Scooter Injuries in Children

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ABSTRACT. Objective. To describe a series of nonmotorized scooter-related injuries to children to increase public awareness and encourage prevention of such injuries.

Design. A descriptive study of a consecutive series of patients.

Setting. The pediatric emergency service of a municipal hospital.

Participants. All children <18 years old who presented to the Pediatric Emergency Service (PES) with a scooter-related injury from July through September 2000.

Methods. Patients were identified by review of the PES medical records. Charts were reviewed for patient data including age, place of injury, use of protective gear, adult supervision, injury sustained, medical management, and disposition.

Results. There were 15 children treated in the PES for scooter-related injuries. The mean age was 7.8 years, 73% were male. Approximately 90% of injuries occurred as a result of falling off a scooter. Irregular pavement caused 3 falls and tandem riding caused 2 falls. Inability to use the foot brake caused 1 collision, and 1 child was hit by a motor vehicle while crossing the street. Injuries occurred in a park (33%), on a sidewalk (47%), in a home (13%), and on the street (7%). Adult supervision was present in half of the cases. Only 2 children were wearing helmets at the time of injury; none wore protective padding. Five children (33%) suffered head trauma; 1 lost consciousness, and 2 suffered amnesia. Three children required a head computed tomography scan, and 1 required cervical spine radiographs. All radiographs were negative. None of these 5 children were wearing helmets. Seven children (47%) sustained facial injuries, and 4 of these children required laceration repair. Seven children (47%) sustained extremity trauma, including 1 laceration and 6 fractures (1 supracondylar, 1 distal radius, 2 radius/ulnar, 1 tibia/fibula, and 1 patella). Four fractures involved the upper extremity. Four fractures were managed by closed reduction; 2 required operative repair. One child required splinting of an avulsed tooth. Three of the children (20%) were admitted. The 5 children with head trauma were observed and released.

Conclusion. The use of nonmotorized scooters by children may result in serious injury, particularly in the young child. Although not life-threatening, these injuries require significant medical intervention and may result in permanent functional and cosmetic deformity. These injuries are potentially preventable with the proper use of protective gear and supervision. Public and parental awareness and education are essential to prevent additional injuries.

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falls in 3 children. Two children fell while riding tandem with another individual. One child collided with a wall because of inability to properly use the foot brake. One child was hit by a motor vehicle while riding the scooter across the street.

Location of Injury
Six children were riding in a park when they fell; 6 were riding on the sidewalk. Two were injured while riding in their apartment building hallway. One child was crossing the street.

Contributing Factors
Adult supervision was present in ~50% of cases. All injuries occurred in clement weather. One child recalled the scooters’ wheels were wet because of a sprinkler in the park. Only 2 children were wearing a helmet, and none wore protective padding.

Injury Pattern and Management
Five children (33%) suffered head trauma; 2 had amnesia and 1 lost consciousness. Three children required a head computed tomography, and 1 of these had radiographs to evaluate for cervical spine injury. All of these radiographs were negative. Seven children (47%) sustained facial trauma; 4 of these involved facial lacerations requiring suturing. Seven children (47%) sustained extremity trauma; 1 involved a laceration requiring suturing and 6 involved fractures (1 supracondylar, 1 distal radius, 2 radius/ulnar, 1 tibia/fibula, 1 patella). Of the 6 patients with fractures, 4 involved the upper extremity. Four fractures were managed by closed reduction with sedation performed in the PES; 1 supracondylar fracture and 1 patella fracture required open reduction. One child had a tooth displacement requiring splinting.

Disposition
Three children (20%) were admitted to the hospital for management of orthopedic injuries. The 5 children who sustained head trauma were observed for 6 hours in the PES and released.

DISCUSSION
The popularity of the nonmotorized scooter is rapidly rising. As retail sales soar, so do the injuries associated with this recreational vehicle. We describe a series of injuries sustained by children riding scooters to increase awareness of the potential for serious injury and to recommend improved preventive measures.

Studies have described severe injuries, including orthopedic and head trauma, with skateboard and inline skating use in children. Because no published reports exist for scooter injuries, one may extrapolate the data from these studies. The scooter’s design likens it to a skateboard with handlebars and a foot brake (Fig 1). Scooters are made of lightweight aluminum, with small low-friction wheels of the same type seen on inline skates. Scooters may achieve coasting speeds up to 5 to 8 mph or faster, depending on the strength and weight of the rider and the incline of the riding surface. The rider typically pushes off with 1 foot, then places both feet on the base of the scooter and glides. This requires coordination and balance.

Although most scooters are marketed for children >7 years old, it is common for much younger children to be seen using these scooters. Young children may not have the ability to ride scooters properly. Their poorer motor skills may prevent them from appropriately breaking a fall. Additionally, their high center of gravity may make balancing a more difficult task, and thereby predispose to falls during rides and turns. Finally, a young child’s cognitive immaturity may place him in potentially dangerous settings, such as on a busy street.

According to the NEISS’ data from January to October 2000, 85% of scooter-related injuries occurred in children <15 years, with one third of these in children <8 years old. This led to the CPSC recommendation of an 8-year age limit for scooter use. Our series parallels their data, with one third of the children injured <8 years old, and a mean age of 7.8 years. This highlights the fact that 33% of all children injured riding scooters are younger than the CPSC’s recommended age limit.

As in the NEISS data, our study found males outnumbered females for injuries (2:1). The NEISS’s data reports that 27% of injuries affected the head and face, 42% of injuries involved the upper extremity, and 24% of injuries involved the lower extremity. In
contrast, over half of our patients suffered head and facial injuries, and 47% suffered extremity trauma. Our study compliments the CPSC database by providing additional details related to the injury mechanism, such as the use of protective gear, supervision, and injury outcome.

Only 2 children were wearing a helmet in our series, and none wore protective padding. Of the 5 children who sustained head injury, none were wearing a helmet. Interestingly, many scooters are marketed with photographs of children riding the scooter without a helmet or protective padding. Additionally, scooters are sold without protective gear in most retail venues. Most of the injuries in our series may have been prevented with proper use of simple protective gear. Research has proven the effectiveness of protective gear in reducing injuries sustained during bicycling and inline skating.7 Schieber et al8 in a case-control study of inline skaters found that the use of wrist guards could reduce wrist injuries by 87%, elbow pads could reduce elbow injuries by 82%, and knee pads could reduce knee injuries by 32%. Thompson et al9 in a meta-analysis of 5 case-control studies found that helmet use for bicyclists provided a 63% to 88% reduction in the risk of head injury. The same benefits may be applied to scooter riding. Two children were injured while riding tandem with another individual. This highlights the risks of riding tandem and demonstrates that even in close supervision, young children may fall and become injured.

There were no serious intracranial or intra-abdominal injuries. Although not life-threatening, the injuries identified, such as facial lacerations, fractures, and head trauma, are serious injuries resulting in potential permanent functional disability and cosmetic deformity. Three patients required hospital admission for orthopedic management of fractures. Five patients with head trauma were observed for 6 hours in the PES and discharged. In other hospital settings, this extended observation may have required hospital admission and would have increased the percentage of hospitalization in this study.

Limitations of this series are because of the retrospective design and small number of patients reported. The patient population in an urban city hospital may not be generalizable to all children injured with scooters.

**CONCLUSION**

The recent increase in nonmotorized scooter use has led to an increase in scooter-related injuries. Although not life-threatening, these injuries are serious and require significant intervention. Most scooter-related injuries are preventable if proper protective gear is used. The use of helmets and of wrist, elbow, and knee padding should be encouraged. Compliance with recommended age limits and close supervision of younger-aged children while riding scooters may help to protect young children from harm. Improved awareness of primary care providers who counsel patients and parents, as well as implementation of community education initiatives, are needed. Responsible marketing by manufacturers and vendors of scooters should be encouraged. Local, state, and federal legislation enforcing helmet use and restricting scooter use from public roadways need to be implemented to further prevent injuries from scooters.

**REFERENCES**

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