SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Surgery

Assessment of Maxillofacial Trauma Due to Road Traffic Accidents in an Insecure Environment at Sominé Dolo Hospital in Mopti (Mali) from 2019-2023

Thera Thioukany David[1*], Kone Mory[1], Sidibe Lamine[2], Diallo Abdouramani[1], Guindo Aly Abdoulaye[1], Fofana Youssouf[2], Guindo Oumar[3], Traore Brehima[1], Cisse Dramane[1], Coulibaly Modibo[4]

[1]General Surgery Department, Sominé DOLO Hospital, Mopti (Mali)
[2]Medical Department, Sominé Dolo Hospital, Mopti (Mali)
[3]Public Health Service, Sominé Dolo Hospital, Mopti
[4]Biological laboratory service, Sominé Dolo Hospital, Mopti (Mali)

DOI: https://doi.org/10.36347/sasjs.2024.v10i10.002 | **Received:** 21.08.2024 | **Accepted:** 26.09.2024 | **Published:** 02.10.2024

***Corresponding author:** Thera Thioukany David
General Surgery Department, Sominé DOLO Hospital, Mopti (Mali)

Abstract **Original Research Article**

***Introduction*:** Maxillofacial trauma represents a social issue that continues to grow. According to WHO, 1.2 million people lose their lives each year on the road, or more than 3,000 deaths per day. The aim of this study is to evaluate the epidemiological, clinical and therapeutic aspects of maxillofacial trauma related to road accidents at Sominé Dolo Hospital in Mopti. ***Patients and Method*:** From 2019 to 2023, we conducted a descriptive cross-sectional study with retrospective collection on cases of maxillofacial trauma due to road traffic accidents at Sominé Dolo hospital in Mopti. ***Results*:** The frequency was 85.59%, the age was 28.37 years and a sex ratio of 5. The Bandiagara region represented 34.6% and that of Mopti 49.76%. 2-wheeled vehicles accounted for 60%. Open fractures accounted for 67.8%, located at the mandibular level 40.10%. Contention associated with osteosynthesis was performed in 49.1%. ***Discussion*:** In our study, the hospital frequency of maxillofacial trauma following a road traffic accident is 85.60%. This high frequency in our country could be explained by the non-compliance with the highway code, the poor condition of the roads, the multiplication of means of transport and the security situation. ***Conclusion*:** The increasing frequency of maxillofacial trauma over the years is a reality in Mopti (Mali) and poses a public health problem. Only early appropriate treatment and peace can minimize the sometimes serious and difficult to correct after-effects.

Keywords: Trauma, Maxillofacial, Mopti, Security Crisis, Accident, Traffic.

INTRODUCTION

Maxillofacial trauma represents a social issue that continues to grow [1]. According to the WHO, 1.2 million people lose their lives on the road each year, or more than 3,000 deaths per day [2].

Between 2000 and 2020, the number of deaths caused by road accidents is expected to increase by 80%, particularly in developing countries [2].

Among 4000 patients, 25% of those with multiple trauma present with facial trauma, which means that it can be considered isolated or integrated into the context of multiple trauma.

People affected by cranio -maxillofacial trauma are mainly young men (20 to 30 years old) who have suffered a road traffic accident (RTA), an attack, ballistic injuries or a sporting activity [3].

According to a study carried out by Traoré H and his colleagues [4], in 2020, road accidents were the main cause with a share of 80.30%. The diversity of lesions is one of the obstacles to the management of maxillofacial trauma. The criteria for the first intervention are clearly established according to the prioritization of emergency situations [4].

In the event of ignorance or even underestimation of these traumas, the injured person is exposed to triple damage that is functional, aesthetic and/or vital [5]. Maxillofacial trauma has diverse consequences, both functionally, morphologically and psychologically [6].

In Mali, few studies have been carried out on the subject, but the frequency of maxillofacial trauma linked to road accidents is now arousing particular interest in terms of diagnosis and treatment.

The aim of this study is to evaluate the epidemiological, clinical and therapeutic aspects of maxillofacial trauma linked to road accidents at Sominé Dolo hospital in Mopti.

PATIENTS AND METHOD

From 2019 to 2023, we conducted a descriptive cross-sectional study with retrospective collection of cases of maxillofacial trauma from road traffic accidents seen in maxillofacial surgery consultation at Sominé Dolo Hospital in Mopti. This hospital is located in Sevaré and is the largest reference center in the 5th region of Mali.

All patients or accompanying persons were questioned and examined by a maxillofacial surgeon and paraclinical examinations were carried out (NFS, blood sugar, creatinine, blood crash, craniofacial CT scan, low face X-ray).

It was defined as a case of maxillofacial trauma due to a traffic accident, the existence of one or more of the clinical arguments supported by the radiographic images.

❖ **Clinical Signs**

Concept of a road traffic accident occurring in a security crisis zone, whether due to the panic of the driver, a road dug up by a terrorist act, or the detonation of a gunshot, or the movement of people in order to take refuge.

Facial swelling and/or deformation,
A wound, a blood flow,
A painful point, abnormal mobility
A disturbance of dental articulation.

❖ **Radiographic Signs**

- A bone continuity solution.
- Any patient meeting the case definition was included.
- Any patient with an unusable file or patients who refused hospital care was excluded.

Data were collected from a standard individual questionnaire developed for this purpose. Our sources of information were the surgical report registers, consultation registers and medical-surgical records of the patients.

The Variables Studied Were:

- Socio-demographic data: age, gender, origin, profession,
- Clinical data: Consultation time, treatment time, comorbidity, location, type of lesion, treatment, complication,
- Radiographic data: Lower face X-ray, maxillary scroll, scanner
- Biology: CBC, blood sugar, creatinine, transaminases, TP, TCA
- Therapeutic data: The type of treatment, the surgical techniques used.

All included patients gave their consent and anonymity was guaranteed.

The data were entered and analyzed using Microsoft Office World, Excel 2016 and Microsoft Office Access software.

RESULTS

In our series, 422 cases of maxillofacial trauma due to road traffic accidents were collected from 493 files examined, representing a frequency of 85.59%.

The age of the patients ranged from 2 to 77 years with a mean age of 28.37 years.

The age Groups were distributed as Follows:

The age group 0-15 years represented 10.7% (n=45), that of 16-31 years represented 53.3% (n=225), that of 32-47 years represented 26.5% (n=112), that of 48-63 years represented 6.2% (n=26) and that of over 63 years represented 3.3% (n=14).

The sex was divided into 352 men (83.41%) and 70 women (16.59%), i.e. a sex ratio of 5.

The occupations of our patients were distributed as follows: preschool children 7.10% (n=30), students 16.58% (n=70), workers 4.50 % (n=19), farmers 33.17% (n=140), traders 9.71% (n=41), housewives 8.29% (n=35), shepherds and civil servants 4.26% (n=18) each, unemployed 4.26% (n=48).

The origin of the patients was distributed as follows: San region 3.79% (n=16), Gao 2.37% (n=10), Tombouctou 4.74% (n=20), Douentza 4.50% (n=19), Bandiagara 34.6% (n=146) and the Mopti region 49.76% (n=210).

The circumstances of occurrence were distributed as follows: public transport 28.43% (n=120), 2-wheeled vehicles 60% (n=252), tricycles 9.47% (n=40), personal vehicle 2.36% (n=10) The helmet was worn in 02.1% (n=09) and was not worn in 98.9% (n=413)

The consultation time before 24 hours was 96.2% (n=406), it was 2% (n=7) between 1 and 3 days, it was 1.2% (n=5) between 4 and 6 days and 0.9% (n=4)

between 7 and 14 days. The comorbidities identified were: Diabetes 1.4% (n=6), asthma 0.5% (n=2).

The time to treatment before 6 hours was 4.6% (n=27), it was 11.3% (n=48) between 6 and 48 hours, it was 81% between 48 and 72 hours (n=342) and 1.2% (n=5) after 72 hours. **Table I**

Tetanus prevention and antibiotic coverage was achieved in 100% of patients.

The types of injury were distributed as follows: Soft tissue wound 15.4 % (n= 65), Open fracture 67.8 % (n=286), Closed fracture 06.9% (n= 29), alveolo-dental fracture 09.9% (n=42). **Table II**

Associated Trauma Included: cranioencephalic trauma 30.56% (n=129), limb trauma 69.43% (n=293%)

The Traumas Were Seat: mandibular 40.10% (n= 173), maxillary 30.09% (n= 127), zygomatic 13.03% (n=55), orbital 10.66% (n=45), nasal 5.21% (n=22).

The methods of anesthesia performed were distributed as follows: local anesthesia 11.4% (n=48), general anesthesia with nasotracheal intubation 58.2% (n=246), general anesthesia with orotracheal intubation 29.7% (n=125), general anesthesia with tracheotomy 0.7% (n=3)

The surgical procedures were distributed as follows: osteosynthesis associated with debridement 26.06% (n=110), reduction plus retention by vestibular arch associated with intermaxillary blocking 24.9% (n= 105) and contention associated with osteosynthesis 49.1% (n=207). **Table III**

The length of hospital stay was distributed as follows: 1 to 3 days 29.14% (n=123), 4 to 6 days 70.37% (n=297) and 7 to 14 days 0.8% (n=2).

After one year of follow-up, the observed sequelae were distributed as follows: keloid scars 2.6% (n=11), paresthesia 3.8% (n=16), facial asymmetry 0.47% (n=2).

Table I: Distribution of patients according to the time taken to receive care

Support time	Staff	Percentage (%)
<6h	27	06.4
6h – 24h	48	11.3
48h – 72h	342	81.0
>72h	05	01.2
Total	422	100

Painting 1: Distribution of patients according to the type of lesion observed

Type of injury	Staff	Percentages (%)
Open fracture	286	67.8
Soft tissue wound	65	15.4
Alveolar -dental fracture	42	09.9
Closed fracture	29	06.9
Total	422	100

Table III: Distribution of patients according to the type of surgical treatment

Types of treatments	Staff	Percentages (%)
Reduction with contention	105	24.9
Osteosynthesis and contention	207	49.1
Trimming and osteosynthesis	110	26
Total	422	100

1. **Illustrations**

Fig. 1: Open maxillofacial fracture by AVP 3D scanner 3 months postoperatively

Fig. 2: Immediate post-op maxillofacial soft part wound 3 weeks post-op

DISCUSSION

In our study, the hospital frequency of maxillofacial trauma following a road traffic accident is 85.60%. This high frequency in our country could be explained by the non-compliance with the highway code, the poor condition of the roads, the multiplication of means of transport and the security situation. This frequency is higher than those reported by other authors in the sub-region [7-9].

The average age of our patients was 28.37 years with extremes from 2 to 77 years. The age group most affected in our study was 16 to 31 years or 53.32%. This can be explained by the involvement of young adults in various activities of daily life. Added to this would be the absence of compulsory helmet wearing, ignorance of the highway code and the use of two-wheeled vehicles which are involved in most road traffic accidents since they represent the means of transport most used by young people as well as panic in insecure areas.

In Mali, results comparable to ours have been reported [4-10]. However, they are superior to those found in Senegal in the study by KEBINAB *et al*., [11], by NGOM *et al*., [12], in Cameroon by Mossus *et al*., [13], in Ivory Coast by Berete PIJ *et al*., [14].

In France, most of these causes (travel accidents, sports accidents, domestic accidents, etc.) affect young people, between 20 and 30 years old, most often, according to GIRAUD O and Coll [15].

In our series, the male sex represented 83.41% of cases against only 16.59% for the female sex, i.e. a sex ratio of 5 in favor of men. This result could be explained by the fact that men, due to their activity, are more exposed than women and they are most often the drivers in road traffic.

A similar trend has been observed in Mali by several authors [10-17], as well as in Burkina Faso by Sonia Jocelyne [18], and by Fasola AO *et al*., [19], in Nigeria, Salonen *et al*., [13], in Finland, Ansari MH in Iran [20], and Tay AG *et al*., [21], in Singapore.

The farmers were the most affected. This result differs from that of Sangaré F et Coll [22]. This could be explained by the fact that the main activity in the area is agriculture and two-wheeled vehicles are the most used means of transport.

The majority of our patients came from the Mopti and Bandiagara region.

This could be explained by the fact that the Sominé dolo hospital in Mopti is located close to these regions and is the only 2nd reference hospital.

In our study, maxillofacial trauma could be isolated or associated with extrafacial trauma. The most frequently found were open fractures, soft tissue injuries, closed fractures and alveolo-dental fractures.

Facial wounds were located on the cheeks, nose and lips. These regions, due to their anatomical position, are particularly exposed during trauma. In the event of a road traffic accident in a vehicle, the driver or passenger may receive windshield debris on the face. On a two-wheeled vehicle, if the head is not protected during the impact, the face is also affected.

The severity of the injuries depends on the intensity of the shock. Maxillofacial trauma is most associated with extra-facial injuries, which can include head injuries with or without initial loss of consciousness, limb fractures, and extra-facial traumatic wounds.

Among the bone lesions, the mandible was the most affected followed by the maxillary bone, the zygomatic bone and the nasal bones. This could be explained by the vulnerability of this area to different shocks.

These results appear to be shared between authors, Fasola AO *et al.*, [11], in Nigeria, Moorhouse JMP *et al*., [23], in Malawi. In the same vein, Sidibé M [16], and Sangare F et Coll & [15], in Mali find that the mandible is three times more subject to fractures than the zygomatico- maxillary complex.

In our work, osteosynthesis associated with debridement was the most frequent type of management, followed by reduction plus vestibular arch retention associated with intermaxillary blocking and general anesthesia with nasotracheal intubation.

This is because for fractures of the maxilla or mandible where the dental articulation is paramount, their treatment must be supplemented by an intermaxillary block.

These therapeutic methods are comparable to those used by Traore MS [24], Diombana ML [25], Sidibe M [16], Diallo M [26], in Mali, Moha A [27], in Cameroon and Sonia Jocelyne [18], in Burkina Faso.

In our study there were few sequelae after treatment, however some cases of sequelae such as keloid scar, facial asymmetry and paresthesia. Our results are similar to those found by Traore MS [24], in Mali and Sonia Jocelyne [18], in Burkina. We note that the sequelae are due in most cases to the delay in specialized care of maxillofacial trauma.

CONCLUSION

The increasing frequency of maxillofacial trauma over the years is a reality in Mopti (Mali) and poses a public health problem. The phenomenon is linked to the flourishing increase in two-wheeled vehicles which constitute the main etiology of trauma caused by traffic accidents. They affect young adults more and are the source of after-effects. Only early appropriate treatment and peace can minimize the after-effects which are sometimes heavy and difficult to correct.

Prevention requires awareness of the dangers of road traffic.

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