Amputations and Leech Therapy

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Disclosures

- I have no financial disclosures related to this talk

- I am a plastic surgeon with specialty training in hand and upper extremity surgery, so the talk is biased towards upper extremity and digital amputations

Objectives

- Review the epidemiology of pediatric amputations
- Discuss treatment options for amputations
- Discuss the indications for replantation and post-operative care including leech therapy

Epidemiology

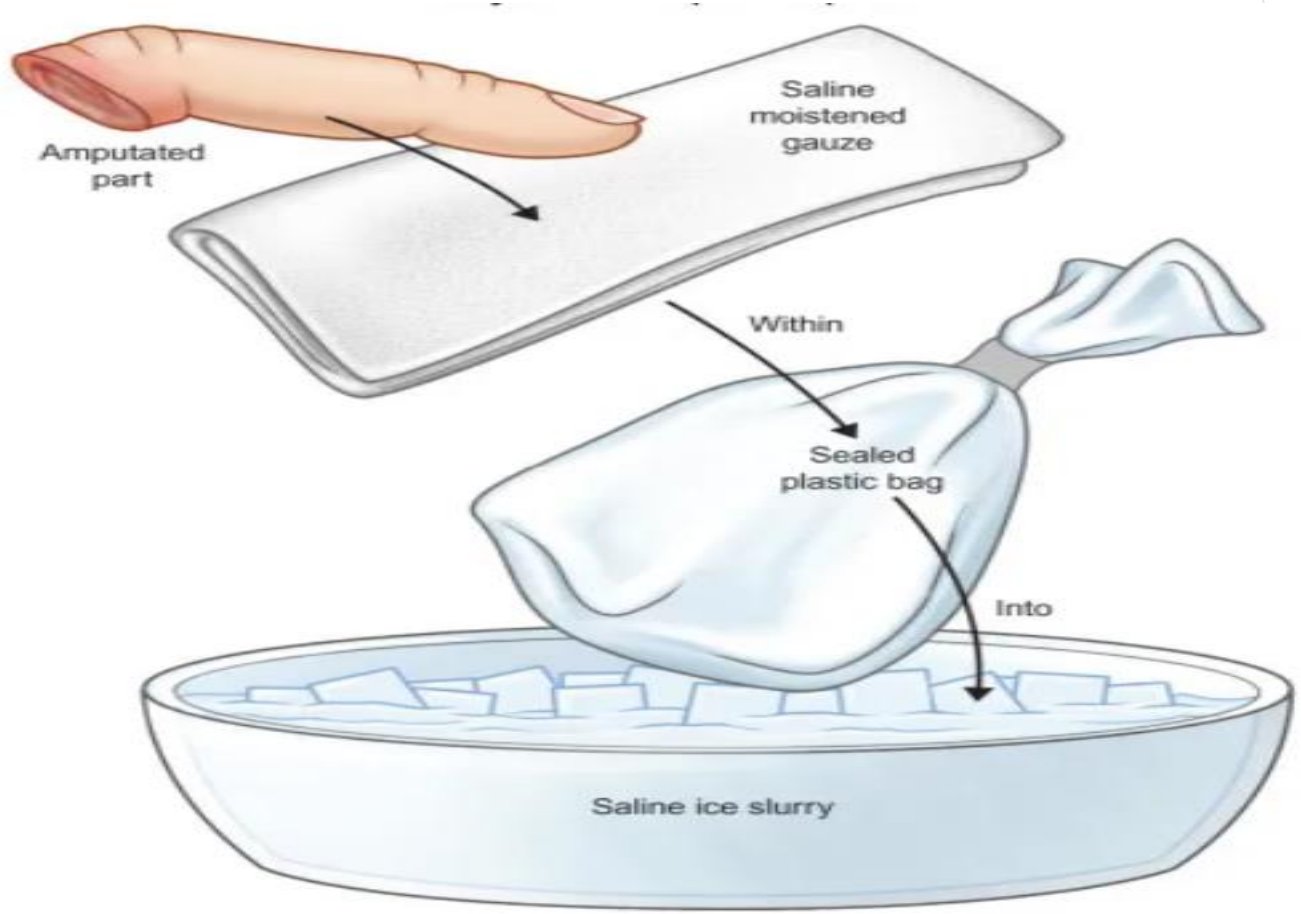
- 0.41% of pediatric traumas are extremity amputations
  - Finger/Thumb = 54%
  - Toe = 20%

- Mechanism
  - Younger = doors, equipment (crushing injuries)
  - Older (teenage) = machinery, power tools, motor vehicles

- Males>females

Care of the Amputated Part

- Wrap the part in a saline moistened gauze
- Place the part and gauze in a sealed bag
- Place the sealed back on a saline ice bat or in another back with saline and ice
- *Wrap the amputee site with non-stick material*



Indications for Replantation

- Indications
  - Thumb
  - Multiple digits
  - Child
  - Palm, wrist, forearm

- Contraindications
  - Life-threatening injuries or significant medical co-morbidities
  - Avulsion or crush injury (relative)
  - Multi-level injury (relative)

Treatment Options

- Replantation
- Composite grafting
- Dressing changes/secondary intention
- Revision amputation

Ischemia Time Limits

- Digit Amputations
  - >12hrs warm ischemia
  - >24hrs cold ischemia
- Proximal Amputations
  - >6 hrs warm ischemia
  - >12 hrs cold ischemia

Replantation

- *Replacement of the amputated part*
- Structures repaired:
  - Bone
  - Artery
  - Vein
  - Tendon
  - Nerve

Post-Replantation Care

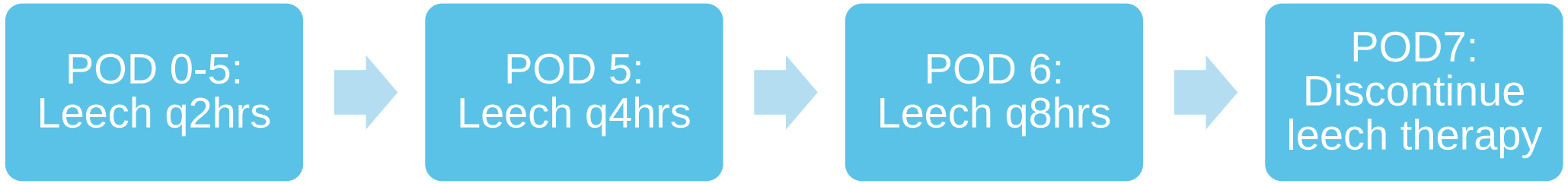
- ICU admission
- Anticoagulation
- Vascular checks
- Warming devices
- Leech therapy

Leech Therapy

- Rationale
  - Provide venous drainage while angiogenesis occurs
- Mechanism
  - Direct drainage
  - Vasodilation
  - Anticoagulation
- Complications
  - Blood loss requiring transfusions
  - *Aeromonas hydrophilia*
  - Psychological stress

Leech Therapy - Weaning

- Begins day 5 when venous outflow theoretically re-established



- Monitor for venous congestion

Outcomes of Replantation

- Digital replantation rate: 35-40%
- Digital replantation success rates: 63-97%

- Cost
  - Revision amputation: $25k
  - Replantation: $40k
- Length of stay (average)
  - Revision amputation: 2 days
  - Replantation: 5 days

Outcomes of Replantation

- Overall complication rate
  - Revision amputation: 3%
  - Replantation: 13%

- Outcomes
  - Stiffness
  - Aesthetic differences
  - Decreased sensation

Treatment Options

- Replantation
- Composite grafting
- Dressing changes/secondary intention
- Revision amputation

Composite Grafting

- Re-attaching the amputated part without putting the blood vessels back together
- Creates a “biologic dressing”
- Indications:
  - Distal digit amputations
  - Pediatric population (less than 4 increased success)
- Outcomes
  - 50-75% success rate
  - Functional, aesthetically pleasing

Dressing Changes/Secondary Intention

- Wound care with occlusive dressing
- Indications
  - Distal digit amputation
- Outcomes
  - Over 90% healing
  - Minimal nail deformities

Revision Amputation

- Shortening of the digit with direct or flap closure
- Indications
  - Contra-indication to replantation
  - No part to replant
  - Failure of replantation
- Outcomes
  - Variable

Take Home Points

- Pediatric extremity amputations are super rare
- Kids do quite well with replantation's, particularly digits, and it is generally thought to be a good idea to try
- The post-replantation care is significant
- Composite grafting, dressing changes, and revision amputation are other options to replantation

Thank you!

References

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