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## Pattern of Maxillo-Facial Fractures and Their Management in Iraqi Kurdistan Province

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### Abstract

Forty three in-patients with Maxillo-facial fractures admitted to Rizgaree hospital in Arbil in the period from May 2007 to April 2008. Thirty seven males were affected and only 6 females were involved with a ratio of male: female ratio of 6.2 : 1.65 % of the patients belonged to 16 – 35 years age group .People with small businesses were the mostly affected group 39.5% . They mostly attended between June and August and on Saturday and Sundays and Wed8) Maxillofacial fractures sites related to gunshots.

Figure 8 show the distribution of site of Maxillofacial fractures resulting from gunshots. There were only 4 patients involved in gunshots Maxillofacial fractures all of them were males . There were 10 fractures.

Maxilla was mostly involved (40%) followed by zygoma (20%) and body of mandible (20%). One of the victims have lost a right eye .

Fighting or assaults –involved only 2 patients, both were male and they had 2 zygomatic fractures on the left side..

The most common cause of facial injures were falls and road traffic accidents followed by gunshots and fighting .The most common site of facial fractures in road accidents and assaults were left zygoma and maxilla (> 65 %) while with falls they were nearly equal ( 37.7 % and 31.1%) .

Most of the cases were treated conservatively, and most of the surgical intervention was localized in zygomas with Gillies approach as the most common surgery (24.2%) performed.

Occiptomented view was the most common X-ray taken (34.4%) because the majority of trauma was localized in the middle third.

**Key Words: Traumatology, Maxillofacial Fractures, Trauma management.**

### Introduction

Maxillofacial injuries are commonly seen in all emergency departments of the teaching hospitals in Iraq and all around the world.

There are few studies concerning Maxillofacial injuries in Iraq ( Muhi Al-Dean et. al. 2005) , Al-Aboosi , et.

al. 1976), but this study will be the first one of its kind in Iraqi Kurdistan Province.

The causes of Maxillo facial injury differ from one country to another depending upon predisposing socio-economic and cultural factors.

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In this study only the in-patient causalities are studied since most of the trauma to the teeth including dento alveolar fractures are treated on out-patient basis and are not admitted to hospitals. Recent advances in the understanding of wound healing related to dental trauma, tooth and bone transplantation and implantation have opened up new treatment avenues which for the first time makes it possible to fully restore even the most severely traumatized dentition (Andreasen 1994).

Therefore encouraging reductions in the incidence of trauma to the teeth have occurred in some in some industrialized countries owing to efforts given to preventive measures from dental trauma (O'Brien 1994).

The major causes of dental and Maxillofacial injuries include road traffic accidents, falls, industrial injuries, sport injuries, gunshot wounds, fighting (assaults), animal kicks and iatrogenic trauma.

Road traffic accidents are still a common cause of Maxillofacial injuries in the western countries where 27.5% of the facial fractures in London (Rowe and Williams 1985) and 66% of facial fractures in Nijmegen Holland (Van Hoot et. al. 1977), but the administration of compulsory seat belt have reduced these incidents dramatically, for example Christian (1976) in Great Britain examining 969 drivers and front seat passengers found that 8.2% of non-wearers of seat belts sustained skull and facial bones fractures compared to 3.5% of wearers who had fractures of facial bones only.

Motor cycle accidents are also a raising cause of injury (Van Hoot et. al. 1977) which caused fractures of middle third of facial skeleton, especially zygoma but the introduction of crash helmets provided better protection (Jamieson and Kelley 1973) and particularly full face helmet

which reduced them to 11% compared to open face helmet wearers (Cannell et.al. 1982).

Bicycle accident was the most common cause of mandibular fractures in children in Czechoslovakia comprising 25% of the body and 32% of the angle fractures (Ramba 1985).

Road traffic accidents in developing countries are high and increasing because of the lack of the preventive measures used (Khalil et. al. 1981, Kapoor et. al. 1983).

Falls was the most common cause of dental trauma for children in Britain (43%) particularly those who are unsteady on their legs and lack proper sense of caution (British Dental Journal 1989). Early during mixed dentition there is a great risk of damaging the permanent incisors particularly those with large overjet 7mm or more (Nyugen et. al. 1999). Falls Maxillofacial injuries are the highest in developing countries (Muhi Al-Dean et. al.2005, Al-Aboosi et. al. 1976).

Industrial accidents have declined in most developed countries due to adoption of safety measures (Voss 1983, Anderson et. al. 1984) but in developing countries like India, 24% of facial fractures were due to industrial accidents (Kapoor et. al. 1983).

Sport injuries was the most common cause of jaw fractures in Norway in patients over 15 years of age (Voss 1983) and in Bradford Britain it was responsible for 132 facial fractures in 130 patients where it involved mostly the zygoma (41%), the mandible (31%) and the dento alveolar fracture (26%), (Hill et al 1985).

The Federation Dentaire Internationale (FDI) have classified organized sports into two categories (1)High risk sports like boxing, resulting, American football, hockey, rugby, football and skating (2) medium-risk sports like basketball, diving,

squash, gymnastics and parachuting (F.D.I. 1990) .

Maxillofacial injuries due to gunshots affect mostly the mandible for example among 1000 jaw fractures during the second world war , they showed 28.1 % affecting the body of the mandible 9.5% the angle, 4.8% the condyle, 2.2% the coronoid process and Maxillary fracture alone in 21.1% , while fracture of maxilla associated with mandibular fracture it comprised only 7.3%, This indicates decreased maxillary fracture in coincidence with brain injury hence decreased the survival rate of this group.

Fighting or assaults are the most common cause of Maxillofacial fractures in several European countries and they were responsible for 43% of facial fractures in Finland (Lamberg 1987), 54% in Norway (Van Host et. al. 1977) , 45% in Stockholm ( Anderson et. al. 1984) , 40% in Aberdeen Scotland ( Brook et. al. 1983 ), and 30.5% in Bradford England ( Hill et. al. 1984) . In developing countries facial fractures resulting from assaults appear to be low (Muhi Al-Deen et. al. 2005, Khalil et. al. 1981, Kapoor et. al. 1983).

Iatrogenic fracture of facial skeleton due to dental treatment reflects poor surgical techniques, also presence of bony pathology in the jaw such as cystic lesion may play a part .

Avulsion of anterior teeth was reported due excessive pressure from laryngoscope during intubation of anesthesia (Welburgze).

The purpose of this study was to retrospectively review the folders of forty three in-patients admitted with maxillofacial fractures, and analyze the included information.

## Materials and Methods

In this study the folders of 43 in-patients with Maxillofacial injuries

admitted to Rizgaree Hospital, oral and Maxillofacial department, in Arbil city during the period from May 2007 to April 2008 were reviewed and the following information were recorded: Age, sex, occupation, day of attendance, month of attendance, cause of injury, anatomical site of injury in relation to each cause, radiographs of the facial fractures, treatment method of facial fracture according to its site. Medical history of the patient and the dental management of medically compromised if needed.

## Results

### 1) Age and Gender:-

Figure (1) shows age and sex distribution 65% of the patient were 16-35 years old. 66% of females and 64.8% of males were within this age group. There were only 3 patients in 0-5 years old and 4 patients in the 46 years old group.

Out of 43 in-patients suffering Maxillofacial fractures there were 37 males and 7 females, with a male: female ratio of 6.2: 1.65

### 2) Occupation:-

Occupation of the victims are set out in Figure (2), small business occupation comprised 39.5% which was the most frequent. Professionals and retired comprised each 4.65 %. Housewives comprised 66.6 % of the female's sample.

### 3) Month of Attendance:-

Out of 43 patients, two did not give a date of attendance thus leaving only 41 patients. Figure ( 3) shows the frequency of attendance of the victims by month of the year 26 patients attended between June and August (43.9%) while no one attended in March , April and December.

### 4) Day of Attendance:-

Figure (4) shows the variation in frequency of attendance by the day of the week. 12 patients attended on

Saturday comprising 29.3% of the victims and if the total number of patients who attended on Saturday, Sunday and Wednesday they comprised 65.9% of the patients while Friday was the least day of the week where patients attendance (4.8%) .

#### **5) Causes of Maxillofacial fracture:-**

Figure (5) shows the incidence and distribution of etiological factors of Maxillofacial fractures and its relation to gender. Fall comprised the highest etiological factor in males (45.9%), and in females (83.3%), and (51.1%) of the total number of patients having Maxillofacial fractures.

Road traffic accidents were the second (34.9%), followed by gunshots (9.3%) and fighting (4.7%). Gunshots comprised (9.3%) of the victims and fighting or assaults only 4.7%.

#### **6) Maxillofacial Fracture Sites Related to fall:-**

Table (1) and Figure (6) show the distribution of sites of Maxillofacial fractures resulting from falls. Zygomatic and maxillary fractures comprised (53.1%) of the total number of fracture sites.

Fracture sites on right side of the face comprised (37.7%) while those on the left (31.1%).

#### **7) Maxillofacial fractures Sites Related to R.T.A.:-**

Table 2 and figure 7 show the distribution of sites of maxillofacial fractures resulting from road traffic accidents (R.T.A.). Zygomatic bone fracture (25%) and body of mandible fracture (35%) comprise about (60%) of the total sites of fracture .

Also the left side of the face is affected 4 times more than the ratio of (65%) than that on the right side (15%) i.e. increase left : right = 4.3 : 1 .

#### **8) Maxillofacial fractures sites related to gunshots:-**

Figure 8 show the distribution of site of Maxillofacial fractures resulting from gunshots. There were only 4

patients involved in gunshots Maxillofacial fractures all of them were males. There were 10 fractures.

Maxilla was mostly involved (40%) followed by zygoma (20%) and body of mandible (20%). One of the victims have lost a right eye.

Fighting or assaults-involved only 2 patients, both were male and they had 2 zygomatic fractures on the left side.

#### **9) Maxillofacial fractures treatment in relation to their site:-**

Table 3 shows the distribution of type of Maxillofacial treatment in relation to the fracture site. There were a total of 54 fracture Zygomatic bone and Maxilla was mostly affected (61.1%).

Conservative treatment which means leaving the fracture to heal by itself particularly if the fracture line is favorable comprised (28%) of the total treatment, followed by Gillies approach (24.2%) for the zygomas fractures then followed by eyelet wires with intermaxillary fixation (I.M.F.) (22.37 %)

#### **10) Maxillofacial Fractures Radiographical Examination in Relation to Their Site:-**

Table (4) shows the distribution of type of Maxillofacial fractures and the type of radiograph prescribed for the patient to investigate each case before treatment decision.

The most commonly used radiograph was occipitontal (O.M. vs.4.4%) followed by panoramic X-ray (O.P.G) (31.4) . The first one was particularly used for fractures of zygoma and Maxilla and the second one was used for the body of the mandible, then followed by Townes X-ray for the mandibular condyles (10%).

Regarding the medical history the results of this study indicated two patients with congenital heart valve defect, they were given antibiotic prophylaxis according to the guidelines

of the American Heart Association. There was one Diabetic patient who was under control and the result of blood sugar test was normal

## Discussion

The small number of females affected by Maxillofacial fracture reflects the limitations of participation of out-door activities for most women in the middle east particularly in Iraq thus staying in the house, where most of these activities are carried out by men.

The age distribution in this study was similar to other studies (Voss 1983, Anderson et. al. 1984, Hill et. al. 1984, Al-Kotany 1987).

Occupation of the victims showed those have small business were the highest, such people do not have a fixed salary and tend to change their work every while.

Concerning the month of attendance were the highest percentage was in summer months (43.9%) and this can be attributed to student's summer vacation when both parents as well as children try to enjoy their time, thus having more chances of an accident (Lindah 1971). For the day of attendance the highest percentage was in week ends and mid week (Wednesday) and this probably attributed to week end shopping.

Concerning the cause of Maxillofacial fracture fall was the highest (51.1%) which is as high as it is in many developing countries (Khalil et. al. 1981, Kapoor et. al. 1983, Al-Aboosi et. al. 1976).

Road traffic accident fracture were less than industrial countries before the introduction of seat belt (Van Hoof et. al. 1977).

The distribution of Maxillofacial fracture related to falls were nearly equal between left and right side of the face while in case of road traffic

accidents the fractures on the left side of the face were about 4 times those on the right ( Table 2 , Figure 7 ) , however as it is well known that in victims of assaults , the left side of the face is more affected by trauma ( Muhei Al-Dean et al 2005 ,Al-Kotany 1987 , Hitchen and Shuker 1973 ) and that was explained by the fact that hemispheric cerebral dominance leads the victim to turn the head to the right side in a reflex manner to avoid a blow , therefore further presenting the left side of the face for further trauma ( Grinkler et . al . 1966 ) but this study have revealed that this phenomenon also exist in road traffic accidents to but not falls . We think that the mechanism by which the driver reflex turns his/her face to the right side should be investigated.

The treatment needs for Maxillofacial fractures have shown that conservation treatment was the highest followed by Gillies approach for zygomatic fractures.

## Conclusions

Maxillofacial fracture are common in Iraqi Kurdistan province as anywhere in Iraq and all over the world .

- 1-The majority of dental trauma and dento-alveolar fractures are treated on out- patient basis , only those with jaw fracture are admitted and treated as in patients in the hospitals .
- 2-The highest age of incidence of Maxillofacial fractures are between 16-35 years old and its affected males 6 times more than females and they attended mostly between June and August and on Saturdays, Sundays, and Wednesdays.
- 3-The most common cause of facial fractures was falls followed by road traffic accidents, gunshots and fighting.

- 4-The most common facial site for injury road traffic accidents was left side of the face particularly left zygoma followed by assaults which did not exist in the victims of falls ( i.e. left & right side of the face are equally affected ) .This is discovered for the first time in the victims of road traffic accidents .
- 5-Gillies approach for zygomatic reduction was the most common treatment after the conservative treatment particularly for maxilla where most of the causes healed without surgical intervention.
- 6-Occipito- mental view was the most common radiograph taken followed by O.P.G.

## References

- 1- Muhie al-Dean R.,Taleb Akeel, Butros Adel. , Maxillofacial injuries in Karkh emergency hospitals, mustansiriah Dent.J. 2005 .
- 2- Al-Aboosi K. Perriman A. One Hundred cases of mandibular fracture in children in Iraq . International J. oral surgery , 1976,5,8-12 .
- 3- Andreasen J. Co. prevention of Dental trauma by Welburg R. Prevention of Oral disease , 4 th Ed. , Murray J.J. , Naun J.H. , steele J. G. (2003 ) , Oxford University Press , 147 .
- 4- O'Brain M. , Childrens dental health in UK (1994) HMSO , London .
- 5- Rowe N.L. and Williams J. , Maxillofacial injuries , Vol II , ( 1985 ) , Churchill , Livingstone , Edinburgh , London , Melbourne, and New York .
- 6- Van Hoof R.F, Rowe N. L. The different patterns of fractures of the facial skeleton in four European countries . Int. J. Oral surgery (1977) , 6, 13-11 .
- 7- Christain M.S. , Non Fatal injuries sustained by seat belts wearers . a comparative study . British Med. J. (1976) , 2,1310 .
- 8- Jamiesen K.G. and Kelly D.A. , Crash helmets reduce head injury , Medical J. of Australia (1973), 2, 806 .
- 9- Cannell H.. Head and facial injuries after low – speed motorcycle accidents. British J. Oral Surgery (1982) , 20, 183-191 .
- 10- Ramba .J. , Fractures of the facial bones in children . International J. Oral Surgery ( 1985 ) , 14 , 472-478 .
- 11- Khalil A.F. Fractures of facial bones in eastern region Libya .British J. of Oral Surgery ( 1981 ) ,19, 300-304 .
- 12- Kapoor A.K. Jacobs , J.R . (Ed.) , Maxillofacial trauma an international perspective (1983) New York , Praeger ,11-21 .
- 13- British Dental Journal , Patient and practice news letter (1989) 15 April .
- 14- Nyugen Q . V, A Systemic Review of the relationship between overjet size and traumatic dental injuries , Europian J. Orthod ( 1999 ) ,21, 503-515 .
- 15- Voss r. In : maxillofacial trauma : an International perspective Jacobs J.R. (Ed.) (1983) , New York , Praeger , 3-10 .
- 16- Anderson L. Jaw fractures in the country of Stockholm (1978-1980) , Int. J. Oral Surg. (1984),13, 194-199 .
- 17- Hill C.M. Dental and facial injuries following sports accidents. A Study of 130 patients . British J. of Oral and maxillofacial surg. ( 1985 ) , 23, 268-274 .
- 18- FDI (Federation Dentaire Internatinal) Commission on Dental products working party No.7 , I.D.I. (1990) World Dental Press : London .
- 19- Lamberg M.A. , Maxillofacial fractures , Proceedings of Finnish Dental Society .(1978) (Suppl.) 74,7 .
- 20- Brook L. M. Steel J.G. Hill C.M. Aetiology and incidents of facial fractures in adults . Int. J. of Oral Surg. (1983) ,12,293-298 .
- 21- Welberg R. Prevention of Dental trauma , Int. Prevention of Oral disease by , Murray J. J. , Nunn J.H. , steele J. G., 4<sup>th</sup> Ed. (2003) , Oxford University Press, 147 .
- 22- Al-Kotany M. Interpersonal Violence and facial soft tissue injuries Dissertation submitted to the University of the Bristol for M.Sc. degree in Oral Surgery .(1986) ,35 .
- 23- Lindahl L. , Tand-Och Kakskador , Goteborg, Nagra , Sociala Faktorus inverken ,Tandl"akatidningen (1974) , 66, 1011-1014 .
- 24- Hitchen A.D. and Shuker S.T. , some observations on zygomatic fractures in Eastern region of Scotland British J. of Oral Surg. (1973) ,11,114-117 .
- 25- Grinkler , R. Cristian N.S. Hoffman,K.C. " Neurology " 6 th Ed. (1966) , Charles C.Thomas .

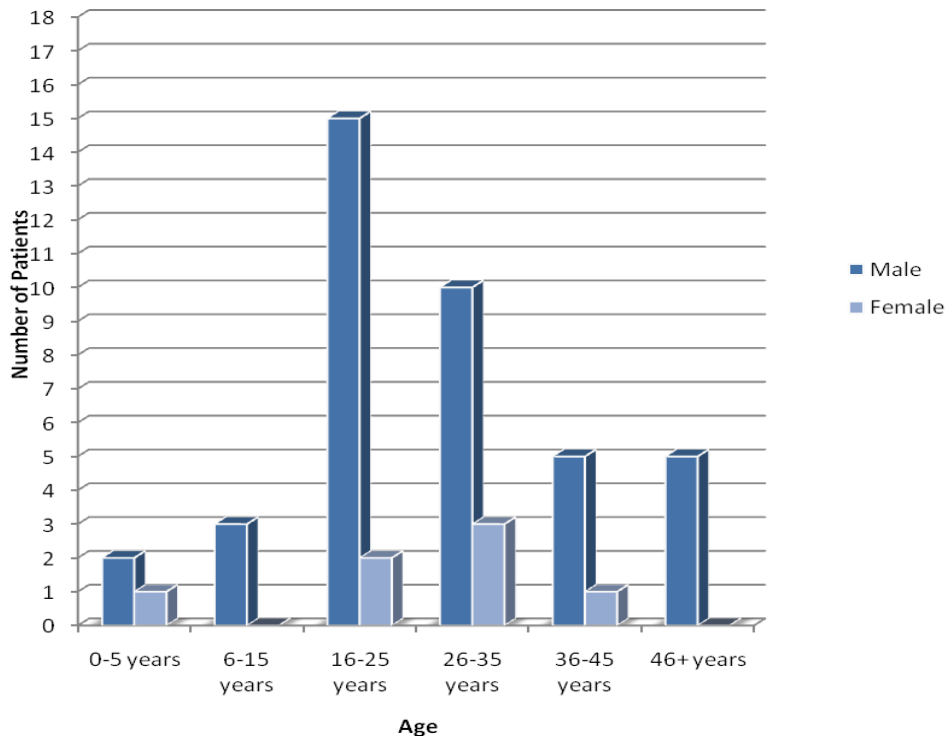


Fig (1) : age and sex distribution of patient involved by maxillofacial injuries

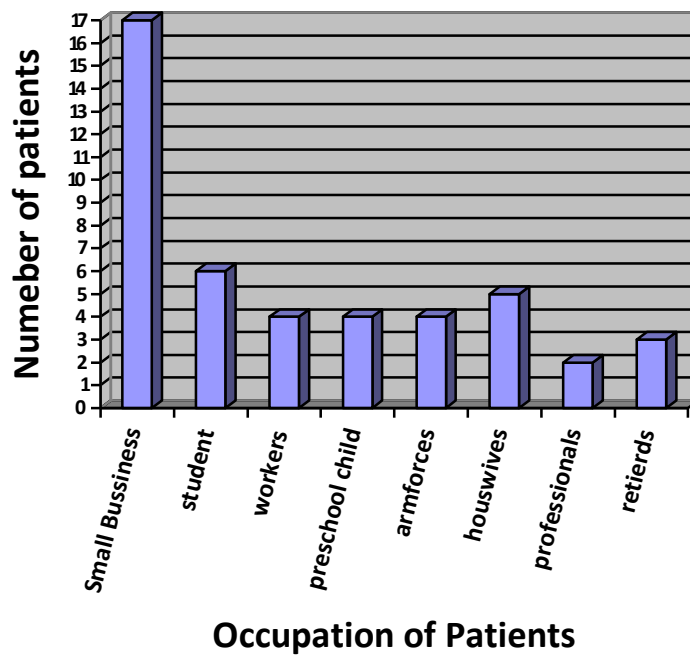


Fig (2) Occupation of Patients

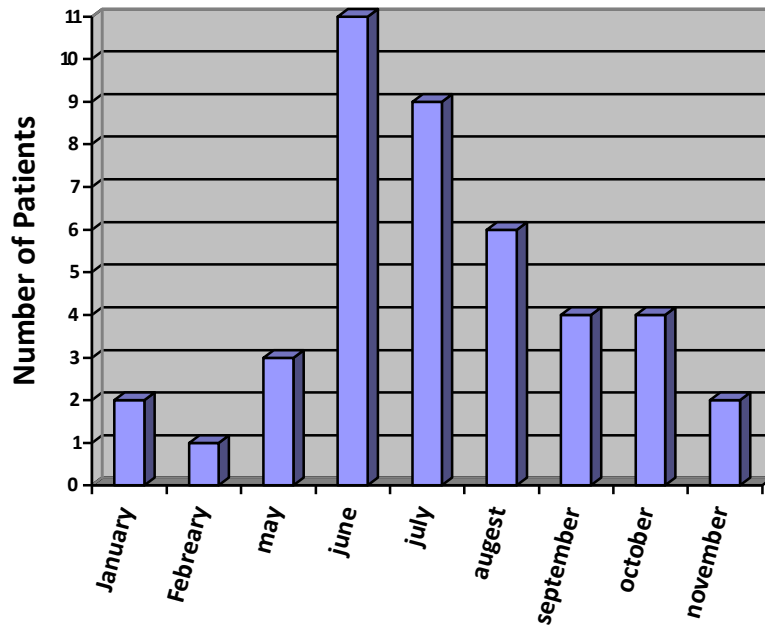


Figure (3) Variation by month of the year of attendance of the maxillofacial fracture victims .

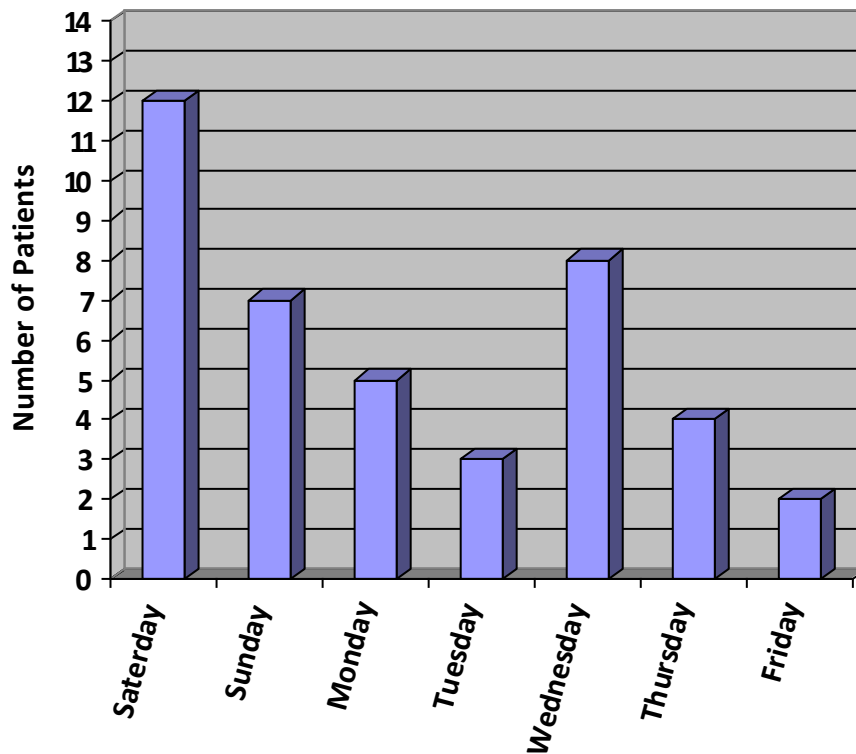
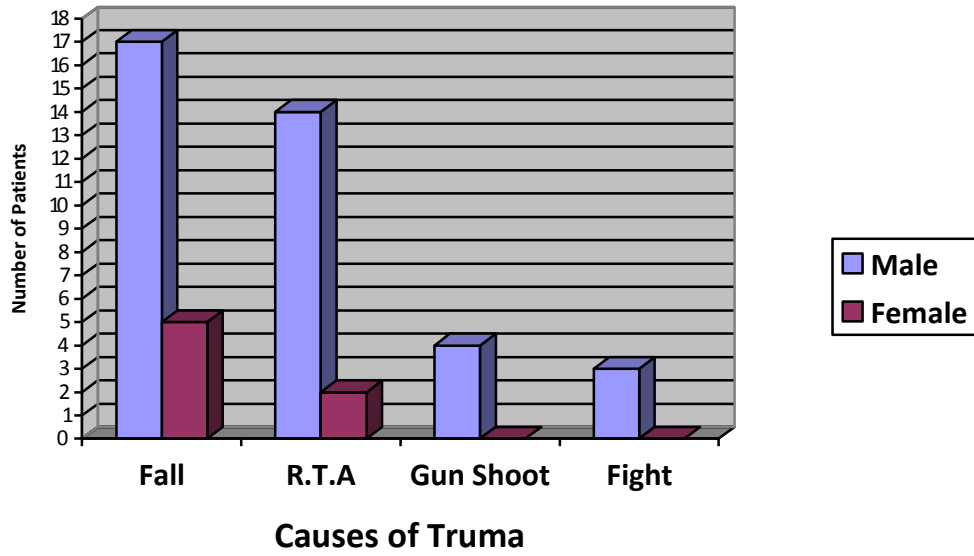
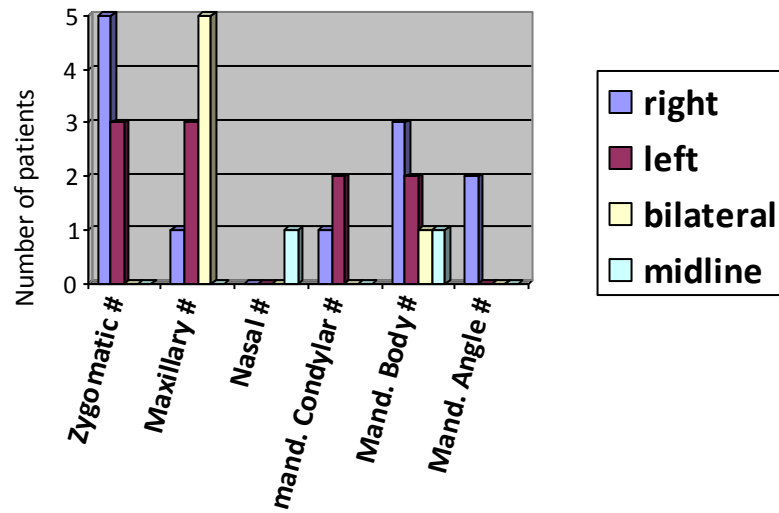


Figure (4) Variation by the day of the week of the attendance of maxillofacial fracture victims





**Figure (5)** Incidence and distribution of aetiological factors of maxillofacial trauma and its relation to gender



**Figure (6)** Distribution of maxillofacial fracture resulting from falls

Table (1): Distribution in number and percentages of sites of Maxillofacial fractures resulting from falls .

Site of #	Right	Left	Bilateral	Mid-line	Total
Zygomatic	5( 15.9%)	3(9.1%)			8(25%)
Maxilla	1(3.1%)	3(9.4%)	5(15.6%)		9(28.1%)
Nose				1(3.1%)	1(3.1%)
Mandibular Condylar	1(3.1%)	2(6.3%)	2(6.3%)		5(15.7%)
Body of Mandible	3(9.3%)	2(6.3%)	1(3.1%)	1(3.1%)	7(21.8%)
Angle of Mandibe	2(6.3%)				2(6.3%)
Total	12(37.7%)	10(31.1%)	8(25%)	2(6.2%)	32(100%)

Table (2): Distribution in number and percentages of sites of Maxillofacial fractures as a result of road traffic accidents.

Site of #	Right	Left	Bilateral	Mid-line	Total
Zygomatic	1(5%)	4(20%)			5(25%)
Maxilla		2(10%)		1(5%)	3(15%)
Nose				1(5%)	1(5%)
Mandibular Condylar	1(5%)	1(5%)			2(10%)
Body of Mandible		6(30%)		1(5%)	7(35%)
Angle of Mandibe	1(5%)		1(5%)		2(10%)
Total	3(15%)	13(65%)	1(5%)	3(15%)	20(100%)

Table (3): Distribution of the type of treatment in relation to the Maxillofacial fractures site.

Type of #	no	Type of Traeatment and % s						
		Gillies approach	Zygomat ic Intra-oral	Arch bar + IMF	Eyelet + IMF	Conservativ e Treatment	Neus dentures	Opn redust
Zygomatic	17	14(24.7%)	1(1.7%)			3(5.1%)		
Maxilla	16			2(3.4%)	5(8.7%)	7(12.3%)		
Nose	3				3(5.1%)			
Mandibular Condylar	8			2(3.4%)	1.(1.7%)	4(6.9%)		
Body of Mandible	6			1(1.7%)	6(10.5%)	1(1.7%)	2(3.4%)	3(5.2%)
Angle of Mandibe	4			2(3.4%)	1(1.7%)			
Total	54	14(24.7%)	1(1.7%)	7(11.9%)	13(22.3%)	18(28%)	2(3.4%)	3(5.2%)

Table (4) : Distribution of the type of radiographs Needed in relation to Maxilofacial fracture site.

Type of #	no	Type of Traeatment and % s				
		Occiptomental O.M. view	Townes	Posteroanterio r (PA) skull	Panormic (OPG)	Lateral skull view
Zygomatic	17	13(18.6%)	1(1.4%)	1(1.4%)	2(2.9%)	1(1.4%)
Maxilla	16	6(8.6%)		3(4.3%)	3(4.3%)	2(2.9%)
Nose	3	2(2.9%)			1(1.4%)	
Mandibular Condylar	8	2(2.9%)	7(10%)	1(1.4%)		
Body of Mandible	6		6(8.6%)		12(17.2%)	
Angle of Mandibe	4	1(1.4%)	1(1.4%)	1(1.4%)	4(5.6%)	
Total	54	24(34.4%)	15(21.4%)	6(8.5%)	22(31.4%)	3(4.3%)