

Our Experience With Motocross Accidents In Children: Patterns Of Injuries & Outcomes

S Boulis, A Rehm

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Abstract

Off-road motorcycling is a popular sports activities practiced by many children. Very little is been written on motocross accidents among children. We report all paediatric motocross accidents admitted to our paediatric orthopaedic unit from 2003 to 2005. Motocross related accidents accounted for 6.7% of our paediatric trauma admission during this 2 year period. The majority of injuries involved the lower limb (70%) and some of these were open (30%) and complex with residual long-term neurological deficit. Clavicle fractures were seen in 20% of the cases. Head injuries were seen in 30% of the cases and were minor in nature. The majority of cases (80%) required operative management and in some cases multiple operations. In the future, strict adequate training and obligatory protective clothing especially to the highly exposed extremity prior to participation in motocross sports need to be in place to help reduce the resultant accidents.

INTRODUCTION

Motorcycling is a popular sport among the paediatric population in the United Kingdom. It is the fastest growing action sport of the new millennium. The combination of suspense, thrill and danger is exploding into the entertainment industry. Despite this being a high-risk sport, there is very little written on paediatric motocross accidents in the literature. In this paper, we aimed to examine all paediatric trauma related to motocross accidents presenting to our unit over a 2 year period. We aimed to identify the patterns of injuries and the resulting morbidities of these accidents.

MATERIALS & METHODS

We reviewed our paediatric trauma database from 2003 – 2005. All paediatric trauma cases due to motocross accidents were identified. Their notes were retrieved and the injuries sustained were identified. The treatment for these injuries was also retrieved. These patients were followed up routinely to examine the outcome and morbidity resulting from the injuries.

RESULTS

During the two year period from 2003 to 2005, there were 150 paediatric trauma admissions to our orthopaedic unit. Of these, 10 (6.7%) cases were due to motocross accidents. The patterns of injuries, treatment, outcomes and complications

are shown in Table 1. 8 out of 10 (89%) cases required an operation to treat the injury. The majority (70%) of the injuries involved the lower limb. 6 out of these 7 injuries involved the tibia or fibula. 30 % of the fractures were open with a grade II or III according to the Gustilo & Anderson classification. Other non-orthopaedic injuries were minor head injuries in 30% of the cases and facial fractures in one case.

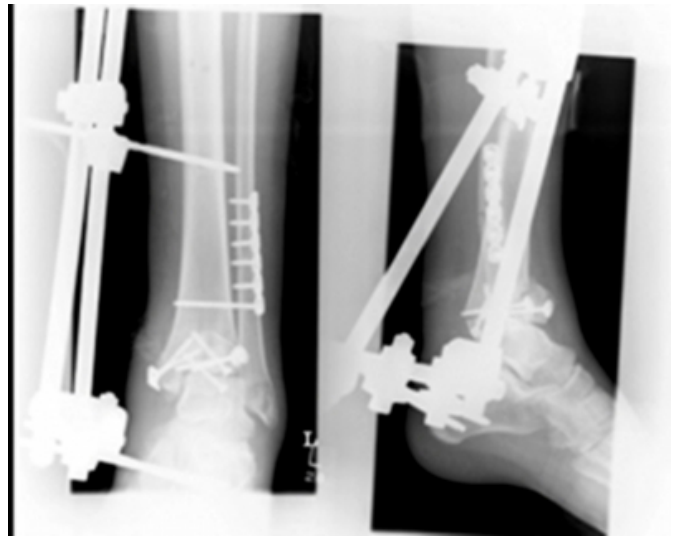
The most significant injuries were in a case 16 years of age coming off his motor cross bike. He sustained a complex closed displaced multi-fragmented fracture dislocation of the left distal tibial articular surface. The dorsal aspect of the foot was cold with a poor perfusion of the toes and no palpable pulses but a detectable tibialis posterior pulse on Doppler examination. After manipulation in A & E department with resultant improved alignment and application of backslap, the perfusion was much improved and all pedal pulses were palpable. The patient also sustained severe facial injuries and a closed displaced mid shaft fracture of the right humerus without a neurological compromise (Figure 1).

Figure 1



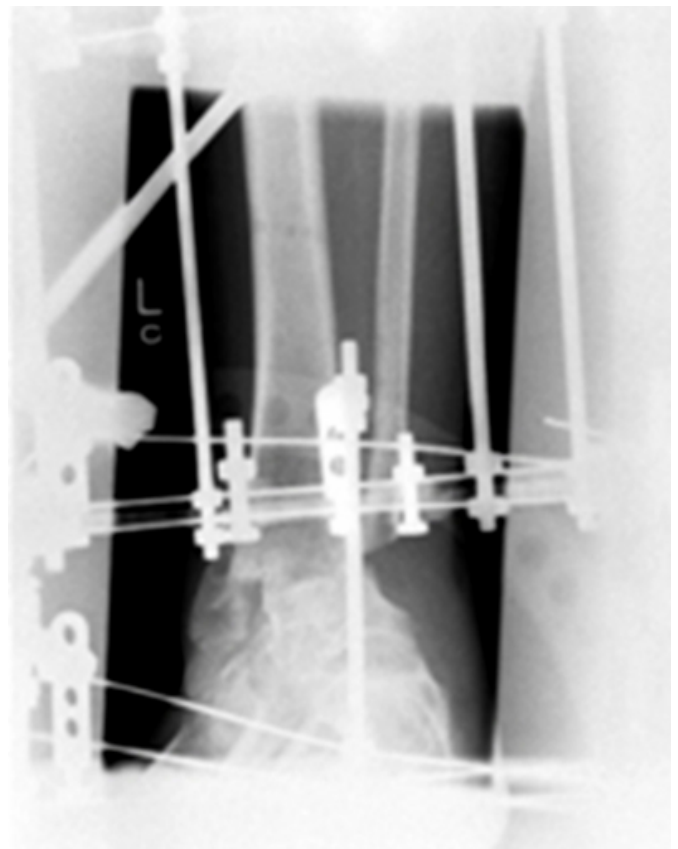
He was taken to theatre for tibial fixation with combination of internal and external fixation. The fibula was plated. The distal tibia was approached through two incisions (posterolateral and posteromedial). The posterior tibial nerve was intact. The fracture was reduced as best as possible after removing tendons from fracture site and held with K-wires and then secured with screws. Following fixation, there was no Doppler dorsalis pedis signal. Therefore the vascular surgeon exposed the posterior tibial artery and undertook a small arthrotomy out of which a same area of thrombus identified. The artery was flushed with GTN proximally and distally to open and a vein patch from the saphenous vein was used to patch the artery. Subsequent on this there was a good vascular flow with a pulse distal. The position of the foot was then held with an external fixator (Figure 2).

Figure 2



He developed MRSA infection of the ankle wounds requiring the metal work removal 3 months later. The wounds required debridement and wash out on several occasions and finally closure. The ankle was subsequently fused with an Ilizarov frame (Figure 3).

Figure 3



The humerus fracture was managed non-operatively in a U-slab followed by a period of bracing. The patient had

residual sensory deficit involving the sole of the foot.

Figure 4

Table 1: Motocross related injuries

| Age at injury | Fracture | Other injuries | Treatment | Outcome | Complication |
|---------------|---------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|
| 12 | Midshaft clavicle | None | Collar & Cuff | Union | None |
| 14 | Midshaft clavicle | None | Collar & Cuff | Union | None |
| 14 | Open mid shaft radius (G II) | Minor head injury | Debridement & plating Delayed closure R/O plate | Union & deformity | Hypertrophic union Residual bowing deformity |
| 7 | Open tibia (G II) | Minor head injury | Debridement & POP Secondary closure | Delayed union (12 weeks) | Grade I pressure sores from POP |
| 11 | Tibial spine fracture avulsion of ACL | None | Medial arthotomy & suture fixation | Slow progress with ROM Loss of 10 degrees of extension | |
| 17 | Spiral fracture tibia displaced middle 1/3 | None | IM nail | Union | |
| 12 | Transverse fracture tibia/fib distal 1/3 displaced | None | MUA & POP | Union | |
| 15 | Open tibia / fibula (G IIA) | Minor head injury | Debridement & Ex-fix Split skin graft | | |
| 15 | Proximal femur | None | Traction 6/52 | Union | Fall on ward, site re-fractured ORIF 9 hole DCP plate + autologous bone graft |
| 15 | 1. Complex distal tibia fracture with neurovascular compromise 2. Distal fibula 3. Mid shaft humeral fracture | Multiple facial fractures | Multiple surgeries | Ankle fusion | MRSA infection of ankle wounds. Neurological sensory deficit in foot. |

DISCUSSION

Although there are many papers in the literature on the patterns of injuries associated with motorcycle accidents and their prevention, the patterns and outcomes of injuries associated with motocross accidents in children has not been reported (1, 2). The mechanisms of injury associated with motocross accidents are different from those in motorcycle accidents. Motocross injuries often result from direct impact against the ground at relatively lower speeds or from falls after high jumps. On the other hand, motorcycle accidents usually occur at higher speeds, and often involve a crash with another vehicle (3). As motorcycling is becoming a popular sport among the paediatric population in the United Kingdom, we will see more and more motocross-related accidents.

The majority of injuries involved the lower limb (70%) and some of these were open (30%) and complex with residual long-term neurological deficit. Clavicle fractures were seen in 20% of the cases. Head injuries were seen in 30% of the cases and were minor in nature. The majority of cases (80%) required operative management and in some cases multiple operations. These findings were similar to the results reported by Gorski et al in the United States (4). They reported that motocross accidents were most commonly associated with extremity injuries and closed head trauma and the overall patterns of injury are similar to those observed in street motorcycle collisions. They also reported that although the overall mortality for motorcross trauma was lower than motorcycle collisions, the morbidity was comparably high, with a large proportion of patients undergoing surgery for treatment of orthopaedic injuries.

Proof of sufficient riding ability is not essential to ride at the tracks and there are no age restrictions. Therefore, in some cases, inadequate training will increase the frequency and severity of injuries. The implantation of regulations to limit the exposure of inexperienced riders among children to these sports is important to decrease the frequency and severity of these motocross related injuries. The use of protective helmets is obligatory, additional protective clothing is only recommended. These specially designed protective clothing such as boots, knee braces and wrist guards may well decrease the incidence of injuries to those highly exposed areas. In the future, strict adequate training and obligatory protective clothing especially to the highly exposed extremity prior to participation in motocross sports need to be in place to help reduce the resultant accidents.

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Author Information

Samah Boulis, BSc MRCS

Specialist Registrar, Dept of Paediatric Orthopaedics, Addenbrooke's Hospital

Andreas Rehm, FRCS (Ortho)

Consultant Orthopaedic Surgeon, Dept of Paediatric Orthopaedics, Addenbrooke's Hospital