

Lawn Mower Injuries in Pediatrics

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Disclosures

• I have no disclosures.



Objectives

- 1. Review common injuries associated with lawn mower injuries.
- 2. Review general medical management of injuries.
- 3. Identify pediatric considerations when treating a child with a lawnmower related injury.
- 4. Discuss injury prevention related to safely operating a lawnmower.



Why is this topic important?

- 1. More than 9,000 children go the ER for lawn mower related injuries.
- 2. More than 17,000 cases when including PCP visits
- 3. Commonly injured body parts include lower extremity, upper extremity, and head/neck.
- 4. Leading mechanism of injury was run over/backover.
- 5. Majority of children injured were boys (77.2%)
- 6. The most common age group injured are less than 5 years old and 13-17 years of age.
- 7. High morbidity
- 8. High cost associated with amputations



Common Mechanism of Injury

Projectile

• Sticks, rocks, toys, etc

Touching hot surface

Run over/backed over

• 39% of children injured when mower was in reverse

Common Areas of Injury

- Lower extremity
 - Upper leg, knee, lower leg, and ankle
- Upper extremity
 - Shoulder, upper arm, elbow, lower arm, and wrist
- Hand/finger

- Head and neck region
- Globe of eye

- Trunk
 - Upper trunk, lower trunk, and pubic region





Children treated for lawn mower-related injuries in US emergency departments, 1990-2014 Ren et al, American Journal of Emergency Medicine, 2017

- Ages < 18 years of age
- Results
 - 212,258 children received care at ER, equaling avg 11.9 injuries per 100,000 US children
 - Overall rate of injury decreased over the years.
 - Leading diagnosis laceration
 - Hand/finger most commonly injured body part
 - MOI: struck by, cut by, and contact with hot surface
 - Younger patients more like to come into contact with hot surface
 - Projectile assoc. with 49.8% of all injuries patient injured as bystanders
 - More likely to be admitted if bystander or passenger vs operator of lawn mower.

Focus on injury prevention efforts.



Pediatric Lawn Mower Injuries Presenting at a Level I Trauma Center, 1995-

2015 A. Fletcher, R. Schwend, M. Solano, C. Wester, & D.E. Jarka (2018) *Journal of Bone and Joint Surgery*

- All patients 0 to 18 years of age who presented to Children's Mercy Hospital, Kansas City, MS
- Results
 - 175 patients were identified, age peaks at 4 and 15 years of age
 - 75% were male
 - 66% admitted to the hospital, with a mean length of stay of 6 days
 - Average of 3 operations performed
 - Lower extremity injuries were most prevalent
 - 40% of the patients with a lower extremity injury required an amputation
 - Average ISS 8
 - Significant predictors were a riding lawn mower, be the passenger on the mower or be a bystander, be injured with a grandparent operator, and live in a nonmetro/rural location
 - Younger children also had higher ISS and higher amputation rate

> Conclusion: These are preventable injuries. Focus on education and safety.



Treatment

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In the Hospital and Beyond



Multidisciplinary team approach can includes...

- Trauma Service
- Orthopedics Surgery
- Vascular Surgery
- Plastic Surgery
- Hospitalist
- Dietician
- PT/OT
- Psych Services
- Child Life
- Infectious Disease

Spectrum Health Helen DeVos children's hospital

Surgical Treatment

- □ Irrigation of the wound
- Debridement of the devitalized tissue
- Bone stabilization
- □ Primary wound closure
 - Possibly delayed
 - Local tissue
 - Negative pressure therapy, VAC
 - Skin grafts, flaps, or healing through secondary intention





Medical Treatment

- 1. Antibiotics
- 2. Pain management
- 3. Child life referral
- 4. Nutrition
- 5. Psych consult
- 6. Blood management



Amputations

- Causes of amputations
 - Caught between objects
 - Machinery
 - Lawn mower (common for <5 and 15-17 years of age)
 - Most commonly foot or toes
 - Power tools/other cutting instruments
 - Explosive/firearms
- In general, amputations are one of the most costly traumatic injuries
- Require lengthy hospital stays
- Numerous surgical procedures
- Postoperative and/or rehabilitative care
- Long term consequences largely unknown- depends on age/time/location of amputation





Cost

- Missed school days
- Parents/guardians miss work
- Pain, nausea, poor oral intake, poor nutrition, poor wound healing
- Psychological care for child and parent, ongoing
- More than \$25,000 for initial hospitalization
- If amputation occurred- long term prosthetics (\$45-75 million annually)





Long Term Psychological Concerns

- Depression
- Anxiety
- Altered goals and plans for their future
- Altered goals and plans for their athletic capabilities



History of Lawn Mower Safety



Voluntary safety specifications first published by the American National Standards Institute and the Outdoor Power Equipment Institute

Revised periodically since

Improved design over the years is a contributing factor in decline of lawn mower-related injuries.

Safety Measures



Spectrum Health Helen DeVos children's hospital

- Weighted seat
- Automatic stop if gears not engaged
- Move pull start to rear of machine versus side
- Blade/chute covers

Safety Measures



- Rollers and shields- prevent hands/feet from going under the mower
- Tamper-resistant no mow in reverse mechanism
 - 2004- required all ride on mowers (except zero turn) to be equipped with NMIR feature that disengages the blades when mower is placed in reverse
 - However, most of these models also have an override switch...





Injury Prevention & Education



At what age should a child be mowing the lawn?



- •12 years of age for a walk behind power mower or hand mower
- •16 years of age for a riding lawn mower



What education can be provided to the adults using the lawn mower?

- Be sure the area is clearchildren inside or a safe distance away.
- Check conditions- do not mow in bad weather, wet grass, or in the dark.
- Clear the area or debris.
- Do not allow children to ride along.

Education

- Wear closed toe shoes, close fitting clothes, safety goggles, and hearing protection.
- Watch for potential projectiles- tall grass can hide dangers.
- Do not use a damaged mower.
- Use the protective shields, guards, and grass catchers if available.
- Do NOT pull the mower backwards or mow in reverse.
- Use extra caution when mowing on a slope
 - Mow across the slope (side to side) when using a walk-behind style to avoid slipping under the blades.
 - Mow up and down the slope when using a ride on mower to avoid tipping.
- <u>ALWAYS, ALWAYS, ALWAYS</u> BE AWARE OF WHERE CHILDREN ARE WHEN MOWING. CHILDREN TEND TO BE ATTRACTED TO MOWERS.



Education

- Stop the engine and let the mower cool before...
 - Refueling
 - Crossing gravel paths, roads or other areas.
 - Unclogging the chute
 - Walking away from the mower





Educational Resources







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