Injuries associated with recreational horse riding and changes over the last 20 years: a review

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DECLARATIONS

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NS, JD and JR devised, wrote and edited the paper. CB and UA gathered the data and organized and tabulated it

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Summary

Objective: To assess the incidence and distribution of recreational equestrian injuries seen in the Kent and Sussex region and review the available literature on this subject.

Design: This is a retrospective case series with historical controls.

Setting: Kent and Sussex region, England.

Main outcome measurement: Injuries related to horses in the recreational setting.

Methods: Subjects were selected from our acute injury database. Notes of all patients presenting with horse riding-related injuries between January and December 2010 were reviewed. Skeletal injuries were confirmed using our Picture Archiving and Communications Systems (PACS) system. Data were tabulated and grouped using Microsoft Excel software. Statistics were calculated using Graph Pad software.

Results: During the study period, 155 patients presented with a total of 199 injuries related to horses, accounting for 0.3% of all presentations; 69% were soft tissue injuries. The most commonly affected areas were the extremities (77 patients, 49.7%) followed by injuries to the head (38 patients, 24.5%) and trunk (36 patients, 23.2%). Seventeen patients (11%) were admitted. Patients presenting with head injuries suffered significantly more injuries compared to other groups (1.65 compared to 1.4 injuries, $p < 0.0002$).

Conclusion: A larger number of persons were riding for a longer period of the year compared to previous studies in the United Kingdom. There was also a shift in the patterns of injury seen in this population over the last two to three decades.

Introduction

Equestrian activities are extremely popular in the United Kingdom. In Great Britain alone, approximately 4.3 million people ride horses. In the greater London area, 135,000 horses are registered, most being ridden for recreational reasons. Added to this is the economic impact of the equestrian industry which is worth £7 billion and provides employment for 220–270,000 persons. Equestrian sports are thought to be more popular than rugby or cricket in the UK.[1] Despite this, recently, there is little information on the rates

and patterns of injury occurring in this population.

The Sussex region is advertised as an area of outstanding countryside, and due to this, there is a large population of persons who ride horses recreationally. While the incidence and patterns of injury in professional jockeys has been well documented,[2,3] there is a relative paucity of similar data in groups such as the population presented in this study. The Kent and Sussex Hospital is one of the largest hospitals in this region. It serves a primary local population and is a referral centre for several minor injury units. This study aims to assess the epidemiology of injuries associated with recreational horse riding in our region and provide an update on this subject.

Patients and methods

All patients presenting to our Accident and Emergency Department (AED) with horse riding (HR)-related injuries are logged as 'horse-related injury' and entered into our AED trauma registry.

This retrospective study was performed between January and December 2010. Data were extracted from our Emergency Medicine database. All patients presenting with HR-related injuries during the study period were extracted and their notes were reviewed. Skeletal injuries were confirmed using our Picture Archiving and Communications Systems (PACS) radiology system, on which all radiographic images are stored.

Data were tabulated and analysed using Microsoft Excel software (Microsoft Corporation, WA, USA). Statistical analysis was performed using the chi-squared test (Graph Pad Prism software CA, USA).

Results

Between January and December 2010, 49,238 patients presented to our emergency department. Of these, 155 patients (144 women and 11 men) presented with a total of 199 injuries related to HR activities, accounting for 0.3% of all presentations for this period. The temporal distribution of injuries is illustrated in Figure 1. Injuries occurred most frequently as a result of falls from the animal followed by kicks, bites and two patients were

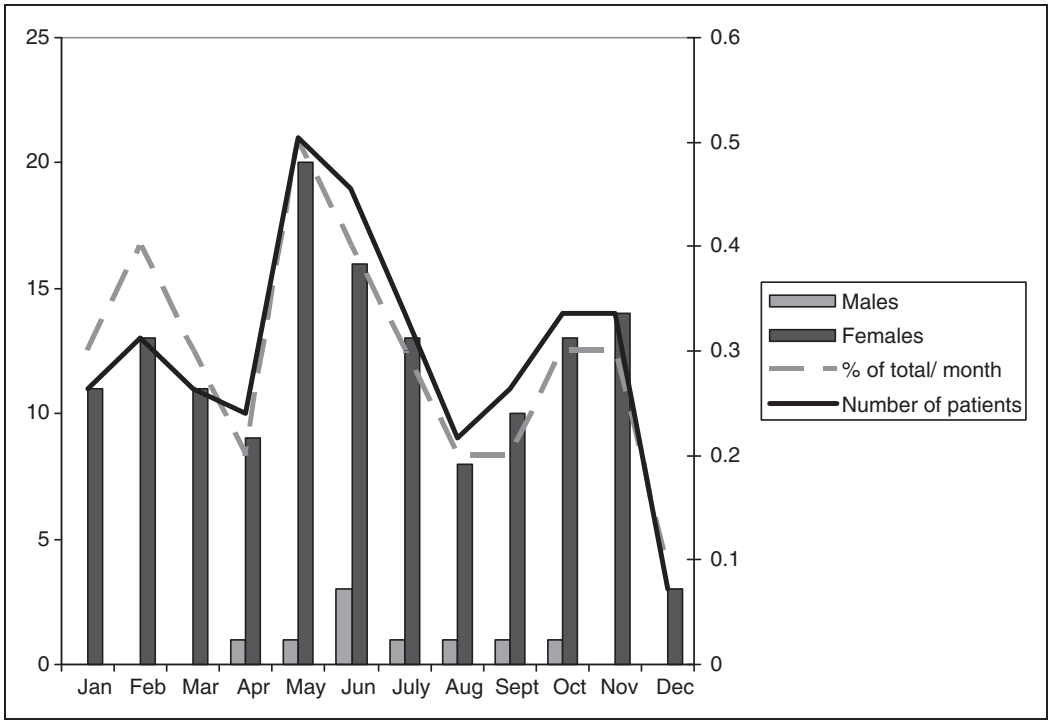

Figure 1. Frequency and variation of injuries throughout the study period.

trod on by the animal, one sustaining a fracture. In two cases, the horse fell onto the rider after they had fallen off resulting in a secondary crush injury (Table 1).

Injury patterns

One hundred and six [see Table 2] patients (68% [i.e. 106/155]) suffered soft tissue injuries (STIs) (Table 2). Thirty-eight percent of injuries were right sided, 43% occurred on the left side and two patients (1%) had bilateral injuries. Other injuries were central, i.e. back, neck and head injuries. There were no fatalities.

Head injuries

Head injuries occurred in 38 patients (35 women and 3 men). The average age of this group was 24 years (range 3–64 years) (Figure 2). These were all due to falls. Two patients lost consciousness for <5 min and at presentation their Glasgow Coma Scores were 15. Eighteen patients in this group had other injuries. Of these, nine (50%) had neck injuries.

Three moderate head injuries occurred in children aged 3, 8 and 15 years secondary to falls from a horse. These patients were admitted and discharged after a 24-hour period of observation.

Table 1. Mechanism of injury.

Mechanism of injury	Men	Women	Total
Falls	8	129	137
Kick	2	9	11
Bite	1	4	5
Trod on	0	2	2

Limb injuries

These were the most common injuries, occurring in 77 patients (71 women and 6 men) and accounted for 39% of all injuries seen in this study; 33 injuries (43%) were left sided and 42 (55%) were right sided, and injuries were bilateral in two cases. Multiple injuries occurred in 21 (27%) patients. The average number of injuries in patients presenting with limb injuries was 1.4 (range 1–4 injuries). Fractures occurred in 14 (18%) cases. The mechanism of injury was a fall in 12 cases. Two patients were kicked by the animal, suffering orbital and pelvic fractures.

Truncal injuries

Thirty-six patients (23%) suffered injuries to the chest and abdomen. All patients were women. Injuries occurred to the chest (seven cases), back (26 cases), pelvis (two cases) and abdomen (one case). Multiple injuries occurred in eight patients (22%). The average number of injuries in this group was 1.4 (range 1–4).

Table 2. Distribution of injuries within this cohort.

	Pattern and distribution of injuries					
	STI	HI	Limb	Trunk	Fracture	Admissions
Total	106	38	77	36	14	17
Women	99	35	71	36	12	16
Men	7	3	6	0	2	1
Children	33	16	28	3	4	7
Multiple injuries	31	18	21	8	2	5
Right side	–	–	42	–	–	–
Left side	–	–	33	–	–	–
Average number of injuries (range)	1.35 (1–4)	1.65 (1–4)	1.4 (1–4)	1.4 (1–4)	1.4 (1–4)	1.55 (1–4)

STI: soft tissue injuries.

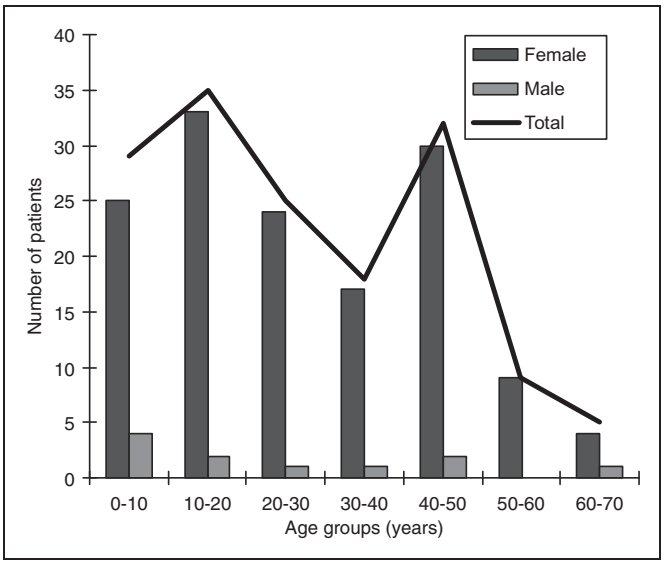

Figure 2. Age distribution of our cohort.

Fractures

Fourteen patients (12 women and 2 men) suffered fractures. Ten (71% [i.e. 10/14]) of these were due to falls. Two patients were kicked and one suffered a fractured hallux after being trodden on.

Admissions

Seventeen patients (16 women and 1 man; 11% of all presentations) required acute admission. Five of these patients (29%) suffered fractures. Seven patients (41%) in this group were children. Sixteen cases resulted from falls and one suffered a head injury as a result of a kick from a horse. Two patients required surgery – one to have closure of a facial laceration and one required reduction of a fracture dislocation of their shoulder.

One patient required admission to the intensive care unit (ICU). This patient had multiple organ injury including a pneumothorax, splenic rupture and blunt hepatic injury. These injuries resulted from a fall from a jumping horse. The rider wore no body protection. This group is summarized in Tables 2 and 3.

Use of protective equipment

One hundred and fifty-two patients (98% [i.e. 152/155]) wore protective helmets. Of these, 95 were aware that their helmets met industry standards. These were also the patients who were aware of the existence of industry standards. One hundred and forty patients wore protective body armour and all wore riding boots.

Table 3. Overview of patient population.

Categories	Men	Women	*N*
Age			
≤16 years	6	44	50
>16 years	5	100	105
Fractures	2	12	14
Admitted	1	17	18
Multiple injuries	3	36	39

Discussion

HR has been described as one of the most dangerous sporting or recreational activities.[4] The risk of fatal injury is comparable to motorsports.[5] Horse riders are one of the top four groups targeted for a reduction in sport and recreational injuries by the Commonwealth Injury Prevention Department.[6]

During the period of our study, HR-related injuries accounted for 0.34% of all presentations to our AED. This is comparable to centres in the UK which contain professional horse racing circuits within their catchment areas.[2] Most injuries

occur in female patients – probably reflecting the significant female majority who participate in this activity – and during the summer months. This pattern has been noted by other authors.[7,8]

One hundred and thirty-seven (69%) of all injuries were due to falls from the animal. This is more than the UK national average of 59% but less than that reported by international authorities.[8] In this group, 125 patients wore protective body armour and all wore helmets as well as protective boots. Twelve injuries in this group occurred while the animal was jumping and one patient fell off as the horse bucked. This patient did not wear body protection. She suffered multiple organ injury and required admission to the ICU for monitoring. She made a full recovery. Seven patients were admitted with back and neck injuries. These were discharged after a 24-hour period of observation. These admission rates not only reflect our hospital's relatively low threshold for admitting patients with potential spinal injuries but also an understanding of the high-energy mechanism associated with HR-related injuries and the potential for evolving spinal injuries. Two patients were crushed by the falling animal – both suffered minor soft tissue extremity injuries and were discharged after being assessed. Both patients wore body armour. Eighteen patients (12%) suffered injuries while not riding the animal.

Upper limb injuries were more common than lower limb injuries. This is potentially due to a lack of protection worn in this region and corresponds with patterns of injury reported from the USA[9] and Australia.[8] This distribution is similar to patterns of injury noted in professional riders – raising the possibility that this group potentially attempt manoeuvres which require advanced riding skills and predispose themselves to injury.

Head injuries accounted for 195 of these HR-associated injuries. The helmet was knocked off in only five of the patients in this group. Their injuries were no more significant than the remainder who retained their helmets. The five who lost their helmets were unsure as to whether their helmet met industry safety standards and whether they had fastened their chin straps adequately. Seventeen patients from this subset (45%) suffered multiple injuries compared to a 25% incidence of multiple injuries noted over the entire cohort ($p = 0.0002$). A high degree of suspicion for more than one injury is thus required by clinicians who manage such patients. A thorough secondary survey according to Advanced Trauma Life Support (ATLS) principles[10] is mandatory particularly in this group of patients.

During our study period, 18 patients (17 women and 1 man) required admission. Seventeen had fallen from the animal and one was kicked. One female patient who was kicked suffered blunt injuries to her liver and spleen which warranted intensive care monitoring. Two patients required surgical procedures to close a facial laceration and to reduce a dislocated shoulder.

The benefits of wearing protective equipment seem logical and non-controversial. A decreased incidence of head injuries has been demonstrated with the use of approved riding helmets (Barone *et al*. 1989).[14] The absence of moderate and severe head injuries in our study likely relates to the 98% [cf. p.4] compliance of our cohort with wearing protective helmets. The importance of matching riding boots and stirrups in reducing the risk of lower limb injury has also been previously alluded to[4,11] as have the benefits of body protectors in reducing the risk of truncal injury.[9] Detailed information regarding choosing and using protective equipment is freely available in the public domain.[8,12]

Horses are unpredictable; therefore, all potential risk cannot be anticipated. More than one in 10 injuries (12%) occurred due to kicks, bites and other situations where the horse was not being ridden, illustrating the unpredictable nature of these powerful animals and emphasizing the need for care when handling them. This indicates that irrespective of the amount of protection worn, a careful approach along with an awareness of one's and the animal's immediate environment should be maintained when handling horses. Strategies for injury prevention start prior to actually riding a horse. The animal itself must be carefully chosen for the age and size of the rider and instruction in riding should be sought. Novice riders with less than 50 h of riding experience are at a higher risk of being injured.[13] Doctors treating this population should also have a role in safety education during the consultation.

Our results suggest that paediatric patients as well as patients with head trauma are at higher risk of having multiple injuries. Clinicians managing these populations need to maintain a high

level of clinical suspicion when assessing these patients.

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