

Musculoskeletal **injuries** in **all-terrain** vehicles

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Objectives: To describe the types of orthopedic injuries sustained by children and adults who ride all-terrain vehicles (ATVs) in Kuwait, and to study their possible risk factors.

Material and Methods – All admissions from ATV accidents in Razi hospital (Tertiary orthopedic center) over 3 months January to March 2003 were analyzed by questionnaire to study the epidemiology of these injuries and their relation to the use of protective measures, drivers experience, parental supervision and field of accident.

Result: Fifty-eight patients were studied over this short period. Fifty percent of those patients were under 12 years of age. Most patients (92%) did not wear protective measures and had little experience (57%).

Conclusion: ATV sport is a dangerous sport and special measures have to be applied before engaging in this hobby.

All-terrain vehicles (ATV), including 3 and 4 wheeled motorized have had been available all over the world for more than 3 decades. This type of vehicles was initially manufactured for the use in farms. In Kuwait ATVs are widely used for recreation. They are mainly used in the desert during the camping season or on non-crowded streets.

These vehicles do not need any registration in the Ministry of Interior hence this made them very accessible to most of the community including children (Fig. 1). When used unwisely by both experienced and inexperienced operators, an all-terrain vehicle can cause serious and life threatening injuries.

We conducted this study in an effort to analyze the high rate of accidents and to shine light on the size of the problem in Kuwait.

Methods and Material

All admissions related to ATV accidents in Razi hospital (Kuwait's only tertiary orthopedic center) over a period of 3 months January to March were studied. Those 3 months represent holidays in Kuwait and hence represent the rush time of ATV injuries.

All patients had been given a questionnaire to answer by person or by phone.

The questionnaire included demographic questions such as age, gender and length of hospitalization. It also included questions of the type of injury and the need for surgery.

Risk factors that were studied are the field of injury (desert versus streets), driver's experience (less or more than 10 hours of driving), whether the patient used protective measures or parental supervision was present.

The patients were divided into 2 age categories of older or younger than 12 years of age.

It is important to note that Al-Razi hospital is a tertiary orthopedic center and hence we do not receive patients with head or abdominal injuries. Instead those patients usually are admitted to other hospitals.

Results

We identified 378 patients admitted to our institution between and during the

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study period. Of those, 58 patients (15%) were admitted due to ATV accidents.

The study population consisted of 46 males and 16 females, male to female ratio was 2.9:1, and the average age was 17.21 +/- 9.2 years. Median length of stay was 7 days (range: 1-62 days). Seventy-seven percent of patients were the drivers (45 patients) and 13 patients (22%) were passengers. Fifty percent of the passengers were children below the age of twelve years. Most patients (84%) were admitted to the hospital on the day of injury. The average time from admission to surgery was 1.43 days. The average time from injury to surgery was 1.98 days. The majority of patients (76%, n = 44) underwent surgical intervention in the operating room under general anesthesia, whereas fourteen patients had closed reduction or other intervention done under sedation or local anesthesia.

Type of the injury	Number of patients	Percentage
Lower extremity	37	64%
Upper extremity	17	29%
Axial and pelvis	9	15%

Table 1

Lower extremities injuries were dominant compared to upper extremities and axial injuries. Table 1 shows the type of injuries by body organ.

The desert was the most common site for injuries (n = 50, 86%). Only five patients (8%) used protective measures. Four patients used helmets only and one patient used both helmet and extremity protective gear. Twenty-five patients (43%) have had driving experience for more than ten hours. Parental supervision was noticed in twenty patients; Of the eight children below the age of eight, seven (87%) had parental supervision.

Literature Review

All-Terrain vehicles have been manufactured initially for the use in the farms. Children and young teenagers currently

use ATV in recreational activities. This new trend change in the use of these vehicles led to a major number of deaths and severe disabilities in those population groups. Study from U.S registry in 1997 showed that there have been 149 emergency department injuries and 0.65 deaths for every 10,000 ATV use [1]. A review from New Brunswick showed that there were 3.3 deaths for every 10,000 registered ATV's. [2] These injuries and deaths involve mainly young population. A study from the U.S consumer product safety commission showed that children under the age of 16 accounted for > 47% of the injuries in 1997 and > 36% death since 1985. [3] Several types of ATV's accidents which promote injury or death upon riding these vehicles have been identified by the accident prevention committee in



Figure 1 - Children all under 12 years of age, who were riding ATVs in a sandy field, with no protection and no parental supervision. The ATV on the right has 2 kids and the driver is looking backward.

1987. These types include loss of control by the driver, rolling over of the vehicle, and collision with fixed objects. [4] Other studies have shown that rider inexperience, intoxication of alcohol, excessive speed and lack of helmet use, are all risk factors that increase the incidence of injuries [5,6]. The identification of these factors especially the lack of helmet use, had an impact on the formulation of decree by the manufacturer in 1988. [7] This subsequently led to the formulation of the action plan in 1998, which agree not to market or sell 3 wheeled ATVs, not to sell adult size ATV to children under 16 and to promote training. [3] These regulations have had an impact on the epidemiology of the rate of injuries and deaths. While the annual emergency department had had visits from ATV-related injuries, reaching 108,000 in 1986, it declined to 54,500 in following years. [8] Recent review by Aaron Etal looking at the types of trauma secondary to ATV use. This review examines the Nova Scotia trauma registry of major ATV-related trauma for adult > 15 years, over 5 year periods. The study showed that 28 (61%) of 46 major injuries involved the face, head and spine, which is a central nervous system type of injury. Other injuries including abdominal and thoracic organ

were 27%. [9] Another study by Pyper Etal published in the orthopedic literature mainly examines the incidence of musculoskeletal injuries, related to the use of off-road vehicles over an 8-year period. There were 352 fractures of the extremity or the spine, 51 major injuries of soft tissue, 186(53%) of the fractures were displaced, 107 (46%) of patient have more than one fracture, 34(10%) fractures were open [10]

Conclusion

All-Terrain vehicle is a potentially dangerous Sport. We therefore suggest the following for safe use of ATVs;

- 1- Take an approved training course.
- 2- Ride an ATV that is right for your age.
- 3- Supervise riders younger than 16 years of age.
- 4- Always wear the right safety gear, especially a helmet, when you ride.
- 5- Never carry a passenger.
- 6- Ride only on designated trails and ride responsibly!
- 7- Always avoid paved surfaces. Never ride on public roads.
- 8- Finally we strongly suggest that legislation should be announced to limit their driving to individuals older than 16 years of age.

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