Diagnosing and Treating Common Hand Problems and Injuries

Observations

• Most common hand injuries/ infections can be treated completely or temporized in ER or office
• Most common conditions are easily diagnosed
• Keep treatments simple, comfortable and safe
• Stabilize patient when needed for referral to specialist

EXAM

MOTION / MOBILITY / SENSATION

ANATOMY IS KEY TO DIAGNOSIS AND TREATMENT

PRECISION TREATMENT REQUIRES A PRECISE KNOWLEDGE OF ANATOMY AND FUNCTION

PARONYCHIA

A paronychia is an abscess of the proximal and/or the lateral nail folds. When it extends laterally, fingertip necrosis can result from pressure within the neurovascular spaces formed by longitudinal fibrous septae.

INFECTIONS

• PARONYCHIA
• FELON
• FLEXOR TENDON SHEATH
  – Kanavel’s Four Cardinal Signs
    • intense pain
    • flexion posture
    • uniform swelling
    • percussion tenderness

HAND INJURIES

INDICATIONS FOR IMMEDIATE SURGERY:

  HIGH PRESSURE INJECTION INJURY
  PEDIATRIC FLEXOR TENDON SHEATH INFECTION
  SEVERE CRUSHING INJURY
  REPLANTATION

LOCAL ANESTHESIA

• EPINEPHRINE USE IN HANDS HAS HAD A BAD RAP FOR MANY YEARS.
• EPINEPHRINE HAS BEEN PROVEN TO BE SAFE IN SEVERAL SERIES.
• USE OF EPINEPHRINE MAKES A TOURNIQUET UNNECESSARY IN MOST HAND CASES.
WARM WATER SOAKS FOUR TIMES A DAY AS DEMONSTRATED BELOW. AT HOME A PAPER CUP IS RECOMMENDED AS AN EASY WAY TO AVOID INJURY AND CONTAMINATION.

THE FINGER IS DRESSED WITH BACITRACIN OINTMENT AND A SMALL GAUZE HELD IN PLACE WITH A STRIP OF COBAN.

LOCAL ANESTHESIA

- WORKHORSE COMBO:
  - WRIST BLOCK
    - 1% LIDOCAINE / 0.25% MARCAINE WITH EPINEPHRINE
    - 10 ML WILL DO A TOTAL BLOCK
  - LOCAL INFECTION OF THE INCISION OR WOUND
    - 1% LIDOCAINE WITH EPINEPHRINE

DIGITAL BLOCK ANESTHESIA

ANATOMY

THE DIGITAL NERVES ARE BLOCKED WHERE THEY LIE ADJACENT TO THE FLEXOR SHEATH AT THE MP FLEXION CREASE

DIGITAL BLOCK ANESTHESIA TECHNIQUE

INJECT 5-10 ML 1% LIDOCAINE +/- EPINEPHRINE IS INJECTED ON THE DORSUM OF THE FINGER AND INJECT TO PALMAR SIDE. NEEDLE LESS PAINFUL TO INSERT THRU DORSAL SKIN

REMEMBER TO CULTURE

THE TANGENTIAL ORIENTATION OF THE KNIFE FOLLOWS THE CONTOUR OF THE FINGERNAIL AS THE PARONYCHIA IS INCISED.

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REMEMBER TO CULTURE

THE TANGENTIAL ORIENTATION OF THE KNIFE FOLLOWS THE CONTOUR OF THE FINGERNAIL AS THE PARONYCHIA IS INCISED.
PAINFUL SUBUNGUAL HEMATOMA

- ONLY NEED PIN HOLE IN NAIL TO RELIEVE PRESSURE
- ROTATE NEEDLE TIP AS DRILL BIT UNTIL DROP OF BLOOD SIGNALS NAIL PENETRATION
- PATIENT WILL LOVE YOU

FELON

- Palm side tip infection
- Incise directly into pus
- Use longitudinal incision to avoid nerve injury

RING REMOVAL WITHOUT CUTTING

- Pass 2 sutures under ring
- Soap Finger
- Spin ring with sutures
- While pulling distally

HOW NOT TO DO IT!!

- I & D INCISION PARALLEL TO THE LATERAL NAIL FOLD
- AREA OF NECROSIS

RING REMOVAL

- Don’t Delay
- Don’t Cut Ring unless necessary

- 2 String technique-100% success rate-
Pass two threads (sutures) through ring with needle reversed. Soap on finger then spin ring with threads while pulling distally

BURNS

- PARTIAL THICKNESS- ALOE CREAM Q3H
- DEEP PARTIAL THICKNESS-BLISTERED- ALOE Q3H; IF BLISTERS RUPTURE CONVERT TO TOPICAL ANTIBIOTIC
- FULL THICKNESS-TOPICAL ANTIBIOTIC/SURGERY IF LARGE AREA
**MALLET FINGER**
- SPLINT IN FULL EXTENSION FOR 6 WEEKS: MUST MAINTAIN IN EXTENSION AT ALL TIMES
- ONE JOINT FLEXION MEANS RESTARTING AT DAY ONE

**Wrist Block**
- Superficial Radial Nerve—below cephalic vein and distal to Brachioradialis tendon

**Anesthesia**
- Wrist block adequate for most hand procedures
- May supplement wrist block with local containing epinephrine to minimize bleeding and need for tourniquet

**REPAIRS**
- SUTURE
- GRAFTS
- FLAPS

**Wrist Block**
- Ulnar Nerve—Deep to FCU tendon and get dorsal branch 1cm proximal to ulnar styloid

**Wrist Block**
- Median Nerve Block—deep to Palmaris Longus tendon
- Ulnar to PL tendon
- Aim to base of ring finger
- Feel for fluid with finger pressing distal to carpal ligament

- Superficial Radial Nerve—below cephalic vein and distal to Brachioradialis tendon

**MALLET FINGER**
- SPLINT IN FULL EXTENSION FOR 6 WEEKS: MUST MAINTAIN IN EXTENSION AT ALL TIMES
- ONE JOINT FLEXION MEANS RESTARTING AT DAY ONE
WRAP IN THE DIRECTION OF THE FINGERS AROUND THE BASE OF THE FIRST METACARPAL

GRAB A KERLIX

1. 1% LIDOCAINE / 0.25% MARCAINE: MEDIAN AND ULNAR NERVE WRIST BLOCKS

2. DROPS OF 1% LIDOCAINE WITH EPINEPHRINE INJECTED ALONG THE COURSE OF THE BRUNER INCISION FOR HEMOSTASIS OBViate THE NEED FOR A TOURNIQUET

ANESTHETIC WRIST BLOCK AND LOCAL INFILTRATION

Hand Splinting to maximize Ligament

• Position of function Ligaments at full length and tight
• Position of Comfort Ligaments loose and comfortable

If Swelling, Infection or other planned Delay

Double Kerlix Dressing and Elevation

Will keep patient comfortable while waiting for referral to specialist and edema resolves

Double Kerlix Dressing acts as splint for fractures which allows for swelling occur without allowing movement or pain to occur causing

Grasping the Kerlix leaves ligaments in loose position of Comfort
SPLINT CONCEPTS

- SPLINT ONLY WHAT IS REQUIRED TO AVOID STIFFNESS OF NON-INJURED DIGITS
- DETERMINE WHAT IS REQUIRED AND DESIGN THE SPLINT TO DO THE JOB

Elevation in cast sleeve keeps gravity on your side and is very comfortable for patient.
**AMPUTATIONS**

- **FINGERTIP AMPUTATIONS**
  - FAVORABLE: VOLAR PAD REMAINS
  - GUILLotine: VERTICAL LOSS
  - UNFAVORABLE: VOLAR PAD GONE
  - WHAT TO DO WITH BONE

**HUMAN BITE INJURIES**

- SUSPECT — IDENTIFY — TREAT

  IF THERE IS A STRONG SUSPICION OF A HUMAN BITE — TREAT AS A HUMAN BITE; A DELAYED PRIMARY CLOSURE CAN ALWAYS BE SAFELY DONE LATER.

- WRIST BLOCK OR LOCAL ANESTHESIA
- SURGICAL HAND WASHING
- SALINE IRRIGATION
- IV ANTIBIOTICS
- CDU OR FOLLOWUP NEXT DAY
- ORAL ANTIBIOTICS
- NO SUTURES UNLESS ADEQUATE IRRIGATION/DEBRIDMENT
- DOUBLE KERLIX GIVES BEST FINGER POSITION

**FINGER SPLINTING**

- LATERAL MOBILITY OF MP VS IP JOINTS
  - MP JOINT EXTENDED — COLLATERAL LIGAMENTS TIGHT = LATERAL MOTION
  - MP JOINT FLEXED — COLLATERAL LIGAMENTS松 = LITTLE LATERAL MOTION

- RETINACULAR TISSUES CONTRACT
  - MP JOINTS SHOULD BE SPLINTED IN FLEXION TO KEEP THE LIGAMENTS STRETCHED TO ALLOW FLEXION
  - NOT STRAIGHT WHICH STRENGTHENS THE MP JOINT, MAKING FLEXION NP POSSIBLE

- IP JOINTS HAVE LITTLE LATERAL INSTABILITY WHEN EXTENDED

- SO:
  - SPLINT IP JOINTS IN POSITION OF FUNCTION WHEN POSSIBLE
    - NOT FLEXED WHICH MAKES INITIATION OF HAND THERAPY MUCH MORE DIFFICULT

- SPLINT FOR MALLET INJURY
  - “STATIC SPLINT”

- SPLINTS
  - BUDDY TAPE
  - “DYNAMIC”
AMPUTATIONS

• FINGERTIP AMPUTATIONS
  – GENERAL RULE:
    • ANY AREA UNDER 1 CM² WILL HEAL BY WOUND
      CONTRACTION AND EPITHELIALIZATION
    • WITH LESS SCARRING AND BETTER SENSATION THAN
      WITH A DISTAL GRAFT OR FLAP
    • IF PATIENT HAS TISSUE CAN REPLACE AS SKIN GRAFT
    • SHORTEN BONE IF NEEDED

• FINGERTIP AMPUTATIONS
  – GUILLOTINE

• FINGERTIP AMPUTATIONS
  – FAVORABLE GUILLOTINE UNFAVORABLE

PEDIATRIC FINGERTIP AMPUTATIONS

This 18 month toddler pinched off the end of the RMF fingertip in a kitchen cabinet.

THE BONE IS SHOWING!

SO WHAT?
Distal phalangeal fractures and fingernail anatomy

CASE ILLUSTRATIONS

TRAUMA

Replantations

- THUMB
- MULTIPLE DIGITS
- STABLE PATIENT

- REPLANTATIONS
  - PROCESS FOR OR/REFERRAL QUICKLY.
  - AMPUTATED PART IN MOIST SALINE GAUZE IN PLASTIC ON ICE BUT NOT SUBMERGED.
  - EVALUATE REST OF DIGIT / HAND FOR SUITABILITY FOR REPLANTATION
    - CRUSHING OR AVULSION INJURIES QUESTIONABLE

One month later . . . .

Twelve years later . . . .

UNFAVORABLE AMPUTATION:
WHAT TO DO WITH THE RECOVERED TIP

- SURGICALLY PREP
- SALINE IRRIGATION
- DE-FAT
- TRIM TO FIT
- SUTURE + COMPRESSION X 4 DAYS

One month later . . . .

Twelve years later . . . .

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MALLET FRACTURE

30% RULE

IF THE SMALL FRACTURE FRAGMENT INVOLVES MORE THAN 30% OF THE ARTICULAR SURFACE OF THE DISTAL PHALANX, THEN THERE WILL BE A GOOD CHANCE THAT THE COLLATERAL LIGAMENTS WILL BE INVOLVED RESULTING IN SUBLUXATION OF THE DISTAL PHALANX. AN OPERATIVE REDUCTION AND FIXATION WILL BE REQUIRED.

OTHERWISE SPLINT IN A STACK SPLINT FOR 8 WEEKS FULL TIME AND TWO MORE WEEKS AT NIGHT.

A 39 y o man had a crushing injury to the RMF.

Exam reveals a dorsal displacement of the proximal nail over the proximal nail fold.

Xrays show a transverse fracture of the base of the distal phalanx with dorsal displacement and volar angulation of the distal fragment.

Treatment:

b. Pop nail into anatomic position and splint.
c. Remove nail plate, K-wire.
d. Replace nail and K-wire fragments.
e. Extend wound to visualize fracture fragments for open reduction and K-wire fixation.
Was this necessary?

Let's check the anatomy...

A more typical door-closing-on-fingertip injury.

Note the pink nail over the sterile matrix.

TREATMENT OPTIONS...
HE CANNOT MAKE A FIST WITH ANY OF HIS FINGERS

TYPICAL DISLOCATION OF THE PIP JOINT

USE CLAMP AS A SHOEHORN

MATTRESS SUTURE THRU PROXIMAL NAIL FOLD TO HOLD IN PLACE

WHAT IF THE NAIL IS GONE?

A 91 yo w.m. fell today landing on his right hand. He noted a deformity of his right middle finger and could not make a fist.

You order:
EPIPHYSEAL FRACTURE

TYPE II

THE EXTENSION BLOCK SPLINTS USED FOR VOLAR PLATE AVULSION FRACTURES PREVENT HYPEREXTENSION RE-INJURY WHICH COULD LEAD TO SWAN NECK DEFORMITIES WHICH ARE INFINITELY HARDER TO TREAT.

"LIMITED MOTION DYNAMIC SPLINT"

What Next?

BUDDY TAPE SPLINT TO PROTECT THE RADIAL COLLATERAL LIGAMENT THROUGHOUT THE RANGE OF FINGER MOTION

COLLATERAL LIGAMENT STRESS TESTING

VOLAR PLATE AVULSION FRACTURE

VOLAR PLATE AVULSION FRACTURE

EPIPHYSEAL FRACTURE

TYPE II

Diagnosing and Treating Common Hand Problems and Injuries
1. WOUND CARE
   • DETERMINE VIABILITY

2. WHEN TO CLOSE
   • CLEAN
   • EASY
   • NOT A HUMAN BITE

3. ANTIBIOTICS
   • CONTAMINATED
   • HUMAN BITE
   • TENDON OR BONE EXPOSED

LACERATION REPAIRS

1. WOUND CARE
   • DETERMINE VIABILITY

2. WHEN TO CLOSE
   • CLEAN
   • EASY
   • NOT A HUMAN BITE

3. ANTIBIOTICS
   • CONTAMINATED
   • HUMAN BITE
   • TENDON OR BONE EXPOSED

REDUCTION TECHNIQUE: FLEX THE MP JOINT

• FLEXION OF THE MP JOINT REDUCES ITS MOBILITY BY TIGHTENING THE COLLATERAL LIGAMENTS.

• THE COLLATERAL LIGAMENTS ATTACH TO THE SMALL FRAGMENT NEXT TO THE JOINT

• THE ANGULATED LARGER/DISTAL FRAGMENT CAN THEN BE LEVERED INTO POSITION AGAINST A STABLE SMALL FRAGMENT.

“FRACTURE INSTABILITY”

• SHORT LEVER ARM
  • BOXERS

• COMMIMINATION
  • PROXIMAL/ENLARGED

• UNFAVORABLE ANGLE
  • BASE OF FIFTH METACARPAL

• TENDON PULL
  • BASE OF FIFTH METACARPAL

• SPIRAL
  • METACARPAL SHAFT

• LACK OF TENDON/LIGAMENT SUPPORT
  • BOUTONNIERE

IN THESE SITUATIONS:
ATTEMPTS AT REDUCTION AND SPLINT FIXATION ARE NOT EFFECTIVE AND A WASTE OF TIME—REFER TO SURGEON

GAMEKEEPER’S FRACTURE

SCAPHOID FRACTURE

BOXER’S FRACTURE

REDUCE IF >45 DEGREES

IF THE BOXER’S ANGULATION DEFORMITY RECURS WHEN THE PRESSURE IS TAKEN AWAY

THEN TREATMENT SHOULD BE A DOUBLE KERLIX ELEVATION AND REFERRAL

IF REDUCTION STABLE SPLINT IN POSITION OF FUNCTION

FULL FUNCTION WITHOUT REDUCTION IS THE NORM IF LESS THAN 45 DEGREES OF ANGULATION
Conclusions

- Many common injuries can be treated without specialist.
- Attention to anatomy and details leads to better treatment.
- Regional blocks allow comfortable care for patients and physicians.
- Elevation keeps edema away and patients comfortable.

Managing Thin avulsion Flaps

- Flap converted to graft
- Flap repaired as laceration

Avulsion Injuries

Thin avulsed skin flap with length to width greater than 1:1 need to convert to full thickness skin graft by cutting remaining attachment.

Flap converted to Graft

100% graft take at 5 days.