Scientific Research Publishing

Case Reports in Clinical Medicine, 2026, 15(11), 484-494
https://www.scirp.org/journal/crcm
ISSN Online: 2325-7083
ISSN Print: 2325-7075

Tibial Plateau Fractures in Kinshasa, Democratic Republic of the Congo: Epidemiological, Injury-Related and Therapeutic Profile—A Multicenter Retrospective Study of 38 Cases

Kalunda Mutombo Junior*, Sangwa Milindi Cedrick, Mukengeshayi Matadi Josue, Diumu Olenga Doudou, Kanunyangi Mukendi Maurice, Kadinekene Kapuku Joseph, Kalunda Mutombo Ezechiel, Albini Lomami Hugues, Mokassa Bakumubatané Luc

Department of Orthopedic Surgery, University of Kinshasa, Kinshasa, Democratic Republic of the Congo
Email: *mutomboj007@gmail.com

How to cite this paper: Junior, K.M., Cedrick, S.M., Josue, M.M., Doudou, D.O., Maurice, K.M., Kapuku Joseph, K., Ezechiel, K.M., Hugues, A.L. and Bakumubatané Luc, M. (2026) Tibial Plateau Fractures in Kinshasa, Democratic Republic of the Congo: Epidemiological, Injury-Related and Therapeutic Profile—A Multicenter Retrospective Study of 38 Cases. *Case Reports in Clinical Medicine*, **15**, 484-494.
https://doi.org/10.4236/crcm.2026.1511061

Received: September 12, 2026
Accepted: November 8, 2026
Published: November 11, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution-NonCommercial International License (CC BY-NC 4.0).
http://creativecommons.org/licenses/by-nc/4.0/

Open Access

Abstract

Introduction: Tibial plateau fractures are complex intra-articular injuries whose management depends on fracture morphology, soft-tissue condition, and the availability of diagnostic and therapeutic resources. This study aimed to describe their epidemiological, injury-related, therapeutic, and clinical characteristics in Kinshasa. **Methods:** A multicenter retrospective descriptive study was conducted from January 2022 to June 2026 in five hospitals in Kinshasa, Democratic Republic of the Congo. Among 71 identified patients, 38 with usable data were included. Epidemiological, clinical, radiological, therapeutic, and follow-up data were reviewed. Fractures were classified according to the Schatzker classification. **Results:** The mean age was 45.5 years ± 15.3 years, and 57.9% of patients were male. Road traffic accidents accounted for 71.1% of injuries. Open fractures represented 18.4% of cases. Schatzker type II was the most frequent fracture pattern (34.2%). All patients underwent standard radiographs, whereas computed tomography was performed in only one patient (2.6%). Surgical treatment was performed in 94.7% of cases, mainly using plate fixation. Complications were documented in 28.9% of patients, with knee stiffness being the most frequent (21.1%). Long-term assessment was limited by a high proportion of patients lost to follow-up. **Conclusion:** Tibial plateau fractures managed in Kinshasa predominantly affect relatively young adults and are mainly related to road traffic injuries. Surgical treatment, particularly plate fixation, was commonly used. Limited access to computed tomography

and insufficient long-term follow-up remain important challenges in the assessment and management of these injuries.

Keywords

Tibial Plateau Fracture, Schatzker Classification, Internal Fixation, Plate Fixation, Computed Tomography, Kinshasa

1. Introduction

Tibial plateau fractures are complex articular fractures accounting for approximately 1% of all fractures. Their incidence is estimated at about 10 cases per 100,000 inhabitants per year. They affect both young adults, generally following high-energy trauma, and older people, in whom low-energy trauma can cause fractures in weakened bone [1] [2].

The diversity of injury mechanisms and fracture configurations makes their management particularly demanding. The Schatzker classification remains one of the most widely used systems for describing these fractures [3] [4]. However, computed tomography allows a more precise analysis of fracture morphology and may modify surgical planning, particularly the choice of approach and fixation method [4] [5].

The therapeutic objective is to restore knee stability, limb alignment, and articular congruity while preserving the soft tissues and allowing early mobilization. Despite advances in osteosynthesis, these fractures remain associated with complications such as infection, joint stiffness, impaired healing, and post-traumatic osteoarthritis [2] [6].

Data on tibial plateau fractures remain relatively limited in sub-Saharan Africa. Available series generally report a relatively young population, male predominance, and a substantial contribution of road traffic accidents, with management methods varying according to available resources [7] [8].

2. Materials and Methods

2.1. Study Type, Setting, and Period

This was a multicenter retrospective descriptive study conducted in Kinshasa, Democratic Republic of the Congo, from January 2022 to June 2026. Patients came from five hospital facilities: Kinshasa University Hospital, the Sino-Congolese Friendship Hospital, Ngaliema Clinic, Camp Tshatshi Military Hospital, and Renaissance Hospital Center.

A total of 71 patients with tibial plateau fractures were identified. After application of the selection criteria, 38 records containing usable data were retained for analysis.

2.2. Population and Selection Criteria

Patients were included if they had an imaging-confirmed tibial plateau fracture, had

been managed at one of the participating centers during the study period, and had usable epidemiological, clinical, radiological, and therapeutic data. Patients with an isolated tibial spine fracture or a fracture below the tibial tuberosity were excluded, as were incomplete records, patients discharged against medical advice, and records that did not allow adequate assessment of management and early outcomes.

2.3. Data Collection and Radiological Assessment

Data were retrospectively collected from medical records. They included epidemiological, clinical, radiological, therapeutic, and outcome characteristics. All patients had standard anteroposterior and lateral knee radiographs. Anterior and posterior oblique views at 45 degrees had not been obtained in any patient. Fractures were classified according to the Schatzker classification [6] [7]. Computed tomography (CT) had been performed in only one patient (1/38; 2.6%), and no magnetic resonance imaging (MRI) had been performed. Open fractures were classified according to the Gustilo-Anderson classification when this information was available.

2.4. Statistical Analysis

Data were entered and analyzed using Microsoft Excel 2013. Qualitative variables were presented as counts and percentages, rounded to one decimal place. Quantitative variables, particularly age, were described using the mean, standard deviation, median, and range, depending on data availability.

3. Results

3.1. Epidemiological and Injury-Related Characteristics

A total of 38 patients were included from the 71 records identified. The mean age was 45.5 years ± 15.3 years, with a median of 47.5 years and a range of 21 to 70 years. The 50 - 69 age group was the most represented (42.1%). Men accounted for 57.9% of the sample, giving a male-to-female ratio of 1.38. Road traffic accidents were the main cause, with 27 cases (71.1%), followed by falls from height with 8 cases (21.1%). The left lower limb was affected in 23 cases (60.5%). Fractures were closed in 31 cases (81.6%) and open in 7 cases (18.4%). Among the open fractures, four were classified as Gustilo-Anderson type II and three as type III. According to the Schatzker classification, type II was the most frequent (34.2%), followed by type I (23.7%). No type V fracture was found in the series (see **Table 1**).

Table 1. Epidemiological and injury-related characteristics of patients (n = 38).

Variables	Count (n)	%
Age		
<30 years	9	23.7
30 - 49 years	12	31.6
50 - 69 years	16	42.1
≥70 years	1	2.6

Continued

Sex		
Male	22	57.9
Female	16	42.1
Cause		
Road traffic accident	27	71.1
Fall from height	8	21.1
Osteoporosis	3	7.9
Affected Side		
Left	23	60.5
Right	15	39.5
Skin Status		
Closed fracture	31	81.6
Open fracture	7	18.4
Schatzker Classification		
Type I	9	23.7
Type II	13	34.2
Type III	5	13.2
Type IV	6	15.8
Type V	0	0.0
Type VI	5	13.2

3.2. Clinical Presentation and Imaging



Figure 1. Schatzker type IV tibial plateau fracture.

The clinical presentation was dominated by the combination of swelling and pain, found in 30 patients (78.9%). Deformity associated with pain was observed in 6 cases (15.8%). The injury mechanism was mainly lateral in 26 cases (68.4%), followed by

mixed mechanisms in 7 cases (18.4%) and sagittal mechanisms in 5 cases (13.2%). All patients underwent standard anteroposterior and lateral knee radiographs (Figure 1). CT was performed in only one patient (2.6%), and no MRI was performed.

3.3. Therapeutic Management

Treatment was surgical in 36 patients (94.7%) and orthopedic in 2 patients (5.3%). Plate-and-screw osteosynthesis was the main treatment modality, used alone in 25 patients (65.8%) (Figure 2 and Figure 3). A plate combined with bone grafting was used in 3 patients (7.9%). Seven patients (18.4%) were treated with an external fixator (Figure 4), and one patient (2.6%) underwent percutaneous screw fixation. Rehabilitation was documented in 30 patients (78.9%) (see Table 2).

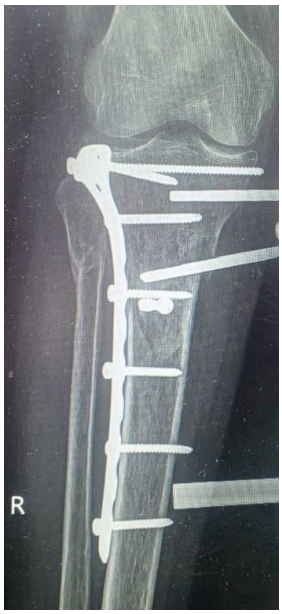


Figure 2. Osteosynthesis using a lateral plate and screws.



Figure 3. Intraoperative images of osteosynthesis using a plate and screws.



Figure 4. Temporary stabilization with an external fixator.

Table 2. Treatment modalities (n = 38).

Treatment Modalities	Count (n)	%
Type of Treatment		
Surgical	36	94.7
Orthopedic	2	5.3
Main Technique		
Plate and screws	25	65.8
External fixator	7	18.4
Plate and screws + bone graft	3	7.9
Long-leg cast	2	5.3
Percutaneous screw fixation	1	2.6
Rehabilitation		
Yes	30	78.9
No	8	21.1

3.4. Complications and Follow-Up

A complication was documented in 11 patients (28.9%). Joint stiffness was the most frequent complication, with 8 cases (21.1% of the entire series), followed by ankylosis in 2 cases (5.3%) and knee osteoarthritis in one case (2.6%). Medium- and long-term follow-up was limited. Thirty-six patients (94.7%) were recorded as lost to follow-up during the period after initial management and/or implant removal, limiting the assessment of late functional and radiological outcomes (see Table 3).

Table 3. Documented complications and follow-up (n = 38).

Outcome	Count (n)	%
Complications		
Joint stiffness	8	21.1
Ankylosis	2	5.3
Knee osteoarthritis	1	2.6
No documented complication	27	71.1
Long-term follow-up		
Lost to follow-up	36	94.7
Documented knee arthrodesis	1	2.6
Missing outcome data	1	2.6

4. Discussion

This multicenter study describes the profile of tibial plateau fractures managed in five hospital facilities in Kinshasa. It mainly highlights a relatively young population, male predominance, the major role of road traffic accidents, a predominance of Schatzker type II fractures, very limited use of computed tomography, and predominantly surgical management.

4.1. Epidemiological Characteristics

The mean age of our patients was 45.5 years, with male predominance of 57.9%. This profile is similar to that reported in several African series. In Togo, Abalo *et al.* found a mean age of 42.7 years and a clear male predominance [8]. More recently, a prospective Ethiopian cohort of 191 patients reported a mean age of 45 years and 73.8% men [7]. This profile partly contrasts with trends observed in some European populations, where incidence increases among older women in a context of low-energy trauma and bone fragility. A Danish population-based study reported a mean age of 52.6 years, with a marked increase in incidence among women after the age of 50 [1].

In our series, road traffic accidents accounted for 71.1% of causes. This predominance is also observed in several series from comparable settings: 84% in Togo [8] and 41.9% in Ethiopia [7]. A large Latin American series of 1165 patients also found a high predominance of road traffic injuries, mainly involving motorcycles [9]. These data suggest that, in young and active populations, tibial plateau fractures remain largely associated with high-energy trauma.

4.2. Injury-Related Characteristics

Closed fractures accounted for 81.6% of cases, compared with 18.4% open fractures. This proportion of open fractures is close to the 21.5% reported in the Ethiopian cohort [7], but higher than that of some large international series, particularly that of Reátiga Aguilar *et al.*, in which 93.1% of fractures were closed [9]. Schatzker

type II was the most frequent in our series, accounting for 34.2% of cases. This distribution is consistent with several publications in which type II is among the most common patterns. In a European study of 607 patients, Schatzker type II was the most frequent, representing 26.8% of fractures. However, distribution varies considerably according to the traumatic mechanism and the population studied: the Ethiopian series was dominated by type I, whereas a multicenter series of 1165 patients reported a predominance of types VI and V [7]-[10]. The absence of Schatzker type V fractures in our series should therefore be interpreted cautiously. It may be related to the small sample size, recruitment characteristics, and also the limitations of radiographic assessment in complex fractures.

4.3. Imaging

One of the most striking findings of our study is the limited use of CT, which was performed in only one of 38 patients (2.6%), whereas all patients underwent standard radiographs. Conventional radiography remains the essential initial examination, but CT allows more precise assessment of articular depression, comminution, and posterior fragments. A systematic review of 14 studies concluded that 2D CT improves the assessment of several tibial plateau fracture classifications and recommended its use in addition to radiography [5]. Its value goes beyond classification alone. Fleming *et al.* showed that adding CT to radiographs changed the choice of surgical approach in 28.5% of cases, patient positioning in 27%, and plate location in 34% [11]. Thus, the contrast between 2.6% CT use and 94.7% surgical treatment is an important feature of our series. This situation may reflect constraints in access to cross-sectional imaging in our setting. It also requires some caution when interpreting the radiological classification of complex fractures. The absence of MRI in our series is less surprising. Although MRI is particularly useful for identifying associated meniscal, ligamentous, and cartilage injuries, its preoperative use is not systematic, and its indications in tibial plateau fractures remain debated.

4.4. Therapeutic Management Analysis

In our series, 94.7% of patients underwent surgery, mainly using plate-and-screw fixation. This high proportion should be interpreted in light of the hospital-based recruitment and the selection criteria of our study. The goals of tibial plateau fracture treatment are to restore the articular surface, mechanical axis, and knee stability while respecting the soft tissues. Open reduction with internal fixation remains a widely used method when less invasive techniques cannot achieve these goals [2]. Plate-and-screw fixation was the main technique in our series. This practice is also reported in African surgical series. In N'Djamena, a series of 35 surgically treated fractures reported plate fixation in 94.2% of cases [12]. An external fixator was used in 18.4% of our patients. This technique retains a role in complex high-energy fractures, particularly when the soft tissues are severely compromised, either as temporary treatment or, in certain situations, as definitive treatment [2].

4.5. Analysis of Complications and Follow-Up

Complications were documented in 28.9% of patients. Joint stiffness, observed in 21.1% of the entire series, was the most frequent complication. Stiffness is a recognized complication after tibial plateau fracture. A review of complications of surgical treatment reported an incidence ranging from 3% to 18% across series, while one study cited in that review found approximately 20% residual stiffness at one year [6]. This relatively high frequency in our series highlights the importance of stable fixation and appropriate mobilization. The Ethiopian cohort notably showed an association between prolonged immobilization and poorer functional outcomes, emphasizing the value of mobilization and gradual resumption of weight-bearing [7].

Conversely, the low frequency of knee osteoarthritis observed in our study does not allow us to conclude that the risk of post-traumatic osteoarthritis is low. This complication usually occurs late and requires prolonged follow-up.

4.6. Limitations

Our study has several limitations. Its retrospective design is susceptible to incomplete data and heterogeneity in management across the five centers. The small sample size also limits the possibilities for comparative analyses. Because CT was performed in only one patient, some complex fractures may have been insufficiently characterized using standard radiographs alone. The main limitation, however, is inadequate follow-up, with a high proportion of patients lost to follow-up. Late complications, particularly knee osteoarthritis, may therefore have been underestimated, and no robust conclusion can be drawn regarding medium- or long-term functional outcomes.

Despite these limitations, this study provides multicenter data on tibial plateau fractures in Kinshasa and highlights several features of their management, particularly the substantial contribution of road traffic injuries and the very limited use of computed tomography.

5. Conclusion

Tibial plateau fractures observed in this multicenter series from Kinshasa mainly affected relatively young adults, with male predominance and a strong contribution of road traffic accidents. Schatzker type II fractures were the most frequent, and management was predominantly surgical, mainly using plate-and-screw fixation. The very limited use of computed tomography contrasts with the high frequency of surgical treatment and highlights constraints in access to advanced imaging in our setting. Joint stiffness was the most frequently documented complication. Improving access to CT, standardizing preoperative assessment, and strengthening postoperative follow-up could help optimize the management of these fractures. Prospective studies with standardized functional assessment and prolonged follow-up are needed to better evaluate medium- and long-term outcomes.

Author Contributions

Kalunda Mutombo Junior: Data collection and initial drafting; Mukengeshayi Matadi Josue and Sangwa Milindi Cedrick: Study design, analysis, supervision, and manuscript revision; Kalunda Mutombo Ezechiel, Kadinekene Kapuku, and Kanuniangi Mukendi Maurice: Data collection and manuscript revision; Albini Lomami Hugues: Supervision and critical revision; Mokassa Bakumubatané Luc: Academic supervision and final validation. All authors read and approved the final version of the manuscript.

Data Availability

The data generated and/or analyzed during this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Elsoe, R., Larsen, P., Nielsen, N.P.H., Swenne, J., Rasmussen, S. and Ostgaard, S.E. (2015) Population-Based Epidemiology of Tibial Plateau Fractures. *Orthopedics*, **38**, e780-e786. https://doi.org/10.3928/01477447-20150902-55

[2] Gahr, P., Kopf, S. and Pauly, S. (2023) Current Concepts Review. Management of Proximal Tibial Fractures. *Frontiers in Surgery*, **10**, Article ID: 1138274. https://doi.org/10.3389/fsurg.2023.1138274

[3] Schatzker, J., McBroom, R. and Bruce, D. (1979) The Tibial Plateau Fracture. The Toronto Experience 1968-1975. *Clinical Orthopaedics and Related Research®*, No. 138, 94-104.

[4] Kfuri, M. and Schatzker, J. (2018) Revisiting the Schatzker Classification of Tibial Plateau Fractures. *Injury*, **49**, 2252-2263. https://doi.org/10.1016/j.injury.2018.11.010

[5] Huitema, J.M., van der Gaast, N., Jaarsma, R.L., Doornberg, J.N., Edwards, M.J.R. and Hermans, E. (2024) The Effect of Addition of 2DCT Scans and 3DCT Scans for the Classification of Tibial Plateau Fractures: A Systematic Review. *European Journal of Trauma and Emergency Surgery*, **50**, 71-79. https://doi.org/10.1007/s00068-023-02344-3

[6] Gálvez-Sirvent, E., Ibarzábal-Gil, A. and Rodríguez-Merchán, E.C. (2022) Complications of the Surgical Treatment of Fractures of the Tibial Plateau: Prevalence, Causes, and Management. *EFORT Open Reviews*, **7**, 554-568. https://doi.org/10.1530/eor-22-0004

[7] Worku, A.B., Kebede, M.A., Abate, A.D., Admassie, S.H., Girma, M., Zewde, B.W., *et al.* (2025) Clinical Outcomes and Management of Tibial Plateau Fractures in Ethiopia: A Prospective Cohort Study. *PLOS ONE*, **20**, e0323956. https://doi.org/10.1371/journal.pone.0323956

[8] Abalo, A., Ouedraogo, S., James, Y.E., Walla, A. and Dossim, A. (2013) Fractures des plateaux tibiaux: Aspects épidémiologiques et thérapeutiques. *Journal de la Recherche Scientifique de l'Université de Lomé*, **13**, 47-53.

[9] Reátiga Aguilar, J., Rios, X., González Edery, E., De La Rosa, A. and Arzuza Ortega, L. (2022) Epidemiological Characterization of Tibial Plateau Fractures. *Journal of Or-*

thopaedic Surgery and Research, **17**, Article No. 106. https://doi.org/10.1186/s13018-022-02988-8

[10] Bormann, M., Neidlein, C., Gassner, C., Keppler, A.M., Bogner-Flatz, V., Ehrnthaller, C., *et al.* (2023) Changing Patterns in the Epidemiology of Tibial Plateau Fractures: A 10-Year Review at a Level-I Trauma Center. *European Journal of Trauma and Emergency Surgery*, **49**, 401-409. https://doi.org/10.1007/s00068-022-02076-w

[11] Fleming, T.A., Torrie, P.A.G., Murphy, T.A., Dodds, A.L., Engelke, D.M., Curwen, C.H.M., *et al.* (2023) The Influence of Pre-Operative Computed Tomography (CT) on Surgical Approach and Fixation for Fractures of the Tibial Plateau. *Journal of Orthopaedics*, **42**, 50-53. https://doi.org/10.1016/j.jor.2023.07.004

[12] Dingamnodji, M., Andjeffa, V., Mossalmbaye, D.A., Fandebnet, S., Hassia, C., Vlei-Aye, B., *et al.* (2024) Résultats du traitement chirurgical des fractures des plateaux tibiaux au Centre Hospitalier Universitaire la Renaissance de N'Djamena à propos de 35 cas. *European Scientific Journal, ESJ*, **20**, Article No. 84. https://doi.org/10.19044/esj.2024.v20n30p84

List of Abbreviations

- RTA: Road Traffic Accident
- HC: Hospital Center
- UCH: University Hospital Center
- KUH: Kinshasa University Hospital
- M/F: Male/Female
- SCFH: Sino-Congolese Friendship Hospital
- MRI: Magnetic Resonance Imaging
- n: Number of Cases
- DRC: Democratic Republic of the Congo
- CT: Computed Tomography