



## Original Article

## X-ray Radiography of Bone Fractures Associated With Road Traffic Accidents (RTA).

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## ABSTRACT

One of the leading causes of bone fractures are Road Traffic Accidents (RTAs), they are perhaps the most prevalent causes of mortality in individuals. **Objective:** To investigate the prevalence and types of bone fractures in patients who have been involved in a road traffic collisions in the city of Gujranwala, Pakistan. **Methods:** It was a cross-sectional analysis at the orthopedic department of the DHQ/Teaching Hospital in Gujranwala, all patients with RTA-related fractures who underwent x-rays were included after written informed consent. The study included a total of 100 patients, all of which had suffered fractures as a result of traffic incidents from January 13<sup>th</sup>, 2022 to April 13<sup>th</sup>, 2022, the research was completed in three months. The obtained data were entered and analyzed by utilizing IBM SPSS Statistics 26.0. **Results:** There were 35 females and 65 males in the study, and according to the age distribution, 34% of those aged 26 to 35 years had a higher risk of fracture. Femur 37.7%, tibia 21.3%, fibula 16.4%, radius 2.5%, ankle joint 1.6%, humerus 6.6%, knee joint 2.5%, elbow joint 4.9%, and thumb and spine 0.8% are among the bones that have been fractured. Moreover, no incidents of skull fractures were recorded. **Conclusion:** Bone fractures are much more common in men than in women. In road traffic accidents, the most common bone fracture is the femur, which occurs most frequently in people who ride motorbikes or cycles, whereas, the transverse bone fracture is the most prevalent type of bone fracture.

## INTRODUCTION

Fracture is a condition that arises as a consequence of a break, split or crack in the building frame of any osteological component, affecting the skeletal system on regular basis [1]. It might be partial or total, and medically, it is defined as any disruption in a skeletal structure, ranging from total disintegration to small hairline incursion of its structural parts [2, 3]. A broken bone is a partial or full break that impact the integrity of the bone [1, 4]. One of the causes of fracture of the bone is vehicle collisions on the road, which are the major reason for mortality in many human beings [5]. Vehicle crashes on road are the ninth biggest reason for death worldwide, making them a major public health concern [6]. The fact that the bulk of the casualties is young persons, underprivileged, and vulnerable road users is even more disturbing [7]. The

number of annual road traffic deaths has grown to 1.35 million, according to the WHO's Global Status Report on Road Safety 2018, issued in December 2018 [8]. Vehicle/ automobile road collisions are the leading reason of mortality among people aged 5 to 29 years old [9]. Pedestrians, cyclists, and motorcyclists endure a disproportionate amount of the cost, particularly in developing nations [10]. Long bone fractures can happen in several different ways [11], while a transverse fracture is defined by its horizontal nature [12]. Fractures that run parallel to the surface of the bone are known as longitudinal fractures [1]. Another form of fracture that develops when a bone is shattered or breaks apart is a comminuted fracture [1, 13]. Comminuted fractures are referred to as mixed fractures that have both longitudinal and transverse

components [14, 15]. The first kind, known as a Greenstick fracture, occurs when one side of the bone is shattered whereas the other one is twisted [16]. When two bones are fractured in a spiral pattern and are wrenched apart, it is called a spiral fracture [14]. Every day, new and quickly evolving technologies arise in a range of fields, notably in medicine [17]. Certain earlier tactics, on the other hand, are still frequently utilized, effective, and valuable in this respect. X-rays are one of these methods for identifying bone fractures [18]. X-ray is the oldest, quickest, and most extensively used radiographic modality in the world for visualizing the body's interior organs and checking suspicious fractures [19]. It has become a very useful and popular technique for identifying fractures in patients, due to its broad availability in regions where many complex and costly imaging modalities are unavailable [20]. Radiologists or physicians carefully evaluate X-ray images to detect the presence and kind of fractures in numerous bones [21]. Finding the exact site of a fracture in a patient who is in pain or has been injured is difficult and time-consuming. Medical imaging methods are now widely used in both research and diagnosis [22]. The technology of X-ray imaging is used to diagnose and represent anatomical aspects in people, such as bones [23]. X-ray scans are commonly used by doctors and radiologists in hospitals to determine whether or not a fracture has occurred, as well as assessing the particular type of the fracture [24]. Road traffic collisions/accidents (RTAs) claim the lives of a large amount of people every year. Each year a wide array of people pertaining to varying ages are injured due to RTAs. In current study the use of x-rays as a first line of diagnosis in emergency situations of road traffic accidents can be endorsed. The present research will aware and acknowledge the patients to use x-rays as a first diagnosis in immediate conditions, because of its reliability and cost/time effectiveness. Furthermore, it will document the type of injuries in Road Traffic accidents which will draw attention towards road safety measures.

## METHODS

All patients with RTA-related fractures who underwent X-rays were included in this cross-sectional analysis at the orthopedic department of the DHQ/Teaching Hospital in Gujranwala. The research was concluded in three months, from January 13th, 2022 to April 13th, 2022. The study included a total of 100 patients, all of these patients had fractures from road vehicle collisions. Patients with fall-related fractures, sports-related fractures, osteoporosis, and patients undergoing bone surgery were all omitted, as were those who refused to take written approval and others who were recalcitrant. A Siemens Ceiling Mount X-Ray machine was utilized to examine the fracture and collect

photos for filming. Whenever applicable, the standard deviation of frequency and percentage were used to express the data. IBM SPSS Statistics 26.0 was used to input the data.

## RESULTS

Table 1 illustrates the incidence of fractured bones related with road traffic accidents among people involved; ulna 3 (2.5%), radius 6 (4.9%), femur 46 (37.7%), tibia 26 (21.3%), fibula 20 (16.4%), ankle joint 2 (1.6%), humerus 8 (6.6%), knee joint 3 (2.5%), elbow joint 6 (4.9%), spine 1 (0.8%) and phalanges 1 (0.8%), the femur is the most frequently damaged bone (37.7%), while thumb (0.8%) and spine (0.8%) fractures are the least prevalent

Fractured bones	Frequency	Percent
Ulna	3	2.5
Radius	6	4.9
Femur	46	37.7
Tibia	26	21.3
Fibula	20	16.4
Ankle Joint	2	1.6
Humerus	8	6.6
Knee Joint	3	2.5
Elbow Joint	6	4.9
Spine	1	.8
Thumb	1	.8
Total	122	100.0

**Table 1:** Total number of fractured bones

Table 2 shows that 41 (33.6%) of patients with RTA-related fractures had to have a transverse fracture, which is the most prevalent type, and 1 (0.8%) had a Garden type IV fracture, which falls in the lowest percentage, least likely to happen.

Fractured bones	Frequency	Percent
Comminuted Fracture	24	19.7
Transverse Fracture	41	33.6
Longitudinal Fracture	6	4.9
Spiral Fracture	25	20.5
Oblique Fracture	17	13.9
Impacted Fracture	8	6.6
Garden Type 4	1	.8
Total	122	100.0

**Table 2:** Proportion of different kinds of fractures

Table 3 indicates the types of vehicles in RTA that are more to less dangerous and cause accidents, with individuals riding bikes 55 (45.1 %) having the greatest accidents and automobile/car passengers 3 (2.5 %) having the fewest fractures.

Fractured bones	Frequency	Percent
Bike	55	45.1
Cycle	13	10.7

Pedestrian	22	18.0
Car	3	2.5
Auto Rickshaw	19	15.6
Truck/Tractor	10	8.2
Total	122	100.0

**Table 3:** Different kinds of RTA vehicles

## DISCUSSION

Multiple patients with RTA-based fractures who underwent X-rays were considered in this cross-sectional assessment at the orthopedic department. The research was conducted in three months. Total of 100 patients suffering from fractures from road accidents were included. Patients with fall- and sports-related fractures, osteoporosis, and those undergoing bone surgeries were all eliminated, as were those who declined to take written approval and others who were reluctant. A fractured bone is a health ailment in which the connectivity of the bone has been broken or compromised. It's a common bone condition that happens when the bone can't handle external forces such as direct hits, twisting traumas, or falls. Pressure, accident, and osteoporosis are all major causes of bone fracture. In present study, the incidence of fractured bones related with road traffic accidents among people involved; ulna 3 (2.5%), radius 6 (4.9%), femur 46 (37.7%), tibia 26 (21.3%), fibula 20 (16.4%), ankle joint 2 (1.6%), humerus 8 (6.6%), knee joint 3 (2.5%), elbow joint 6 (4.9%), spine 1(0.8%), and phalanges 1(0.8%), whereas, the femur is the most frequently damaged bone (37.7%), while thumb (0.8%) and spine (0.8%) fractures are the least prevalent. Studies by Aloudah *et al.* 2020, and Anibor, *et al.* 2021 [5,2], indicated that the femur was the most often shattered bone and the most prone skeletal structure to fracture, followed by the tibia/fibula. This study demonstrated that 41(33.6%) of patients with RTA-related fractures had to have a transverse fracture, which is the most prevalent type, and 1 (0.8%) had a Garden type IV fracture, which has the lowest percentage and is least likely to happen. Based on the current study, the findings of this research were comparable to those of Shahzad *et al.* 2021, who found that road traffic accidents are the major reason for bone fractures and that transverse bone fractures are the most common type of bone fracture [14]. Current research indicates the types of vehicles in RTA that are more to less dangerous and causes accidents, with individuals riding bikes 55 (45.1 %) having the greatest accidents and automobile/car passengers 3(2.5 %) having the fewest fractures. This study's findings were comparable to those of Omoke & Ekumankama and Shahzad *et al.*, who found that road traffic collisions were the most prevalent cause of fractures [14, 25].

## CONCLUSION

The most probable bone fracture in road traffic accidents is the femur, which is more prevalent in people on bikes. The most prevalent kind of fractured bone is a transverse bone fracture.

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