Cheong and Rice, J Trauma Treat 2015, 4:4
DOI: 10.4172/2167-1222.1000275

Journal of Trauma & Treatment

Research Article Open Access

Off-Road Motorbike and All-Terrain Vehicle/Quadbike Accidents in Rural New South Wales

Ju Yong Cheong* and Mark Rice

Dubbo Base Hospital, Myall St, Dubbo NSW, Australia

Abstract

Objective: To determine the demographics, risk factors, patterns of injuries sustained from off road motor vehicles in rural NSW.

Design: A retrospective review.

Setting: Dubbo Base Hospital is a major referral base hospital for Western NSW.

Participants: All patients admitted to Dubbo Base Hospital with off-road motor vehicle injuries in between years 2009-2011.

Main outcome measures: Demographics, referral areas, pattern of injuries sustained from off road motor vehicle accidents.

Results: There were total of 57 cases, with 53 being males. Average age for the patient was 13.7. There were 9 quadbike accidents, and 48 off road dirtbike accidents. For quadbike accidents, mechanism of injuries were: collision(5), rollovers (3), fall (1). Four out of nine quadbike accident patients were wearing a helmet. With off road motorbike (dirtbike) accidents, 17 were from motorcross jumps, and 31 were farming accidents. Farming accidents comprised of 19 falls and 12 collisions. Of the 17 involved in motorcross jump related accident, 12 were wearing safety gears. On average, they were travelling at much higher speed, with average of 50 km/hr, and highest of 80 km/hr. The most common injuries were soft tissue injuries and peripheral long bone fractures, however more severe injuries were noted with motocross jump related injuries.

Discussion/Conclusion: This study found the vast majority of injuries from off road motor vehicles in rural Australia occur in children. It is of concern that there are currently no enforceable road regulations for off-road motor vehicle use on privately owned properties. There needs to be better education of the younger drivers as well as enforceable regulations to allow safe use of the off road motor vehicles.

Keywords: Trauma; Motor vehicle accident; Dirtbike; Quadbike; Rural community

What is Already Known on this Subject?

- Off road motor vehicles are commonly used in rural communities.
- Studies from North America suggest that the off road motor vehicles can cause severe injuries.
- There are no rules and regulations on their usage on private properties.

What Does this Study Add?

- Presentations to rural hospitals of trauma from off-road motor vehicle accidents are not uncommon.
- Most of the patients are children and adolescents, with severe injuries.
- This study highlights the urgent need for rules and regulations for the off road motor vehicles to be introduced.

Introduction

Motorized off-road vehicles are a common form of transportation used by the rural community. These vehicles are rugged and relatively inexpensive, making them practical and versatile in mining, logging and farming communities. They are ideal modes of transport especially on farms where there is little or no paved roads as the bikes can easily navigate over uneven surfaces. There are two main forms of off-road vehicles used in rural communities.

The first main form of off-road vehicle is the off-road motorbikes. These bikes are specifically designed for off-road riding and are also known commonly as 'dirtbikes'. Compared to street road motorbikes, off-road bikes are simpler by design and feature and are lighter, having long suspension travel, high ground clearance, and rugged construction with little bodywork and no fairing (i.e. motorcycle shell). The wheels of off-road motorbikes have knobby tires that provide more traction on surfaces that are not paved. A special variant of the off-road motor bikes is the 'motorcross bikes', which are used for closed off-road track riding. These bikes are more compact and often with smaller fuel tanks. Other variants also include the 'enduro' bikes, which have much larger fuel tanks and are commonly used in off-road endurance competitions such as the Dakka Rally. Another special variant in the mini-bikes, or 'pee-wee bikes', which are commonly used by minors who are not yet big enough, or are experienced enough, to ride the larger dirtbikes.

The second group of off-road vehicles is the all-terrain vehicle, also

***Corresponding author:** Ju Yong Cheong, Dubbo Base Hospital, Myall St, Dubbo NSW 2830, Australia, Tel: +61409110219; E-mail: santiago-james@hotmail.com

Received November 27, 2015; **Accepted** December 11, 2015; **Published** December 18, 2015

Citation: Cheong JY, Rice M (2015) Off-Road Motorbike and All-Terrain Vehicle/Quadbike Accidents in Rural New South Wales. J Trauma Treat 4: 275. doi:10.4172/2167-1222.1000275

known as 'quadbikes'. These vehicles were introduced into Australia in the 1970s by Honda, and were initially marketed for use on farms and other rural properties. Today, these vehicles have now become a popular form of recreational activities. Like a motorcycle, the rider straddles the top of the vehicle and will steer the vehicle using the handlebars located at the front-top of the vehicle. Common features of the quadbike design includes low pressure tyres, allowing high maneuverability over rugged surfaces, and these bikes are capable of speeds of up to 100 km/hr [1]. Quadbikes have a high center of gravity and with it come the inherent risk of a rollover in the event of an accident [1-3].

Aim of study

As a general surgeon in rural communities in New South Wales, traumas from off-road motor vehicle accidents are not uncommon. This study aimed to investigate the demographics of off-road motor vehicle accidents in rural community Dubbo, New South Wales. Dubbo is a city in the Orana region of New South Wales and has the largest population within the Orana region, with an estimated population of 31,007 and serving an estimated catchment of 130,000. Dubbo is located 303 km north-west of the state capital Sydney (400 km by road) and is a major road and rail freight hub to other parts of New South Wales, with links to national highways north to Brisbane, south to Melbourne, east to Sydney and Newcastle, and west to Broken Hill and Adelaide. This study aims to identify the mechanism of accidents, pattern of injuries sustained and the risk factors associated with such injuries.

Method

Dubbo Base Hospital is a major referral center for western New South Wales. Thus majority of traumas cases are referred to Dubbo Base Hospital. This study retrospectively analysed the paper and electronic records of all patients admitted to Dubbo Base Hospital in the period between 2009 and 2011. Ethics committee approval for the research has been granted.

Gender		**Percentage**
	Male	93%
	Female	7%
Age		
	Median	14
	Male (mean)	13.8
	Female (mean)	13.7
	Youngest	6

Table 1: Demographics.

Area	Number of patients	Distance from Dubbo
Gilgandra	3	37 km
wellington	3	48 km
Mudgee	11	128 km
Tullamore	1	126 km
Bourke	3	369.4 km
Narromine	2	39.9 km
Coonabaraban	2	138 km
Gulgong	2	111 km
Condobolin	1	222 km
Warren	2	126 km
Peak hill	1	70 km
Nyngan	4	165 km
Trangie	2	73.7 km
Dunedoo	1	91.5 km
Cobar	1	296 km
South Windsor	1	341.3 km

Table 2: Rural communities that have referred patients to Dubbo Base Hospital and the distance travelled.

Quadbike		9
	Collision	5
	Rollover	3
	Fall	1
Dirtbike/Minibike		48
	Motorcross	19
	Farm accidents	29

Table 3: Mechanism of injury.

Results

Over the three–year period from 2009 to 2011, there were a total of 57 admissions to Dubbo Base Hospital as a direct result of off-road motor vehicle accidents. The demographics of the patients are outlined in Table 1. Out of these admissions, 53 of the patients were males (93%) and 4 were females (7%). The majority of the patients were minors, with the median age of 14 years and an interquartile range of 10.6 years to 15.7 years old. Average age for both male and female patients was 13.8 and 13.7 years, respectively. The youngest patient was 6 years old and the oldest was 52 years old. 17 of the 57 patients (29%) were presented directly to the Dubbo Base Hospital. Of these, six patients were brought in by family members and eleven were brought in by ambulance. The remainder (40 of the 57 patients, i.e. 71%) were transferred from other areas to Dubbo Base Hospital. Table 2 shows the areas from which the patients were transferred. The average distance for transfer of patients to Dubbo Base Hospital was 138.8 km, with Bourke being the furthest (369 km) and Condobolan being the closest (22 km). Of the 57 accidents, 9 were from quadbikes, 3 from minibikes/pee-wee bikes, and 45 from dirtbikes (Table 3). The mechanism of injury for quadbikes were collision (55%), rollover (33%), and falls (12%). 44% of the patients were wearing helmets at the time of the accident. Of the 48 patients involved in dirtbike and minibike accidents, 19 (40%) were from motor cross riding and 29 (60%) were from farming accidents. Of the 19 motor cross accidents, 12 were from falls during or after a jump and 2 were from collisions. Of the 29 farming accidents, 19 were from falls and 10 were from collisions with trees, barbed wires or with another rider. Safety gear was worn in 66% of the patients at time of accident. The minimum of this was a safety helmet. 73.6% of patients involved in motor cross accidents and 68% of patients involved in farm accidents, and 44% of quadbike riders were wearing a helmet at the time of accident. None of the 57 patients were intoxicated with alcohol or drugs at the time of their accident. Only two patients had previous history of off-road motor vehicle accidents. The average speed at time of accident (as recollected by the patient) for quadbikes was approximately 46 km/hr, 38 km/hr for dirtbike accidents, and 53 km/hr for motor cross riding. Figure 1 outlines the injuries sustained collectively by all patients. All together, the 57 patients sustained 77 injuries. The most common injuries involved fractures of the upper limb (31%), followed by soft tissue injuries (24.6%) and fractures of the lower limb (15.5%). Other injuries included abdominal and pelvic solid organ injuries, chest injuries, and head injuries. Of concern is the rate of growth plate injuries in 13.8% of the fracture of the upper and lower limbs. Twenty-seven (47.3%) patients required orthopaedic surgery, with 13 patients (22.8%) requiring closed reduction, and 14 patients (24.5%) required open reduction and internal fixation. Thirteen (22.8%) patients had washout and debridement of soft tissue injuries. Most of the patients were treated at Dubbo Base hospital, with only two patients (3%) requiring transfer to either the Sydney Children's Hospital or

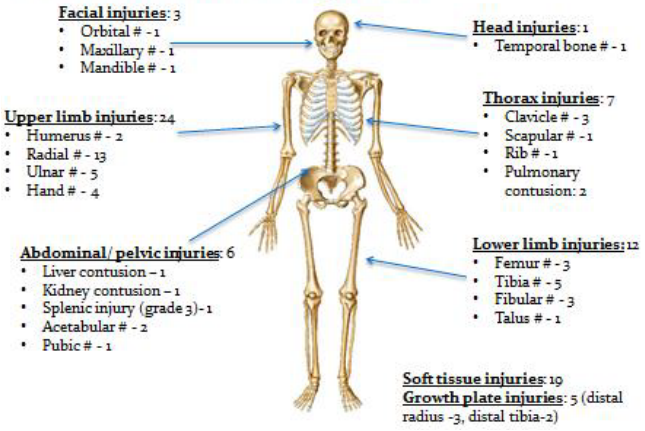

Figure 1: Distribution of injuries from off road motor vehicle accidents.

Westmead Children's Hospital. Fifteen (26.3%) patients were admitted and observed. The average length of hospital stay was 2.9 days.

Discussion

In this study, we have identified a number of very concerning facts about off road motor vehicle use in rural Australia. Firstly, vast majority of our patients (96.5%) were minors under the age of 18, with the youngest being only six years of age. Many of these children may not be physically strong enough to operate these vehicles. Compounding to this is the lack of formal education, licensing and lack of safety regulations, as well as the high speeds involved places these children at significant risk of injuries. As seen from this study, loss of control resulting in fall and collision was the most common mechanism of injury, which suggests that a certain level of skills is required to operate and maneuver these heavy vehicles.

Secondly, another concerning feature is the significant number of children were involved in motor-cross accidents. Motor cross bike riders tended to have higher velocities, and are required to perform complex turns and jumps. One is lead to question why children as young as six are allowed to perform these maneuvers. It is staggering that 73% (14 out of 19) motorcross accidents in children were from either jumps or collisions.

Thirdly, the lack of safety gear worn by the patients is disconcerting. Only two of three (66%) children were wearing at least a helmet at time of the accident. The rate was lowest for quadbikes (44%), which is extremely concerning because quadbikes tended to be the heaviest of all the vehicles, and also has the highest risk of a rollover. A study by the Consumer Product Safety Commission in 2005 found that quadbikes are more dangerous than dirtbikes, with risk of injury of 171 per 10'000 riders and risk of death of 1.1 per 10'000 riders [4,5].

Fourthly, the injuries sustained by the children are serious. As a result of young age, high velocity, lack of safety gear has resulted in serious musculoskeletal, head and severe abdominal solid organ injuries.

There is a real need to prevent such severe accidents occurring in Australian rural communities. Part of the problem is that currently there are no rules and regulations for the use of off road motor vehicles in private properties in Australia. The State road rules apply only in relation to the use of licensed vehicles on public roads. The local government by-laws are focused on municipal matter, such as public nuisance (noise pollution), wildlife conservation and land management. Therefore, the use of off-road motor vehicle on private properties are not subject to any rules or regulations. The requirements that must be met in connection with use of vehicles on public roads (e.g. age, holding of valid licence, driving a registered vehicle) is not applicable to off-road vehicles. Another fact of concern is the great distances these patients had to travel after their injuries. The average distance from site of injury to Dubbo base hospital was 138 km, with longest distance being 369 km. All of the patients were transported by road. Given the gravity of the injuries from trauma, the great distance may delay potentially life-saving treatments. Given this problem, it becomes even more imperative of the need to prevent these traumatic injuries from occurring in the young rural population.

From this study, we postulate that the population involved in off-road motor vehicle accidents are different entities to those involved in on-road motor vehicle accidents. Off-road motor vehicle accidents tended to occur in young children and in none of these accidents was alcohol a causative element. This highlights the need for education, supervision and enforceable regulations on the use of off road motor vehicle in Australia.

Limitation of study

This study has been performed retrospectively.

Acknowledgement

I would like to thank Dr Jonathan Grassby and Dr Mark Rice for their supervision at Dubbo Base Hospital.

References

1. Balthrop PM, Nyland J, Roberts CS (2009) Risk factors and musculoskeletal injuries associated with all-terrain vehicle accidents. The Journal of Emergency Medicine 36: 121-131.
2. Friedman R, Harris JP, Sitzer M, Schaff HB, Marshall L, et al. (1988) Injuries related to all-terrain vehicular accidents: a closer look at head and neck trauma. Laryngoscope 98: 1251-1254.
3. Holmes PJ, Koehler J, McGwin G Jr, Rue LW 3rd (2004) Frequency of maxillo-facial injuries in all-terrain vehicle collisions. Journal Oral Maxfax Surg 62: 697-701.
4. CPSC 2005 Annual Report of Deaths and Injuries. US Consumer Producr Safety Commission, Washington DC, USA.
5. Heads of Workplace Safety Authorities.