

Orthopaedic Injuries Associated with Hoverboard Use

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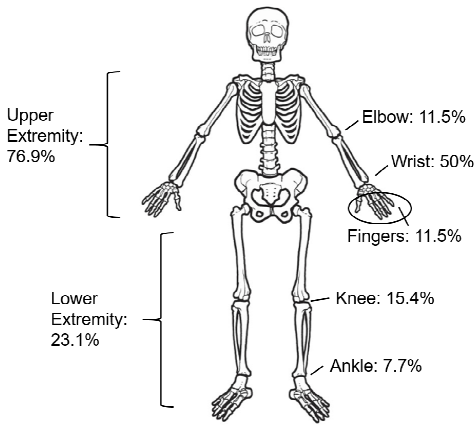
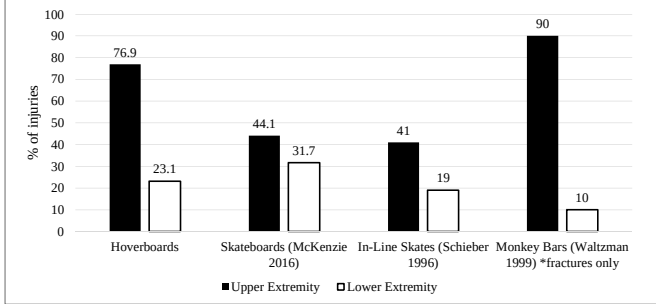
OBJECTIVES

The first hoverboard prototype was released in April 2015, and sales surged in the latter half of the same year and the winter holiday season. A hoverboard is a handle-less motorized scooter that uses electronics and precision sensors to accelerate in the direction the user transfers his or her body weight. Its utilization requires a keen sense of balance and control, and therefore poses significant risk of both forward and backward falls, as well as a risk of fingers catching in the wheels. As a result, since its release, the hoverboard has been associated with various orthopaedic injuries, particularly in children, including upper extremity fractures related to falls and non-orthopaedic injuries, such as burns and concussions. However, the public health implications of this new popular toy have yet to be explored in the orthopaedic literature. The current study assesses the nature of orthopaedic injuries and the clinical resources utilized associated with hoverboard injuries at a single, high-volume, regional pediatric hospital over a three month period.

METHODS

- Departmental database of Emergency Department (ED) consultations and Urgent Orthopaedic Clinic (UC) visits query using a word search for 'hoverboard' and 'hover board'
- Retrospective medical record review performed for all patients presenting in the 90-day period between 12/25/15 and 3/25/16, with confirmation of an injury related to hoverboards.
- Demographic data: DOB, age, gender, height, weight, BMI
- Injury information: DOI, mechanism, diagnosis, location of injury, protective gear
- Clinical course: time missed from school/sports, length of recovery, follow up visits
- Resource utilization: imaging, casting, reduction, surgery, hospital admission
- Comparison to frequency of hoverboard-related consultations to monkey bar-related injuries and separately for supracondylar fractures.

Figure: Comparison between rates of upper and lower extremity injuries related to hoverboards, skateboards, in-line skates and monkey bars.



RESULTS

- 26 patients with orthopaedic hoverboard injuries presented to ED and/or UC in the study period
- 13 (50%) presented to the ED, ~2.2% of all orthopaedic ED consults over that period, compared to:
 - 1.5% for monkey bar injuries
 - 7.3% for supracondylar fractures
- 20 (77%) injuries involved the upper extremity; 13 (50%) were distal radius fractures, representing the most common hoverboard-related diagnosis (figure left).
- The following resources were utilized for hoverboard injuries over the 3-month study period:

Resource	N	% of total cases
Patients presenting to ED or UC	26	100%
ED Orthopaedic Consults	13	50%
Initial UC Visits	13	50%
Orthopaedic Clinic Follow-Up Visits (≥3)	19	73%
Radiographs	25	96%
Advanced Imaging (CT, MRI)	5	19%
Anesthesia	9	35%
Surgeries	4	15%
Casting	22	85%

CONCLUSIONS

The introduction of the hoverboard, a popular new toy marketed primarily towards children, was associated with a variety of orthopaedic injuries often requiring significant utilization of resources in the ED, UC, follow up orthopaedic clinics and the operating room. Other specific recreational activities, toys, or apparatuses, such as skateboarding, in-line roller skating, trampolines, and monkey bars have traditionally been associated with pediatric orthopaedic injuries well known to emergency and orthopaedic departments (figure above). As these activities became more popular and widely used, numerous studies have been published and safety measures have been implemented. None of the patients in this study reported wearing safety gear, and the rates of missed school and activities as a result of hoverboard-related injuries are high. These data may represent a starting point for further multi-center research and public health efforts towards prevention measures related to hoverboard injuries.

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