

# RESULTS OF MAXILLO-MANDIBULAR BLOCKING IN THE MANAGEMENT OF MAXILLOFACIAL FRACTURES IN A COUNTRY WITH LIMITED RESOURCES

Original  
Article

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## ABSTRACT

**Introduction** Maxillomandibular blocking is common practice in our setting.

The aim of this study was to describe the results of maxillomandibular blocking in the management of maxillomandibular fractures.

**Material and methods** This was a retrospective descriptive study carried out over a 2-year period (January 2021 to December 2022), including the records of patients managed for maxillofacial fractures and treated with maxillomandibular blocking .

**Results** The mean age of patients was 30.24 years, with extremes ranging from 4 to 61 years. Males predominated (84.4%), with a sex ratio of 6.40. The etiology was dominated by road traffic accidents in 93% of cases (n=262), due mainly to 2- or 3-wheeled vehicles. . The socio-professional stratum was dominated by motor-taxi drivers in 42% of cases (n=119). Mandibular fractures were the most common bone lesions in 45% of cases (n=126). Maxillo-mandibular blockages on vestibular arches were the most common in 70% of cases (n=196). The mean duration of blocking was 29.5 days, ranging from 7 days to 52 days. Treatment was considered successful in 99% of cases (n=274). 1 case of manducatory dysfunction and 2 cases of mandibular osteitis were noted as complications after a 6-month follow-up.

**Conclusion** Maxillo-mandibular blocking enabled restoration and maintenance of the dental articulation, guaranteeing good fracture consolidation and recovery of good masticatory function.

**Key Words:** maxillo-mandibular, blocking, fractures

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## INTRODUCTION:

Maxillo-mandibular blocking is an orthopedic method which consists in immobilizing the dental arches (maxilla and mandible) in contact with each other to restore the dental articulation in maximum intercuspitation [1]. This concept has been known since ancient times [2].

The first written records date back to 460 BC, when Hippocrates used strips of calico glued to the skin close to a fracture of the mandible and held on the scalp to obtain occlusion [3]. In maxillofacial traumatology, it is indicated for fractures that result in dental articulation disorders, to achieve reduction and immobilization of the fracture site(s) in the mandible or maxilla in good dental articulation [1]. This orthopedic procedure can be performed using steel wire ligature or vestibular arches, according to several methods.

Ligature maxillo-mandibular blocking first appeared in the 19th century, and arch blocking at the end of the 19th century [4]. It is also used in orthognathic surgery [5].

Maxillo-mandibular blocking can be used either on its own, as an orthopedic treatment during the period of bone consolidation, or as an aid to the reduction and containment of fracture sites prior to osteosynthesis [1]. In developed countries, recourse to osteosynthesis is almost systematic for the treatment of maxillofacial fractures, given the high socio-economic level of these countries and the spread of universal health coverage. In developing countries, on the other hand, the management of maxillofacial fractures remains a challenge for the practitioner, as there are very limited resources to repair the inherent damage [6].

In Côte d'Ivoire, the lack of public facilities for the supply of osteosynthesis materials and the low socio-economic status of patients seriously limit access to surgery.

Orthopedic treatment therefore becomes the ultimate solution in the treatment of these fractures. It is widely used in our practice.

Several recent studies on maxillofacial traumatology have been carried out in our context [7- 9]. However, no

specific study has focused on maxillomandibular blocking.

It therefore seemed worthwhile to carry out a study with the aim of outlining the results of orthopedic treatment of maxillofacial fractures in a resource-limited setting.

**MATERIALS AND METHODS**

This was a retrospective descriptive study conducted in the odontostomatology and maxillofacial surgery department of the University Hospital of Bouaké over a 02-year period from January 2021 to December 2022.

Patients admitted for maxillofacial fractures treated by maxillo-mandibular blocking were included in our study.

Patients who refused orthopedic treatment, maxillofacial fractures treated surgically and patients lost to follow-up were not included in our study. A pre-established survey form was used to collect data on the variables studied.

**The variables studied were :**

-Epidemiological (Frequency, Age, Sex, Etiology, Profession, Consultation time)

-Diagnostic (type of fracture)

-Therapeutic (Vestibular arch, Ivy ligature, Leblanc ligature, Erns ligature)

-Evolution Outcome evaluation criteria were based on the following clinical parameters:

Restoration of dental articulation		
Poor = 1	Fair = 2	Good = 3
B + PMC + DIL	B + DIL ou B + PMC	Normal dental articulation

B: Beance

PMC: Premature molar contact

DIL: Deviation of the inter-incisal line

Mouth opening		
Poor = 1	Fair = 2	Good = 3
< 30 mm	30-40 mm	40 mm

Pain		
Poor = 1	Fair = 2	Good = 3
Pain on mobilization of mandible or mastication	slight discomfort with chewing	No pain

The score was added up to a maximum total of 9 points.

Treatment was judged :

- Good if the score was between 7-9

- Fair if score between 3-6

- Poor if score below 3

**RESULTS**

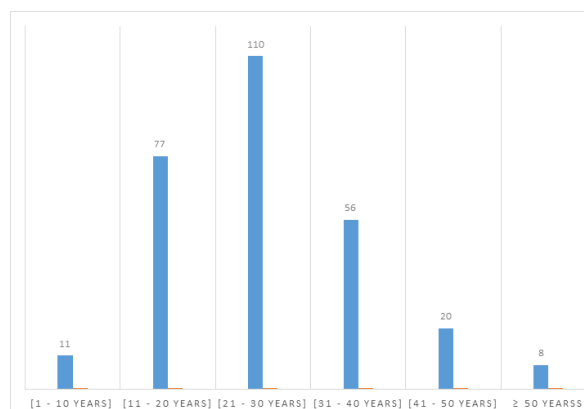
**Frequency**

282 maxillofacial fractures out of 854 maxillofacial traumas.

i.e. a frequency of 33%.

**Age**

The mean age was 30.24 years, with extremes ranging from 4 to 61 years.



**Figure 1: Age distribution**

**Gender**

Men predominated (84.4%).

238 men for 44 women, i.e. a sex ratio of 6.40

**Etiology**

The etiology was dominated by road traffic accidents (93%, or n=262), 99% of which involved 2 or 3-wheeled vehicles.

-Work accidents (3% or n=8)

-Domestic accidents (2% or n=6)

-Brawl (2% or n=6)

**Occupation**

The socio-professional stratum was dominated by motorcycle-taxi drivers in 42% of cases (n=119).

**Table I:** Distribution by socio-professional stratum

Profession	Numbers	Percentage (%)
Farmers	119	42
Motorcycle cab drivers	47	17
Shopkeepers	43	15
Workers	35	12
Pupils/Students	26	10
Civil servants	12	4
Total	282	100

**DIAGNOSTIC ASPECTS**

Mandibular fractures were the most common bone lesions in 45% of cases (n=126), followed by alveolodental fractures in 20% of cases (n=57).

**Table II:** Fracture distribution

Type of fracture	Effectifs	Percentage (%)
Mandibule	126	45
Alveolodental	57	20
Maxilla	48	17
LeFort I + Mandible	22	8
LeFort I	18	6
LeFort II	11	4
Total	282	100

**Treatment**

Maxillo-mandibular blocks on vestibular arches were the most common treatment (70%=196), followed by Ivy ligature blocks in 12% of cases (n=33).

**Table II:** Breakdown by treatment

Types de blocage	Effectifs	Percentage (%)
Vestibular arch	196	70
Ivy method	33	12
LeBlanc Ligature	27	10
Erns Ligature	15	5
Vestibular arches + internal suspension	11	3
Total	282	100

Maxillomandibular blocking combined with ADAMS internal suspension was considered for the management of Lefort II fractures.

Hygienic and dietary measures were introduced after blocking:

- Liquid and semi-liquid diet 4 to 6 times a day
- Oral hygiene with a soft brush and mouthwash 3 times a day.

**Duration of treatment**

The average duration of blockage was 29.5 days, ranging from 7 days to 52 days. Active and passive mechanotherapy was systematically performed after unblocking.

**Evolution**

Treatment was considered successful in 99% of cases (n=274).

**Table III:** Breakdown by treatment outcome

Results	Numbers	Percentage (%)
Poor	274	99
Fair	8	1
Good	0	0

On the other hand, 3 types of complications were observed after a 6-month follow-up

- 1 case of manducatory dysfunction
- 2 cases of osteitis (1 right-angle osteitis in 1 patient and horizontal branch in another).



**Figure 2:** Maxillo-mandibular blocking on vestibular arches in a patient treated for mandibular fracture

## DISCUSSION

### Frequency

The frequency of maxillofacial fractures was 33%. Indeed, maxillofacial fractures are relatively frequent in our context. This result is consistent with those found in several African series [10-12].

### Age and gender

Maxillofacial fractures occur in all age groups

In the present study, the mean age was 30.24 years, and young male adults in the 21-30 age bracket were the most affected. This result was similar to those found by several authors [13-15]. This male predominance is probably explained by the more aggressive nature of males, who are considered to be mobile and more active. Women are less exposed to risky behavior [16-18]. The high level of physical and professional activity in this population at this time of life, with job-hunting and participation in outdoor activities more vulnerable than in other age groups, could explain this high peak in this age group [19-21].

### Etiology

The etiology was dominated by road traffic accidents (93% or n=262), with 2 or 3-wheelers accounting for 99% of cases. This situation is attributable to the indiscipline of motorcycle users in the city of Bouaké. In addition, there is a lack of control over these multi-speed machines requiring a driver's license, ignorance of the highway code, and ignorance of personal safety measures [22].

### Profession

The socio-professional stratum was dominated by farmers, followed by motorbike-taxi drivers, as farmers, considered to be a less affluent population, make extensive use of 2 or 3-wheeled vehicles to go about their business for want of a 4-wheeled vehicle [7]. As for motorcycle cab drivers, most of them are young people who have not attended school or who have dropped out, using 2 or 3-wheeled vehicles for commercial purposes (motorcycle cabs) to support themselves. This assertion was shared by Madougou in his study [23].

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However, the socio-professional category affected differs from one city to another in the West African sub-region. In fact, Diallo et al. found that schoolchildren and students made up the majority of the young population using motorized bicycles to get to their respective schools [24].

### Type of fracture

Fracture of the mandible was the most frequently noted lesion. According to the literature, it is the most frequent maxillofacial fracture. National [3,6], sub-regional [10,25] and even international studies confirm this [26-28]. Indeed, maxillofacial anatomical dispositions place the mandibular level in a prominent position, making it more exposed to trauma, hence the clear frequency of fractures at this level, based on the experience of authors and the literature. This opinion is shared by Beogo et al [11].

### Treatment

Blocking on vestibular arches was the most common type of blocking. Indeed, according to the practitioner's experience, it appears to be more stable than other types of blocking [29]. Blocking with Ivy ligatures was mainly considered for non-displaced fractures [1].

Other orthopedic methods are also available, such as maxillo-mandibular blocking with blocking screws. This technique was described in 1989 [5]. The advantages of this treatment option are manifold. It is easier and quicker to place and remove than traditional archwires, while preserving the buccal mucosa and patient comfort. What's more, it reduces the risk of blood exposure accidents by minimizing the need for manipulation, while minimizing the risk of nerve or root damage [5]. In orthognathic surgery, blocking is also used to immobilize the dental arches according to the planned occlusion, before and during osteosynthesis. Depending on the case and indication, blocking can be maintained from a few moments intraoperatively to 6 weeks [1].

### Evolution

The majority of cases progressed well. However, the major complication was mandibular osteitis. Its occurrence was attributable to failure to comply with recommended hygiene measures. As for the dysfunction of the manducatory apparatus, this was due to prolonged immobilization of the temporomandibular joint for the management of a low subcondylar fracture. Despite its importance, maxillo-mandibular blocking has certain disadvantages, such as muscle atrophy, reduced bone mineral load and thinning of the condylar cartilage [30].

## CONFLICT OF INTEREST

This clinical study was self-funded by the authors, with no conflict of interest.

## CONCLUSIONS

Maxillomandibular blocking occupies an important place in the management of maxillofacial fractures in our context. It is a treatment of choice given the low socio-economic status of patients. Despite its discomfort, it is less expensive, easy to perform and accessible to almost everyone. It requires a pre-therapeutic psychological approach, compliance and, above all, good dentition on the part of the patient.

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