

PREHOSPITAL CARE

Pattern and severity of injuries in micro-scooter related accidents

K Adeboye, L Armstrong

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See end of article for authors' affiliations

Correspondence to:
Mr K Adeboye, 27
Chaldron Way,
Eaglescliffe, Stockton on
Tees TS16 0SD;
kay.ade@lineone.net

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Objectives: To examine the pattern and severity of injuries sustained by children following micro-scooter (MS) accidents, and to document the extent of use of protective clothing in these accidents.

Methods: Prospective data collection on all children with MS related accidents from January to June 2001. Demographic data were collected, including the mechanism of injury, place of accident, use of protective clothing, extent of injuries, and injury management. Injury severity score was calculated for each child.

Results: A total of 92 children with 104 injuries were seen during the study period. Male and female sex distribution was similar. The pattern of injuries was similar to those from roller blading accidents. Soft tissue injuries constitute 79.8% (83 of 104) and fractures 20.1% (21 of 104). Injuries of the upper limb particularly the wrists were commonest for both soft tissue and fractures. The mean ISS (SD) was 2.08 (2.31) with a range of 1 to 18. No deaths were recorded during the study period and all the head injuries seen were minor in nature. None of our patients wore any protective clothing, and almost all accidents occurred in public places.

Conclusions: MS related injuries are on the increase. Currently, the manufacturers' advice on use of protective clothing is being ignored. Parents and riders of the MS need to be educated about the related injuries. The use of protective clothing should be encouraged to reduce injuries.

Injuries are common reasons for children to attend accident and emergency departments. Injury is the leading cause of morbidity and mortality in children aged 1–14.¹ The recent government green paper *Our healthier nation* has made the reduction of accidents and injuries a priority. By the year 2001, the green paper proposes that the incidence of preventable accidents should be reduced by one fifth.²

Over the past few months, we have witnessed a gradual increase in the number of injuries related to the micro-scooters (MS) in children presenting to our accident and emergency department. This increase was particularly noted after the Christmas period when MS were a popular gift item.

The rise in MS related injuries followed the trend that had been noted in the USA after the introduction of the MS to that society in the year 2000.³ Data collected over the first eight months of the year 2000 in the USA recorded about 9500 MS related injuries with no deaths reported.³

In the UK, there are currently no national figures for MS related injuries and only a single fatality has been reported in the news journals of a child that rode into the path of a vehicle.⁴

The typical MS is lightweight, weighing about 5 kg. They are made of titanium or aluminium. They possess a collapsible handle, a narrow base, and run on low friction wheels similar to those for in-line skating.³ They are foot/self propelled and have a simple braking mechanism operated by the back foot exerting pressure on the back wheel. The MS is most popular with children under 15 years old.

This prospective study looked at the pattern of injuries from MS related accidents and whether the patients followed the manufacturers advice to wear protective clothing.

METHODS

This prospective study was based at the accident and emergency department of North Tees University Teaching Hospital in the North East of England. This department serves

mostly an urban population with a small rural percentage. The study was from January until June 2001. All MS related accidents were documented, but only accidents involving children (less than 16 years) were analysed in the study. At the beginning of the study, all personnel in the department were informed of the study and the nature of data to collect. Data were collated by a combination of methods. Information gathered included age, sex, place of incident, the model of the MS (if known), and use of protective clothing. This was performed by a brief interview by Department of Trade and Industry (DTI) accident clerks. Further information was gathered from the accident and emergency notes for mechanism and nature of injuries, outcome and the use of imaging. Radiology reports were examined to confirm the presence of fractures. Place of accident were classed either as home (driveways), or public place such as roads, pavements, or public recreational areas (parks). Injury severity score was calculated for each child.

RESULTS

For the study period (January to June 2001) 92 children were seen with MS related injuries with a total of 104 injuries. There were 52 boys and 40 girls. These constitute about 1.53% of our paediatric attendance for the study period. The mean (SD) age being 9.36 (2.73) years with a range of 3 to 15 years. There were eight adults (over 17 years) with MS related injuries, these were not included in the analysis. The male:female ratio was 1.3:1 and 51% of our patients were over age 10 years.

Of the 104 injuries, 21 were fractures, and the other 83 were soft tissue injuries. The mean injury severity score (ISS) and SD for soft tissue injuries was 1.54 (1.50) with a range of 1 to 4 and for fractures, mean ISS (SD) was 4.1 (3.58) these figures

Abbreviations: MS, micro-scooter; ISS, injury severity score

Table 1 Anatomical distribution of fractures

Upper limb	16 (12 wrists, 2 forearms and 2 fingers)
Lower limb	3 (ankles)
Head and neck	2 (teeth)

were skewed by a single displaced forearm fracture of both radius and ulna. The median ISS for fractures was 4. The combined ISS (SD) for all injuries was 2.08 (2.31) with a range of 1 to 18. The anatomical distribution of injuries are shown in tables 1 and 2.

Soft tissue injuries predominate. The commonest injuries were of the upper limb especially around the wrist. Sprains and fractures around the wrist constitutes almost 27% (28 of 104) of all injuries. These were followed by facial lacerations. All head injuries seen were minor in nature.

DISCUSSION

Presently, very little has been published on injuries related to MS. This is because the MS is a recent introduction to the list of recreational toys/devices (although the manufacturers deem the MS as a means of travel and not a toy). The MS shares a few features that are similar to the roller blades and in-line skates particularly that they are self propelled, narrow based with low friction wheels, and possibly similar in speed generated on the flat. The MS has a rudimentary braking system and differs in possessing a steering mechanism.

Much has been published regarding injuries sustained by in-line skaters and roller bladers.⁵⁻⁹ The pattern of injuries sustained from MS accidents in this study are quite similar to those sustained by children from in-line skating and roller blading despite the scooter possessing a steering mechanism.⁵⁻⁹

There is a predominance of sprain injuries particularly of the wrist. The commonest fractures also involved the wrist. The most frequent mechanism of injury was attributable to loss of control of the MS and a fall onto outstretched arms.

Almost all accidents occurred in public places, especially on pavements with few accidents occurring in patients' own driveways. All injuries occurred in children using the scooter and none involved a non-rider despite most accidents being in public places. This differs somewhat from roller blading accidents where the public have been injured.⁸ The difference may be attributable to the ability to steer the MS.

Reported injuries so far have been mostly of low severity. No deaths occurred over the study period. One of our patients required inpatient care for fracture manipulation under anaesthesia, while two patients with fractured teeth required maxillofacial follow up. Most other injuries required simple intervention for wound care and fracture immobilisation. In the USA, legislation to compel riders of MS to wear protective clothing—helmets, pads, and wrist guards—has been suggested.³ None of our patients wore any protective clothing. This is in total breach of the manufacturers' advice. Unlike in roller blading, there are no specific clothing designed for users

of MS. Retailers do not particularly promote the use of protective clothing with MS. It is also possible that parents lack the appreciation of the potential speed that can be achieved by MS, particularly on slopes and the possibilities for injuries. Wrist guards have been shown to increase the threshold for fractures of the forearm and wrists in falls onto outstretched arms.¹⁰ All people involved in the sale of the MS should encourage parents and their children on the use of protective clothing to reduce injuries associated with MS accidents.

In conclusion, this study shows MS related injuries are on the increase. Currently, the need for protective gear as advised by the manufacturers is being ignored. So far injuries have been mostly of low severity. This may change, as children become more adventurous with the activities performed with the MS. Parents and riders should be educated on the potential injuries associated with the MS and take similar precautions to those used by the cyclists.

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Contributors

K Adeboye initiated the study, collated the data, and was involved in the drafting and editing of the paper. He is the guarantor of the paper. L Armstrong was involved in data collection, drafting, and editing of the paper.

Authors' affiliations

K Adeboye, L Armstrong, North Tees General Hospital, Stockton on Tees, UK

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Table 2 Anatomical distribution of soft tissue injuries

	Laceration	Contusion	Sprain	Abrasion	Total
Head and face	18	1	-	1	20
Upper limb	2	12	17	4	35
Lower limb	3	8	6	-	17
Trunk/chest	-	2	-	-	2
Head injury		9			9
Total	23	32	23	5	