

# **BMX bicycles: accident comparison with other models**

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## **SUMMARY**

A comparison has been made between BMX bicycle accidents and those occurring when children ride other types of bicycle. The injuries sustained are compared to see if the clinical impressions that BMX are more dangerous, and produce more facial injuries, are correct.

This was found not to be true as half the children involved rode BMX bicycles, and the injuries sustained were similar to those occurring to non BMX riders. BMX riders had a lower proportion of serious injuries than riders of racing cycles. There were a large number of head injuries needing admission to hospital, but BMX riders had fewer head injuries than the other groups. The use of protective headgear was minimal. Facial injuries were evenly distributed between BMX and non BMX groups.

The major cause of accidents to BMX riders was performing stunts but, overall, poor cycling technique associated with minimal cycling experience were the factors common to 50% of accidents.

## **INTRODUCTION**

The recent BMX bicycle craze has led to children performing alarming manoeuvres on their machines. The resulting accidents are a common feature in accident departments. To assess the numbers and severity of the injuries sustained, particularly the impression that there are more facial injuries, a record was made of all children's cycle accidents.

## METHODS

A record form was completed on all children up to 14 years old who had been riding a bicycle when involved in an accident. The following information was recorded:

- Date and time of accident.
- Cyclist's description of accident, supplemented by information from ambulance crew and police.
- Cyclist's age, type of bike, experience and details of protective clothing.
- Description of injury and its management.

The injuries as assessed in the accident department were divided into three groups:  
*Grade 1*: major fracture of bone, head injury requiring admission and major chest or abdominal injury.

*Grade 2*: minor digital fractures, wounds needing suture and major sprains.

*Grade 3*: minor injuries needing minimal treatment.

## RESULTS

Period of study: April–June 1984 (91 days).

Total number of accidents: 253 (Male 80%; Female 20%).

**Table 1** Age of rider/bicycle type

<i>Years</i>	<i>BMX</i>	<i>Racing</i>	<i>Upright</i>	<i>Child's</i>
0–4	1	—	—	8
5–9	45	2	3	46
10–14	79	35	17	17
Total (%)	125 (49.4%)	37 (14.6%)	20 (7.9%)	71 (28.1%)

## Definitions:

*Racing type*. A bicycle with drop handlebars and derailleur gears regardless of size.

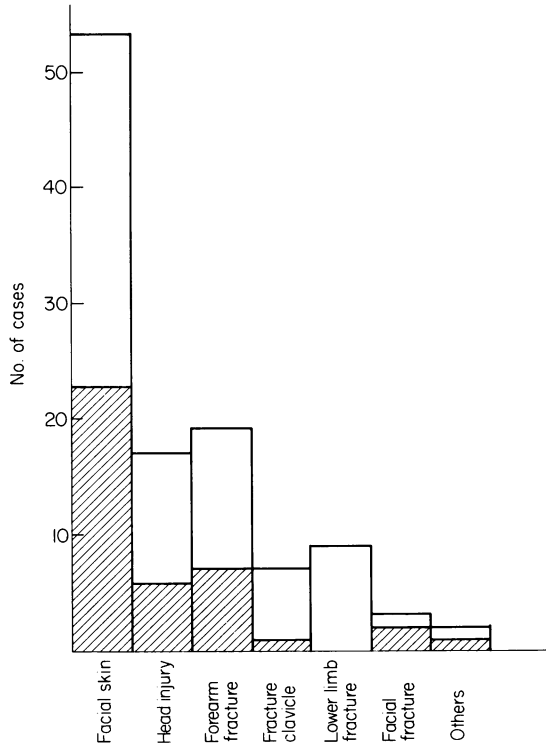
*Upright type*. Standard upright bike with 22 to 26 inch wheels.

*Child's type*. A group of small-wheel bicycles of varying frame design, smaller than the upright category.

**Table 2** Severity of injury (% of cycle group)

<i>Grade</i>	<i>BMX</i>	<i>Racing</i>	<i>Upright</i>	<i>Child's</i>	<i>Total</i>
1	24 (19%)	12 (32.4%)	3 (15%)	15 (21%)	54 (21.7%)
2					92 (36.3%)
3					106 (42%)

Major fractures: 43. Number of patients admitted: 23 (9% of total).



**Fig. 1** Histogram of anatomical distribution of major injuries. Shaded area shows proportion due to BMX.

## DISCUSSION

BMX bicycles accounted for nearly 50% of the accidents in this survey. This is not an excessive proportion given the prevalence of BMX in general use.

Table 1 shows how the cycle type ridden varied with the age of the rider. It is quite common for older children to ride smaller 'child's type' bicycles, as they find it easier to perform stunts and skids on them.

There was no significant difference between BMX and non BMX riders in the seriously injured group. Children riding racing cycles had a higher proportion of serious injury than any of the other groups. This is probably due to a combination of factors associated with their use and design. Most accidents with racing cycles occur on the road (75%), and 30% involve a collision with another vehicle. There is also a longer sideways fall from the normal riding position, usually on to an outstretched arm. This is reflected in the numbers of fractures of the clavicle (Fig. 1), six occurring to racing cyclists and only one to a BMX rider.

Facial injuries were common (21% of total numbers). Significant fractures occurred more often to BMX riders (Fig. 1), but lacerations were equally divided between BMX and non BMX groups. It is probable that the more serious facial injuries occur to BMX

riders as accidental dismount usually occurs over the handlebars (30% in this series). Specialist advice from the faciomaxillary team was sought in 37% of the facial injuries, giving them approximately one new trauma case per week from a bicycle.

There were no cases of serious abdominal trauma as described elsewhere (Soysa *et al.*, 1984; Sparnon, 1984; Tuck, 1984; Chapple, 1984). Only one child from a BMX accident presented with a minor bruise to the abdomen due to impact with the handlebars.

Significant head injury occurred in 30% of those seriously injured, and caused the only death in this study. Riders of BMX bicycles had a lower incidence (Fig. 1) than other cyclists but this was not statistically significant. None of those admitted with a head injury were wearing any protective headgear.

BMX riders had all the serious lower limb injuries. Although numbers are too small to be significant, this may be due to the riding positions. The legs are flexed much further whilst sitting, and all major stunts are performed standing on the pedals. This position leaves the legs exposed and the falling bike can exert more leverage on the limb.

In investigating why and where the accidents occurred, a previously noted pattern was found. The most frequent cause in BMX riders was stunts (37%), a figure that compares with other series (Illingworth, 1984; Chapple, 1984). However, commonest overall was poor riding technique. Thus, the accident occurred solely due to the rider's mishandling of the bicycle, e.g. 'foot came off pedal—fell off'. This agrees with a study which included adults (Ballham *et al.*, 1985).

Collisions with other vehicles occurred in 18% of accidents. Cars were most frequently involved (54%), another bicycle was hit in 33% and the other objects involved ranged from vans to pedestrians and dogs.

The accident site varies with the type of cycle ridden. BMX accidents tend to happen off the road (68% of total), with the local skateboard track providing 12% of these. The smaller child's bikes are also usually ridden off the road (73%). In contrast only 25% of racing cycle accidents and 30% of the upright cycle group occurred off the road.

The cycling proficiency test is the national standard for handling a bicycle. It is offered to children around the age of 10 years. In the 10 to 14 year age group 70% of children had not taken this simple test.

The experience of the rider also relates to the ability to handle the bicycle. Of these children 49% had ridden the bicycle involved in the accident for less than six months. It is interesting to note that this figure is independent of total cycling experience, as 87% of this group had ridden a bicycle for over 2 years. The number of children with more than 2 years experience of their bike before the accident was small (8% of total) suggesting that this decreases their chance of having an accident.

Protective clothing was only worn by 10 children. This may indicate its efficiency in protection against injury, but despite BMX culture extending to padding and helmets, very few children appear to wear it.

## CONCLUSIONS

BMX bicycles do not seem to be more dangerous than the other models ridden by

children. All types of cycle accidents produce facial injuries, and the increasing number of these probably represents the popularity of the bicycle generally, rather than the upsurge in BMX.

In view of the more serious accidents happening on the road and the large number due to poor bicycle handling, perhaps enforcement of the proficiency test should be considered.

The number of head injuries makes development of a light acceptable helmet urgent, and encouragement to use such an item will increase the safety of an enjoyable activity.

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