

## RIDING AND OTHER EQUESTRIAN INJURIES: CONSIDERABLE SEVERITY

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## ABSTRACT

All horse-related injuries presenting to an Accident Service over a two-year period were investigated. 237 patients presented. The injuries were not considerable in absolute number but were in severity. There was a high morbidity with 22% of all patients requiring admission to hospital, 50% of all admissions because of head injuries. At least seven life-threatening injuries were identified and there were other severe pelvic and spinal injuries. The wearing of protective head gear remains the most important safety measure.

Key words: Horses, Riding, Injury.

## INTRODUCTION

Addenbrooke's Hospital Accident Service serves a mainly rural population of some 350,000 including South Cambridgeshire and the town of Newmarket, a centre of the racing industry. This geographical mix means that people with both professional and recreational associations with horses present to the service with horse-related injuries. This survey was conducted in order to elucidate the frequency, nature and severity of horse-related injuries presenting to the service.

## METHOD

Between August 1982 and August 1984 all patients presenting to the Accident Service with a horse-related injury were identified on arrival. A proforma was started on each patient and clinical, demographic and accident detail data were entered. At three months after presentation follow-up data were obtained both from clinical records and from a postal questionnaire sent to every patient. If a questionnaire had not been returned within five weeks a reminder was sent.

## RESULTS

The survey identified 237 patients with horse-related injuries. This was 0.3% of all 78,000 new attendances and 4.3% of all sports-related injuries. All the identified patients were sent a postal questionnaire and 186 (78%) replied.

## Patient Characteristics

The principal characteristics are shown in Table I.

TABLE I

Characteristics of 237 patients presenting to accident and emergency.

	Female		Male		All Patients
	Amateur	Professional	Amateur	Professional	
Number	131	31	32	43	237
(Age (yrs)					
Median	16	21	36	23	21
Range	6-69	16-51	7-75	15-70	6-75
Below 20 years	61%	39%	25%	28%	47%
Admitted to Hospital	29 (22%)	9 (29%)	6 (19%)	6 (14%)	50 (22%)
Head Injuries	24%	39%	25%	26%	27%

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Twice as many females, 162, attended as did males, 75. Amateur females formed the largest group with 131 patients, 61% of whom were less than 20-years-old. The median age in this group was 16 years. The other groups contained a more even spread of ages. There was a wide range of ages in all the groups.

Fifty-seven per cent of the males and 18% of the females were professional riders. The male professionals were exclusively concerned with the racing industry, i.e. grooms, stable lads, jockeys and trainers. Half of the female professionals were concerned with recreational riding, i.e. show jumpers, livery stable owners and riding instructors. There were no agricultural workers or carters. Two patients had an incidental contact with horses.

Fifty (22%) patients were admitted to hospital. Twenty-three per cent of all females were admitted while 16% of all males were admitted.

## Injury Characteristics

No patients died during the survey. The injury characteristics of the 50 patients admitted to hospital are shown in Table II. The injury characteristics of the seven patients considered to have life-threatening injuries are shown in Table III. In addition three of the patients with a fractured pelvis were complicated; one with multiple long bone fractures, one with a urethral rupture and one with a pulmonary embolus.

50% of those admitted had head injuries although most were admitted for neurological observation after minor or

TABLE II

The injury characteristics of those patients admitted.

	Female		Male		All Patients
	Amateur	Professional	Amateur	Professional	
Number	29	9	6	6	50
Type of Injury					
Head*	15 (52%)	6 (66%)	1 (17%)	3 (50%)	25 (50%)
Cervical Spine	1	—	—	—	1
Fractures					
Spine	4	—	—	—	4
Pelvis	3	1	—	1	5
Arm	4	—	1	—	5
Leg	1	1	1	1	4
Abdominal Injury	1	—	1	—	2
Thoracic Injury	—	1	2	1	4

\*Head Injuries — These include closed cerebral concussion, skull fracture, intracranial haemorrhage or any combination of these three.

TABLE III  
Life-threatening injuries.

Patient	Age	Sex	Status	Mechanism and Ambience of Injury	Nature of Injury
1	10	F	Amateur	Hacking, lost control, fall	Extradural haemorrhage, skull fracture
2	21	F	Amateur	Point-to-point, fall	Fracture-dislocation of spine at C2/3, no spinal cord injury
3	22	F	Professional	Schooling a partially trained horse, fall	Pneumothorax complicated by pneumococcal pneumonia
4	27	F	Amateur	Hacking, horse bolted, fall	Transection of tail of pancreas
5	40	F	Amateur	Point-to-point, fall	Closed head injury, multiple rib fractures, pneumothorax
6	41	M	Amateur	Hacking, fall	Ruptured spleen
7	59	M	Amateur	Horse stumbled during gallop, crushed rider	Severe chest injury with haemopneumothorax and multiple rib fractures

moderate concussion. Four head injuries were classified as major. In three cases recovery, i.e. the period of post-traumatic amnesia, was prolonged beyond four days and in one case there was an extradural haematoma that required operation. All four patients recovered without permanent sequelae. Two patients had a skull fracture, one with a severe head injury and one with a minor concussion.

Five patients sustained a fracture of the spine. There was one fracture dislocation of the cervical spine and four fractures of the lumbar spine. All recovered without sequelae. Of the patients treated as outpatients 38 (20%) had head injuries and 47 (24%) had a fracture of which 32 (17%) were of the shoulder girdle and upper limb. The remaining 102 patients presented with soft tissue injuries (bruises, lacerations, abrasions) or joint injuries (sprains, haemarthroses). All the injuries followed acute traumatic events and there were no overuse or occupational syndromes.

#### The Mechanism of Injury

Table IV shows the distribution of the mechanism of injury. In 15% of injuries the mechanism of injury could not be determined. Most injuries (71%) were caused by a fall from the horse. This rises to 81% of head injuries and 100% of both the life threatening injuries and the four major head injuries.

TABLE IV  
The mechanism of injury.

	All Injuries	Head Injuries
Fall	142 (60%)	43 (80%)
Kick	30 (13%)	8 (15%)
Other	27 (12%)	0 (0%)
Unknown	38 (15%)	3 (5%)

#### Note

The "others" include;

Foot stepped on by hoof	8
Knocked over by horse	4
Dragged by rein	4
Bites	2

Ninety-six per cent of those who were riding at the time of the accident were wearing protective head gear. Two patients volunteered that the hat had fallen off before the patient struck the ground. Patients were questioned as to their practice with regard to wearing protective head gear. 93% always wore protective head gear, 4% sometimes and 3% never. Three of those who never wore a protective hat wore another form of hat.

Sixty-five per cent of the accidents happened during recreational riding, 20% during professional work and 15% during actual competition or races. Most occurred in open country, 38%, while 19% occurred in a competition arena or race course, 19% in a stable or stableyard, 10% on a public highway and 14% in other places (horsebox or bridleway for example). Five answers implicated a motor vehicle as contributing to the cause of the accident when the accident happened on a public road.

#### DISCUSSION

Approximately 7% of all patients attending the Accident Service at Addenbrooke's Hospital have sports-related injuries (Sherriff, personal communication). Of all patients attending, 0.3% had horse-related injuries, that is 4.3% of sports injuries. Thus the absolute numbers of riding injuries during the period of the survey was not large, yet the severity of injuries associated with horses was notable. During the two years, 50 patients were admitted to hospital; that is 22% of all horse-related injuries. In general 5-6% of all sports-related injuries at Addenbrooke's are admitted (Sherriff, personal communication). Although none of these 50 patients died seven were thought to have life-threatening injuries including one patient with an extradural haematoma, there were three other major head injuries, there were five fractures of the spine and there were three complicated fractures of the pelvis. The severity of riding injuries has been compared with that of the injuries sustained by motorcyclists (Barber, 1973).

Patients with head injuries constituted the largest group admitted to hospital. Fifty per cent of the admitted patients had head injuries, however only four of these were major. The rest were admitted for neurological observation after moderate concussional episodes, i.e. periods of post-traumatic amnesia not exceeding 24 hours. In 1973 Barber

reported from a very similar patient population a series of 154 patients admitted to hospital with riding injuries, 66% had head injuries, there were 14 with skull fractures, two with intracranial haematoma that required evacuation and one patient died. In the 50% of the admitted Cambridge patients with head injuries there were two skull fractures, one intracranial haematoma and no deaths. This reduction in the severity and frequency of head injury is probably explained by an increased usage of protective head gear. Whereas 96% of riders in this survey were wearing protective head gear at the time of the accident only 70% of the riders in Barber's study did so. Ninety-three per cent of riders who completed the questionnaire in the present study stated an intention always to wear protective head gear when riding. This is probably as good a rate of compliance with recommended safety procedure as could be achieved. Nevertheless head injuries remain numerically the principal form of injury among those admitted to hospital.

There are two ways in which head protection could be improved. Firstly there is the matter of the chin strap. Muwanga and Dove (1985) have drawn attention to the fact that protective hats often are not worn properly. They reported on 17 major head injuries associated with horses and in six instances the hat became dislodged in the course of a fall. They suggested that in many cases chin straps had not been used. Secondly there is the matter of the type of helmet worn. There are two types of protective head wear approved by the British Standards Institute. There is the jockey's cap (skull-cap) conforming to BS 4472 (1969) which was made mandatory for racing by the Jockey Club in 1968. This standard has a much higher specification for both the amount of force required to produce deformation and for the retaining system (chin strap) than the traditional velvet-covered cap that may conform to BS 6473 (1984). That the skull-cap provides a greater degree of protection is tacitly admitted by the British Standard in that BS 6473 (1984) is not recommended for cross-country riding.

Simply working with horses, unstable and wilful creatures, may be dangerous but it is the actual riding that produces the greater number and severity of injury.

All the life-threatening injuries, all the complicated pelvic injuries and most head injuries (81%) occurred during a fall. Indeed 71% of all injuries where the mechanism could be determined were caused by a fall with or without a crushing element. Edixhoven et al (1981) reported a horse-related injury study in which 50.2% of injuries were attributable to a fall or crush and a further 4% occurred while riding the horse but not falling. The fact that there were less falls as

compared with the present study is explained by the fact that 89% of the subjects reported by Edixhoven were involved professionally with horses and would be expected to spend more time working with rather than riding horses and to be more proficient in riding. This smaller number of injuries attributable to a fall resulted in fewer patients being admitted to hospital (14%) and to there being no reported life-threatening injuries and no major head injuries. There were also fewer head injuries in total; 16% among amateurs as compared with our 24% and 4% among professionals as compared with our 31%. Pounder (1984) reported on 18 deaths from horse-related injuries and 16 of these occurred after a fall.

Although the accidents happened in a wide variety of places and ambiances, 65% happened during recreational riding or activity. The most vulnerable group were the amateur females; the median age of this group was 16 years.

The outstanding inference from this study is that horse-related injuries, in comparison with other sporting injuries and absolutely, are not considerable in number but are considerable in severity. Head injuries constitute the major group of the more serious injuries. Head protection can be improved by;

- (i) The promotion of the correct usage of chin straps by all those with influence in riding circles.
- (ii) The more widespread use of BS 4472 (1969). I believe that this form of head gear should be compulsory in all competitive riding.

Most injuries occur in falls from the ridden horse. Safety measures must concentrate on the adequate supervision of the young and inexperienced rider.

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#### References

- Barber, H.M., 1973 "Horse play: a survey of accidents with horses". *British Medical Journal* 3: 532-534.
- British Standards Institute 1969 BS 4472.
- British Standards Institute 1984 BS 6473.
- Edixhoven, P., Sinha, S. C. and Dandy, D. J., 1981 "Horse Injuries". *Injury* 12: 279-282.
- Muwanga, L. C. and Dove, A. F., 1985 "Head protection for horse riders; a cause for concern". *Archives of Emergency Medicine* 2: 85-87.
- Pounder, D. J., 1984 "The grave yawns for the horseman; Equestrian deaths in South Australia 1973-1983". *The Medical Journal of Australia* 141: 632-635.