"OVIDIUS" UNIVERSITY CONSTANȚA
DOCTORAL SCHOOL OF MEDICINE

# DOCTORAL THESIS

MEDICO-SURGICAL ATTITUDE IN MAXILLOFACIAL TRAUMAS FROM AN INTERDISCIPLINARY ENT-OMF APPROACH

-DOCTORAL THESIS ABSTRACT-

SCIENTIFIC SUPERVISOR:
COMȘA GHEORGHE IONEL, M.D., Ph. D,
PROFESSOR

Ph.D. CANDIDATE:
MIHAIL DAN LAURENŢIU, M.D.

CONSTANŢA
2018

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Key words: maxillofacial structures, trauma mechanism, osteosynthesis

# GENERAL PART

## CHAPTER I. INTRODUCTION

The face is the element on which human interaction focus, and represents a source of man fascination, when it relates to beauty. Ironically this is the most damaged region in case of trauma.

Maxillofacial fractures etiology varies from one geographic region to another, and between different group ages. The main cause of maxillofacial trauma are car accidents, in developing countries, and attacks in developed countries. Last years the importance of terrorism and armed violance increased.

Head trauma is the most frequent cause of decease and permanent disability in traumatic pathology.The lesions appear when the energy, usually kinetic, transferred to the body exceeds the tissues tolerance.

Traditionally they are classified as penetrating or blunt, but in many cases there is an association.

The face contains manny structures which are essential to different senses: sight, smell,taste, hearing. The human communication depends not just on facial structures required for speaking and hearing, but on structures which define the face expression. Manny elements associate to create human identity, and their protection is important from an aesthetic and functional point of view. Damaging them may cause important disabilities which can be avioded by early recognition and treatment[1].

After a thorough examination the surgeon must focus on the regions which suffered the most. Maxillofacial fracture treatment must be lead very thorough and predictible.The key element is for the doctor to choose tehniques that have minimal influence on the form and shape of the face. It is essential to obtain a result as close as possible to ideal by using minimal incisions, located ideal to obtain easily hidden scars.

Imagistic evaluation represents an important segment to detect possible fractures and associated lesions. It evolved over time, and if in the past they used x-ray in different incidences focused on different segments,which had there own limitations, today there is computed tomography, MRI, 3D reconstruction which offers information for a complete and correct diagnostic.

Treatment purpose is to bring back the ocular, masticatory and nasal functions to normal, reestablishing normal speech and a fast bone healing.

Results relate to surgeon abilities, knowledge and experience acquired, and ability to fixate and position the fragments in ideal positions.

The clinical trials were made on a patients lot which were treated in ENT clinic and OMF surgery compartment of Constanta County Hospital, between 1 of january 2017-1 june 2017, courtesy of Prof Univ Dr Comsa Gheorghe Ionel, Conf Univ Creanga Adrian and Dr Vlad Daniel.

## CHAPTER II.ANATOMY

The top layer of the face is represented by skin. It is formed by 3 layers: epiderma, dermis and subcutaneous layer.

*Muscles* are in the subcutaneous tissues of the anterior and posterior scalp, face and neck regions. The majority are attached to bone and fascia, and they act by traction of the skin. They are moving the skin to change the face expression and emphasize a state of mind. They are surrounding the mouth, eyes and nose orifices, acting as sphincters and dilators to open and close the orifices.

*Face nerves.* Many facial expression muscles are innervated by facial, whereas mastication muscles are innervated by trigeminal nerve, mandibular branch. Sensitive innervation is achieved by three main trigeminal branches and secondary spinal nerve branches[4].

*Face vascularization.* Face presents a rich vascular network made up of two main blood vessels, facial artery and superficial temporal artery, alongside a series of arterioles which accompany sensitive nerves.

Facial skeleton is composed of 14 bones, of which 6 are pairs(maxillary bones, zygomatic bones, nasal bones, lacrimal bones, palatal bones, inferior turbinates) and two unpaired( vomer and mandible).

Cranial bones are united by fixed structures, called sutures. The exception is the mandible, which is attached to the skull through temporomandibular joint [5].

# SPECIAL PART

# CHAPTER III. TRAUMATIC PATHOLOGY STUDY OF DIFFERENT CAUSES

The most frequent causes in the world are car accidents, falling, aggressions, wounds produced by fire arms, sport accidents and work accidents. These etiological factors are related to geographic conditions, socioeconomic status, cultural character. Car accidents are very frequent in developing countries, and violence is first in developed countries. Adults suffer mainly due to car accidents, and young populations suffers due to falling accidents. The epidemiological studies showed that age and sex are key elements which influence trauma. The highest incidence appears in 20 to 40 age group, whereas the rarest cases appear under 5 years and over 60 years. Recent data shows a male: female ratio 3:1 all around the world.

Trauma represents a physical aggression secondary to release of energy towards and inside the victim determined by penetrating or a blunt mechanism. Anatomic lesions and their consequences depend on their location and the amount of energy released.

# PERSONAL PART

# CHAPTER IV. CLINICAL STUDY

Aims at obtaining the next results:

- Finding trauma mechanisms, age, sex, patients provenance environment
- Establishing prognostic indices based on clinical, imagistic criteria and socio-economic reinsertion ratio
- Statement criteria of choosing medical and surgical treatments depending on affected structures, types of trauma and mechanism
- Pursuing the reworded therapeutic plan and adjust it to the type of lesion
- Achieving a thorough research to establish the main types of lesions included in the study
- Studying cases which represent the ground for processing data
- Graphic and chart interpretation
- Establishing benefits and limitations of every therapeutic procedure

In order to establish a study group, it is necessary to develop inclusion and exclusion criteria.

Inclusion criteria (clinical and imagistic):

-moderate lesions, closed or opened which include isolated fractures with displacement

-severe trauma, affecting bone and sinuses structures without cerebral, cervical spine and septic complications

-very severe traumatic lesions with dish face and cerebral repercussions

-substance loss and important functional and aesthetic sequelae

-possibility to evaluate the patient on medium and long term to establish the treatment efficiency and the degree of social reinsertion.

Exclusion criteria:

-superficial lesions

-simple contusions which interests only the soft tissues(ecchymosis and edema )

-traumas which interests bone structures without displacement and without damaging the sinuses

-disobliging patients, alienated and with mental disorders which cannot be thoroughly examined with regard to the conditions and trauma mechanisms

## Material and methods

The research involves 129 patients, with maxillofacial trauma, hospitalized in ENT Clinic and OMF compartment of Constanta County Hospital which suffered surgical interventions between 1of January 2013 and 1 June 2017.

To establish a complete diagnosis, patients were submitted to clinical and imagistic examinations. During face and oral cavity evaluation we looked up for the next signs:

-pericrania hematoma, superior floor bone deformation, supraorbital rims deformation, zygomatic hematoma and zygomatic complex deformation, nose deformation, nose hematoma, facial palsy, superior lip hematoma, oral cavity superior vestibule ecchymosis, oral hematoma, superior palate, oral bleeding, malocclusion, soft tissues edema, raccoon eyes, subconjunctival haemorrhage, epistaxis, rhinoliquorrhea, ocular motility limitation, diplopia, enophthalmia, painful mandible in motion, pain, soft tissues lesions, foreign bodies.

Palpation was used to discover the deformation, crepitations, abnormal mobility of bone fragments, pain, loss of sensitivity.

For imagistic evaluation we used:- Computed tomography in axial, coronal and sagittal sections

-3D reconstruction

- cranial MRI in axial, coronal and sagittal sections

-facial radiography frontal and side face view

-verticosubmental radiography(Hirtz)

-panoramic radiography

-mandible radiography frontal and side face view

-Caldwell' view radiography

-Blondeau View

-anterior sinuses radiography(Tscheboul)

Interdisciplinary exams were necessary in certain cases in order to establish the presence of associated lesions which interest other structures and organs, affecting patients, evolution and body's capacity to bear a surgical intervention:

-neurosurgical examination to determine the presence of associated brain or cervical spine lesions

-ophthalmologic exam to evaluate the visual field, ocular motility, presence on any lesion

-anesthesiology exam for surgical interventions

## RESULTS

The study group has 108 men(83,72%) and 21 women(16,28%). From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test).

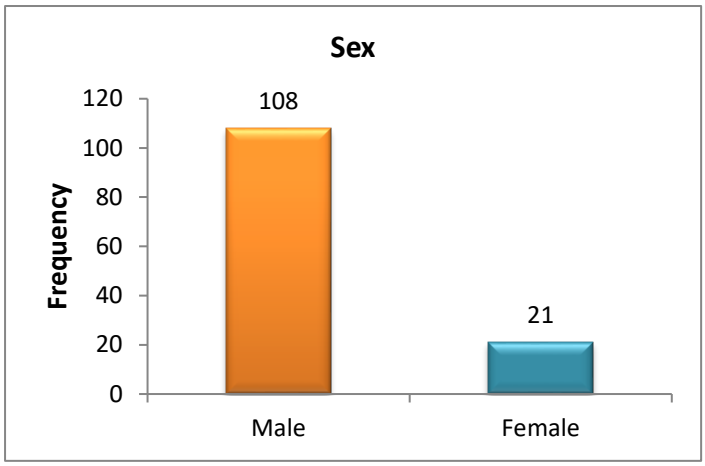


Fig 1. Representation of variable sex

In the study group there are 26 patients (20,16%), age between 0-20 years, 60(46,51%), age between 20 and 40 years, 23(17,83%), age between 40 and 60 years and 20 (15,50%) over 60 years. From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test).

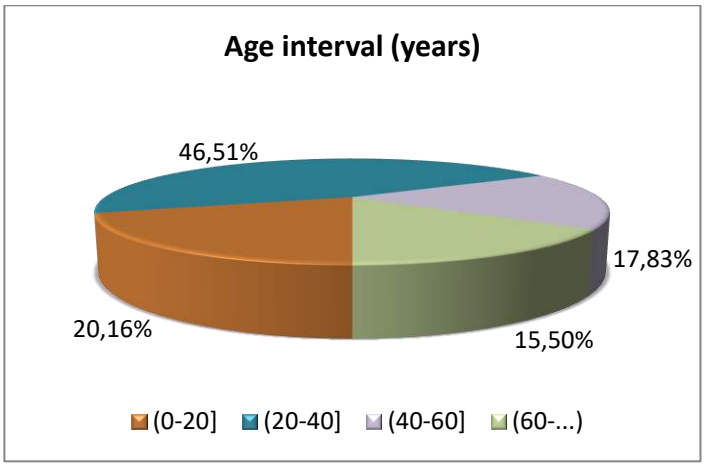


Fig 2.Representation of variable age

To establish the provenance in the study group there were observed 91(70,54%) patients from urban environment and 38(29,46%) from rural side. From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test).

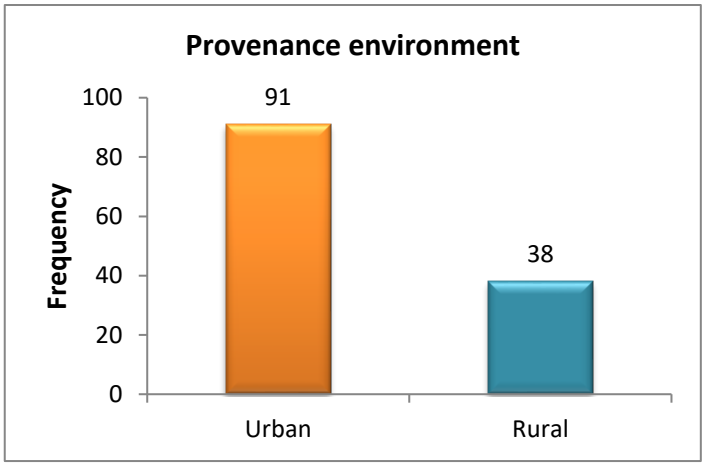


Fig 3. Representation of variable provenance environment

From the number of cases produced annually, point of view, we can see that there were 29 traumas(22,48%) in 2013, 36 traumas (27,91%) in 2014, 35 traumas (27,13%) in 2015, 24 traumas (18,60%) in 2016, 5 traumas (3,88%) in 2017. . From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test). There are no notable difference in the first 3 years, but we can observe a decrease in 2016 and 2017, keeping account that in the last year were included cases from the first 5 month.

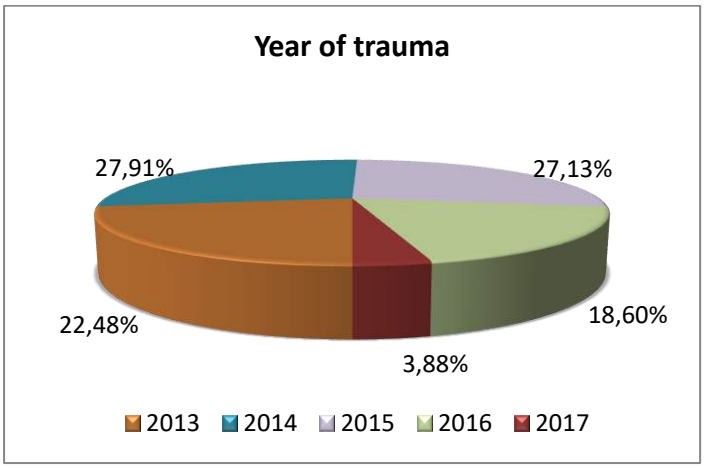


Fig 4.Representation of variable-year of trauma

The maxillofacial structures were divided in 3 floors-superior floor which include the frontal bone and sinus, the inferior border is represented by a line which crosses the supraorbital rims and the base of the nose.

-middle floor is separated from the inferior floor by a plane which divides the two dental arcades. It includes a series of anatomic elements: nasal bones, lacrimal bones, maxillary bones, zygomatic complex, palatal bones, vomer, ethmoid, sphenoid bone and cavities: orbits, nasal fossae, maxillary sinuses, ethmoid sinuses, and sphenoid sinus. It represents the most complex segment of the face.

-inferior floor is represented by a single bone, mandible.

89 patients (68,99%) suffered lesions after aggressions, 15 patients (11,63%) suffered after a car accident, 15 (11,63%) by falling, 2 cases (1,55%) by falling from high ground, 2 patients (1,55%) suffered after a sports accident, 3 patients (2,33%) were a victim of a work accident and 3 cases appeared after an accidental blow. From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test).

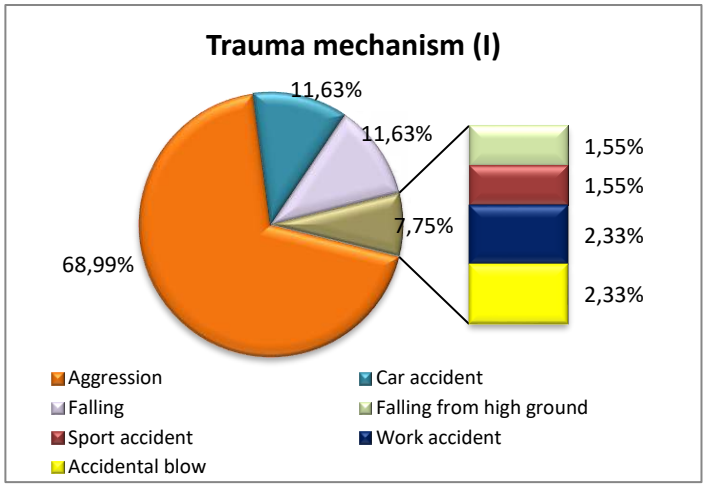


Fig 5.Representation of the variable trauma mechanism

The most frequent trauma mechanisms observed in the study group were aggressions followed by car accidents. This represents the tendency in the international studies.

89 patients (68,99%) suffered traumas after aggressions and 40 patients (31,01%) suffered traumas due to different forms of accidental mechanisms. From a statistic point of view the two categories have different percentage ($p < 0.001 < \alpha = 0.05$-CHI-Square Test).

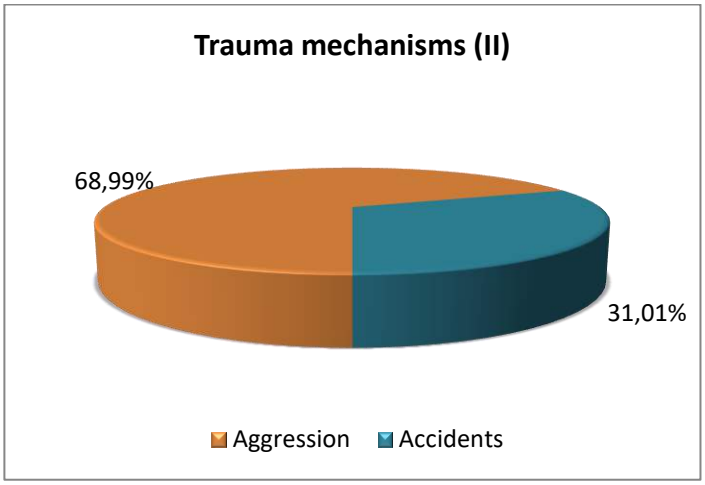


Fig 6. Representation of variable trauma mechanisms

Analyzing the trauma mechanism, out of the 108 male patients 83 (76,5%) suffered following aggressions, in 9 cases (8,3%) the lesions appeared following car accidents, 8 patients (7,4%) suffered due to falling, in 2 patients (1,9%) the mechanism was falling from high ground, 1 patient (0,9) suffered following a sports accident, in 3 patients (2,8%) the mechanism was work accident and 2 patients (1,9%) suffered due to an accidental blow. Out of 21 female patients 6 patients (28,6%) suffered following aggressions, 6 patients (28,6%) were victims of car accidents, 7 patients suffered due to falling, 0 cases after falling from high ground, 1 patient (4,8%) was a victim of a sports accident, no cases due to work accidents and 1 case(4,8%) following a accidental blow.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| | Car accident | 9 | 6 | 15 |
| | Falling | 8 | 7 | 15 |
| | Falling from high ground | 2 | 0 | 2 |
| | Sports accident | 1 | 1 | 2 |
| | Work accident | 3 | 0 | 3 |
| | Accidental blow | 2 | 1 | 3 |
| Total | | 108 | 21 | 129 |

Table 1. Representation, trauma mechanism related to patient sex

Ratio between age groups and the trauma mechanisms shows the next aspects:

• aggression was the main mechanism for 18 patients (20,22%) with age between 0 and 20 years, 47 patients (52,8%) between 20 to 40 years, 12 patients (13,5%) between 40 and 60 years, 12 patients (13,5%) over 60 years

•car accidents were the main mechanism for 8 patients (20%) between 0 and 20 years, 13 patients (32,5%) between 20 and 40 years, 11 patients(27,5%) between 40 and 60 years and 8 patients(20%) over 60 years.

| | | Age interval (years) | | | | Total |
|---|---|---|---|---|---|---|
| | | (0-20] years | (20-40] years | (40-60] years | (60-...) years | |
| Trauma mechanism(II) | Aggression | 18 | 47 | 12 | 12 | 89 |
| | Accidents | 8 | 13 | 11 | 8 | 40 |
| Total | | 26 | 60 | 23 | 20 | 129 |

Table 2. Representation, the main mechanisms related to age

The next chart reveals the distribution of fractures in the middle floor of the face, nasal bones have the indicative 1,zygomatic bone 2, temporozygomatic arch 3,orbits 4 and superior maxilla 5. It can be seen a predominance of nasal bones fracture.

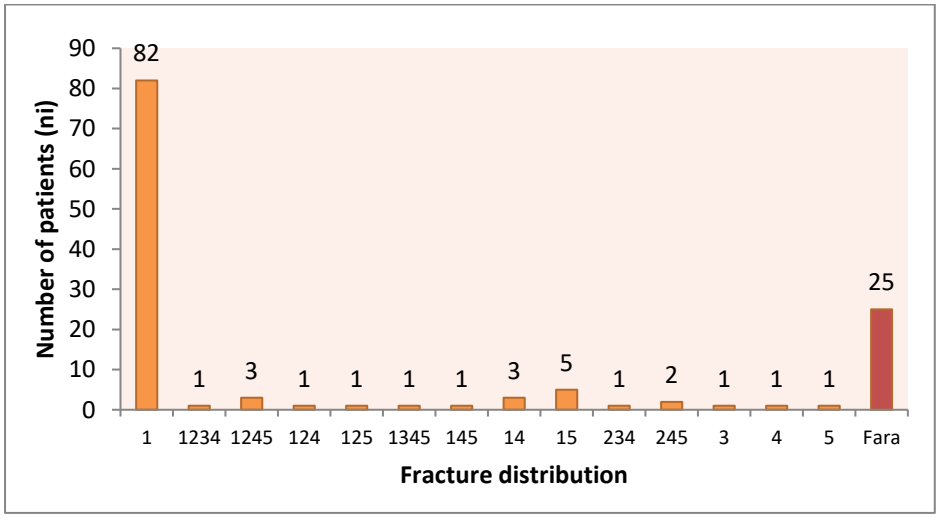


Fig 7. Middle floor fracture distribution

Establishing an association between nasal bone fracture and sex distribution shows that there were 79 male patients (80,6%) and 19 female patients(19,4%). Also inside the male group 73,1% suffered a nose fracture, and inside female group 90,5% had such a lesion.

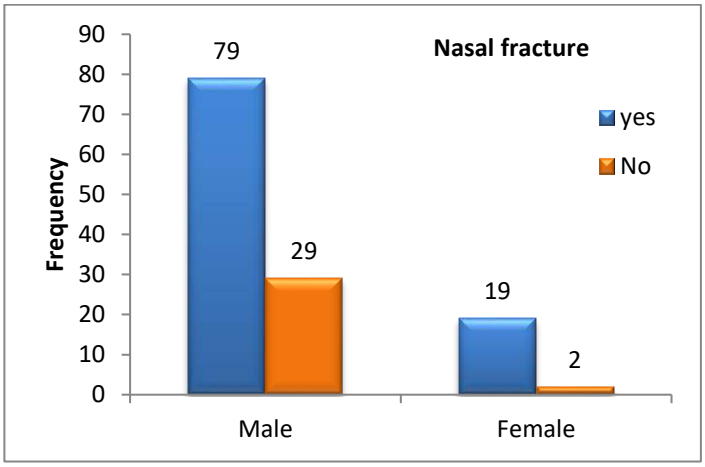


Fig 8.Representation, nasal fracture related to sex

Zygomatic fractures were found in 7 male patients (77,8%) and 2 female patients(22,2%). From the entire male group 6,5% had this type of lesion, and in female group 9,5% had it.

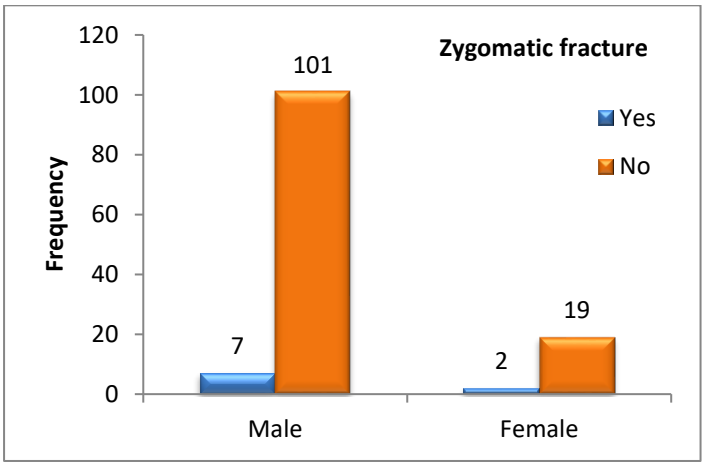


Fig 9. Representation of zygomatic fracture related to patient' sex

Orbit fractures were found in 11 male patients (78,6,6%) and 3 female patients (21,4%). In the male group 10,2% suffered this type of fracture, in female grup the percentage was 14,3%.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Orbit fracture | Yes | 11 | 3 | 14 |
| | No | 97 | 18 | 115 |
| Total | | 108 | 21 | 129 |

Table 3.Representation of the orbit fractures related to patient's sex

Maxillary fractures were found in 13 male patients (92,9%) and 1 female patient (7,1%). From the total of male patients 12% suffered this type of fracture, in the female group 4,8%.

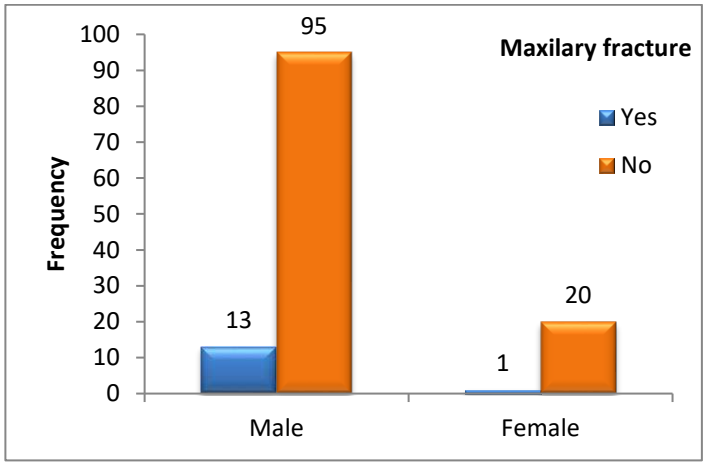


Fig 10. Representation of maxillary fractures related to patient's sex

The next chart presents the distribution of fractures at the inferior floor, where 1 is the angle, 2 body, 3 ramus and 4 the condyle.

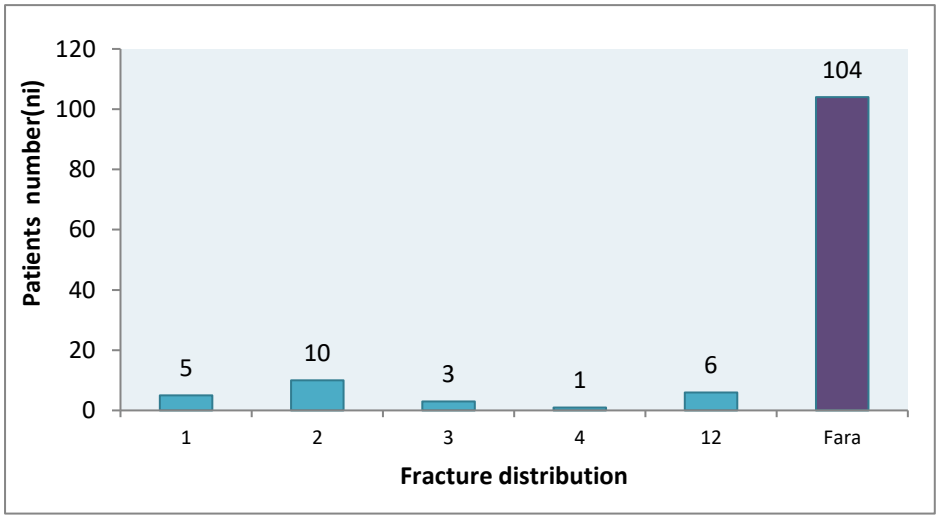


Fig 11. Mandible fractures distribution

Mandibular angle fracture existed in 11 male patients and no female patient. They represent 10,2% of all fractures.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Mandibular angle fracture | Yes | 11 | 0 | 11 |
| | No | 97 | 21 | 118 |
| | | | | |
| Total | | 108 | 21 | 129 |

The body fractures appeared in 16 male patients and no female patient. They represent 14,8% of all fractures in male patients.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Mandibular body fracture | Yes | 16 | 0 | 16 |
| | No | 92 | 21 | 113 |
| Total | | 108 | 21 | 129 |

Table 5. Representation of mandibular body fracture related to patient's sex

Mandibular ramus fractures appeared in 3 male patients and no female patient. They represent 2,8% of all fractures.

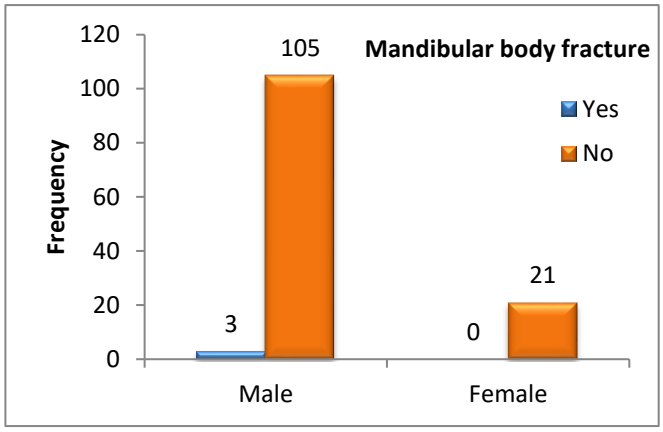


Fig 12. Representation of the mandibular ramus fracture related to sex

There was a male patient with condyle fracture and no female patient. It represents 0,9% of all fractures found in male patients.

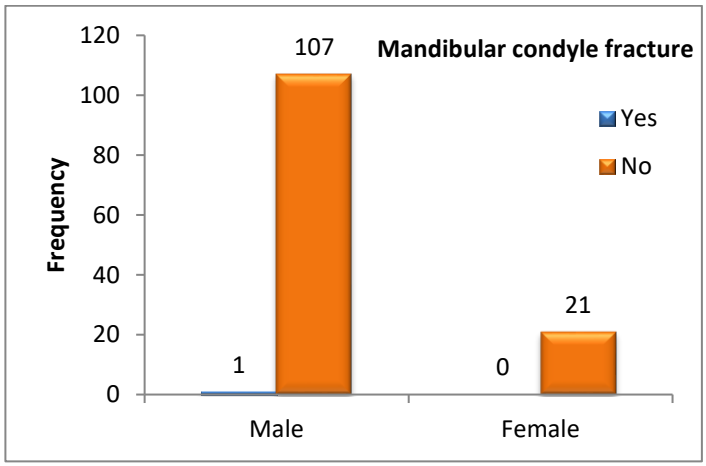


Fig 13. Representation of the condyle fractures related to patient's sex

There were 7 male patients with superior floor fractures representing 87,5% and 1 female patient(12,5%). It represents 6,5% of all fractures in the male group and 4,8% in female group.

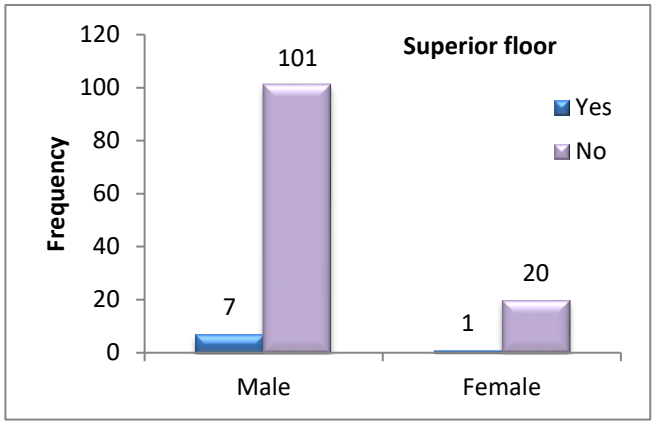


Fig 14. Representation of superior floor fractures related to patient's sex

There were 103 middle floor fractures distributed like this: 83 male patients (80,6%) and 20 female patients (19,4%). This lesions are found in 76,9% of all male patients and 95,2% of all female patients.

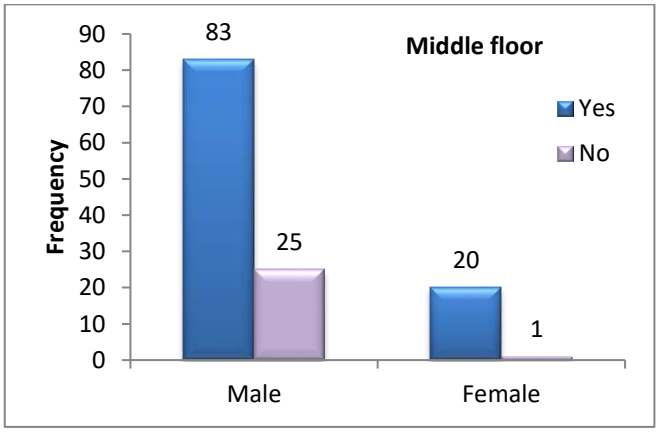


Fig 15. Representation of middle floor fractures related to sex

Inferior floor fractures affected 27 male patients and represents 25 % of all fractures found in this group. There were no female patients.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Inferior floor | Yes | 27 | 0 | 27 |
| | No | 81 | 21 | 102 |
| Total | | 108 | 21 | 129 |

Table 6. Representation of mandible fractures related to sex

In the superior floor there were 5 patients (62,5%) with closed fractures and 3 patients (37,5%) with open fractures. Closed fractures at this level represent 5,4% of all maxillofacial closed fractures and 3,9% from all maxillofacial fractures. Open fractures represent 8,3% of all maxillofacial open fractures and 2,3% of all maxillofacial fractures.

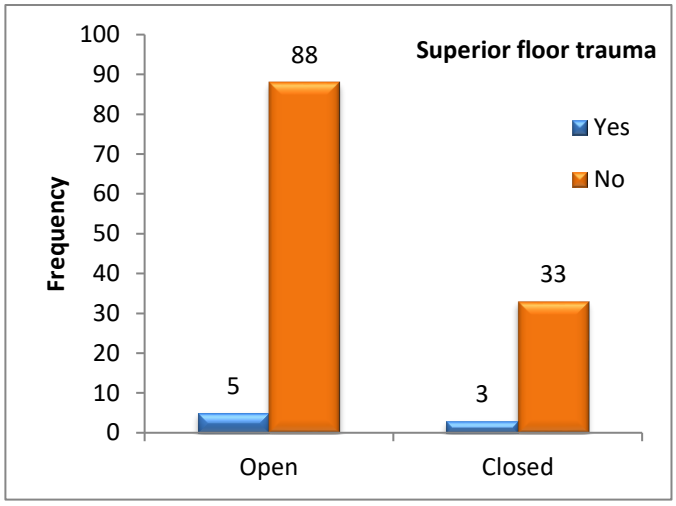


Fig 16. Representation of superior floor fracture types

In the middle floor level there were 73 patients (70,9%) with closed fractures and 30 patients (29,1%) with open fracture. Closed fractures at this level represent 78,5% from all maxillofacial closed fractures and 56,6% from all maxillofacial fractures. Open fractures represent 83,3% from all maxillofacial open fractures and 23,3% from all type of fractures.

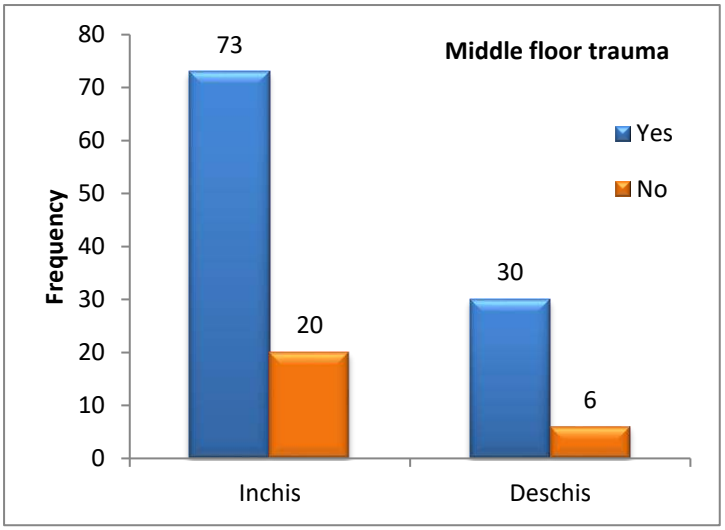


Fig 17. Representation of middle floor fracture types

Regarding the inferior floor there were 20 patients (74,1%) with closed fracture and 7 patients(25,9%) with open fractures. Closed fractures represent 21,5% of all closed maxillofacial fractures and 15,5% of all fractures. Open fractures represent 19,4$ of all open maxillofacial fractures and 5,4% of all maxillofacial fractures.

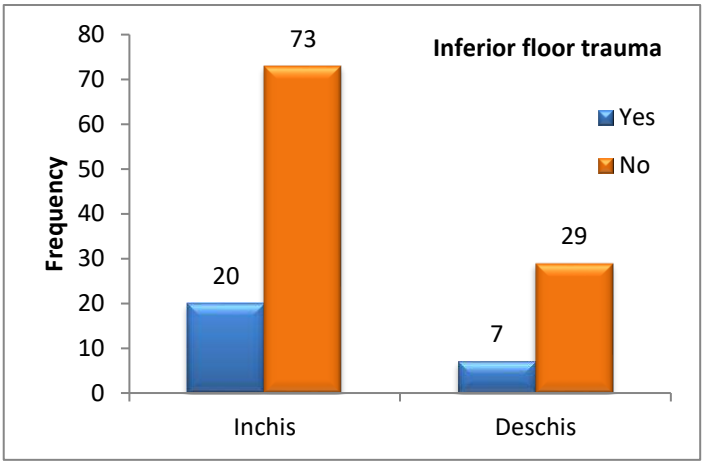


Fig 18. Representation of the inferior floor fracture types

From the treatment point of view there were used closed reduction techniques in 93 male patients (83,8%) and 18 female patients. Open reduction techniques were used in 15 male patients and 3 female patients (16,7%). Closed reduction techniques were used in 86,1% of men and 85,75 of women.

| | | Sex | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Fracture reduction type | Closed | 93 | 18 | 111 |
| | Open | 15 | 3 | 18 |
| Total | | 108 | 21 | 129 |

Table 7. Representation of type of treatment related to patient's sex

In study group were identified next type of traumas:

| | Yes | Yes % | No | No % | Total |
|---|---|---|---|---|---|
| Frontal bone | 8 | 6,20% | 121 | 93,80% | 129 |
| Nasal bones | 98 | 75,97% | 31 | 24,03% | 129 |
| Zygomatic bone | 9 | 6,98% | 120 | 93,02% | 129 |
| Temporozyg. arch | 4 | 3,10% | 125 | 96,90% | 129 |
| Orbits | 14 | 10,85% | 115 | 89,15% | 129 |
| Maxillary | 14 | 10,85% | 115 | 89,15% | 129 |
| Mandibular angle | 11 | 8,53% | 118 | 91,47% | 129 |
| Mandibular body | 16 | 12,40% | 113 | 87,60% | 129 |
| Mandibular body | 3 | 2,33% | 126 | 97,67% | 129 |
| Condyl | 1 | 0,78% | 128 | 99,22% | 129 |

Table 8. Representation of maxillary fractures

# CHAPTER V. CLINICAL CASES

## CASE I

Patient S.A. age 21, male, from rural environment, presented in the Emergency Room of Constanta County Hospital. He was a victim of an aggression. He was accusing local pain, mastication and speaking disorders. Clinical exam established presence of a left mandibular paramedian opened fracture. There weren't any associated lesions or pre-existing pathology that might need interdisciplinary evaluation.

Fig 19. Left paramedian mandibular fracture (left view)

Fig 20. Left paramedian mandibular fracture (frontal view)

The case presented the next following characteristic:

-there was a unique paramedian fracture

-the fracture reduction can be done manually

-there were enough dental units for placing the intermaxillary fixation elements

-orthopedic methods allowed fixing the fracture and establishing a normal occlusion

Based on this fact the decision was to use intermaxillary fixation. Splints were attached to the teeth with wires. Initially the splint was fixed to the superior dental arcade. We used the teeth which allowed applying the wires shaped to dental form. After a splint was attached to the inferior dental arcade. This was interrupted at the fracture line to avoid maintaining a defect. The intermaxillary fixation of the two dental arcades was done with elastic units. After 24h was applied a rigid fixation.

The antibiotic and anti-inflammatory medication was given from the beginning to the end of hospitalization. There was no need of osteosynthetic materials.

Fig 21. Intermaxillary fixation

Fig 22. Intermaxillary fixation (after 24h)

Evolution was favourable, there were no complications during hospitalization. The patient was discharged after 48h with antibiotic and anti-inflammatory medication. The recommendations were oral hygiene and weekly follow-ups.

Patient presented to follow-up. There were no complications during this period. The intermaxillary fixation was maintained for 4 weeks. The fracture was consolidated, and the occlusion was normal. The mandible regained normal functions and the patient could resume his normal lifestyle.

Case II

B.I. patient, age 68, male, urban environment, victim of an aggression presented to the Emergency Room of Constanta County Hospital with an opened craniofacial trauma, loss of consciousness and anterior bilateral nasal bleeding. After interdisciplinary evaluation ENT,OMF and imagistic evaluation the presence of cerebral lesions was established. The patient was hospitalized under permanent watch in the intensive care department and the surgical intervention was postponed until the patient's condition was stable.

Imagistic (Computed Tomography) and clinical exam established the presence of a maxillofacial comminute fracture with total disorganization of the facial structures, extension to the skull base and multiple plagues.

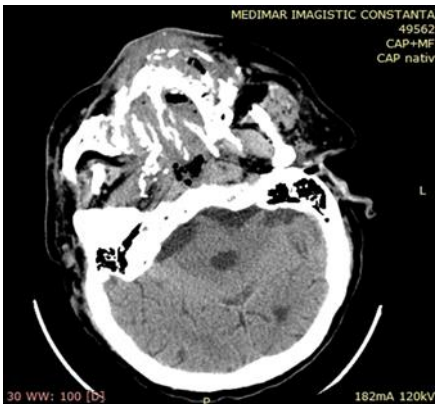


Fig 23. CT B.I. patient in axial section

First stage, when the patient presented to the Emergency Room, the plagues were cleaned and sutured to prevent any infections and to stop bleeding, nasal plugging. It was given antibiotic and anti-inflammatory medication.

Fig 24. Preoperative photos

Fig 25. CT – 3D reconstruction

After health improvement, based on clinical and imagistic data offered by CT and 3D reconstruction, the medical team established the surgical plan. The approach was complex:

-intraoral access by superior vestibule to have open access to maxillary bones bilateral for fixing the fracture lines with osteosynthetic plates and fixing the occlusion

-bilateral infraorbital incision for an easy access to the superior maxillary bones, zygomatic bones and orbital cavities reconstruction. There were no global eyes, lacrimal glands, nerves and vessels lesions.

-going through soft tissues scars.

The medical team reconstructed the nose, superior maxillary and the two zygomatic bones. They used titanic plates and screws adapted to local anatomy. There were no sensitive or motor dysfunctions. The patient was maintained for 24h under intensive care and was afterwards transferred in the OMF compartment.

Fig 26. Postoperative photo

Patient's evolution was favourable. He continued the antibiotic and anti-inflammatory medication. The plagues were cleaned every day. There were no infectious complications or rejection reaction of the osteosynthetic material.

After 7 days the wires were removed, and the patient was discharged with indication of periodic follow-ups.

## DISCUSSIONS

These studies have the object of developing a unitary image ENT, OMF over traumatic maxillofacial pathology. The necessity comes from the desire to determine what needs to be changed in order to improve the quality of life and the degree of health population. These informations establish the mechanism through which these patients are affected, there provenance environment, social behaviour, and how do all these influence the type of trauma. We pursuit establishing the best techniques which can be used to assure the proper healing and avoiding the possible complications.

The study group involved patients who suffered maxillofacial fractures from isolated forms with a single bone fracture to complex forms which passed the field of these two specialities. Were covered the main types of lesions which appear in this type of pathology. There were no LeFort fractures and other described types, but this confirms tendencies found in present studies, according to which by increasing trauma force appears the tendency to comminuted fractures which don't respect the classic lines. The treatment aims to the best functional and aesthetic results. The techniques used varied from simple to complex adapted to every case.

## CLINICO-STATISTICAL STUDY IMPORTANCE

A clear image of the high incidence of this pathology, in this part of the country, was created, to bring it in front and to underline the necessity of prevention measures and the importance of a quality medical procedure from the moment when a correct and complete diagnostic is established until the medical and surgical procedures are applied.

It was established that male victims were in higher number with a ratio 4:1 male: female, but regarding women, domestic aggressions play an important role. Young males are the most affected. These elements play an important role in improving prevention techniques.

Relationships between trauma mechanism and patient's particularities were studied. Some stereotypes related to patient's age, very young patients, young adults, elders, victim's sex and provenience environment were encountered.

The type of medical and surgical techniques used for every type of trauma was identified. The best type of intervention and approach, closed or open, was established. This data is creating a model of the proper techniques to be used in lesion's treatment.

Analysing the type of intervention for every patient was performed to identify possible influence of several factors, like age and sex, on operation procedure.

The obtained information's were explored from classic and modern parameters point of view.

All these elements lead to creating a big picture over traumatic pathology located in the maxillofacial area, which exceeded the borders of every speciality and included data which covers both ENT and OMF, to give a global vision and a unitary terminology.

## PERSONAL CONTRIBUTION

The aim of this study was to prove the importance of maxillofacial trauma, the implications and repercussions on the individuals and society, in general.

Starting from the premise that a quality surgical act needs a good knowledge of anatomy and physiology the doctoral thesis pursued the description of every anatomical element, from the superficial layers to the bone structures and sensitive elements located at this level.

I identified the types of lesions present at this level, the cause and factors.

I obtained classifications and comparisons of different types of lesions, which lead to discovering statistical information, important to issue a series of recommendations, to decrease the incidence of this trauma with fatal potential or irreversible damage.

From an etiological point of view, a series of relevant social facts were identified with major influence over the incidence.

Complete anamnesis and investigations, including the imagistic exams adapted to every type of trauma, are necessary to develop a diagnosis which allows a correct treatment,

## PREVENTION PROPOSALS

Improve the infrastructure to decrease the risk of car accident. Enlightenment the population about the risk they are exposing themselfs by non-use of the seatbelt and failure to respect the safety measures.

Giving lectures addressed to young population, in order to understand the risks of driving with high speed and under alcohol and drug influence.

Taking legislative measures to protect domestic violence victims and enhance the sanctions for the aggressors. Developing special units for the accommodation of the victims and their counselling.

Teaching the population about the measures that must be taken to help a trauma patient, to increase the survival chances and avoiding procedures with negative effect over victims. Introducing in schools lectures on first aid, obtaining haemostasis, and avoiding infection.

## CONCLUSIONS

• The face represents the main element of human interaction and trauma at this level has functional and aesthetic consequences on the individual. This type of pathology has known variations in human evolution from trauma mechanism point of view and techniques utilized in modern era for treatment. There can be temporary or permanent repercussions, and there is a need of a psychiatrist or psychologist help for social reinsertion. Maxillofacial trauma may be a part of a polytrauma which can affect other organs and structures. In these situations, a multidisciplinary approach is needed and choosing the treatment base on lesion gravity.

• The lesions can vary from easy with soft tissues damage or fractures without any displacement, serious with large fractures, without affecting cerebral tissue or infectious complications, and very serious with maxillofacial deformation or brain damage.

• Maxillofacial structures are divided in 3 floors defined by 3 demarcation lines: border line between superior and middle floor passes supraorbital rims and fronto-nasal sutures, and the border line between middle and inferior floor is represented by a plane which passes the 2 dental arcades.

• Some parameters were fixed: sex, age, environment provenance, trauma mechanism used as a base for studying the cases. A high percentage was observed in males, 20 to 40 years patients, urban environment and the most common mechanism was aggression. After examining the cases the fractures were divided on 3 floors, and there were identified some types: frontal bone fracture, nasal bone fracture, temporo-zygomatic fracture, maxillary, orbit fracture, mandible. There were established some associations between parameters and every lesion.

• Repartition based on percentage discovered that most cases appeared at middle floor, followed by the inferior floor. The most common fractures interested the nasal bone. There was identified an etiological model for every type of fracture of the patients included in this study.

• There was a follow up on every type of approach, depending on trauma type in order to identify the proper techniques for a good recuperation, with functions recovery, and avoiding any complications and aesthetic sequelle.

• Comparisons with other studies from different countries were made for this type of pathology. Apart from small differences based on the level of development and cultural model of the countries, most of the results were similar.

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