Hand Trauma Essentials

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Disclosures

- Non-Declaration Statement: I have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

Objectives

At the conclusion of this session, the learner will be able to:

- Review important hand anatomy.
- Summarize the key components of a good hand examination.
- Discuss several common hand injuries and the initial emergency management of these injuries.
- Identify important potential complications of these common hand injuries.

Hand Trauma Background [3]

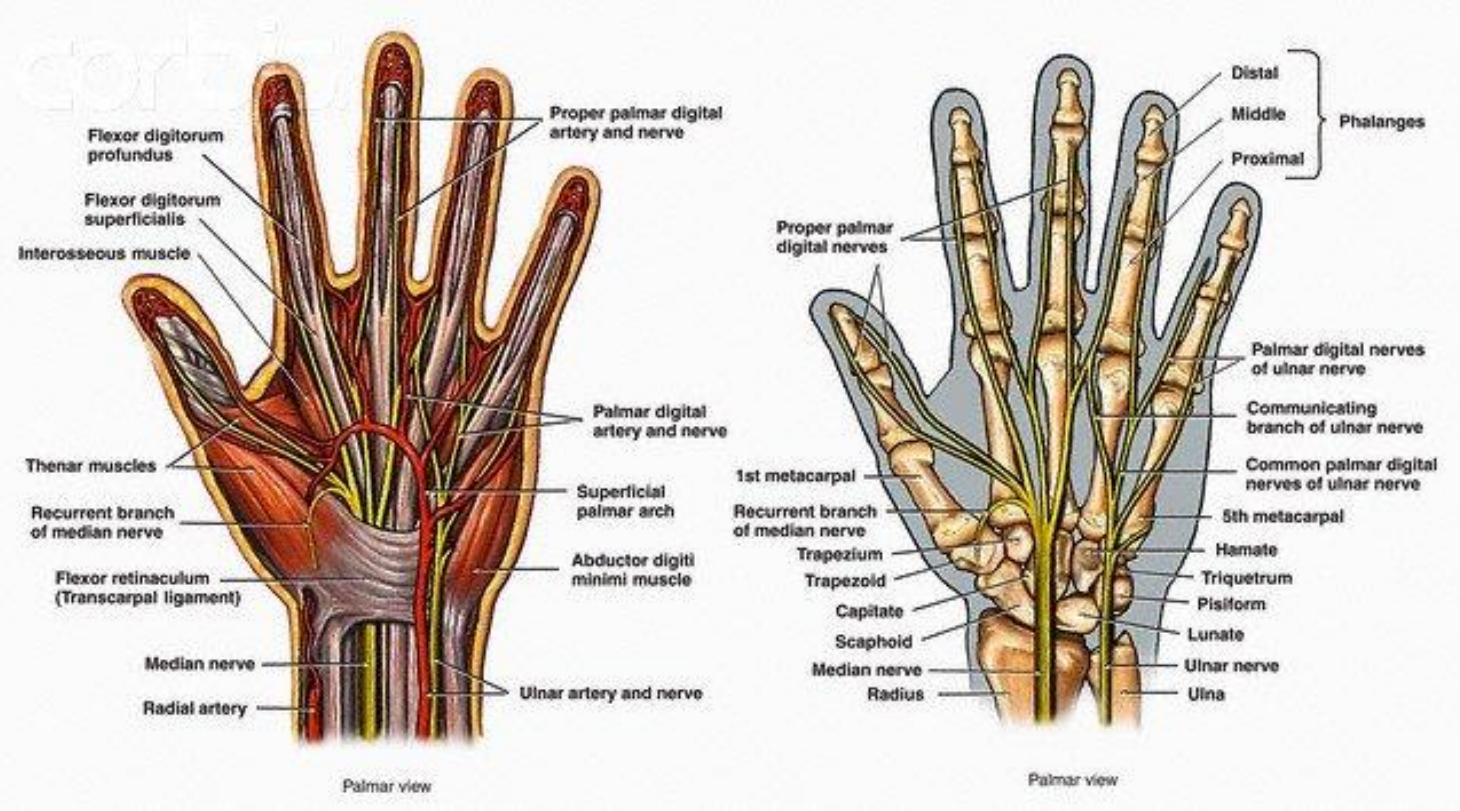
- 11 – 20 % of all ED visits in the US.
- Contusions and fractures are the most common hand injury.
- Of all work accidents in the US, the most common are lacerations and fractures of the fingers.
- Cost of injury is quite high.

Relevant History

- Dominant hand.
- Mechanism of injury.
- Hazardous material exposure.
- History of immunocompromise.
- Smoking history.
- Prior injury to the hand.
- Tetanus immunization status if applicable.

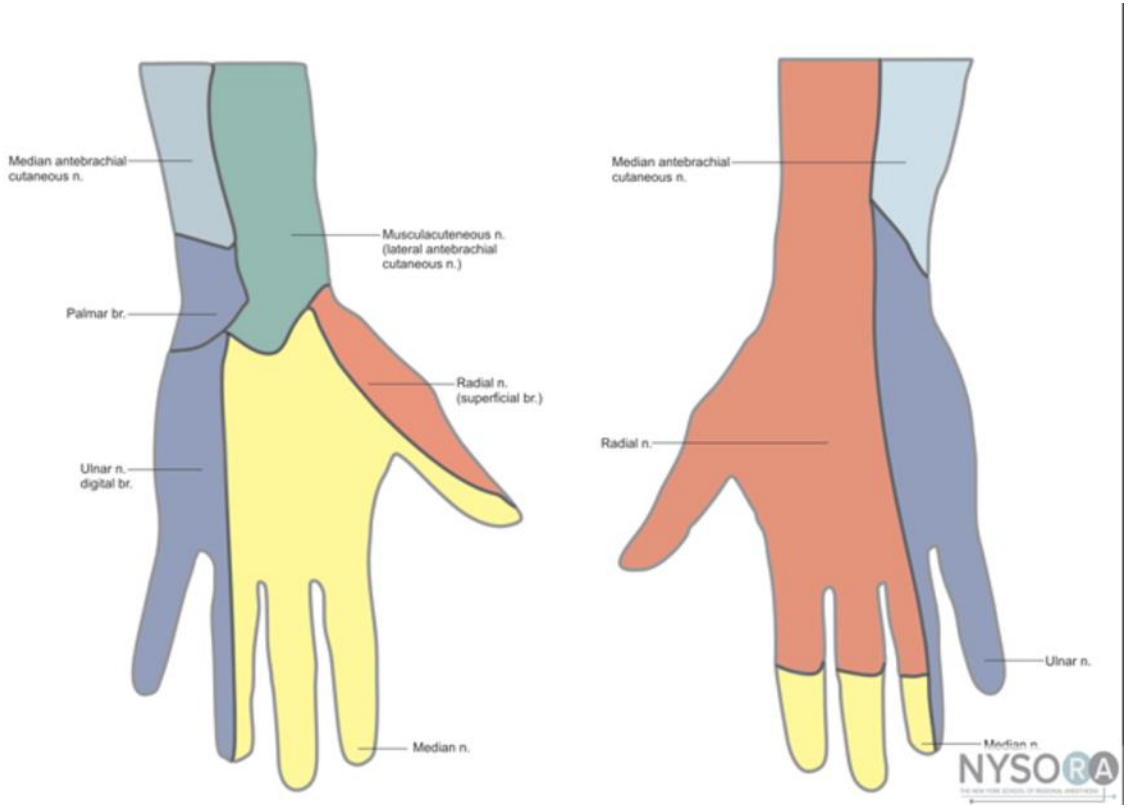
Important Hand Anatomy

Important Hand Anatomy



https://www.quora.com/What-peculiarities-of-the-anatomy-of-hands-should-be-taken-into-focus-for-improving-the-drawing-of-hands

Important Hand Anatomy



http://sjrhem.ca/rcp-regional-anesthesia-hand/

Important Hand Anatomy

	Motor supply	Sensory territory
MEDIAN	Thenar muscles: • abductor pollicis brevis • flexor pollicis brevis (with ulnar) • opponens pollicis • lumbricals to index and middle fingers	
ULNAR	Flexor carpi ulnaris Flexors of distal phalanx of ring and little fingers All intrinsic hand muscles except the thenar group above	
RADIAL	Triceps Brachioradialis Supinator All extensors of wrist, thumb and fingers	

https://www.pinterest.com/pin/511088257685499377/

Hand Examination

Key components of a good hand examination

Hand Examination

- Inspection
- Palpation
- Neurovascular examination
  - Sensation
  - Motor
  - Vascular
- Special tests
  - https://www.orthobullets.com/hand/6008/physical-exam-of-the-hand

Hand Examination

Inspection

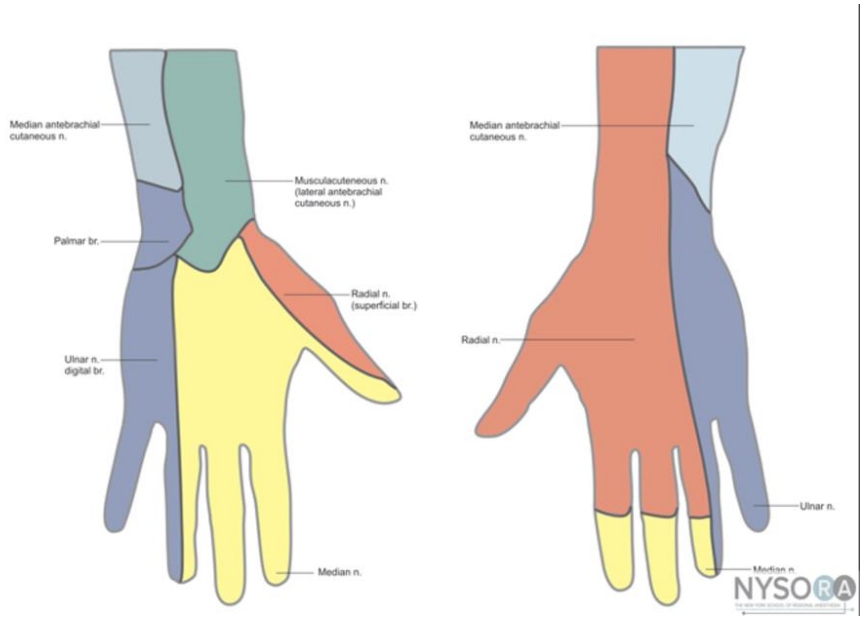
- Skin
- Circulation
- Deformity
- Muscular atrophy
- Swelling

Palpation

- Masses
- Tenderness to palpation
- Joint effusion
- Temperature

Hand Examination: Neurovascular

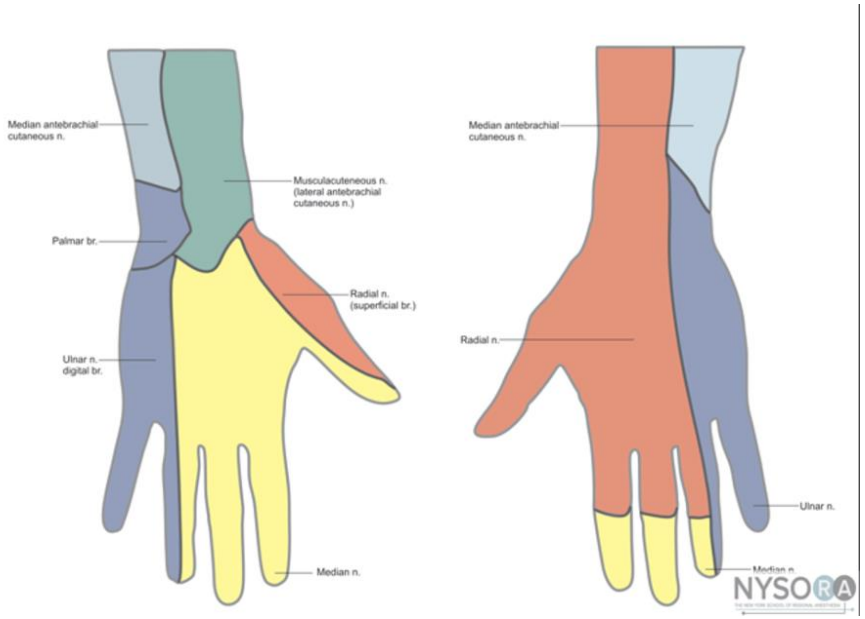
- Radial nerve
  - Sensory
  - Motor: extension of wrist and digits
    - Thumb IP joint extension against resistance



http://sjrhem.ca/rcp-regional-anesthesia-hand/

Hand Examination: Neurovascular

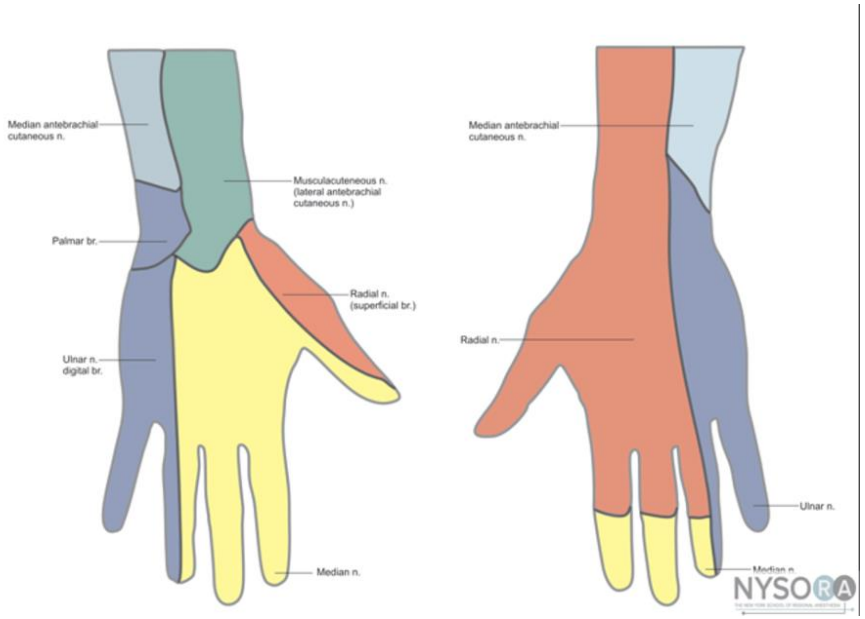
- Median Nerve
  - Sensory
  - Motor: recurrent motor branch
  - Motor: anterior interosseous branch



http://sjrhem.ca/rcp-regional-anesthesia-hand/

Hand Examination: Neurovascular

- Ulnar Nerve
  - Sensory
  - Motor: cross the fingers OR
  - Motor: abduct fingers against resistance



http://sjrhem.ca/rcp-regional-anesthesia-hand/

Hand Examination: Wounds

- Anesthetize!
  - Local
  - Digital block
  - Avoid epinephrine on the fingers
- Explore to bloodless base.

Digital Block

Common Hand injuries

Common Hand Injuries

- Fractures and dislocations
- Subungual hematoma
- Lacerations
- Foreign bodies
- High pressure injection injuries
- Avulsion, amputation and degloving injuries
- Compartment syndrome
- Burns

Hand Fractures and Dislocations

- Closed fracture
- Open fracture
- Dislocation

Radiology Pearls

- Ideally get more than one view for Xray.
- If you're unsure, see if you can get a radiologist to read.
- Compare to old films if available.
- If there's bony tenderness and you don't see a fracture, consider splinting.
- Always advise your patients that additional films may be indicated.

Closed Fracture Hand

https://en.wikipedia.org/wiki/Boxer%27s_fracture

Closed Fracture

Initial Management

- Pain management.
- Reduce fracture if indicated.
- Splint.
- RICE
- Follow up with orthopedist.

Potential Acute Complications

- Neurovascular compromise.
- Compartment syndrome.
- Refer to hand specialist.

Open Fracture Hand [5]

Open Fracture Hand [5]

Initial Management

- Update Tdap as indicated.
- Pain control.
- Antibiotics.
- Close and splint as indicated.

Potential Acute Complications

- Neurovascular compromise.
- Non healing wounds, loss of digit.
- Osteomyelitis.

- Refer to hand specialist.

Dislocation Phalanx

- Pain control.
- Reduce dislocation.
- Splint.
- RICE.
- Follow up with orthopedics.

- Neurovascular compromise.
- Compartment syndrome.
- Refer to hand specialist.

Subungual Hematoma Finger [1]

- Very painful due to pressure that builds up under the nail.
- Initial management
- Potential acute complications
  - Nail avulsion
  - Permanent nail deformity
  - Infection
  - Refer to hand specialist.

Subungual Hematoma Trephination

- Indicated for acute presentation.
- Anesthesia ?
- Clean area. Avoid alcohol or chlorhexidine if using cautery.
- Cautery vs 18 gauge needle.
- Dry dressing.
- Follow up with PCP.

- Potential acute complications: pain, infection, bleeding.

Laceration Finger

Lacerations of the Hand

Initial Management

- Pain control.
- Explore to bloodless base.
- Xray if indicated.
- Tdap
- Wound closure.
- Splint if necessary.

Potential Acute Complications

- Dehiscence of wound.
- Infection.
- Neurovascular compromise.
- Refer to hand specialist.

Foreign Bodies of the Hand

https://www.saltstrong.com/articles/100-reasons-to-replace-your-treble-hooks/

https://www.youtube.com/watch?v=cF4cptv7L3k

Foreign Body - Fish Hook

Immediate Management

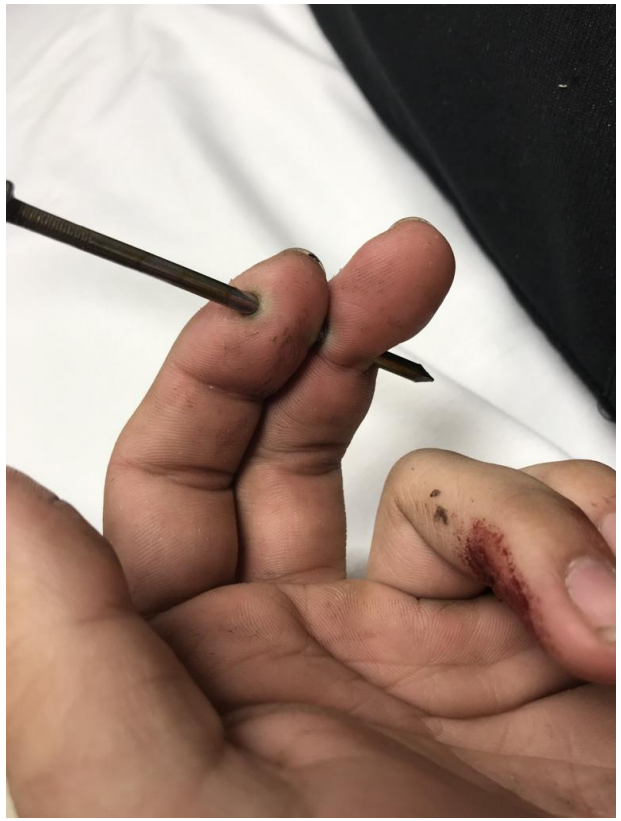
- Pain control.
- Tdap
- Image if necessary.
- Remove foreign body.
- Antibiotics if indicated.

Potential Acute Complications

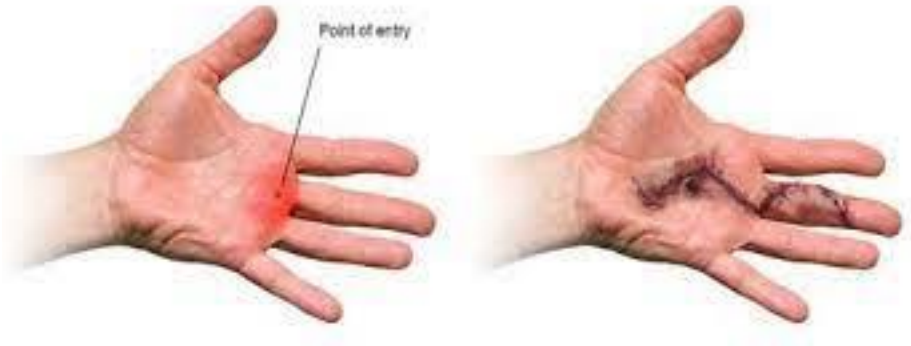
- Neurovascular compromise.
- Infection.

- Refer to hand specialist.

Foreign Body of the Hand



Hand High Pressure Injection Injuries



https://www.jseasy-safety-software.com/us/hydraulic-safety

High Pressure Injection Injuries

Initial Management

- Pain control.
- Tdap.
- Hand or ortho consultation.
- Imaging of hand.
- IV antibiotics.

Potential Acute Complications

- Neurovascular compromise.
- Infection.
- Compartment syndrome.

- Refer to hand specialist.

Avulsion, Amputation, and Degloving Injuries of the Hand

Initial Management

- Pain control.
- Tdap.
- Wound dressing for simple avulsion.
- Specialty consultation for degloving or amputation.
- Possible transfer to higher level of care.

Potential Acute Complications

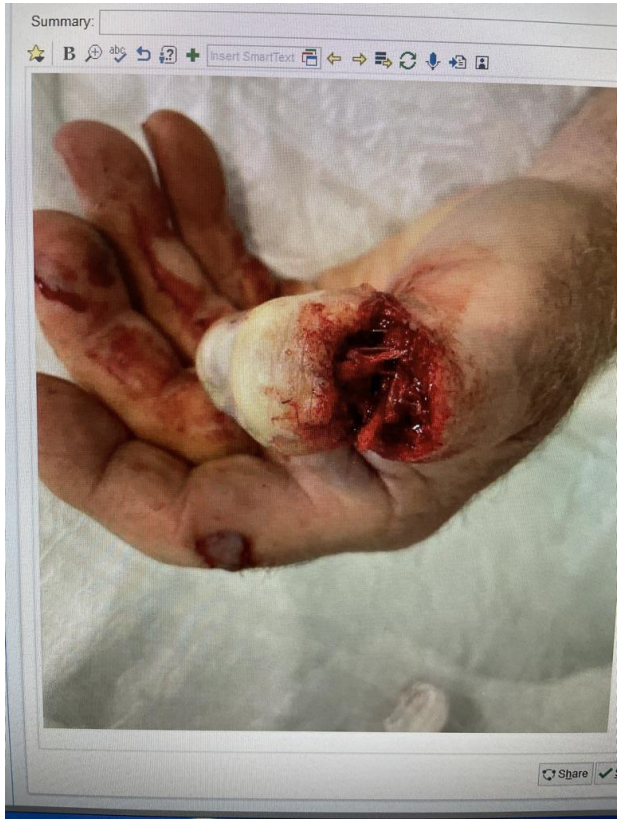
- Neurovascular compromise.
- Deformity.
- Disability.
- Wound infection.
- Refer to hand specialist.

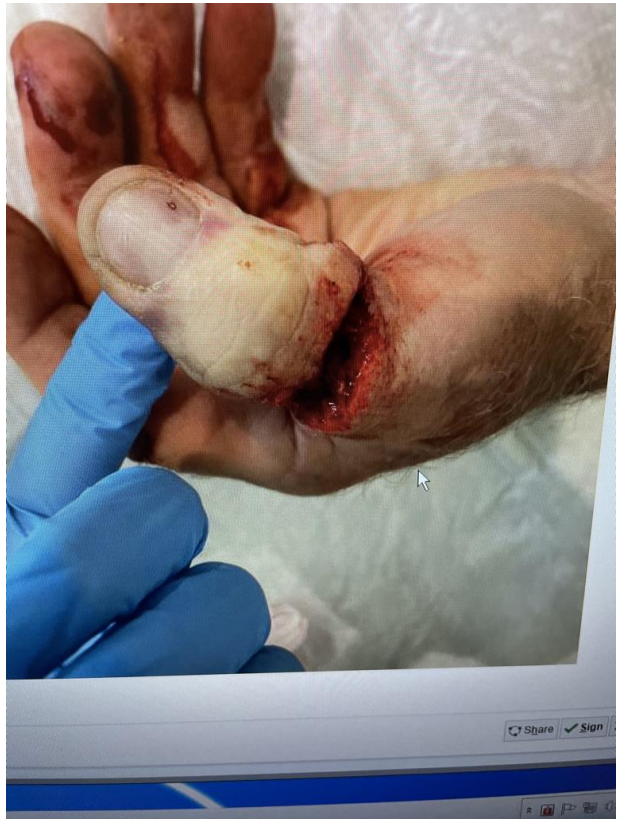
Avulsion and Amputation Injury

https://www.youtube.com/watch?v=0i7jYg2x_D0

https://www.reddit.com/r/medizzy/comments/8kzph4/finger_amputation_injury/

Near Avulsion Injury





Degloving Injury of the Hand

Hand Trauma

- What's your diagnosis?
- What are your next steps?

Compartment Syndrome Hand

https://www.orthobullets.com/trauma/1064/hand-and-forearm-compartment-syndrome

Compartment Syndrome Hand

Immediate Management

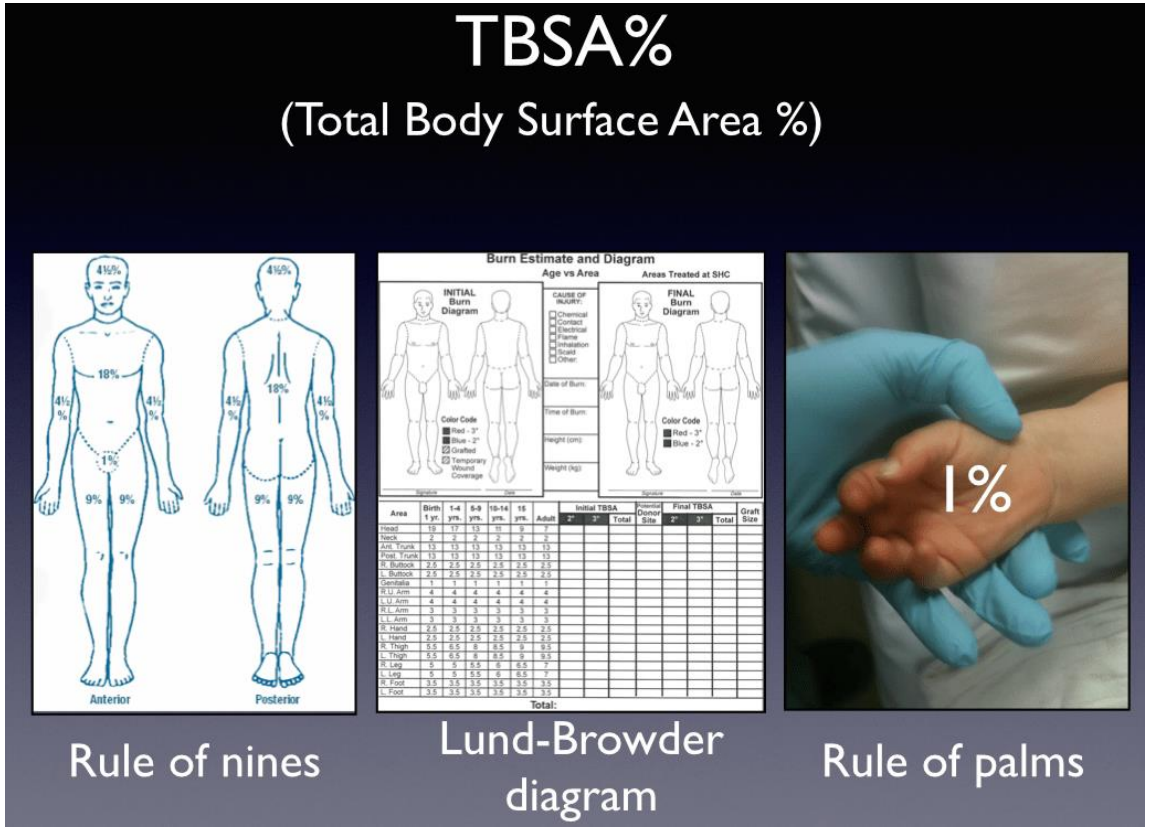
- Pain control.
- Tdap.
- Specialty consultation.
- Imaging as indicated.

Potential Acute Complications

- Neurovascular compromise.
- Loss of function.
- Muscle necrosis leading to required amputation.
- Disability.

- Refer to hand specialist.

Burns of the Hand



https://lacerationrepair.com/other-topics/burns/burns-part-ii-tbsa-assessment-burn-apps/

Burns of the Hand [8]

Immediate Management

- Cooling.
- Pain control.
- Tdap.
- Burn center consultation.
- Burns suspicious for abuse:
  - Scald burn with clear demarcation.
  - Burns in the shape of an object.

Potential Acute Complications

- Secondary infection.
- Disability.
- Higher risk for comorbid conditions.
- Refer to burn specialist / burn center.

Take Home Points

- Always perform a complete history and physical examination and look for risk factors for complications.
- Always consider performing a radiograph if indicated. 2-3 views are better than a single view.
- Many hand injuries can be treated in the acute setting but always consider referral to a specialist due to high risk of disability with hand injuries.
- Always consider potential complications and provide good follow up instructions for patients with injuries discussed in this lecture.

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Questions?

Thank you for your attention.