventional radiographs and CT were used to assess reduction quality (Figures 1-8).

Figure 1 Patient supine with support under ipsilateral gluteal region.

Figure 2 Counter-traction with sheet loop around contralateral groin.



Figures 3 & 4 C-arm at 90° perpendicular to axial body axis, obtaining strict AP view of hip.



Figures 5 & 6 C-arm rotated approximately 60° relative to patient to obtain optimal lateral profile.

Figure 7 Specific floor markings.

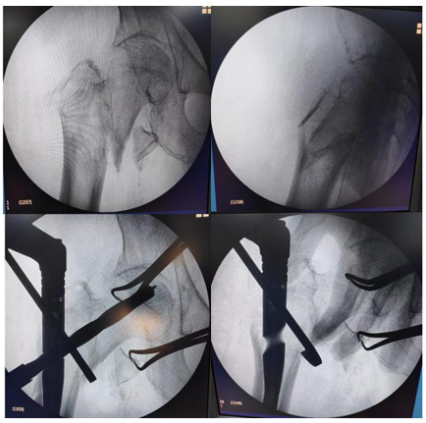


Figure 8 Intraoperative fluoroscopic AP and lateral hip views.

Results

Out of 85 patients, 32 were included, 12 male and 20 female (37.5% and 62.5%), with a mean age of 80.1 years (range 64–92 years). The mean cervicodiaphyseal angle was 126.1° in operated hips versus 128.1° in contralateral hips. Mean Tip-Apex Distance was 4.8 mm (AP) and 5.2 mm (lateral). Regarding cephalic screw position, 50% were located between central and superior quadrants

Citation: Bertoni E, Vecchio MD, Moreno EA, et al. Impact of using the C-arm without traction table in the reduction of lateral hip fractures with locked cephalomedullary nail fixation. *MOJ Orthop Rheumatol.* 2025;17(5):133–136. DOI: 10.15406/mojor.2025.17.00721

(Cleveland & Bosworth). All patients achieved independent ambulation at 6 months. One surgical site infection and two implant-related complications ("cut-out", 6%) were recorded. Nevertheless, rehabilitation and reintegration were achieved.

Patient data table

Age	Sex	Fracture date	Surgery date	Cephalic screw position	Operated hip CDA	Contralateral hip CDA	Tip-apex AP	Tip-apex Lat
81	F	12/11/2022	28/11/2022	1	123	122	8	13
78	F	27/11/2022	5/12/2022	5	124	127	4	4
81	M	26/11/2022	6/12/2022	3	127	123	7	9
75	F	27/12/2022	6/1/2023	2	125	127	5	3
82	M	30/12/2022	5/1/2023	2	121	122	5	6
91	M	4/1/2023	9/1/2023	2	114	120	7	3
64	F	22/12/2022	12/1/2023	2	130	133	7	6
82	F	24/1/2023	31/1/2024	1	123	134	2	3
84	F	1/2/2023	6/2/2023	3	123	125	4	5
66	F	12/4/2023	20/4/2023	2	120	127	5	5
88	M	26/5/2023	1/6/2023	1	134	122	5	8
81	M	2/7/2023	6/7/2023	2	123	130	7	6
67	M	4/8/2023	16/8/2023	2	122	124	9	8
80	M	4/8/2023	17/8/2023	1	121	124	6	5
92	F	27/8/2023	30/8/2023	1	123	130	6	9
86	F	27/8/2023	10/9/2023	1	123	120	3	4
82	F	25/9/2023	1/10/2023	2	127	130	3	3
70	F	18/11/2023	23/11/2023	3	124	140	2	2
82	F	31/10/2024	7/11/2025	2	127	130	3	4
72	M	9/11/2024	14/11/2024	3	132	130	4	2
76	F	23/12/2024	2/1/2025	2	118	127	7.5	8.8
92	F	13/12/2024	1/12/2024	2	133	129	4	7
67	M	1/2/2025	11/2/2025	5	128	130	2	2
77	M	12/2/2025	28/2/2025	1	127	132	3	2
63	M	16/2/2025	14/3/2025	1	130	129	5	6
78	F	3/3/2025	18/3/2025	2	132	130	7	9
89	F	7/3/2025	19/3/2025	3	135	132	5	2
92	F	5/3/2025	21/3/2025	2	128	130	3	4
91	F	22/3/2025	3/4/2025	3	130	132	4	5
88	F	2/4/2025	25/4/2025	3	132	130	4	6
86	F	19/4/2025	30/4/2025	3	128	130	4	6

Discussion

In this analytical, retrospective, longitudinal, and observational study, we described the results of patients who received a cephalomedullary nail without traction table (supine or manual repositioning). Our findings reflect those observed in the literature. We observed congruence with TAD <25mm and equivalent radiological and clinical outcomes.[4,5]

Reduction quality and radiological parameters such as Tip-Apex Distance (TAD) and cervicodiaphyseal angle (CDA) did not differ significantly between techniques, suggesting outcomes equivalent to the literature.[6] This aligns with other studies showing biomechanical and postoperative results similar to those with traction table. Patients were followed for 29 months, achieving consolidation and full weight-bearing at 6 months, resuming low-demand daily activities. Unlike some reports of traction table–related complications (perineal compression, neuropraxia),[7–11] we did not observe such events. The 6% cut-out complication rate is comparable to Jiamton et al.[7] who reported 15.8%. This method showed positive outcomes with functional recovery and low complication rate.

Conclusion

The presented technique without traction table can be a valid alternative for femoral neck fractures, especially in resource-limited settings. It proved efficient and safe compared with conventional techniques, showing advantages in OR setup time and radiation exposure without compromising reduction or functional outcome. Although our sample size was small, further data collection will continue.

Acknowledgements

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Citation: Bertoni E, Vecchio MD, Moreno EA, et al. Impact of using the C-arm without traction table in the reduction of lateral hip fractures with locked cephalomedullary nail fixation. *MOJ Orthop Rheumatol.* 2025;17(5):133–136. DOI: 10.15406/mojor.2025.17.00721

References

1. Cangiano LV, Yapur PM, Talamo F. Intertrochanteric fractures in older adults: risk factors associated with failure in cephalomedullary nailing. *Rev Asoc Argent Ortop Traumatol.* 2022;87(1):41–50.
2. Benchimol JA, Elizondo CM, Giunta DH, et al. Survival and functionality in the elderly over 85 years with hip fracture. *Rev Esp Cir Ortop Traumatol*. 2020;64(4):265–271.
3. Florschutz AV, Langford JR, Haidukewych GJ, et al. Femoral neck fractures: current management. *J Orthop Trauma*. 2015;29(3):121–129.
4. Khanna V, Tiwari M. Significance of tip apex distance in intertrochanteric fractures managed with proximal femoral nailing. *Orthop Traumatol Surg Res*. 2021;107(6):103009.
5. Geller JA, Saifi C, Morrison TA, et al. Tip-apex distance of intramedullary devices as a predictor of cut-out failure in elderly peritrochanteric fractures. *Int Orthop.* 2010;34(5):719–722.
6. Vélez M, Palacios-Barahona U, Arango-Posada MM, et al. Functional results and complications of cephalomedullary nailing in hip fractures. *Acta Ortop Mex*. 2018;32(3):126–130.
7. Jiamton C, Boernert K, Babst R, et al. The nail-shaft-axis of the proximal femoral nail antirotation (PFNA) as a prognostic factor. *Arch Orthop Trauma Surg*. 2018;138(3):339–349.
8. Li DY, Liu CG, Zhang K. Whether assisted intramedullary nail implantation without traction table in intertrochanteric fractures: is it safe and effective? *Clin Interv Aging.* 2023;18:387–395.
9. Zhang X, Zhou N, Ma M, et al. Comparison of axial distractor vs. traction table assisted fixation in subtrochanteric fractures. *Chin J Repar Reconstr Surg.* 2023;37(12):1465–1470.
10. Trabajos Científicos Congreso AAOT.
11. Zhang X, Zhou N, Ma M, et al. Comparison of effectiveness of lower extremity axial distractor and traction table assisted closed reduction and intramedullary nail fixation in femoral subtrochanteric fracture. *Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi.* 2023;37(12):1465–1470.

Citation: Bertoni E, Vecchio MD, Moreno EA, et al. Impact of using the C-arm without traction table in the reduction of lateral hip fractures with locked cephalomedullary nail fixation. *MOJ Orthop Rheumatol.* 2025;17(5):133–136. DOI: 10.15406/mojor.2025.17.00721