

Profile of Orthopaedic and Traumatological Surgical Procedures at a Referral Centre in Chad

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Abstract

Introduction: Operating theatres are one of the main areas of hospital activity and represent the most costly facilities within a hospital. Assessing these activities provides scientific evidence and enables their documentation, with a view to improving the quality of service. The aim of this study was therefore to describe the profile of surgical procedures in orthopaedics and traumatology at the Renaissance University Hospital in N'Djamena, a centre of excellence in Chad.

Patients and methods: This was a descriptive, retrospective cross-sectional study conducted in the operating theatre of the Renaissance in N'Djamena, covering 18 months of orthopaedic and trauma surgery, from 1 April 2024 to 30 September 2025, involving 407 patients. The study included patients of both sexes, of all ages, with a complete medical record who had undergone surgery in the operating theatre during the study period, whether elective or emergency.

Results: We recorded 407 patients who underwent surgery, representing 22.6 cases per month. The 21–30 age group was the most common, accounting for 22.90% (n = 93), with ages ranging from 12 months to 98 years and a sex ratio of 2.95. Traumatic conditions were the most common, accounting for 91.17% (n = 371), followed by degenerative conditions at 3.93% (n = 16). Road traffic accidents were the most frequent cause, accounting for 68.80% (n = 280). Patients undergoing elective surgery accounted for 84% (n = 342) compared with 16% (n = 65) undergoing emergency surgery. Regarding traumatic conditions, the types of procedures performed were dominated by intramedullary nailing, followed by screw-fixed plate osteosynthesis, accounting for 20.40% (n = 83) and 19.90% (n = 81) respectively. Non-traumatic conditions were dominated by the removal of osteosynthesis hardware and total hip replacements, accounting for 17.70% (n = 72) and 3.93% (n = 16) respectively.

Conclusion: This study shows that the majority of patients admitted to the operating theatre of the orthopaedic and trauma department are young adult males who have been involved in road traffic accidents. Osteosynthesis plays a major role in their treatment. In our region, further efforts are needed in terms of both material and human resources.

Keywords: Surgical Procedures • Orthopaedic and trauma • Osteosynthesis • Sub-saharan africa • Referral centre • Chad

Introduction

Operating theatres, initially regarded as separate, scattered units under the jurisdiction of each surgical specialty, are now being consolidated and have become one of the main hubs of hospital activity [1]. They are among the most costly facilities within a hospital [2]. Orthopaedic and Trauma Surgery (OTS) is one of the most demanding and delicate specialties, due to the wide range of procedures and surgical indications on the one hand and the rapid evolution of surgical materials and techniques on the other [3]. Assessing these

activities provides scientific evidence and enables their documentation, thereby improving the quality of service [4]. In Chad, very few studies have focused on assessing the profiles of surgical procedures in orthopaedics and traumatology, despite the importance of such studies in enabling the organisation of care to be adapted to local realities and in advocating for improvements to technical facilities. The aim of this study was to describe the profile of surgical procedures in orthopaedics and traumatology at the Renaissance University Hospital in N'Djamena, a centre of excellence in Chad.

Patients and Methods

Patients

The study included 407 patients who underwent surgery in the operating theatre of the Orthopaedic and Trauma Surgery Department at the Renaissance University Hospital in N'Djamena. The study included male and female patients of all ages who underwent surgery in the operating theatre during the study period, whether elective or emergency. The following excluded patients whose scheduled procedures were subsequently cancelled, patients who underwent minor surgical procedures in the A&E department or outpatient clinic and those whose medical records were incomplete.

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Methods

This was a descriptive cross-sectional study involving retrospective data collection, conducted in the operating theatre of the Renaissance University Hospital in N'Djamena, covering 18 months of surgical activities in Orthopaedic and Trauma Surgery, from 1 April 2024 to 30 September 2025.

The Renaissance University Hospital operating theatre has five operating theatres, comprising one sterile theatre, two aseptic theatres and two hyper-aseptic theatres. The team of orthopaedic surgeons and traumatologists operates in a dedicated hyper-aseptic theatre equipped with a surgical monitor, reserved for clean surgery and in another so-called septic theatre, shared by surgical specialities and dedicated to dirty surgery.

Data were collected from surgical reports, recovery room records and medical records. The parameters assessed were epidemiological and, above all, surgical. Data were entered using Microsoft Office 2019 (Word and Excel) and processed and statistically analysed using Sphinx software (version 5.1.0.4).

Results

During the study period, 407 patients underwent surgery in the Orthopaedic and Trauma Surgery theatre over an 18-month period, representing 22.6 cases per month. The 21–30 age group was the most common, accounting for 22.90% (n = 93) of cases, with ages ranging from 12 months to 98 years. A male predominance was observed, with 74.70% (n = 304) of cases and a sex ratio (male/female) of 2.95. Traumatic conditions were the most common, accounting for 91.17% (n = 371) of cases, followed by degenerative conditions in 3.93% (n = 16) and neoplastic conditions in 2.21% (n = 9) of cases (Table 1). With regard to traumatic conditions, Road Traffic Accidents (RTAs) and domestic accidents were the most common causes (Table 2), accounting for 68.80% (n = 280) and 8.84% (n = 36) respectively.

Patients undergoing elective surgery accounted for 84% (n = 342) compared with 16% (n = 65) undergoing emergency surgery. With regard to traumatic conditions, the types of procedures performed were dominated by intramedullary nailing, followed by screw-fixed plate osteosynthesis and then pinning, accounting for 20.40% (n = 83), 19.90% (n = 81) and 5.65% (n = 23) of cases respectively (Table 3). Non-traumatic conditions were dominated by the removal of osteosynthesis hardware, followed by total hip replacements and intermediate hip replacements, accounting for 17.70% (n = 72), 3.93% (n = 16)

and 2.21% (n = 9) of cases respectively. No knee replacements or arthroscopic surgeries were performed. Operating theatre time (Table 4) ranged between 2 and 4 hours in half of the cases, accounting for 49.14% (n = 200).

Discussion

We conducted a cross-sectional, descriptive study on the profile of the various surgical procedures performed in the operating theatre of the Department of Orthopaedic and Trauma Surgery at the Renaissance University Hospital in N'Djamena (Chad).

During the study period, 407 patient records were collated, representing 22.6 cases of orthopaedic and trauma surgery per month in the operating theatre. This relatively high frequency of orthopaedic and trauma surgery cases could be explained by the fact that our centre is one of the most sought-after referral centres in the country and by the high incidence of trauma.

The majority of patients were young people, with those aged 21–30 and 31–40 being the most numerous. Indeed, a systematic review of trauma registries in low- and middle-income countries shows that the median age of victims is around 27 years [5]. This is the most active segment of the population and therefore the most exposed to trauma. Males were by far the most affected, with a sex ratio of 2.95. This trend can be explained by men's greater exposure to high-risk activities, particularly driving vehicles especially motorised two-wheelers as well as daily physical labour.

In terms of the nature of the injuries, traumatic conditions accounted for the majority of operating theatre activities, representing 91.17% of cases (n = 371). Several recent studies, notably in Niger and Burkina Faso, show that limb fractures and trauma resulting from road traffic accidents are the main indications for orthopaedic treatment [6,7].

Road traffic accidents were the most common cause of these injuries, accounting for 68.80% (n = 280) of cases. In African literature, a recent study conducted in 2024 by Barry A, et al. [4] in Guinea found similar to ours, with road traffic accidents accounting for 53.29% of cases (Figure 1 and Figure 2). A systematic review of road traffic accidents in sub-Saharan Africa showed that road traffic accidents are a major cause of trauma, accounting for a median proportion of approximately 32% of trauma patients [8]. These accidents may be linked to road safety issues, notably speeding, failure to comply with the Highway Code, inadequate infrastructure and the increase in the number of motorised two-wheeled vehicles.

Table 1. Breakdown of patients by type of condition.

Type of Condition	Staff Numbers	Percentage (%)
Traumatic pathology	371	91,17
Degenerative diseases	16	3,93
Tumour pathology	9	2,21
Infectious diseases	5	1,22
Others	6	1,47
Total	407	100

Table 2. Breakdown of patients by cause of lesions.

Causes	Staff Numbers	Percentage (%)
Road traffic accident	280	68,80
Domestic accident	36	8,84
Playful accident	26	6,39
Ballistic trauma	18	4,42
Workplace accident	6	1,47
Sports injury	2	0,50
Landslide	2	0,50
Rixe	1	0,24
Thermal burn	1	0,24
Others	35	8,60
Total	407	100

Table 3. Breakdown of patients by type of procedure.

Type of Procedure	Staff Numbers	Percentage (%)
Trauma Surgery		
Locked or non-locked intramedullary nailing	83	20,40
Osteosynthesis using a screw-fixed plate	81	19,90
Skewering	23	5,65
Screwing	12	2,95
Hoof trimming	11	2,70
Stable elastic intramedullary nailing	10	2,45
Triple percutaneous screw fixation	7	1,72
Hoof trimming + Exofixation	7	1,72
Tenorography	5	1,22
Transcondylar traction	3	0,74
Trimming + Skewering	3	0,74
Amputation	3	0,74
Others	34	8,35
Orthopaedic Procedures		
Removal of osteosynthesis hardware	72	17,70
Total hip replacement	16	3,93
Hemiarthroplasty of the hip	9	2,21
Removal of a synovial cyst	7	1,72
Release of JUDET	4	0,98
Bone biopsy	4	0,98
Realignment osteotomy	4	0,98
Treatment of pseudarthrosis + intramedullary nailing	3	0,74
Replacement of osteosynthesis hardware	3	0,74
Management of the amputation stump	3	0,74
Total	407	100

Table 4. Breakdown of patients by duration of surgery in the operating theatre.

Operating theatre time	Staff Numbers	Percentage (%)
Less than 1 hour	49	12,04
1 to 2 hours	114	28,01
2 to 4 hours	200	49,14
More than 4 hours	44	10,81
Total	407	100

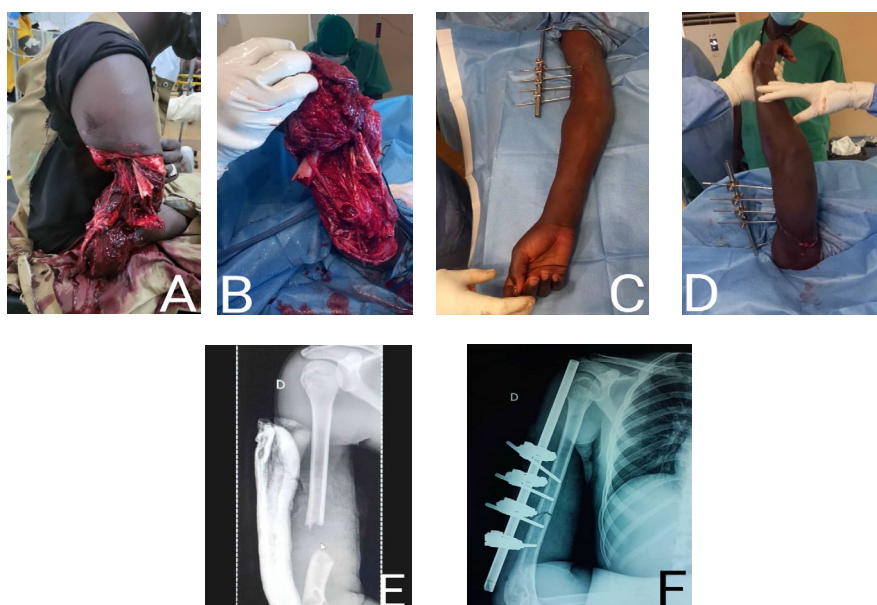


Figure 1: A 20-year-old adult, right-handed, who was involved in a road traffic accident involving a car and a motorbike, resulting in an open fracture of the right humerus classified as type IIIA according to Gustilo and Anderson, without downstream neurovascular disorders. **A)** Image taken at the scene of the accident, **B)** Intraoperative image following debridement, **C, D)** Anterior and posterior views of the limb following reduction and humerohumeral external fixation and **E, F)** Standard anteroposterior radiographs (pre-treatment and follow-up) showing a simple fracture of the junction between the proximal and middle thirds of the right humerus, with a transverse line and elongation, and an external fixator securely in place with anatomical reduction.

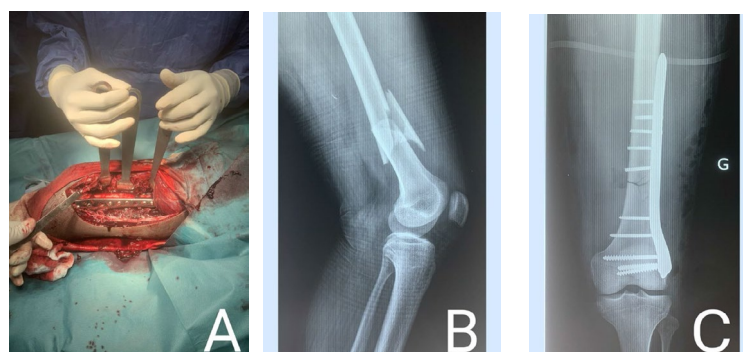


Figure 2: A 32-year-old patient, victim of a motorcycle-motorcycle road traffic accident resulting in a closed fracture of the left femur classified as AO type 32 B1, without downstream neurovascular compromise. **A).** Intraoperative image showing a screw-fixed plate (LCP type) inserted following reduction via a posterolateral approach, **B).** Complex fracture of the distal third of the left femoral shaft with detachment of a third fragment in a butterfly wing configuration, with a spiral fracture line and **C).** Lateral screw-fixed plate fixation in place with anatomical reduction.

In the majority of cases (84%, $n = 342$), the procedure was performed as elective surgery, compared with 16% ($n = 65$) as emergency surgery. This high proportion of patients undergoing elective surgery could be explained, on the one hand, by the delay in patients seeking consultation following the initial trauma and, on the other hand, by organisational constraints in the operating theatre, particularly the availability of equipment and staff, leading to procedures being scheduled at a later date.

Intramedullary nailing and screw-fixed plate osteosynthesis were the main procedures performed for traumatic conditions in 20.40% ($n = 83$) and 19.90% ($n = 81$) of cases, respectively. Our results are similar to those reported in a study in Togo [9], which found the same types of implants to be the most commonly used, at 32.57% (nails) and 24.88% (screw-fixed plates) respectively. Indeed, these findings are consistent with current guidelines, which indicate that internal fixation particularly using intramedullary nailing and screw-fixed plates is the standard treatment for long bone fractures, owing to their biomechanical stability and favourable functional outcomes [10].

Non-traumatic conditions were dominated by the removal of osteosynthesis hardware, followed by total hip replacements, accounting for 17.70% ($n = 72$) and 3.93% ($n = 16$) respectively. This low incidence of hip replacements is consistent with the data in the literature. In the DRC [11] report that total hip replacement is commonly performed in developed countries, but access to the procedure in sub-Saharan Africa remains very limited. The main reasons include the high cost of prosthetic implants, the lack of suitable hospital facilities and a shortage of specialist surgeons.

Although arthroscopic surgery and knee replacements are common practices in developed countries, these techniques are generally not widely available in sub-Saharan Africa. In Chad, arthroscopic surgery and knee replacements are not currently available. These techniques require specialised facilities, expensive equipment (arthroscopy towers, prosthetic implants) and specific surgical expertise.

Conclusion

This study shows that the majority of patients admitted to the operating theatre of the Orthopaedic and Trauma Surgery Department are young males, most of whom have sustained injuries resulting from road traffic accidents. Osteosynthesis procedures constitute the main surgical interventions performed. The organisational and material challenges, as well as the lack of human resources, faced by orthopaedic and trauma departments in resource-limited countries act as a barrier to the development of orthopaedic and trauma surgery. There is a need to strengthen road safety strategies and improve surgical care capacity.

Consent to Publication

I, the undersigned, Yafoutané Djaba Pacôme, give my consent to the publication of all information that could identify me, as well as the data

contained in this manuscript, which is to be published in the Journal of Trauma & Treatment. I confirm that I have read and understood both the instructions for authors and the material and article to be published by the Journal of Trauma & Treatment and certify that the study has not violated any national or international human rights laws. I have discussed this consent form with Adoum Allamine Hassan, who is one of the authors of this article.

Conflict of Interest

All authors declare that they have no known financial conflicts of interest or personal relationships that might influence the work presented in this article.

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