Lawnmower Injuries in Children
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Epidemiology

• ~140,700 lawn mower related injuries to individuals 20 years of age and younger treated in ERs in the USA from 1990-2004.


NUMBER OF LAWNMOWER INJURIES BY AGE AND GENDER

Epidemiology

• ~140,700 lawn mower related injuries to individuals 20 years of age and younger treated in ERs in the USA from 1990-2004.
• ~9,400 injuries treated annually

NUMBER OF INJURIES PER YEAR IN USA, 1990-2004

Epidemiology

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• ~9,400 injuries treated annually
• 11.1 injuries per 100,000 children and adolescents per year
MONTH OF OCCURRENCE OF LAWNMOWER INJURIES

TYPES OF INJURIES RELATED TO LAWNMOWERS

Foreign Body Injuries

- Eyeball/face (39%) and lower extremity (41%) accounted for 80% of these injuries
- These injuries tend to occur in the children older than 12 years

10 YEAR OLD MALE RUN OVER BY RIDING MOWER WHILE BLADES WERE NOT ENGAGED

11 year old struck by projectile from lawnmower

Presented with pain and swelling 10 days after the injury despite antibiotic treatment

Surgical cultures grew numerous organisms!
Open Fractures/Soft Tissue Injuries

- ~750 children and adolescents per year (8%) required admission to the hospital or transfer to another hospital for management of a lawnmower related injury.

Amputations

- ~1/3 of all traumatic amputation injuries occur among children <18 years of age.
- Children continue to have moderate pain and phantom limb sensations at least once per week after lawnmower related amputation.
- Half of these children said that the injury influenced their future aspirations.

Amputations

- Of all lawnmower related amputations for which the type of lawnmower is known, 70% involved a ride-on lawnmower.
Ride-On Lawnmowers

- Loss of mower stability is one recognized injury mechanism with ride-on mowers

Ride-on Lawnmowers

- ~25% of children run over by mowers jump or fall off as passengers

Ride-On Lawnmowers

- ~75% of run-over injuries occur when children are playing in an area being mowed
- Injuries from back overs are twice as common as run overs

Ride-on Lawnmowers

- 5 year old boy backed over by 13 year old brother on a ride-on mower

Ride-on Lawnmowers

- One year after injury, prior to a stump revision procedure to assist prosthetic fitting

Subsequently underwent a dorsal Syme amputation with skin graft
Management of Lawnmower Injuries

- Broad spectrum IV abx:
  - Ancef, Gentamycin, and Penicillin

Management of Lawnmower Injuries

- Broad spectrum IV abx:
  - Ancef, Gentamycin, and Penicillin
  - Tetanus prophylaxis

Clostridium tetani

Surgical Debridement

2 year old with lateral ankle injury before debridement

After surgical debridement

Soft Tissue Management

9 year old with lawnmower injury to foot

Required forefoot amputation and VAC dressing
Soft Tissue Management

After a week of VAC dressings, the wound is ready for skin grafting.

Soft Tissue Management

Lawnmower injury to heel with salvageable foot.

Vacuum Assisted Closure

- Increases local blood flow to wounds
- Decreases edema
- Increases rate of proliferation of granulation tissue
- Decreases the extent of bacterial colonization

Vacuum Assisted Closure

- Children treated with VAC dressings had:
  - Fewer dressing changes
  - Decreased need for free flap procedures

Vacuum Assisted Closure

- Average length of hospital stay for patients managed with VAC dressing: 16.8 days
- Average number of surgical procedures: 4.6

Soft Tissue Management

Managed with a VAC dressing initially.
Soft Tissue Management

Cross-leg flap harvested and applied to heel wound

Soft Tissue Management

Cross-leg flap fixed in place with an external fixator, with graft detachment and skin graft of donor site in three weeks

Fascio-Cutaneous Flaps

14 year old with significant foot wounds with exposed tendons

Fascio-Cutaneous Flaps

After debridements and external fixation

Fascio-Cutaneous Flaps

A reverse sural flap is drawn out and harvested *note: the visible vascular pedicle*

Fascio-Cutaneous Flaps

The flap is pivoted on its neurovascular pedicle and placed over the anterior soft tissue defect
Fascio-Cutaneous Flaps

Recipient and donor site closure

Other local flaps are available, though they may be in the zone of traumatized tissue:
- Abductor hallucis muscle flap
- Extensor digitorum brevis muscle flap

Free tissue transfers can take the form of either muscle or fascio-cutaneous flaps

Free Tissue Transfer

Parascapular flaps can provide any type of tissue needed

Outcomes

- The younger the child, the worse the outcome re:
  - Need for amputation
  - Need for transfusion
  - Length of hospitalization
  - Number of surgeries per hospitalization

Outcomes

- Younger children fare worse than older children and adolescents due to:
  - Smaller blood volume
  - Smaller blood vessels lead to reconstruction difficulties
  - The same lawnmower blade will cause more damage to a 4 year old foot than a 14 year old foot
Outcomes

• Younger children fare worse than older children and adolescents due to:
  • RIDE-ON MOWERS!

Outcomes

  • 23 of 33 children (70%) treated for lawnmower injuries had permanent impairment of >40% of the whole person (AMA Guidelines for Medical Impairment)

Prevention

• Lawn Mower Safety Design (Passive Protection):
  • Has the highest likelihood of success in decreasing the rate and severity of lawnmower injuries
  • No Mow In Reverse (NMIR) for riding mowers

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  • Prevention of toes/feet from penetrating under the mower and into the path of rotating blades
Prevention

- Education
  - Age and maturity guidelines for lawn mower operation
  - American Red Cross curriculum for power lawn mower safety

- The necessity for keeping young children out of the area when power lawn mowers are being used

PREVENTION IS THE ONLY GOOD OPTION FOR THIS INJURY!