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Research Article

Open Foot Trauma in Adults at Dalal Jamm National Hospital in Guediawaye

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Abstract

Introduction: Open trauma of the foot is represented by skin, muscle, tendon and osteoarticular lesions. They have poor prognosis and pose problems of possible healing, reduction, stabilization and consolidation.

The aim of our work is to evaluate open trauma to the adult foot on the epidemiological, anatomoclinical, therapeutic and evolutionary aspects in the Orthopedics-Traumatology department of the Dalal Jamm National Hospital Center (CHNDJ) in Guédiawaye, Dakar.

Material and methods: This is a continuous retrospective study over a 12-month period from January 1, 2024 to December 31, 2024. There were 122 files of patients with foot trauma. Based on our inclusion and non-inclusion criteria, twenty-seven (27) patients were selected out of 38.

Results: There were 22 men for 5 women with an average age of 27.03 years for an extreme of 18 years and 59 years. They were victims of an Albumin-to-Creatinine Ratio (ACR) in 15 cases. The mechanism was direct in 22 cases and indirect in 5 cases. The average consultation time was 2.3 hours with extremes of 1 hour and 9 hours. Professional activities were dominated by delivery men on 2-wheel motorcycles. The average surgical treatment time was 8.2 hours with extremes of 4 hours and 28 hours.

Surgical treatment (debridement) was done systematically for all patients with obligatory antibiotic therapy and prevention of tetanus. The average length of hospitalization was 5.2 days for extremes of 3 days and 23 days and rehabilitation was prescribed for 8 cases with an average session of 8. Complications were present in five (05) patients. The majority of our patients 59% were very satisfied with their care and the average AOFAS score was 70.5 with extremes of 35 and 100.

Conclusion: In view of these results, it is important to note that open foot trauma is very common and their management must be well codified. It requires perfect execution and close monitoring as well as patient compliance to obtain a satisfactory anatomical and functional result.

Keywords: Trauma; Open; Foot; Adult

Introduction

The foot is a highly evolved organ that serves as support for the weight of the body in the process of ambulation on any type of terrain. It is with this in mind that any type of trauma can lead to significant consequences [1]. We can define open foot trauma as all benign or serious lesions which affect this limb following a direct or indirect mechanism caused by a vulnerating agent with skin breakage and exposure of the osteoarticular, musculo-tendinous and vascular elements [2]. These include fractures, dislocations and wounds. These open foot injuries are common in both adults and children, but there is a difference in how they are treated [3].

Our objective is to evaluate open trauma to the adult foot on the epidemiological, anatomoclinical , therapeutic and evolutionary aspects in the Orthopaedic and Traumatology department of the Dalal Jamm National Hospital Center in Guédiawaye.

Material and Methods

Material and Patient

This is a continuous retrospective study covering a 12-month period from January 1st to December 31st, 2024, conducted in the Orthopaedic and Traumatology Department of the Dalal Jamm National Hospital Center (CHNDJ). We included all adult patients admitted for a recent (less than 21 days) open traumatic foot injury and followed up in the department during the study period.

- Methodology

The epidemiological, anatomoclinical, therapeutic and evolutionary aspects were studied.

Epidemiological Aspects

- Age
- Gender
- Profession
- Circumstances of occurrence
- Mechanism
- Consultation time

Anatomoclinical Aspects

- Clinics
- Radiological

Therapeutic aspects

- Delivery time
- Operating technique and associated gestures
- Length of hospitalization

Evolutionary Aspects

Anatomical

The evolutionary aspects are based on clinical (healing of lesions) and paraclinical (bone consolidation) evaluation.

Functional

They are assessed according to the results:

- *Subjective:* Assessment by the patient of the degree of satisfaction (very satisfied, satisfied and dissatisfied)
- *Objectives:* Functionally, the AOFAS score. This score studies pain, function and alignment of the bones of the foot

Category: Very good; Good; Average; Bad

Complications

- Infection (skin necrosis, osteitis)
- Ischemia
- Pseudarthrosis
- Malunion

In total, there were 122 patient records presenting with foot trauma. Thirty-eight (38) patients met our inclusion criteria and twenty-seven (27) were evaluated.

Results

Epidemiological aspects

Distribution of patients by gender

Males were the most represented (81%) with a sex ratio of 4.4.

Distribution by age (Fig. 1)

The average age of our patients was 27.03 years, ranging from 18 to 59 years.

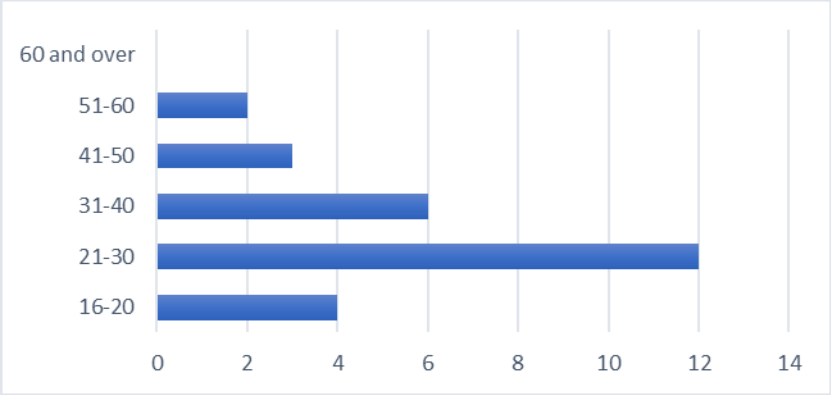

Figure 1: Distribution of patients by age.

Distribution by occupation (Fig. 2)

Professional activities were dominated by motorcycle couriers (48%).

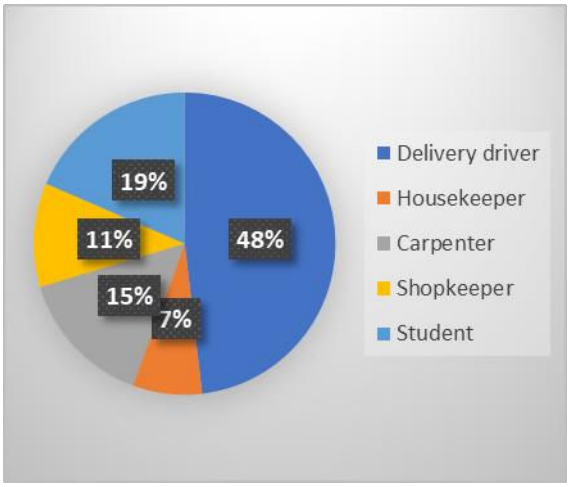

Figure 2: Distribution of patients by occupation.

Distribution by circumstances of occurrence (Fig. 3)

Our patients were victims of road traffic accidents in 56% of cases, followed by accidents at work in 26% of cases.

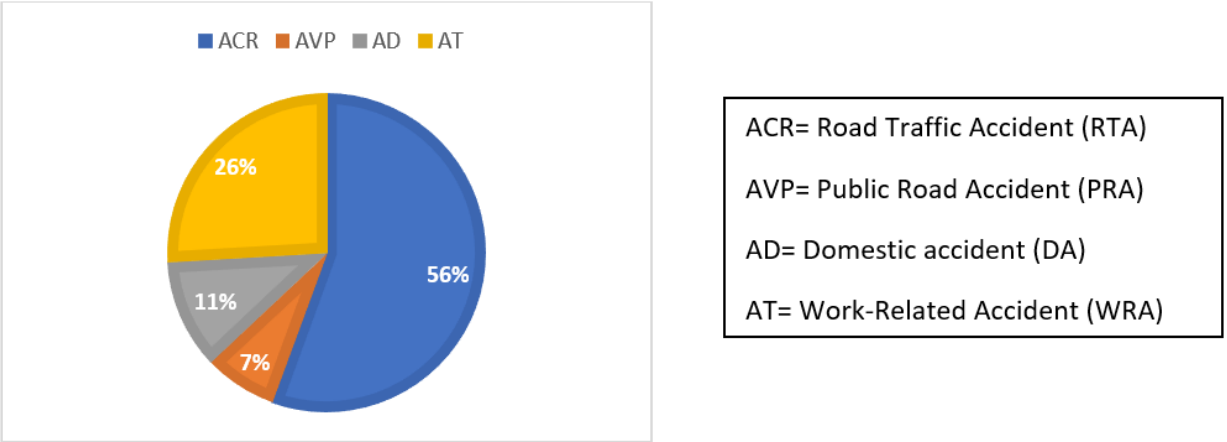

Figure 3: Distribution of patients by circumstances of occurrence.

Distribution according to mechanism
The mechanism was direct in 81% of cases and indirect in 19% of cases.

Distribution according to time to consultation
The average time to consultation was 2.3 hours, ranging from 1 hour to 9 hours.

Anatomical and Clinical Aspects
Distribution according to the affected foot
The right foot was affected in 63% of cases and the left foot in 37% of cases.
Distribution according to the location of the lesion (Fig. 4)
The forefoot was affected in most cases (59%), followed by the midfoot in 26% of cases and the rearfoot in 15% of cases.

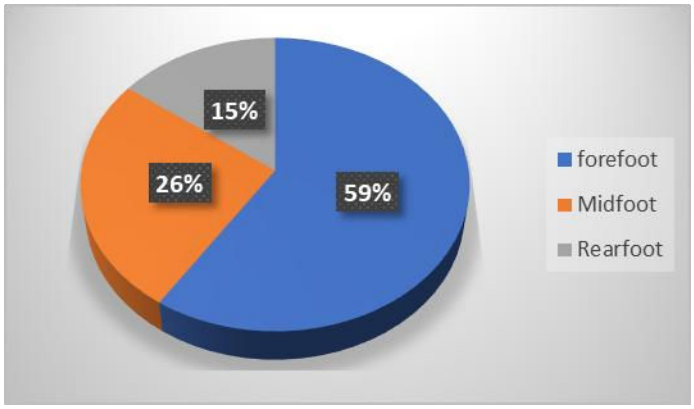

Figure 4: Distribution of patients according to the location of the lesion.

Distribution according to lesions found (Fig. 5,6)
In our patients, we found:
- Twelve (12) cases of simple wounds
- Nine (09) open foot fractures, including three (03) open fractures classified as Gustilo and Anderson type 1 and six (06) open fractures classified as Gustilo and Anderson type 2
- Metatarsals in 5 cases
- Phalanges in 3 cases
- Calcaneus in 1 case
- Two (02) cases of open Lisfranc dislocation
- Two (02) cases of tendon injuries to the toe extensors were noted
- Associated fractures were observed in 02 cases: A metatarsal fracture and a Lisfranc dislocation

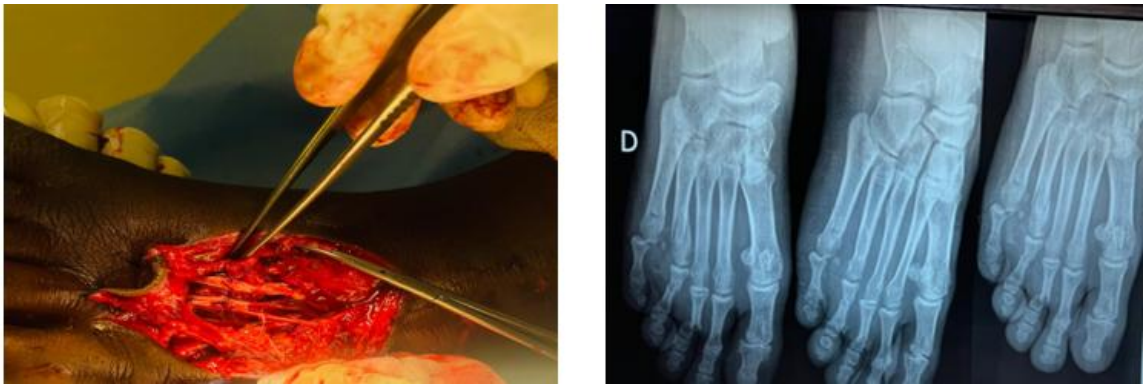

Figure 5: Clinical open fracture of the metatarsals of the left foot and radiological fracture-dislocation of M5-P1, fracture of M4, P1 of 4th toe, P1 of 3rd toe (CHNDJ).

Figure 6: Wound on the back of the left foot and the lateral side of the right foot.

Therapeutic Aspects

Delay in Treatment

The average delay in surgical treatment was 8.2 hours, ranging from 4 hours to 28 hours.

Treatment (Fig. 7-9)

- Surgical treatment (trimming) was performed systematically for all patients, with mandatory antibiotic therapy and tetanus prevention combined with medical treatment
- Patients with simple wounds were sutured
- Osteosynthesis by pinning was performed in six (06) cases, with one (01) case of screw fixation and orthopaedic treatment was combined in two (02) patients
- Reduction + fixation with pins for the two (2) cases of open dislocations
- Tendon repair in two (2) patients
- Twelve (12) patients had a plaster cast splint

Figure 7: Simple suture of a foot wound (CHNDJ).

Figure 8: Screwing of the base of the 5th metatarsal and pinning of the 1st metatarsal (CHNDJ).

Figure 9: Pinning of M5-M4, P1 of 4th toe and P1 of 3rd toe (CHNDJ).

Length of Hospital Stay

The average length of hospital stay was 5.2 days, ranging from 3 days to 23 days.
Rehabilitation was prescribed for eight (08) cases, with an average of 8 sessions.

Progressive Aspects

With an average follow-up of 11 months, 27 patients were assessed in terms of:

Anatomical

- Clinically, wound healing was achieved in an average of 14 days, with extremes of 8 and 33 days
- Tendon healing was achieved in an average of 26 days
- Bone consolidation was achieved in an average of 48 days, with extremes of 33 and 62 days

Functional

- Subjective (Fig.10)

The majority of our patients (59%) were very satisfied with their care.

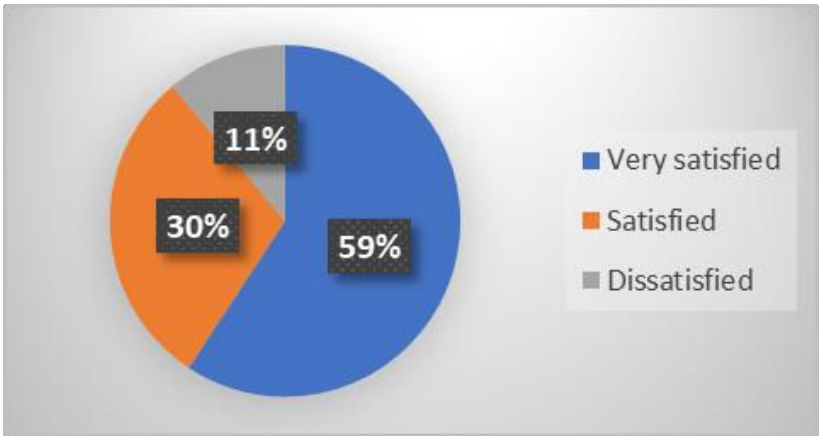

Figure 10: Distribution of patients according to degree of satisfaction.

- Objective (Table 1).
- The average duration of permanent partial disability was 18 days, ranging from 10 to 45 days
- Socially, 22 out of 27 patients were able to return to the same job after an average of 24 days of rest; three (03) patients had their workstation rearranged and two (02) out of 27 patients were forced to change jobs.
- The average AOFAS score was 70.5, with extremes of 35 and 100 (Table 1)

AOFAS Functional Results	Patients	Percentage
Very Good	**10**	**37**
Good	9	33.3
Fairly Good	5	18.5
Poor	3	11.1
Total	27	100

Table 1: Distribution of patients according to AOFAS functional results.

Complications

There was a complication rate of 18.5% affecting five (05) patients.

The complications were wound suppuration in two (02) cases, skin necrosis in three (03) cases with guided tissue repair and secondary amputation in one (01) case.

We did not find any cases of osteitis or vascular and nerve damage in our series.

Sequelae

Most of our patients (78%) had no sequelae after recovery. However, the sequelae observed were malunion in 7% of cases, residual pain in 11% of cases and joint stiffness in 4% of patients.

Discussion

Our study encountered a number of difficulties:

- Number of patients in our stydy because it is a new service
- The non-use of some files due to poor archiving
- Non-cooperation of some patients in data collection and evaluation due to their unavailability

1. *Epidemiological Aspects*

- According to gender

In our study, we found a male predominance (81%) with a sex ratio of 4.4.

This result is close to those of KOUAME I and NDAO M, who found a male predominance of 78.3% and 60% respectively [4,5].

This could be explained by the fact that men are more active and engage in more activities than women and are sometimes the most exposed in their daily activities.

- *According to age*

We note that the age group most affected is between 21-30 years old, with a rate of 44.4%. The age groups between 31-40 year represented 22.2% of our series, with an average age of 27.03 years.
This fact could be explained by the fact that young adults who occupy a very significant segment of our population in terms of deliveries by two-wheeled vehicles, as well as in service . They can also be very active in small bisinesses.
This result is close to that of KOUAME I [4], who found an average age of 31.

- *By profession*

Delivery drivers on two-wheeled motorcycles were the most affected in 48% of cases. This could be explained by the fact that this group is the most exposed to road accidents and traffic incidents. Delivery drivers are also the most dynamic and sometimes the most exposed in their daily activities due to their recklessness.
There is also a high cumulative frequency among manual workers. They are exposed to open foot injuries through their work and their journeys between home and work.
This result corresponds to that of KOUAME I [4], who found traders and laborers in his series.

- *According to the Circumstances of Occurrence*

We observed a high frequency of road traffic accidents, accounting for 56% of cases, which could be explained by several reasons, including:

- The significant increase in two-wheeled vehicles
- The growth in the number of vehicles on the road
- Inadequate traffic lights and road signs
- Unregulated occupation of streets
- Failure to comply with traffic regulations
- Lack of civic-mindedness encouraged by impunity

This result corresponds to that of NDAO M, who found 47.7% in his series and differs from that of KOUAME I, who found 81.9% for ACRs [4,5].

2. *Anatomical and Clinical Findings*

- *According to the injury*

In our study, we found that simple wounds were the most common injuries with a rate of 44.4%, followed by Gustilo and Anderson type 2 open fractures with 22.2%.
This result differs from that of KOUAME I [4], who found a predominance of Gustilo and Anderson type 2 open fractures with a rate of 42.1%.

- According to the affected foot

In our study, the right foot was predominantly affected, with a rate of 63%.
This can be explained by the fact that most of our population is right-footed and during accidents, victims try to save themselves or approach the road by putting their right foot forward first.
This result is comparable to that of NDAO M [5], who found a rate of 52% in his series.

- According to the location of the trauma

Our study showed a predominance of the forefoot with a rate of 59%.
This could be explained by the fact that the forefoot is less protected and therefore more vulnerable than the rest of the foot and is exposed to enormous shocks from multiple directions. This result is similar to that of KOUAME I [4] and NDAO M [5], who found 61.4% and 62% respectively.

- According to the nature of the bones affected by fractures

The metatarsals were the most affected, accounting for 54.5% of injuries. This could be explained by the fact that the metatarsals are the longest bones and are less protected by skin and muscle tissue.

Fractures of the phalanges were also significant, accounting for 34% of the fractures recorded in our series. This could be explained by the fact that the phalanges are the most prominent bones in the foot and therefore the most exposed to trauma.
This result is similar to that of TRAORE D [6] and NDAO M [5], who found 50.85% and 55% respectively.

3. Therapeutic Approach

- Depending on the time taken to provide care

Most cases (74%) were treated within 6 hours.
This result differs from that of KOUAME I [7], who found that 25.3% of patients received treatment within 24 hours.
This allowed us to establish a correlation between the time to treatment and a favorable outcome. The shorter the time to treatment, the more favorable the outcome.

- According to treatment

During our study, all our patients received medical treatment in 100% of cases, followed by surgical treatment in 100% of cases with associated procedures in 44%.
Physiotherapy was provided for 29.6% of patients.
These results led us to conclude that the management of open foot trauma is based on a treatment plan for each type of traumatic foot injury.

4. In terms of Progression

- According to the progression of fractures

In our study, we found that 61% of fractures had healed at the bone level.
This could be explained by the fact that most of our patients with open fractures were treated early with appropriate treatment and regular follow-up.
This result is comparable to that found by KOUAME I [4], who found 66.28%.

- According to the AOFAS score results

After treatment and follow-up, most results were very good at 37% of cases. Good results accounted for 33.3% and poor results for 11.1%. This study enabled us to better specify the relationship between the time taken to provide treatment and the results obtained after treatment.
On this point, our work showed that our results were similar to those of KOUAME I [4], who found 29.5% for very good results, 29.3% for good results, 10.3% for fairly good results and 10.3% for poor results and different from those of NDAO M [5], whose good results were in the majority with 93% of cases, fairly good results in 5% of cases and poor results in 2% of cases.

- According to sequelae

In our study, the absence of after-affects, therefore recovery, was the most frequent in 78% of cases.
Residual pain and malunions represent the most frequent after-effects wiyh a respective rate of 11% and 7%.
This could be explained by the fact that the majority of our traffic accident victims are treated very early in the emergency room (good result factor). This result is similar to that of NDAO M, which found 91% of cases of absence of after-effects and 5% of patients having presented malunions and that of KOUAME I which found 90% of cases of absence of after-effects and 2.4% of patients having presented malunions [4,5].

Conclusion

In view of these results, it is important to note that open foot injuries are very common in our daily practice and their management must be well codified. Of course, perfect execution and close follow-up are required, as well as patient compliance, in order to obtain a satisfactory anatomical and functional result.

Conflict of Interests

The authors declare that there is no conflict of interest related to this study.

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