Evaluation of Hand Injuries

Jennifer Ty, MD
10/10/2017
Faculty Disclosure

• I have no relevant financial relationships with industry to disclose.

• I will not discuss off label use and/or investigational use in my presentation.
Learning objectives

• Review anatomy, physical examination
• Understand treatment principles of common hand injuries
• Recognize problematic injury patterns and when to refer
Epidemiology

- 16 M children treated for injuries from 1990-2009
- Mean annual injury rate of 11.6/1000
- 65.3% male
- 57.7% occur in the home
- 31.3% lacerations
- 10-14 y 26.7% fractures

Shah et al., J Trauma Acute Care Surg 2012
Epidemiology

Hastings & Simmons, *Clin Orthop*, 1984

- 354 pediatric hand fractures, 2 year follow-up
- Small percentage of injuries -> large percentage of complications and poor outcomes
- Malunion risks
  - Failure to obtain adequate x-rays
  - False assumptions about remodelling
Not little adults

Examination

Treatment – sedation?

Growth potential: +/-

Compliance – immobilization?
History - what is important?

Age
Hand Dominance (age 2-3)
Sports and Activities
Trauma laceration?
bite?
injection?
blunt?
crush?
A word on…Terminology

- Identify digit by name
  - Thumb, Index, Middle, Ring, Little
- Describe location using
  - Volar-Dorsal
  - Radial-Ulnar

- 2nd finger:
  - Index or Middle?
- What is medial?
Examination:
Topographical anticipation

What can be injured?
Topographical anticipation

Radial digital nerve!
What can be injured?

EPL

EIP
EDC to index
Examination: Resting position

Digital Cascade –
Fingers point to the base of the thumb
Examination: Tenodesis
Examination: palpation

Bony tenderness?
Examination: flexor tendons

- FDP tendon → DIP joint flexion
- FDS tendon → PIP joint flexion
- Immobilize other digits eliminates FDP
Examination: extensor tendons

Terminal tendon → DIP

Central slip → PIP

Sagittal bands → MCP

Intrinsic muscles →
- MCP flexion
- IP extension
Examination: nerves

Digital nerves
(Radial and ulnar)
• 2-point discrimination
• Threshold testing
• Warm immersion testing - wrinkling

Can you feel this?
Does it feel normal?
Examination: nerves

Median
• Opposition, palmar abduction, index finger flexion

Ulnar
• Crossing fingers, finger abduction, little finger flexion

Radial
• Finger extension - at MCP

Document what you see -
• NOT grossly intact
Radiographs

- Radiographs of digit not hand
Simple lacerations

Is it a simple laceration?

TOPOGRAPHICAL ANTICIPATION!

Nerve involvement?
Tendon involvement?
High risk of infection?

Best time to evaluate patient is when wound is open
Young patient = moving target
Simple lacerations - Treatment

Local (+/- sedation)

Digital block
  Lidocaine + Epinephrine ok*
  Bupivacaine/Ropivacaine

Phentolamine (1mg/1ml) reversal
Intralipid (cardiac toxicity)
Simple lacerations - Treatment

IRRIGATION
• Tap water or saline
• Sufficient volume

Consider tourniquet for good visualization
(glove for a finger tourniquet – use clamp to remember to remove tourniquet)
Simple lacerations - Treatment

Primary wound closure with absorbable suture: 4-0, 5-0 Chromic or plain gut

- Loose skin especially in dorsum - evert edges
- Small bites 2mm from skin edge
- Horizontal mattress sutures to evert skin

- Overlapping skin does not heal well
Simple lacerations

Antibiotics? No evidence of benefit

Tetanus booster?

Nonstick dressing (bacitracin & Adaptic)

FOREARM BASED SPLINT
Rest hand, tension off repair
Splints

• Age appropriate immobilization

• Functional position – soda can

• Do not wrap too tightly

• Pad Ortho-glass
Home instructions

- Keep splint clean and dry
- Elevate hand – Statue of Liberty
- Early follow up: 3-5 days
- Refer for concerns re wound or healing
Not so simple lacerations

- Human or animal bites
- Wound contamination
- Tissue loss with exposed bone or tendon
- Vascular concerns
- Beware of glass
- Emergent referral
Vascular anatomy

Artery is dorsal to nerve in finger!

Suspect nerve injury if arterial bleeding

Avoid cautery devices
Arterial lacerations

Pressure

Emergent referral for arterial insufficiency or continued bleeding
Open tendon injuries

Isolated tendon laceration

- Irrigate wound
- Close skin
- Dorsal blocking splint to protect tendons from retraction
- Urgent referral 1-2 days
- Recommend repair within 7-10 days
Nerve lacerations

Document exam

Isolated nerve injury
  • Irrigate wound
  • Close skin
  • Splint
  • Urgent referral 1-2 days
  • Recommend repair within 7-10 days
Fingertip injuries
Where is the nail?
Where is the nail?
Where is the nail?
Replace nail

- Replace nail under eponychial fold
Near amputation of fingertip

Finger closed in door

Laceration through dorsal structures
Volar structures remain intact

Open fracture?
Near amputation of fingertip

Emergent referral?
(often needs sedation)
Nailbed Lacerations
Subungual Hematomas

Intact nail and nail margin
Decompress subungual hematoma by trepination
Follow up 1-2 days
Refer for concerns

Beware: pyogenic granuloma
Amputations

Emergent referral

Bring amputated part
- Damp NS soaked gauze in plastic bag or cup
- Place bag/cup on ice

? Replant depending on level and tissue quality
Fingertip Amputations

Replace tip as “biologic dressing” vs
Allow tissue to granulate in
Nonstick dressing

Usually good cosmetic and functional result
Jersey Finger

- FDP avulsion
- Ring finger most common
- Diagnose, splint
- Urgent referral 1-2 days
- Delayed treatment complications and difficult repair
Mallet injuries

Axial load, hyperflexion
Check xray for fracture

Bony mallet:
Non-operative vs. surgical treatment?
Splint
Urgent referral 1-2 days
Soft tissue mallet injuries

Axial load, hyperflexion

Soft tissue mallet finger:
Injury to terminal tendon
Full-time extension splinting
Follow up in 4 wks
Begin wean/therapy or
Urgent referral 3-5 days
Skeletal anatomy
Boxer’s fracture

- Metacarpal neck fracture
- Pinky finger most common
- Check rotation
- Consider reduction - ED referral
- Immobilize x 3-4 wks
Metacarpal shaft fractures

Check angulation and rotation

Splint

Refer 1-3 days for eval of non-op versus operative management

Higher risk of malunion

- Multiple MC fractures
- Rotated, flexed or shortened fractures may need surgery
Extra-octave fracture

- Base of pinky proximal phalanx fracture
- Check cascade in flexion & extension
- Consider reduction if cannot adduct fingers
- Splint all 4 fingers together
Phalangeal shaft fracture

Assess for malrotation!

Unstable, irreducible injuries require surgical stabilization

Splint
Early referral 1-3 days
Phalangeal neck fractures

Common
Finger caught in door
X-rays findings subtle
Closed treatment -> little remodeling, poor flexion
Most benefit from surgery
Splint and early referral
1-3 days
PIP volar plate injuries

Hyperextension injury
X-rays: small fleck of bone proximal aspect of middle phalanx
Excessive immobilization leads to joint stiffness
• Buddy tape to adjacent finger, early motion

If large fragment refer early 1-3 days
Intercondylar phalangeal fracture

“Flake” of bone in joint is osteochondral fragment until proven otherwise

Urgent referral 1-3 days most benefit from surgery
Seymour’s fracture

Open physeal fracture of distal phalanx

Bleeding around nail or nailplate avulsion

Incarceration of germinal matrix

Emergency referral: open fracture
MCP & IP joint dislocations

Usually dorsal
ED referral for reduction

MCP dislocations –
avoid in line traction!
Flex wrist/IP joints
hyperextend proximal phalanx
and bring over MC head
Paronychia

Periungual abscess - staph / strep

Treatment:

• Warm soaks:
  tap water at bath temp 15 min BID
• Oral antibiotics
• 18 gauge needle along side fingernail for pus
• Early follow up 1-2 days

Emergent referral if worsening, lack of improvement
Herpetic Whitlow

- HSV 1 or HSV 2 infection
- Look for perioral lesions
- Small clear vesicles which can coalesce
- Role of antiviral therapy
- Watch and treat secondary infections
Felon

Digital pulp space infection

Treatment:

- Warm soaks:
  - tap water at bath temp 15 min BID
- Oral antibiotics
- “Willie Sutton” approach I&D
- Early follow up 1-2 days

Emergent referral if worsening, lack of improvement
Flexor Tenosynovitis

- Ascending infection within tendon sheath
- Emergent referral
  - Operative drainage
  - IV antibiotics
Take home message

• Topographical anticipation: what is at risk?
• Assess rotation: digital cascade
• Appropriate radiographs

• ABSORBABLE suture: 4-0 Chromic
• Evert skin edge - small bites - horizontal mattress

• Nonstick dressing & appropriate immobilization
Take home message

• If requires emergent treatment or if definitive treatment (fracture reduction/lacerations that need sedation) refer to ED

• Evaluation for possible urgent surgery – refer to clinic in 1-2 days

• Most finger fractures heal in 3-4 weeks
Thank You

Jennifer Ty, M.D.
302 651 5723
jty@nemours.org