BRIEF REPORT

Incidence of trampoline related pediatric fractures in a large district general hospital in the United Kingdom: lessons to be learnt

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Aim: To test the observation that the incidence of trampoline related pediatric fractures is increasing—both nationally and in a large district general hospital.

Method: A retrospective analysis was undertaken of patient records establishing mechanism of injury of pediatric fractures over three consecutive summers from 2000–03. Theatre records of fractures treated operatively were used as the initial data source.

Results: A statistically significant increase in trampoline related injuries was discovered. This reflects the rising incidence of injuries from national data and furthermore corresponds to the growing popularity of domestic use trampolines in the UK.

Conclusion: The incidence of injuries is increasing. There are lessons to be learnt from existing work from countries where trampoline prevalence has been greater for longer. The authors recommend various safety measures that may reduce children's injuries.

all cases of pediatric fracture necessitating a general anesthetic over a period of three summers.

METHOD

A retrospective analysis of operative records for July and August, 2001–03, was undertaken to identify all children (0–18 years) who required surgery, thus isolating the “serious” fractures. July to August is the period when most child fractures are seen,^{1,2} corresponding to long hours of daylight³ and summer holidays in the United Kingdom.

RESULTS

These figures suggest that trampolines are less dangerous than climbing frames and other playground equipment, cycling, playing football, and even falling. However the percentage of trampoline related fractures seen at our hospital has increased significantly ($p = 0.002$ using Fisher's exact test).

Further examination of the trampolining injuries show a preponderance of upper limb injuries, as is true of pediatric fractures in general. This study only examined those injuries that required general anesthesia.

DISCUSSION

Injury statistics from the Royal Society for the Prevention of Accidents (RoSPA) based on detailed injury data collected from 18 representative hospitals reflect our finding.

In 2004, we observed a large number of children presenting with fractures sustained during trampolining and felt we had a role in preventing these injuries. To assess our observation further we examined the mechanism of injury in

Table 1 Mechanism of injury of all pediatric fractures treated using general anesthesia in the summer months of 2001–03

Mechanism of injury	Year			Total
	2001	2002	2003	
Falls on ground	18 (19.6%)	13 (12.1%)	13 (18.0%)	44
Climbing frame	12 (13.0%)	8 (10.5%)	6 (8.3%)	26
Football	9 (9.8%)	7 (9.2%)	8 (11.1%)	24
Bicycle	9 (9.8%)	8 (10.5%)	5 (6.9%)	22
Playground equipment	10 (10.9%)	8 (10.5%)	4 (5.6%)	22
Furniture	6 (6.5%)	4 (5.3%)	5 (6.9%)	15
Trampoline	1 (1.1%)	1 (1.3%)	8 (11.1%)	10
Fence/wall	4 (4.4%)	2 (2.6%)	3 (4.2%)	9
Roof/tree	3 (3.3%)	4 (5.3%)	1 (1.4%)	8
Ice skating	3 (3.3%)	3 (4.0%)	0 (0%)	6
Punch	1 (1.1%)	1 (1.3%)	4 (5.6%)	6
Piggyback	1 (1.1%)	3 (4.0%)	0 (0%)	4
Sports equipment	0 (0%)	2 (2.6%)	2 (2.8%)	4
Bouncy castle	0 (0%)	2 (2.6%)	1 (1.4%)	3
RTA pedestrian	2 (2.2%)	1 (1.3%)	0 (0%)	3
RTA passenger	1 (1.1%)	0 (0%)	1 (1.4%)	2
Skateboard	2 (2.2%)	0 (0%)	0 (0%)	2
Horse	0 (0%)	1 (1.3%)	1 (1.4%)	2
Missing record	10 (10.9%)	8 (10.5%)	10 (13.9%)	28
Total	92	76	72	240

RTA, road traffic accident.

Figure 1 Estimated incidence of trampoline related fractures in the UK (extrapolated from detailed accident and emergency data from 18 representative hospitals) for children aged 0–18 years. Kindly provided by the Royal Society for the Prevention of Accidents.

The prevalence of domestic trampolines is increasing; 40 000 were sold in 2003 in the United Kingdom, a substantial increase over 2001. Trampolining is a popular activity long enjoyed in other countries. Clinicians working elsewhere have also made the association between trampoline prevalence and fracture incidence.⁴ Smith *et al*⁵ report data extracted from The National Electronic Injury Surveillance System of the United States Consumer Product Safety Commission. They found a 98% increase in trampoline related injuries presenting to emergency departments from 1990–95. This corresponds to an estimated fivefold increase in trampoline sales during the same period.

We have focused on fractures requiring reduction under anesthesia—either open or closed—but these injuries, although the most serious, are likely to be only the tip of the iceberg. Studies in the United States demonstrate that only 3% of trampoline related injuries require hospital admission.² Ninety percent of our fractures involved the upper limb—similar to findings in New Zealand.⁶

Detailed data from one hospital in Utah¹ show that over 60% of the injuries seen had been sustained when there was more than one child on the trampoline and that the periphery of the trampoline, including the springs, is frequently associated with injury.

CONCLUSION

The Royal Berkshire Hospitals serve an estimated population of 500 000 and represent one of the largest trusts in the country. We have identified a worrying trend in the incidence of pediatric fractures related to trampolining and our statistics are mirrored by both RoSPA and international findings. Although few can deny the fun of this activity, as a matter of public health clinicians should support the

Key points

- The incidence of trampoline related pediatric fractures was seen to increase in a large district general hospital.
- This observed increase reflects the rise in injuries seen using representative national data.
- Fractures of the upper limb supersede those of the lower limb.
- Restricting the number of children on a trampoline, padding of springs and exposed metalwork, the use of safety mats and circumferential netting, and discouraging complex maneuvers are all measures we recommend to reduce the incidence of injuries.

following safety suggestions: no more than one person on a trampoline at once; children to be supervised; exposed metalwork to be padded; somersaults and complex maneuvers should be discouraged; falls off a trampoline should be prevented or made safer with methods such as digging the trampoline into a pit level with the ground, putting padding on the ground, and/or adding circumferential netting.

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