



## Evaluation of Maxillo - Facial Trauma by Using Multi-Detector Computed Tomography in Taif City, Kingdom of Saudi Arabia

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Frequent Trauma to the facial region may lead to severe complications such as sinuses obstruction, intracranial injuries, sensory disturbance, and loss of vision. Multi-detector Computed Tomography (MDCT) has a critical and significant rule for early evaluation of the facial region. This study aimed to evaluate the findings that occur due to facial injuries using MDCT. Analytical retrospective study of 100 patients with facial bone injuries examined by CT scan. The study extended from January 2022 to January 2023. 128 slice CT systems (Siemens Medical system) was applied to investigate patients with facial trauma at King Abdul-Aziz Specialist Hospital (KAASH) in Taif city, KSA. a total of 100 facial trauma (87%) males and 13(13%) females, were examined via facial CT and presented with various types of trauma. The findings have noticed that the maxillofacial fractures were significantly higher in the male population (87%) than the female population (13%) Based on age groups. The incidence percentage of facial fractures was 50%, happened in the age group 20-39 years. The most common cause of injury in patients presenting with facial trauma was road traffic accidents, comprising 41% of cases. The most frequent fracture was nasal bone 75%.the majority facial fractures were recognized during a facial CT scan, and the majority of the patients were male. The Nasal bone was the most common site of the fracture, followed by Orbital bones. Therefore, CT is essential for the patient with facial trauma for early management to avoid any further complications for the patient.

**Keywords:** Maxillofacial, CT, MDCT, Injuries, multi-detector, Fractures

### INTRODUCTION

Multi-detector Computed Tomography (MDCT) is a vital modality that provides detailed and accurate information regarding normal and abnormal that may occur in the human being which helps in the diagnostic field and guide the physician team to plan and decide the best patient treatment in a fast and easy way. MDCT consider a significant and proper modality that is used in the case of a traumatic patient because of the less time it takes to scan the patient, especially those who are considered lifesaving.

Maxillofacial injuries occur quite commonly following trauma and these injuries if not properly managed can negatively influence the aesthetic, functional, and psychosocial activities of the patient [Yamamoto K, et al, 2014]. The facial region is one of the most complex regions of the human body anatomically. Because of its complexity, MDCT is the imaging method of choice for an accurate diagnosis and for depicting the complex anatomic structures of the maxillofacial region and now regarded as the gold standard in a case of maxillofacial

trauma [Deepak Y, et al. 2019]. It helps in detecting the exact site, number, and extent of fractures, displacement of fragments, and soft tissue injuries [Pathria MN et al, 1989, Thai KN et al 1997, Salvolini U 2002]. Furthermore, MDCT has completely replaced plain radiographs for the investigation of choice in a case of maxillofacial trauma [Deepak Y, et al. 2019].

Injury to the head, neck, and facial regions has most commonly occurred. Which represent the largest proportion of admissions to hospitals due to trauma to these regions and are considered life-threatening situations [Ahmad, Kaleem, et al 2014].

One of the common causes that led to facial injury is road traffic accident which has been reported by the World Health Organization (WHO) that road traffic crashes make up to 25% of all injuries and is one of the major contributors to mortality and morbidity, accounting for more than 1.27 million deaths globally [Naeem Z et al 2014, Ansari S et al 2000]. The Kingdom of Saudi Arabia (KSA), RTAs contributes 81% of deaths to hospitalized patients [Ansari S et al 2000]. Furthermore, a study

revealed that head injuries and facial trauma account for 30% of all injuries, contributing to 26% of deaths in KSA [Bokhari K et al 2015]. Facial trauma or maxillofacial trauma (MFT) is a frequent presentation of RTAs, ranging from simple nasal fractures to gross or severe maxillofacial injuries [Jose A, et al 2016].

MDCT provides multi-planar imaging techniques and 3-dimensional reconstructive methods which are beneficial for understanding the pattern of fractures and for better clinical and surgical management [Dharan, Nepal 2013]. Hence this study aimed to evaluate facial trauma by using MDCT in Taif city, KSA, and determine the common causes that may lead to these traumas.

**Objectives of the study:**

To evaluation of maxillofacial trauma in Saudi Arabia by using multi-detector Computed Tomography.

**MATERIALS AND METHODS**

A retrospective analytical study conducted on 100 Patients suffering from maxillo-facial injury including both genders (male and female) with their ages ranging from 1 to 60 years old. All these patients examined by 128 slice CT systems (Siemens Medical system) MDCT facial bone in the Radiology department of King Abdul-Aziz Specialist Hospital (KAASH) in Taif city, KSA. The duration of this study is from 1 January 2022 to 31 January 2023. The protocol of the CT examination was started by scout anteroposterior and lateral for the planning of the area of the exam. And the scan covered all the area of the injury. The data analyzed professionally by using excel version 16. Program and statistical program Statistical Package for the Social Sciences (SPSS) version 23. And presented in form of a table and suitable charts.

**Inclusion criteria:**

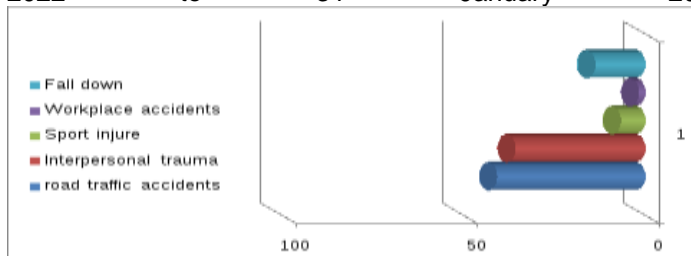
Patients with maxillo - facial injuries.

**Exclusion criteria:**

Normal maxillo-facial bone and patient.

**RESULTS**

This part presents the result of a retrospective study conducted in KAASH hospital in On a total of 100 patients that referred to the radiology department for facial trauma and requested to do CT facial bone between 1 January 2022 to 31 January 20



**Figure1: Shows the cause of the maxillo-facial trauma.**

**Table1: Distribution of the study sample according to gender and age**

Variable	Frequency	Percent %
Gender		
Male	87	87 %
Female	13	13 %
Age range (years)		
1-19 y	24	24 %
20-39 y	50	50 %
40-59 y	22	22 %
60 and older	4	4 %
Mean age	25	25 %
Standard deviation (SD)	± 12	

**Table 2: Site of facial bone fractures Distribution.**

Type of Bone	Occurrence of fractures (n=100)	%
Frontal bone	5	5
Nasal bone	74	74
Zygomatic bone	6	6
Orbital bones	23	23
Maxillary bones	17	17
Mandible bone	6	6
Pterygoid bone	2	2

**Table 3: Orbital Injury According To The Walls Involved**

Orbital injury	Number of fractures (n=33)	Percentage %
Lateral wall	7	21.2
Medial wall	10	30.3
Roof	1	3
Floor	15	45.5

**DISCUSSION**

The facial bone is fourteen in number that articulates with the cranium that formed the human face. these bones can't recognize easily due to their relatively small size and irregular shape.

Facial trauma is a frequent presentation of RTAs, ranging from simple nasal fractures to gross or severe maxillofacial injuries [Jose A, et al 2016]. Furthermore, trauma to this region will cause a sinus obstruction, intracranial injuries, loss of vision, sensory disturbance, and other complications that may occur if not properly managed [Ode Angelis et al 2014]. Add to that Imaging

this region becomes even more difficult in traumatized patients because of their clinical condition and inability to cooperate [Motamedi et al 2014, Marciani et al 1993]. Fortunately, with the recent development in the Radiological field especially MDCT examination that helps to define the extent of the injury and to plan the surgical, interventional, or conservative therapy. On other hand MDCT help to reach proper management in a fast way that patients require.

Common causes of facial injury vary depending on many factors (social, cultural, and environmental factors [Marciani et al 1993]. However, one of these causes is RTAs which has been reported by the World Health Organization (WHO) that road traffic crashes make up to 25% of all injuries and are one of the major contributors to mortality and morbidity, accounting for more than 1.27 million deaths globally [Naeem Z et al 2014, Ansari S et al 2000]. In the Kingdom of Saudi Arabia (KSA), RTAs contribute 81% of deaths in hospitalized patients [Ansari S et al 2000]. Furthermore, A study revealed that head injuries and facial trauma account for 30% of all injuries, contributing 26% of deaths in KSA [Bokhari K et al 2015]. However, facial trauma may be caused by interpersonal trauma, fall and workplace accident, and sports injury.

In the present study a total of hundred patients were referred with facial trauma and injuries were found to be more common in the male population about 87 (87%) of cases compared to females 13 (13%) with a male: female ratio of 6.7 This result was in agreement with Deepak et al. Maximum fractures were observed in the age group of 20 to 39 years 50 (50%) followed by 1 to 19 years of age 24 (24%). The least amount of fractures was seen in 60 and older of age group 4 (4%) with a mean age of 25 years (SD:  $\pm 12$ ) comparable to other research done previously. [Khan AA, 1988] Facial fractures of all injuries are found to be common in young males. [Awad A, et al 2020] An increasing number of maxillofacial injuries among the teenage group is due to social and cultural differences. In this study, road traffic accidents accounted for the majority of cases of maxillofacial injuries 41 (41%) followed by Interpersonal trauma 36 (36%) and fall from height 7 (7%) which are similar to other studies. [Khan AA, 1988] and Our results agree with Rix L et al.

In the present study, the result demonstrates the common orbital walls that are involved during facial trauma where the orbital floor is the most frequent site of fractures comprising 15% followed by the medial wall of the orbit, the lateral wall of the orbit, the roof of the orbit which comprising of 10%, 7%, 1% respectively that is consistent with studies of orbital fractures where the floor and the medial wall were commonly involved [Kieser J, et al 2002].

## CONCLUSION

Multi-planar imaging techniques and 3D MDCT are required in imaging facial bones which offer an excellent and high spatial resolution that provides an ability to the

physician to correctly diagnose the maxillofacial fractures, determine the exact site, number, and associated soft tissue injuries, and help for surgical planning and proper management.

## CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

## ACKNOWLEDGEMENT

I would like to thank the staff of radiology department of King Abdul-Aziz Specialist Hospital (KAASH) in Taif, KSA for their help.

## AUTHOR CONTRIBUTIONS

First & second Author collect the data, third & fourth author analyze the data, fifth and sixth author write the discussion and conclusion.

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