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A Retrospective Study of Jaw Trauma in 36 Patients: Evaluation of Prevalence and Management of Jaw Trauma

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Abstract:-

➢ ***Aim:***

The aim of this retrospective descriptive study is to identify the performance of maxilo-facial region fracture management.

➢ ***Materials and Methods:***

In this study, were included cases with maxillo-facial fractures treated in the MF surgery service at the French hospital in " Mother Teresa" University Hospital Center for the period April 2015-June 2016. These cases have been analyzed in terms of age, gender, type of fracture, its localization, and the way these fractures are treated. For the evaluation of clinical cases of this study was used the Register of Surgery of the M-F Surgery Service operation room as well as the clinical cards of patients.

➢ ***Results:***

For the period April 2015-June 2016, 36 patients with maxillo-facial fractures resulted. 32 patients are male (89%) and 4 patients are female (11%). The most affected age group by fractures is 18-23 years and 60-65 years old. Patients presented with fractures have an average age of 38.2 years. The most common fractures are of the lower jaw, mandible fractures (69.4%) and the most common localization is in the mandible body (13.9% of cases).

➢ ***Discussion:***

The results presented in this study are in line with other foreign studies and its analysis shows that these traumas are not usually threatening lives if proper treatment is applied in a timely manner. This retrospective descriptive study may be the subject of further studies and its analysis provides important information regarding the management of jaw trauma.

➢ ***Conclusions:***

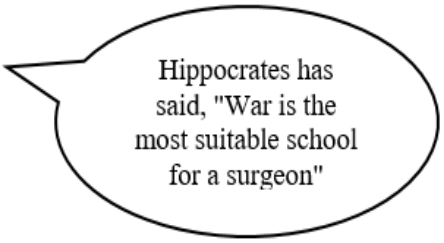
In the studied population, maxillo-facial fractures occur more in men over the age of 20 years. The most common site of fracture localization is mandible and mainly the mandible body.

Keywords:- *Maxillo-Facial Trauma, Fracture, Mandible, Maxilla.*

I. INTRODUCTION

Jaw trauma is any physical trauma that affects the upper and lower jaw. This trauma in addition to the jaw fracture can also permeate soft tissue damage such as. wounds, lacerations, bruises, eye injuries. The symptoms are specific depending on the type of injury but that appear with pain, swelling, loss of function, deformations (1,2).

It must be accepted that most of the knowledge about maxillofacial injuries has come as a result of treatments for these injuries in battlefields (1).



A. Trauma Etiology

The most common cause of jaw fractures is a traumatic stroke on the face. Jaw fractures take second place in terms of facial damage after nasal injuries (3,4,5). Car accidents (MVAs) cause 43% of mandible fractures, and 34% violin strokes. Rivals, sports accidents, bicycle accidents, occupational-related injuries cause 7% of mandible fractures. The rest of the mandible fractures come as a result of its pathological fractures (14). Maxilla fractures come as a result of MVAs, quarrels, falls. They account for 6% to 25% of all facial fractures. As a cause for jaw fractures it is usually the direct action of the external force. The source of this force can be of different nature: hits from animals, with stones, or hard objects, hits with agricultural tools or handicrafts such as sickles, other hammer. The fracture can be caused by either violent breaks or during the fall on the chin from the height (trees, ladders, buildings, etc.). It can be caused though very rarely, even during brutal tooth removal especially the third molar down. In cities, due to jaw fractures are disasters with means of transport (bicycles, motocycles, automobiles, etc.), accidents at work and others (firearms, grenades), (7,8,9,10). Harmful mechanisms such as crashes, sports injuries, car accidents, violin strokes are the most common causes of jaw trauma in the child and in the adulte (13). Strokes with pointed tools, punches or objects are among the most common causes (15). These traumas can also occur in wartime as a result of gun strikes or explosions. Animal attacks or work-related injuries such as industrial accidents are other causes (20). Automotive trauma is one of the main causes.

B. Examination of the Patient, Symptomatology and Diagnosis

- *History:* Individuals who suffer from facial trauma capable of causing maxillary and mandibular fracture may be unconscious or unable to speak. A clear description of the event that led to the trauma should be obtained from the person himself or from the witnesses of the event . Given that these injuries associated with severe facial trauma can be life-threatening, the assessment of vital signs and their stabilization takes precedence. It is important that in the cases of these traumas to be determined whether or not we have a loss of consciousness or any change in mental status, vision, hearing, occlusion (16,17).
- *Examination of the General Condition:* In the first place, the activity of the cardiovascular system should be controlled, to see if there are respiratory disorders, to examine the pulse,to determine the state of the central nervous system (contusio, compression, comotio), major hemorrhages etc, because they endanger the live of the sick (19.20). The most common symptom is jaw pain. Individuals refer that their teeth do not stay in order (maloclusion),they have a restriction on opening the mouth, problem with speech, swelling of the jaws (11,13). The movement of the jaw fragments can lead to muscle spasms or produce a crack. There are areas on the face, chin, lower lip, where we may have numbness or stinging as a result of nerve damage. We may also have bleeding from the nose or mouth or cerebrospinal lichid from the nose or ears. There are facial wounds, mouth or toothache (16,18). We may have bruising below the tongue or cracks in the ear canal as a result of the backward movements of the broken jaw.
- *Physical Examination:* is based on specific examination of maxilla and mandible. This examination is important to detect accompanying injuries (11,12,13). It starts with a face inspection at all angles for asymmetry, open wounds, or foreign bodies. Either mandible (including condyles) are examined with fingers (palpation) to identify swollen areas, with continuity decay. The mouth is examined for hemorrhage, edema, ecchymosis. Teeth are contemplated for stability, bleeding at the level of gingives and maloclusion (12,13) Fractured or fallen teeth should be evaluated and muttered. The eyes are examined to identify if we have clarity of the first (near or away), extraocular movement (eye ability to move in all directions), integrity of the orbital bone, bruising. For maxillary fractures (Le Fort) during physical examination we may find facial distortion in the form of facial elongation, mobile maxillary, middle face instability, and maloclusiveness.. Pain, soft tissue edema, pathological mobility, dislocation of fragments, crepitation, in two-handed palpation (bimanual), are characteristics for all fractures. Among the clinical signs that help diagnose jaw fractures we should mention the variability of the face shape (face asymmetry), (20). In jaw trauma, examination of cranial nerves should be performed; sometimes this helps to determine the localization of the fracture. The sensitivity disorder in the lower jaw region and in the mentum proves that there is a rupture of the inferior alveolar nerve in the mandibular canal and fracture in this region (16).
- *Tests:* If the fracture is an isolated injury, laboratory tests may be required before surgical intervention (15). If a major trauma has occurred, laboratory tests are part of the standard trauma protocol in the emergency department. *Imaging examinations, laboratory examinations*

C. Complications of Trauma in the O.M.F Region:

- *Hemorrhage* - Large facial vessels whose impairment gives great hemorrhage are: maxillary artery externa, whose wounding gives quite strong hemorrhage requiring immediate hemostasis to save the injured; facial transversal artery.
- *Asphyxia* - The causes of asphyxia in maxil-facial injuries may be different, usually have a mechanical character: the fall of foreign bodies in the airways like pieces of fractured teeth, blood coals, partial closure of the pharynx by the distal fragments in the complete fractures of the upper jaw, tongue decline in bilateral mandible fractures, especially in the mental region, hemorrhage at the root of the tongue.
- *Shock*- A rare but serious complication in the traumas of the maxillofacial region is also traumatic or hemorrhagic shock characterized by a marked decrease in all vital functions, primarily blood circulation and respiration (1.2).

- *Wound Infection* - All fractures from firearms should be treated as infected as well as those of accidents (20). The more damaged are the soft tissues, the more and faster they will become infected, due to the minimal reduction of their local immunity.
- *Functional Disorders* - Many functional disorders can come and as a result of nerve damage (17,18,19). In jaw fractures and in facial injuries, facial nerve can be directly damage, also infraorbital nerve, palatine nerves, inferior alveolar nerve, lingual nerve, hypoglos nerve and glossofaring nerve can be damaged too. Lateral lesions of the facial nerve disrupt motor function in different parts of the face (11).

D. Trauma Management in the O.M.F Region:

➢ *Emergency Assistance:*

- *Methods for Stopping Hemorrhage*: hemostatic methods by making wound lip sutures, ligature or sutures of the main artery where hemorrhage comes from , tamponade, compression
- *Emergency Asphyxiation Assistance*: this consists of avoiding blood clots, foreign bodies as well as attracting tongue which as a result of bilateral mandible fractures may have fallen backwards.

➢ *Fracture Treatment:*

- Temporary immobilization
- Definitive immobilization which is done in two ways: orthopedic and surgical (17,18,19)

E. The Aim of the Study

- Evidence of maxilo-facial region fractures management performance.

F. Objectives of the Study

- To identify the correctness of establishing the correct diagnosis for the correct management of jaw fractures
- To identify the contemporary protocol of jaw fracture management
- To identify the importance of timely diagnosis for adequate management of fractures of the maxillo-facial region

II. MATERIALS AND METHODS

This study includes 36 clinical cases, 4 females and 32 males with maxillo-facial region fractures. The clinical cases included in this study were managed in the Maxillo-Facial Surgery Service, the French hospital, the " Mother Teresa" University Hospital Center for the period April 2015 - June 2016.

For the evaluation of clinical cases of this study was used the Register of Surgery of the M-F Surgery Service operation room as well as the clinical records of patients. In the clinical file of each patient is reflected in detail: patient generalities, anamnezae morbi, anamnzaza vitae, objective extraoral and intraoral examination as well as the various graphies that have served to establish the diagnosis, the patient's consortium for the intervention performed and the patient's clinical performance during hospital stay. Clinical cases included in this study are fractures of jaws localized: in the upper jaw (3 cases), in the zygomatic complex (2 cases) and in the lower jaw (25 cases), 1 case with dento-alveolar trauma and 5 cases with post-traumatic state.

The determination of the diagnosis was carried out on the basis of anamnesis, objective extraoral and intraoral examination and imaging examinations. For the evaluation of the results, statistical descriptive analysis was performed, the tables and graphies were processed with the Exel computer program.

III. RESULTS

A number of 36 patients with maxillo-facial fractures were studied, 32 males (89%) and 4 females (11%) . Mandibular fractures are more common than other injuries accounting for 69.4% of fractures. The mandible body is their most common anatomical localization (13.9%).

Table 1: The Frequency of Maxillo-Facial Fractures Observed in this Study

Type of Fracture	**No. of Patients**	**%**
Mandible	*25*	*69.4*
Body	5	13.9
Mandibular angulus	2	5.6
Symphysis	1	2.8
Mentum mandible	2	5.6
Media	2	5.6
Condylar fracture	2	5.6
Combined fracture	6	16.7
Mandible fractures	5	13.9
Maxilla	*3*	*8.3*
Maxillary fractures	1	2.8
Le Fort 2	1	2.8
Le Fort 3	1	2.8
Zygomatic complex	*2*	*5.6*
Dentoalveolar trauma	*1*	*2.8*
Post- Traumatic state	*5*	*13.9*

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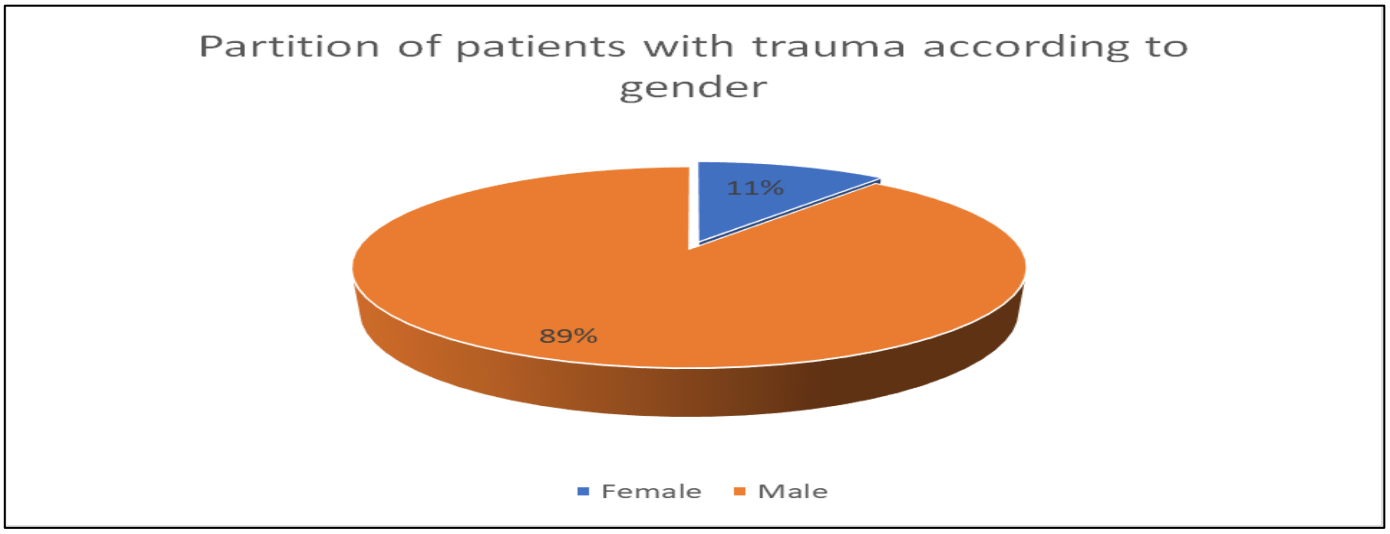
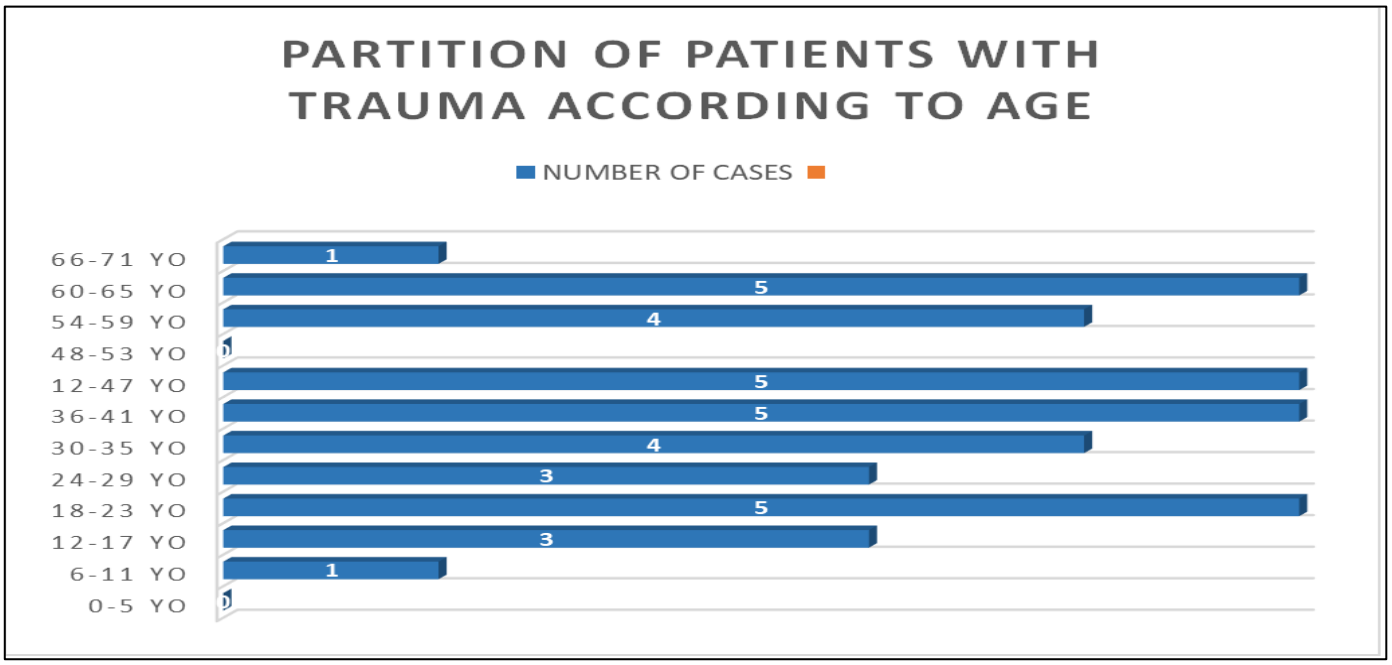


Diagram 1: Presentation of Patients with Fractures by Gender

The studied population consist of 36 patients, 32 males (89%) and 4 females (11%). Male:Female ratio is 8:1.



Graph 1: Presentation of Patients by Age Group

Patients with jaw fractures taken in the study predominate those in age groups: 18-23 years, 36- 47 years old, 60-65 years old (14%) followed by age groups 30-35 years, 54-59 years old (11%) as the most active age groups in daily life and those with the lowest incidence are 6-11 years old, 66-71 years old (3%). About 3/4 of the patients are between the ages 18 and 65 yo.

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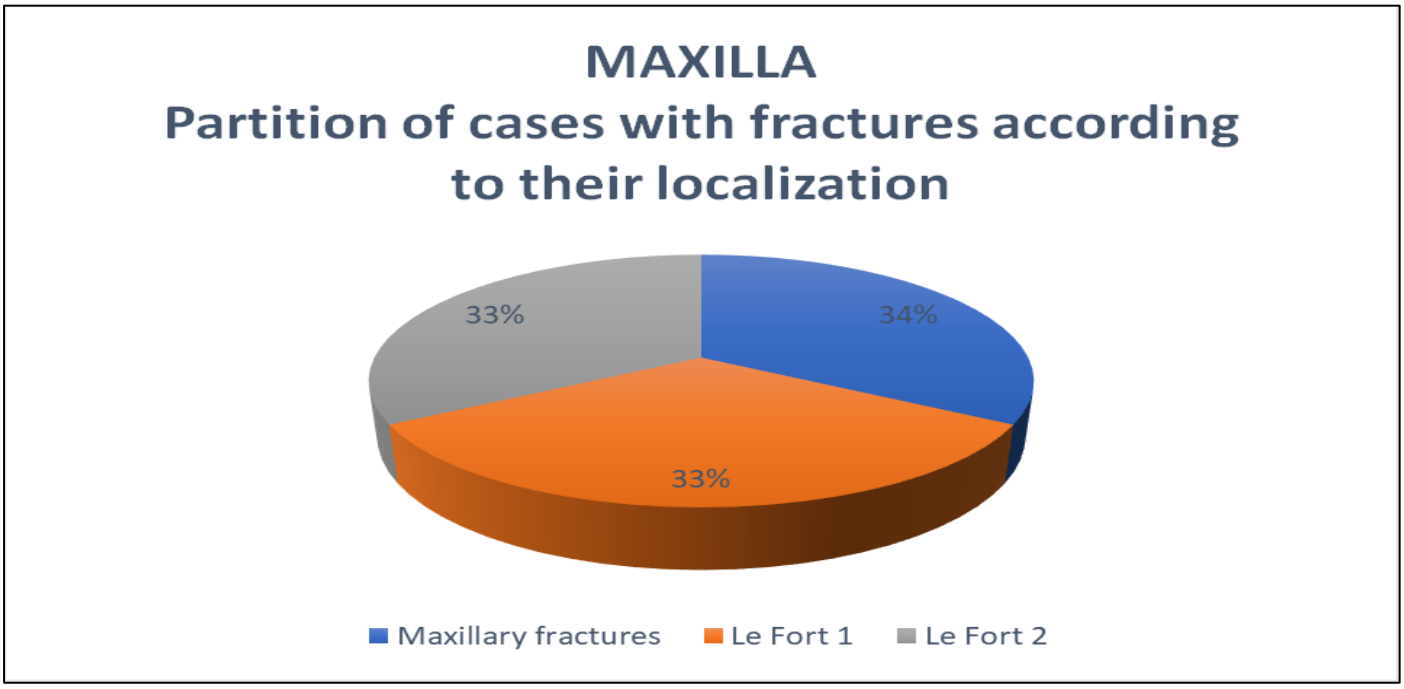

Diagram 2: Presentation of Fractures in the Upper Jaw According to Localization

Of the 3 cases presented with fractures on the middle and upper floor of the face we have 1 case localized to the upper jaw (33.3%) and 1 case with fracture Le Fort 2 (33.3%), also 1 case with fracture Le Fort 3 (33.3%).

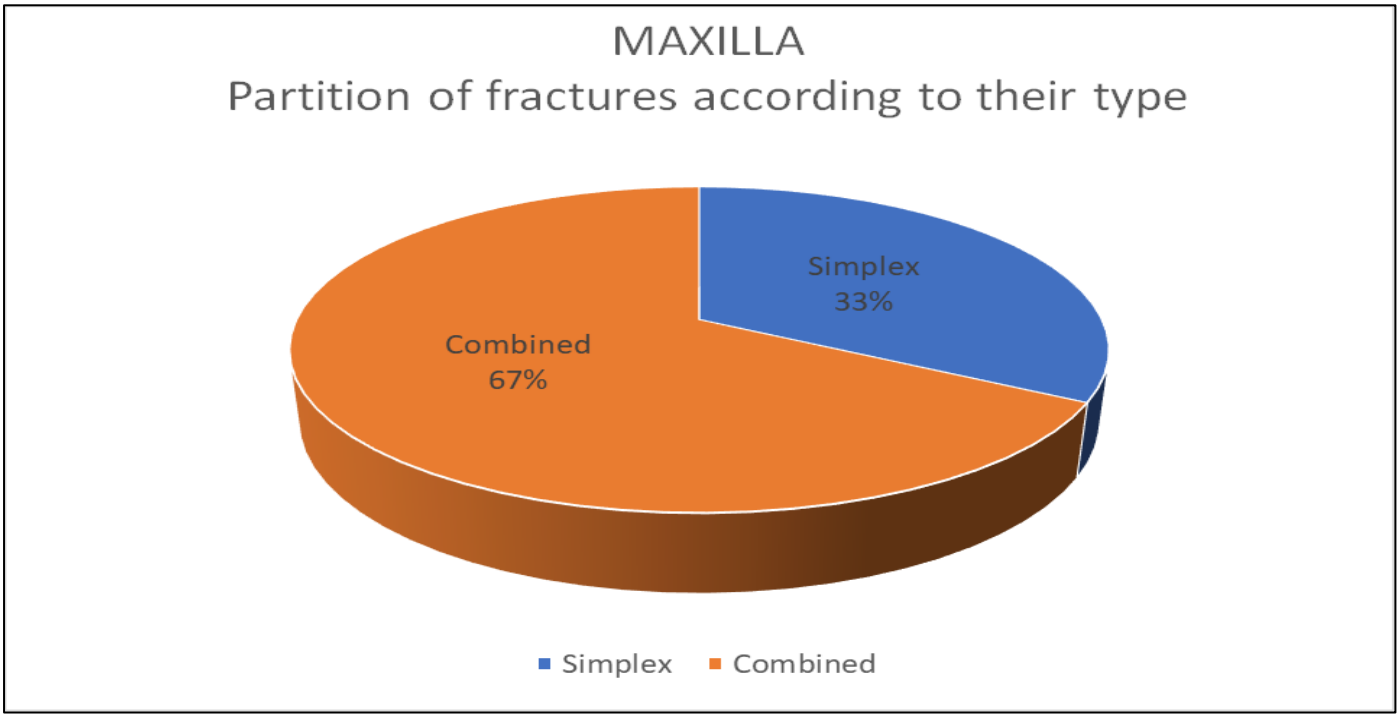

Diagram 3: Presentation of Fractures in the Upper Jaw According to their Type

Of the 3 patients presented with upper jaw fractures: 2 patients had simple fracture (67%) and 1 patient had combined fracture (33%).

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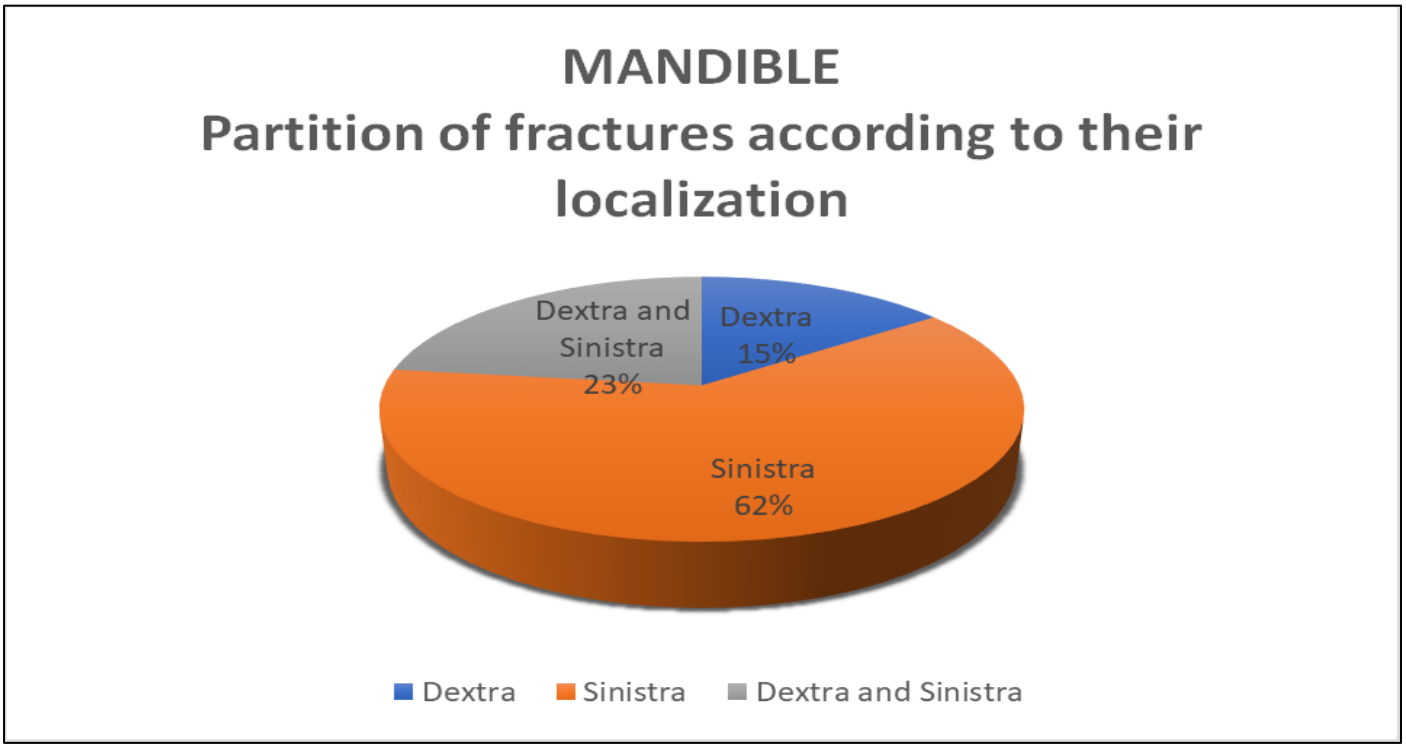

Diagram 4: Distribution of Fractures in the Lower Jaw According to Localization

A number of 8 patients or 62% of patients had fractures of the lower jaw localized to its left, while 2 other patients or 15% of patients had fractures localized on the right side. While 23% of patients (3 patients) had fractures localized on the both sides.

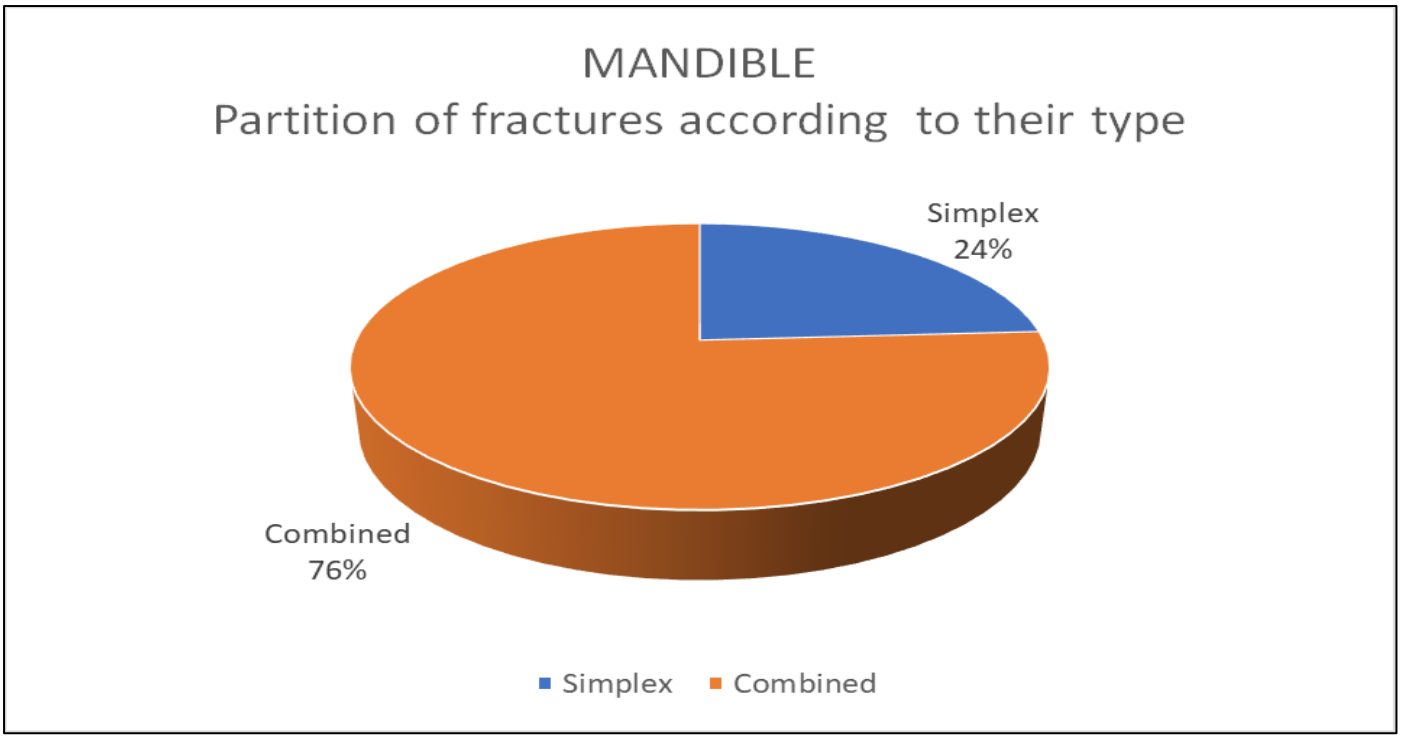

Diagram 5: Presentation of Fractures in the Lower Jaw by Type

From the total number of fractures in mandible which is 25, we have simple fractures in 19 cases (76%) and combined fractures in 6 cases (24%).

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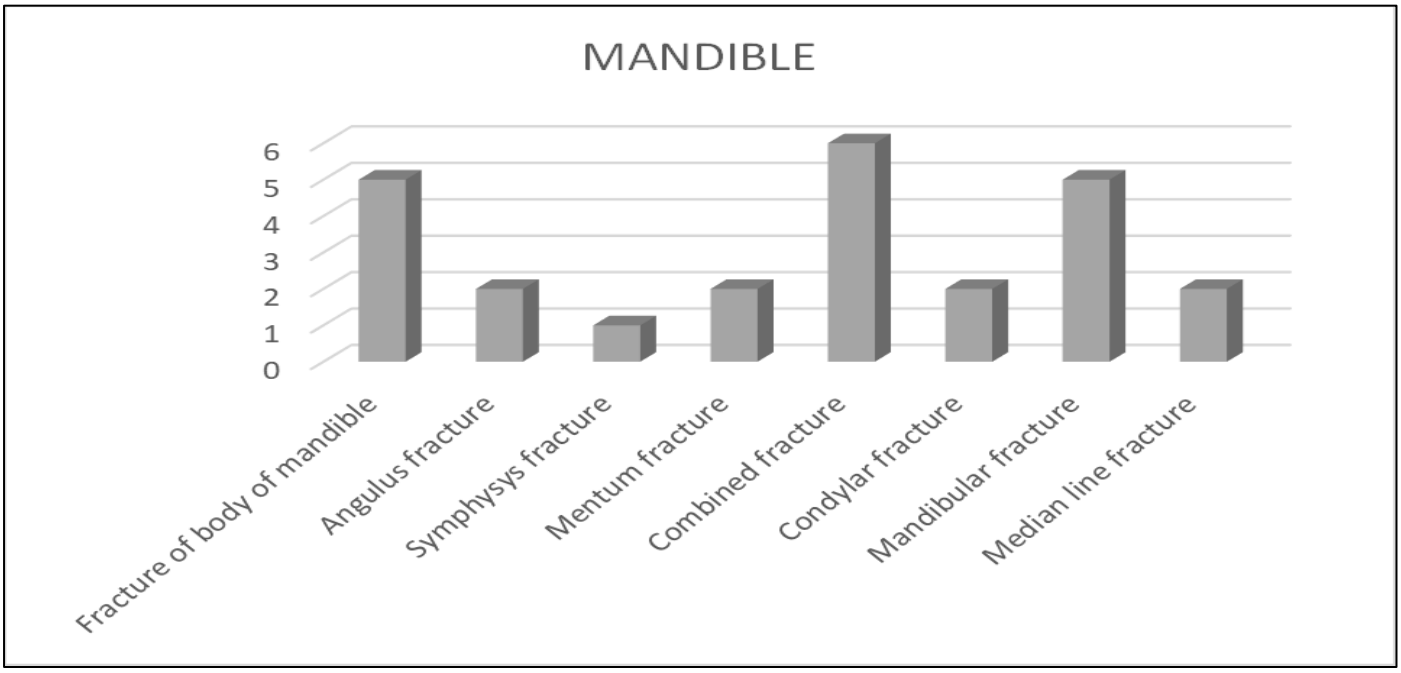

Graph 2: Presentation of the Number of Fractures According to their Localization in the Mandible

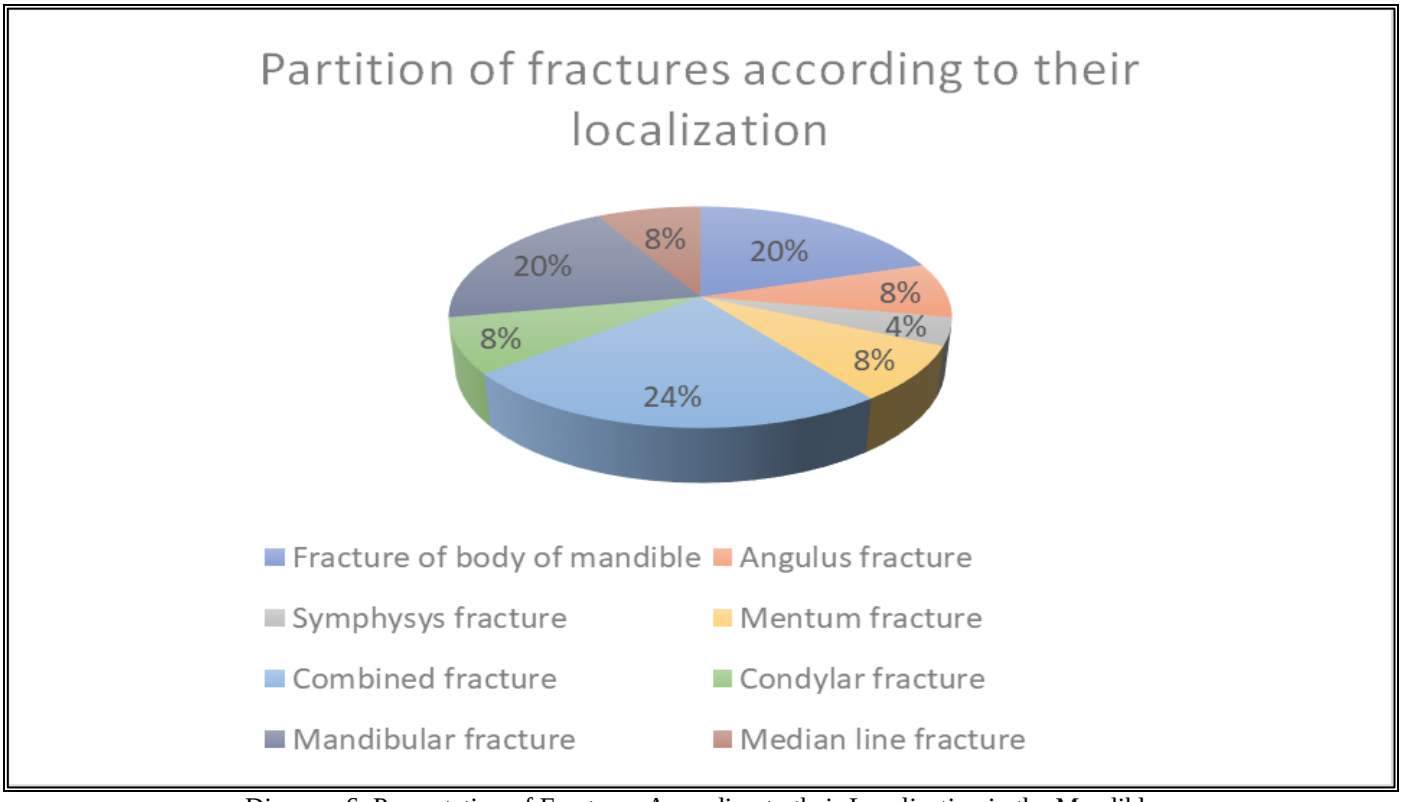

Diagram 6: Presentation of Fractures According to their Localization in the Mandible

Of the 25 patients presented with lower jaw fractures these fractures are mostly localized to the mandible body (13.9%) angulus fractures (5.6%) and symphysis (2.8%) mental (5.6%) media (5.6%) and combined (16.7%) condyl fractures (5.6%) mandibular fractures (13.9%).

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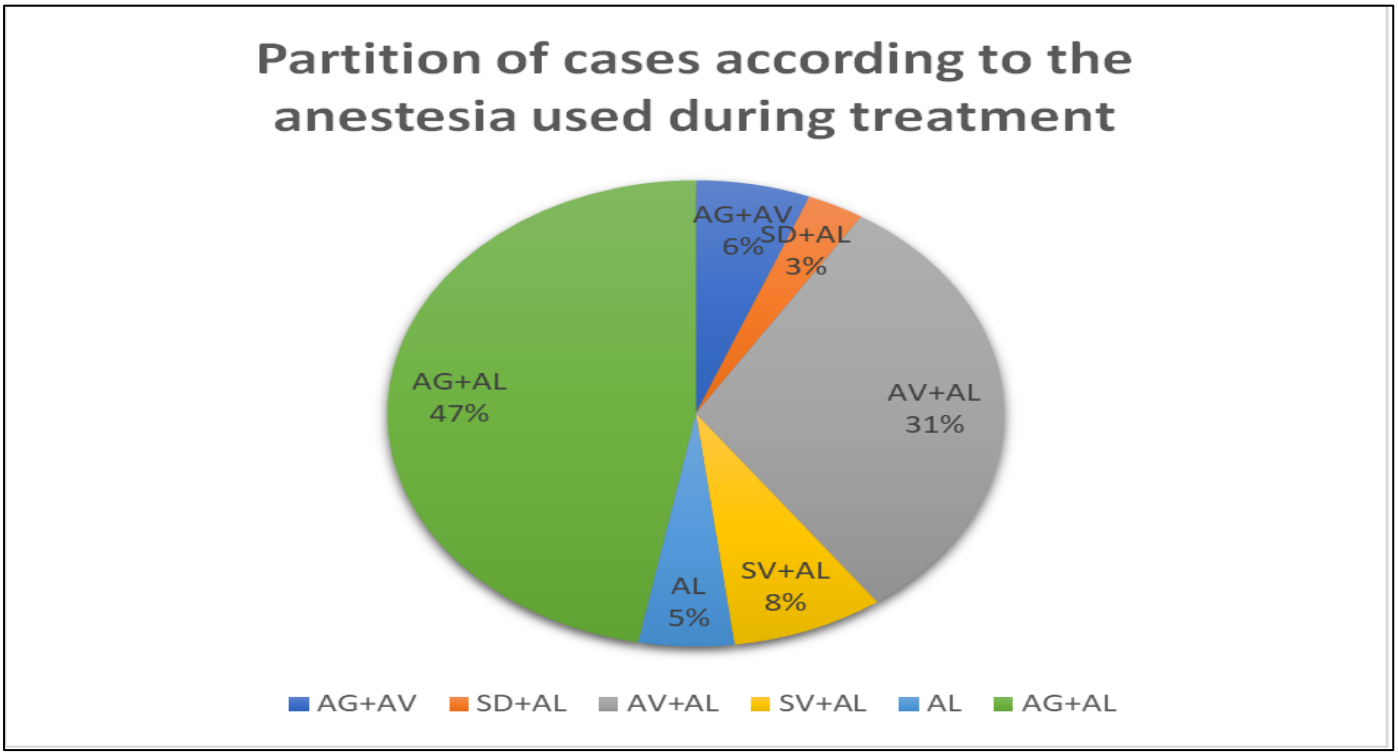
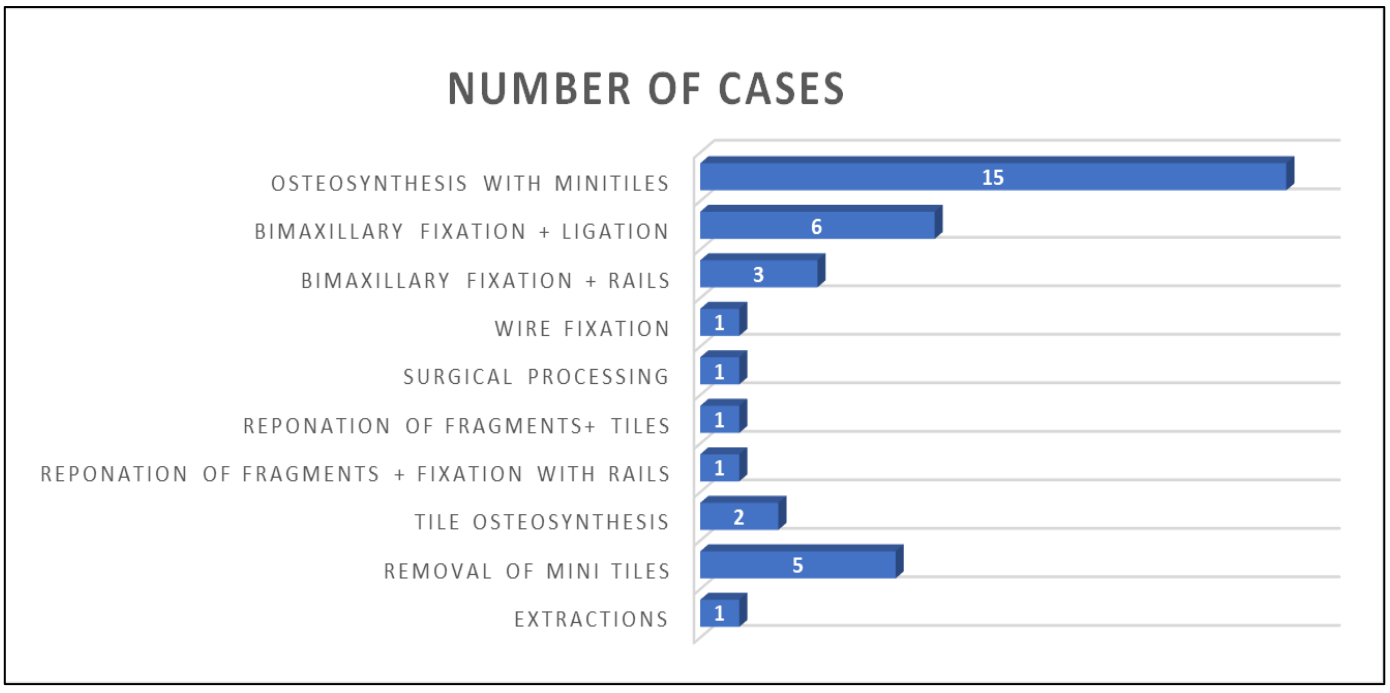


Diagram 7: Presentation of Cases According to the Anesthesia used during Treatment

Treatment of these cases is done in hospital conditions performed under local or general anesthesia and according to the data of the files and the operating room register the patient was presented quietly during the intervention and woke up in the operating room. There is no statistical relation between the treatment method and the age of the treated patient. Most patients were treated with local and general anesthesia (17 patients - 47%). While 11 other patients (31%) were treated with AV+AL. 2 cases were treated (5%) with local anesthesia. 3 cases were treated with SV+AL and 2 cases with AG+AV



Graph 3: Presentation of Cases by Type of Treatment

Patients presented at the MF surgery service at the French hospital, “Mother Teresa” University Hospital Center were treated with 2 methods. The methods used for treatment are mainly focused on the surgical method (open reduction).

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Fig. 1: (Osteosynthesis with plaque - Mental Fracture: Card No. 318, A.K., 21 Years old, Male)

Fig 2 (Mental Fracture: Cardfile No. 460, K.B, 23 years old, Male)

The number of cases treated with osteosynthesis is higher where the total number of these cases reaches 17, 2 are cases treated with osteosynthesis with tiles (6%) and 15 cases treated with osteosynthesis with minitiles (42%).The treatment of 2 other cases is done through the reponation of fragments and fixation with rails or plates (6%). We also have 10 cases treated with the orthopedic method (closed reduction) through bimaxillary fixation and rails, ligatures or wire fixation (28%). There are also 5 cases (14%) with post-traumatic state where minitiles removal was performed and one case was subjected to extraction.

Table 2: The Number of Cases of Maxillo-Facial Fractures According to their Localization

Trauma Localization	Maxilla	Mandible	Dentalveolar Trauma	Zygomatic Complex	Post -Traumatic State
Number of cases	3	25	1	2	5

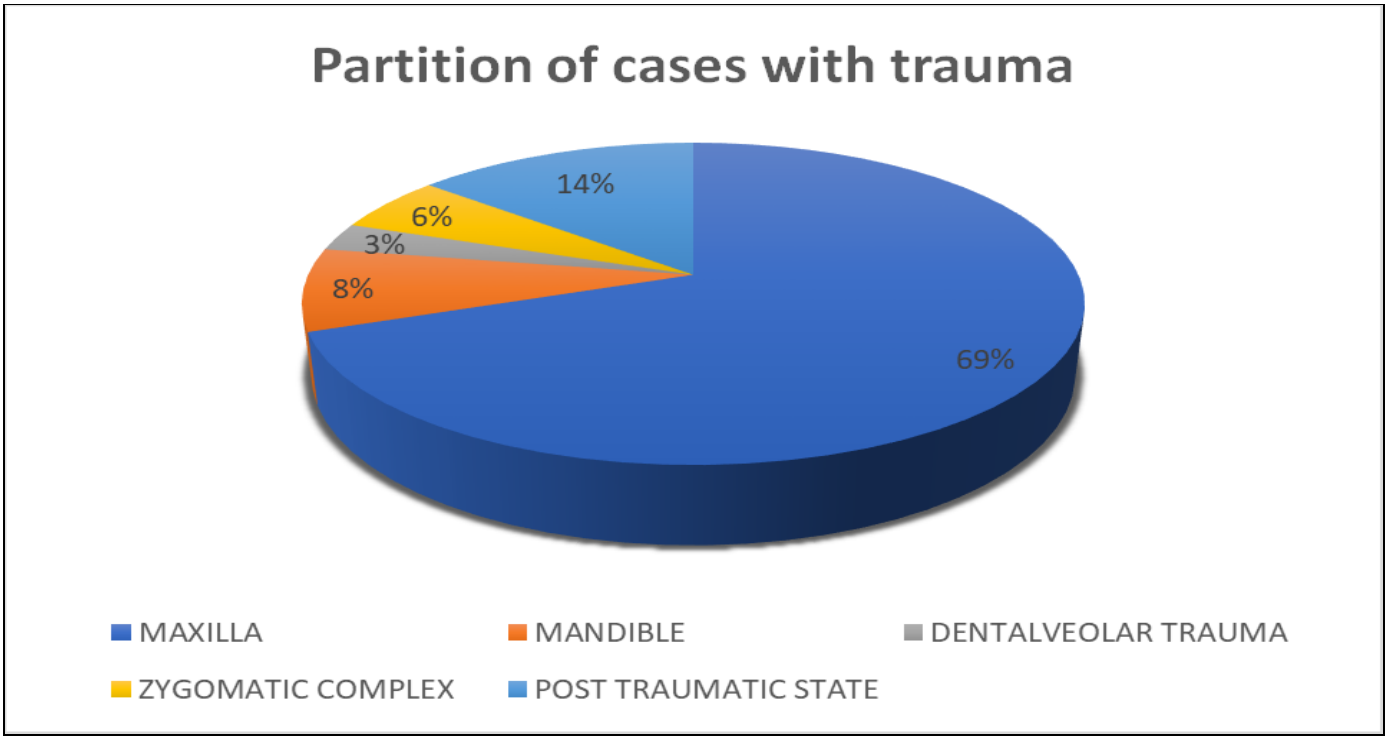

Diagram 8: Distribution of Cases with Trauma According to Localization

Of the 36 cases with maxillo-facial trauma, most of them are localized in the lower jaw (which make up 69.4% of cases). While fractures in the upper jaw occupy 8.3% of cases. We also have a case of dentao-alveolar trauma that accounts for 2.8% of the cases and 2 cases (5.6%) localized to the zygomatic complex, as well as 5 cases with post-traumatic state (13.9%)

IV. DISCUSSION

This retrospective study describes the epidemiology of 36 patients with jaw trauma (whether these simple or combined trauma). Various authors present some approximate estimates in the etiological study of maxillo-facial fractures:

- Mandible fractures are more common than maxillary fractures
- Paramediane and angular fractures predominate in mandible fractures.
- Numerous results enable the determination of the distribution of mandible fractures in percentage data with interval: corpus 21-40%, kondil 15-20%, angulus 20-31%, parasimfisisis 10-15%, ramus 3-9%, process alveolar 3-5%, coronary process 1-2%.
- The most vulnerable average age to car accidents and physical violence is 25-40 years old.
- For maxillo-facial fractures the male ratio:female in most cases is 2:1, 3:1, 4:1.(27,28,30)

In the Oro Maxillo Facial surgery service at the French hospital in “Mother Teresa” University Hospital Center the male-female ratio, calculated from this study for the period April 2015 - June 2016 results in 8:1. In terms of male predisposition this is a similar conclusion to the of other foreign studies. Comparing the data of this study with the data of other studies it turns out that the jaw that is most affected by fractures is mandible. The mandible fracture is the most common macsilo-facial damage in both this study and studies in other countries but contradictory to studies in countries such as Austria where the raw material occupies the 1/3 middle facial fractures.All manipulations have been performed in accordance with the standard trauma treatment protocol. Relying on scientific literature data on the different types of techniques for treating and managing jaw trauma it should be said that even in our study conducted in patients treated at the MF surgery service at the French hospital in “Mother Teresa” University Hospital Center there are similar treatment techniques to those of other countries studies which vary as the case may be presented in the hospital. The use of osteosynthesis is being widely applied in many surgical clinics (21, 22, 25 , 26). Today with the establishment of tertiary centers, with the multidisciplinary team, as well as with the increase of imaging and the improvement of treatment techniques the survival has increased quite a bit and the percentage of success has increased. New concepts in the treatment of O.M.F trauma are early diagnosis and priority is given to therapeutic treatment and application of resorbable materials (27, 28, 29).

V. CONCLUSIONS

- In the studied population maxillofacial fractures occur mainly in men over the age of 20 yo.
- The most common site of fracture localization is the lower jaw.
- The mandibular body is the most common anatomical localization of fractures in the lower jaw.
- Surgical treatment is a standard and most common treatment for maxillofacial fractures.
- Implementation of programs to reduce the number of road accidents and violence between people are needed to reduce the number of maxillo-facial traumas.

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