FINGER INJURIES IN PRIMARY CARE

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American Academy of Physician Assistants
  Financial
  Splinting/Casting Workshop Director, Guide to the MSK Galaxy Course

• JBJS- JOPA Journal of Orthopaedics for Physician Assistants- Associate Editor

• American Academy of Surgical Physician Assistants – Editorial Review Board
LEARNING OBJECTIVES

Attendees will be able to

• Recognize and treat Mallet finger injuries
• Recognize and treat adult Trigger finger
• Recognize and treat Subungual Hematoma & Nail bed injuries
• Recognize and treat Superficial Finger infections
  • Paronychia
  • Felon
  • Abscess
• Recognize and treat Herpetic Whitlow
MALLET FINGER DEFORMITY
Epidemiology

- “Baseball Finger”
- 2 types injury: Soft tissue tendinous vs. Bone avulsion fracture

Pathophysiology

- Occurs 2nd to disruption of terminal extensor tendon @ insertion into distal phalanx
- Traumatic blow tip of finger causing eccentric flexion @ DIP jt.
- Laceration dorsal finger over area to EDC insertion into distal phalanx
- All injury mechanisms result in droop at DIP jt.


MALLET FINGER DEFORMITY

Presentation:
• obvious droop deformity DIP jt.
• Swelling & tenderness dorsal DIP jt. region
• Inability to actively extend finger @ DIP jt.
• Traumatic injury

Radiology

• X-ray views AP, Lateral & Oblique finger
  • Alternative: AP, Lateral & oblique Hand
• Soft tissue Mallet finger – negative x-ray findings
• Boney Mallet Finger
  • Size bone fx/avulsion variable
  • >25-50% joint surface involvement consider surgery
  • Volar subluxation body Distal Phalanx

**Treatment: Emergent care**

- Soft-tissue or Bony injury
  - Non-displaced bone injury <50% articular surface
  - Splint injuries in extension DIP jt.
  - Avoid hyperextension & skin blanching
  - Allow free movement @ PIP jt.
- Must wear splint 6-8 weeks to achieve adequate healing
- Remove daily to minimize skin issues
- RICE
- Analgesia

Wieschhoff GG, Sheehan Se, Wortman JR, Et Al, Traumatic Finger Injuries: What the Orthopaedic Surgeon Wants to Know, Radiographics, 2016; 36(4):1106-1128

MALLET FINGER

Photo courtesy TGocke, PA-C

Photo courtesy TGocke, PA-C

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Epidemiology

• Typically affects pts with Diabetes mellitus (DM) > than non-Diabetics
• 5-20% onset Diabetics (10% lifetime occurrence)
• 1-2% non-diabetics (2-3% lifetime occurrence)
• Correlation between age and duration of DM
• Diabetics with HbA1c > 7% more likely develop Trigger Finger
• Duration of Diabetes and level of HbA1c control has direct impact development and recurrence of Trigger finger
• High risk developing Trigger Finger with hx of Inflammatory Arthritides
• Affects women > men
• Thumb, Middle & ring fingers most commonly affected

Giugale JM, Fowler JR, Trigger Finger-Adult and Pediatric Treatment Strategies, Ortho Clinic, North America 2015;46:561-569
Etiology

• Trigger finger occurs as a result of;
  • Chronic repetitive friction between flexor tendon and A1 pulley
  • FDS/FDP provide a mechanical strength advantage resulting in higher stress on flexor tendon and increased incidences Stenosing Tenosynovitis

Pathophysiology

• Chronic Hyperglycemia creates cross-links between collagen molecules impairing degradation and results in a build-up in the tendon sheath that surrounds the Flexor tendon
  • Histologic analysis of tissues in Trigger Finger reveals fibrocartilaginous metaplasia, disrupted fibers with hypercellular and an increased # on chondrocytes.
  • There are no inflammatory cells or synovial proliferation
  • Findings are consistent with tendinopathy
  • A1 pulley shows signs of thickening and stiffness on Ultrasound

Giugale JM, Fowler JR, Trigger Finger-Adult and Pediatric Treatment Strategies, Ortho Clinic, North America 2015;46:561-569
Clinical Presentation

• Finger stiff, Painful with motion and Locked position
• Nodule @ A1 pulley (Palmar flexor crease)
• Duration DM, Age & Glucose control contributes to severity of symptoms
• Reflects systemic nature of disease and correlation of DM and Trigger Finger

• Women > Men, can be bilateral & multiple fingers
• Duration DM, Age & Glucose control contributes to severity of symptoms
• Reflects systemic nature of disease and correlation of DM and Trigger Finger

• DM contributes relationship between Trigger Finger and Carpal Tunnel Syndrome, de Quervain’s Tenosynovitis and Dupuytren’s Disease

Giugale JM, Fowler JR, Trigger Finger-Adult and Pediatric Treatment Strategies, Ortho Clinic, North America 2015;46:561-569
<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Pain with Flexion, No mechanical symptoms</td>
</tr>
<tr>
<td>1</td>
<td>Uneven Motion during Flexion/Clicking</td>
</tr>
<tr>
<td>2</td>
<td>Locked digit that is actively corrected</td>
</tr>
<tr>
<td>3</td>
<td>Locked digit that is passively corrected</td>
</tr>
<tr>
<td>4</td>
<td>Locked digit, uncorrectable/fixed flexion contracture</td>
</tr>
</tbody>
</table>

Quinnell R, Conservative management of trigger finger, Practitioner 1980;224:187-190
Non-operative Treatment

- Splints (sole joint) 6-10 weeks full time (nighttime), Variable results (Lundsford 2019)
- NSAIDS- low efficacy 2\textsuperscript{nd} to non-inflammatory nature Trigger Finger
- Improved Control Hyperglycemia improves outcome
- Steroid Injection Mainstay of Treatment for Trigger Finger (DM vs. Non-DM patients)
  - Ultrasound guided injection (Hansen 2017)
    - 70% accuracy intra-synovial injection
    - Cure Rate: 60-90%
  - Intra tendon sheath vs Extra Tendon sheath injection
    - Better results with extra sheath injection (Taras 1998)
  - Repeat Injections (Dardas 2017)
    - 39% pts with DM have 2\textsuperscript{nd} or 3\textsuperscript{rd} injection & long-term relief
    - 50% got relief of symptoms > 1 year
Complications for Steroid Injection
• Injection site pain
• Fat Atrophy
• Cellulitis
• Skin Pigment Change
• Tendon Rupture
• Elevation Blood Sugar - ranges from 2-5 days elevated BS

Giugale JM, Fowler JR, Trigger Finger-Adult and Pediatric Treatment Strategies, Ortho Clinic, North America 2015;46:561-569
FINGERTIP INJURIES

• Subungual hematoma
  • Results from blunt trauma to the fingertip
• Displaced fx distal phalanx – open fx
• Matrix trauma results in bleeding under the nail

• Presentation
  • Swollen
  • Throbbing
  • Painful

• > 50% area nail
  • remove nail plate & repair nail bed
  • periosteal elevator aids in nail removal
• Preserve nail plate to replace into eponychium
  • Aluminum or petroleum gauze
• Copious lavage if open fx
• Use absorbable suture to repair wound
  • 6-0 absorbable suture
  • Wound glue - Dermabond
• Stabilize open fx as needed
• Check Tetanus status and Abx prophylaxis
Decompression Subungual Hematoma

- Hematoma < 50 % area nail
  - decompress with heated paper clip, electrocautery
- Drill: 18 Gauge needle or #11 Scalpel Blade
- Soak warm H2O daily to facilitate continued drainage
- Mild compression bandage minimizes fluid accumulation

• Nail plate/matrix avulsion
  • High energy injury to remove all or portion of nail
  • Distal Phalanx fx possible
  • Associated nail-bed laceration or avulsion germinal matrix
  • Concerns for long-term nail deformities
• **Nail Avulsion complete**
  • Germinal matrix injured
  • Higher risk nail deformities
  • Increased chance nail bed laceration
  • Good chance no nail returns
  • Granulation healing
  • Tetanus and abx prophylaxis
Nail Avulsion Partial

- Germinal matrix injured
- Higher risk nail deformities
- Increased chance nail bed laceration
- High risk distal phalanx fx
- High risk extensor tendon laceration (Mallet deformity)
- Granulation healing & primary repair lacerations
- Splint immobilization
- Wound re-checks
- Tetanus and abx prophylaxis
NAIL AVULSION INJURIES

Open Fx

Picture courtesy T Gocke, PA-C

Nail Avulsion

Picture courtesy T Gocke, PA-C

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Nonoperative Treatment

• Healing by secondary intention – few negatives
  • Simple technique – wound granulation
  • Kids & adults: no bone or tendon exposed
  • < 2cm of skin loss
  • Begin early ROM finger
  • Fingertip protector device
  • 3-5 weeks for tissue re-growth

• Wound closure less likely due to tension resulting in finger tissue loss
Operative Treatment

• Primary tissue closure
  • Less likely due to wound tension 2\textsuperscript{nd} tissue loss
• Guide
  • Finger amputation with exposed bone
  • Ability to rongeur bone proximally below adequate tissue sleeve
  • Avoid compromising bony support to nail bed
NAIL AVULSION INJURIES

Treatment: Operative

• Primary closure (revision amputation)
  • fingertip amputation with exposed bone and the ability to rongeur bone proximally without compromising bony support to nail bed
• Ablate remaining nail matrix
  • prevents formation irregular nail remnants
• Flexor or extensor tendon insertions cannot be preserved, disarticulate DIP joint
• Transect digital nerves and remaining tendons as proximal as possible
• Palmar skin advanced over bone and sutured dorsal skin
NAIL AVULSION INJURIES

Complications:

• Infections
• Hypersensitivity @ fingertip
• Decreased function finger
• Hook nail deformity
• Flap failure
  • Inadequate arterial flow & venous outflow
  • Vasospasm leads to thrombosis at anastomosis site
SUPERFICIAL FINGER INFECTIONS

- Abscess
- Acute paronychia
- Chronic Paronychia
- Felon
• Usually follows puncture wound
• Pain, swelling, erythema, fluctuance
• Common organism: *Staph aureus*
• Aspirate/I&D:
  
  Gram stain, culture & sensitivities
  
  LABS: CBC, ESR, CRP, I

• Incision and drainage:
  
  Wound left open
  
  Soaks and dressing changes

• Antibiotics
  
  • A*cephalosporin, doxycycline, TMP/SMX, Clindamycin
ACUTE PARONYCHIA

Epidemiology
- Superficial Infection
- Acute onset
  - Inflammation nail fold w & w/o abscess
  - Acute – single bacteria
  - Children- mixed oropharyngeal flora
  - Diabetes- mixed bacteria
- Nail trauma: cuticle, Nail fold
- Trauma can lead to bacterial infection
ACUTE PARONYCHIA

- Factors affecting Superficial
  - ARTIFICIAL NAILS
  - MANICURE/PEDICURE
  - HANG NAIL/ INGROWN NAILS
  - OCCUPATIONAL HAZARDS (DISHWASHER)
  - NAIL BITING

- Symptoms
  - Erythema
  - Swelling nail fold
  - Tender nail fold
  - Abscess?

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ACUTE PARONYCHIA

- **Organisms**
  - Staph / Strep
  - Polymicrobial (Oral Flora, anaerobes) – DM, Drug use, immunocompromised
  - Pseudomonas – green color nail bed (rare)
  - MRSA

- **Treatment**
  - Mild cases – Warm soaks multiple time daily
  - Abscess- Mechanical drainage
    - Antibiotics not necessary
    - Immunocompromised – consider antibiotics
ACUTE PARONYCHIA

- Elevation of paronychial fold without incision
- Eponychium involved → remove nail base
- Incise at right angles to nail fold
- Packing x 24 - 48°
- Warm water soaks and antibiotics
CHRONIC PARONYCHIA

Epidemiology

• multiple organisms, > 6 weeks recurrent infections, chemical
  • Candida Albicans
  • Occupational, chronic water exposure & irritant acid/Alkali Chemicals

Risk Factors

• Diabetes, psoriasis, chronic steroid use
• Retroviral meds

Exam

• Nail Plate HYPERTROPHY
• NAIL FOLD BLUNTING & RETRACTION DUE TO REPEAT INFLAMMATION
• PROMINENT TRANSVERSE RIDGES NAIL PLATES
TREATMENT

Non-op:
- Warm soaks, antifungal meds, Limit wet exposures

Operative:
- Marsupialization: excise dorsal eponychium to germinal matrix
- Failed Conservative treatment
Epidemiology

• Any injury to fingertip can create source for Felon to develop
• Common Causes
  • Puncture Wound
  • Untreated Paronychia – common cause
  • Foreign Bodies
• Staphylococcus aureus – most common organism
  • Consider Streptococcus species
  • Consider Eikenella corrodens for bite wounds & immunocompromised

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Pathophysiology
• Defined as Subcutaneous infection involving the pulp of fingertip
• Pulp has many compartments separated by fibrous septae
• Swollen pad/Septae create pressure and cause pain
  • Can Contribute to:
    • Tissue Necrosis
    • Osteomyelitis
    • Pyogenic Flexor Tenosynovitis
Clinical presentation

- Erythema
- Intense throbbing
- Tense swelling
- Volar Pulp pain
- NO swelling proximal to DIP F felon contained within pulp
FELON TREATMENT

• **No abscess**
  - Warm soaks
  - Oral ABX – cover for Staph & Strep
    - First Generation Cephalosporins
    - Amoxicillin/Clavulanate
    - TMP/SMX

• **Abscess**
  - High lateral Incision
    - not crossed DIP Extensor crease
    - ≤ 3 mm from nail border
    - Blunt dissection of septae
    - No proximal probing
  - Warm water soaks. Packing and antibiotics?
Epidemiology

• Viral infection of skin around fingertip
• Inoculation through broken skin
• Prodromal pain
• Vesicles Clear fluid-erythematous base
• Appears 3-4 days after inoculation
• Recurrence rate 20-50%

Clinical Presentation

• Prodromal symptoms: burning, itching 2-3 days prior to eruption followed by painful vesicles
• Redness & pain
• Looks Similar to Acute Paronychia
Treatment

- *Herpes Simplex Virus (HSV)* 1 or 2
- Primarily Clinical Diagnosis
- Tzanck smear / culture for diagnosis
- Reduce transmission
- Pain control
- Oral Antiviral drugs
- Resolves 21 days?
• Surface anatomy key to accurate diagnosis
• Evaluate Flexor/Extensor mechanism
• Kanavel Signs and role in diagnosing flexor tendon infections
• High suspicion for infection:
  • Animal bites, human bites, bunch ("fight-bite") injuries
• High Pressure Injections injuries need emergent attention
• Think beyond local injury site
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