FINGER INJURIES IN PRIMARY CARE

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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

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MALLET FINGER DEFORMITY



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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.

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

Wang QC, Johnson BA, Fingertip Injuries, Am Fam Physician 2001;63(10): 1961-6

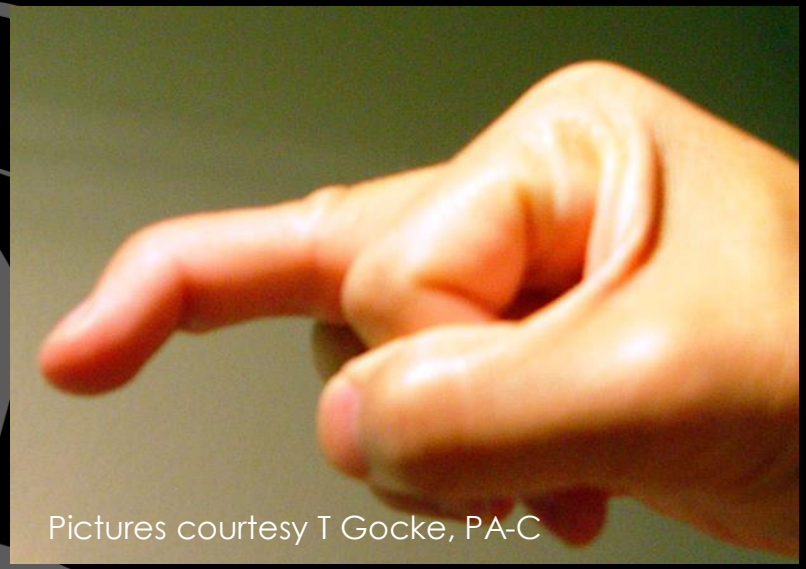
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MALLET FINGER DEFORMITY

Presentation:

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





Pictures courtesy T Gocke, PA-C





Pictures courtesy T Gocke, PA-C

Wieschhoff GG, Sheehan Se, Wortman JR, Et Al, Traumatic Finger Injuries: What the Orthopaedic Surgeon Wants to Know, RadioGraphics,

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MALLET FINGER

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

McMurphy JT, Isaacs J, Extensor Tendon Injuries, Clinics in Sports medicine, 2015;34:167-180

Bony Avulsion



Picture courtesy TGocke, PA-C

Salter-Harris II



Picture courtesy TGocke, PA-C

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MALLET FINGER

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

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MALLET FINGER



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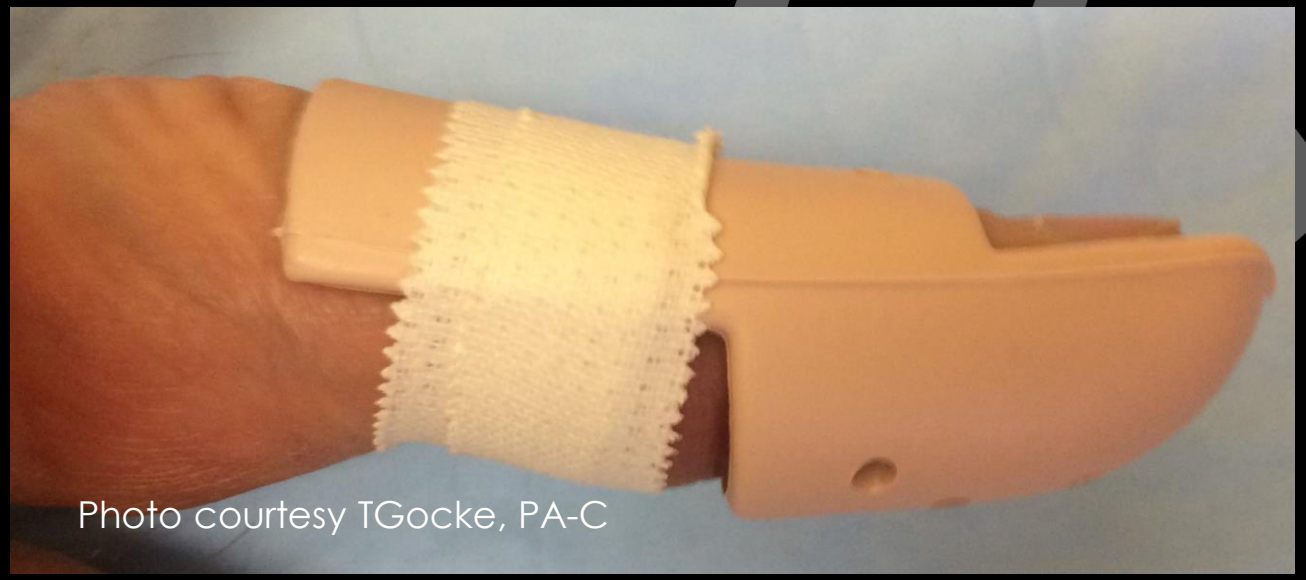
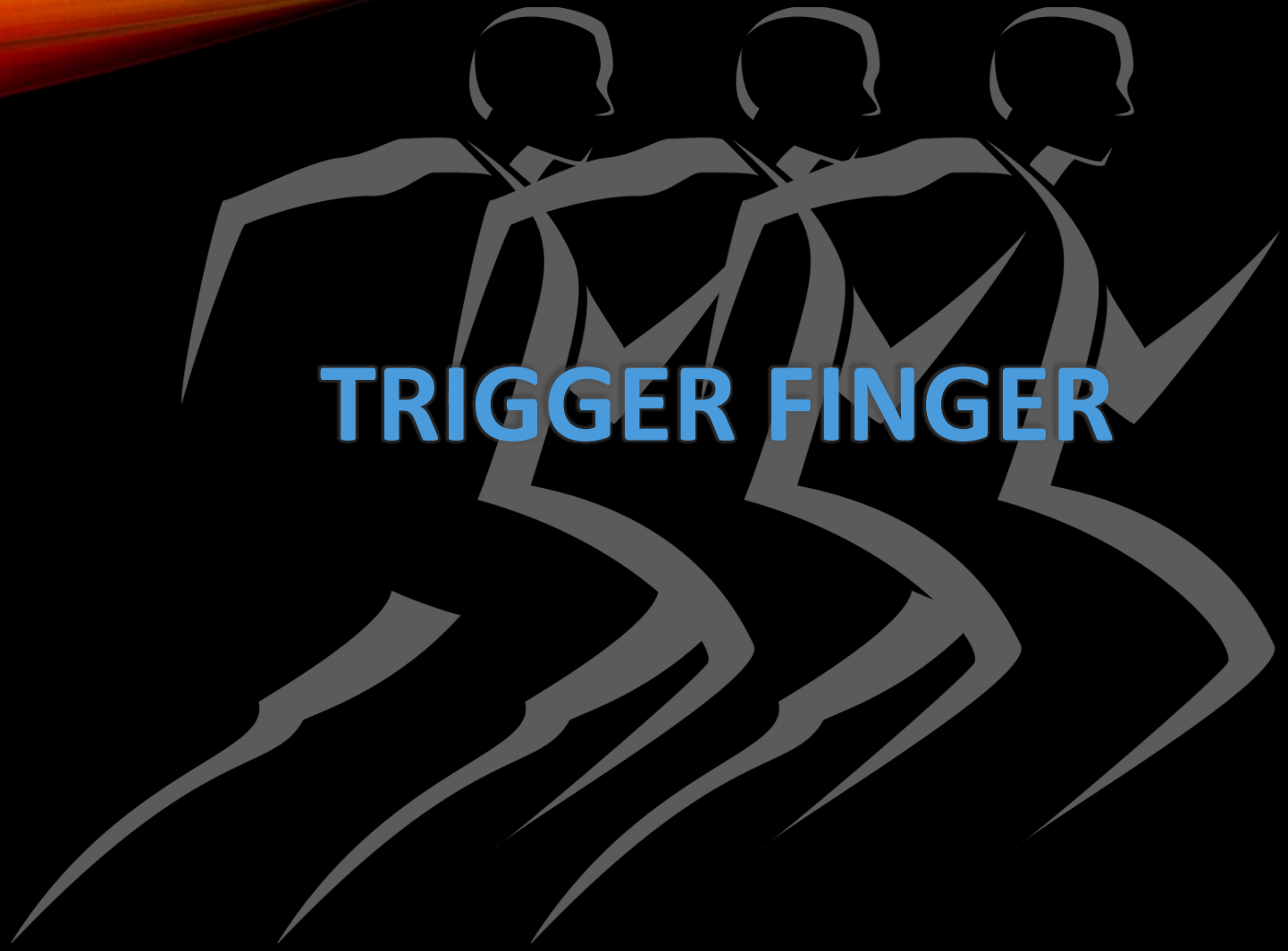


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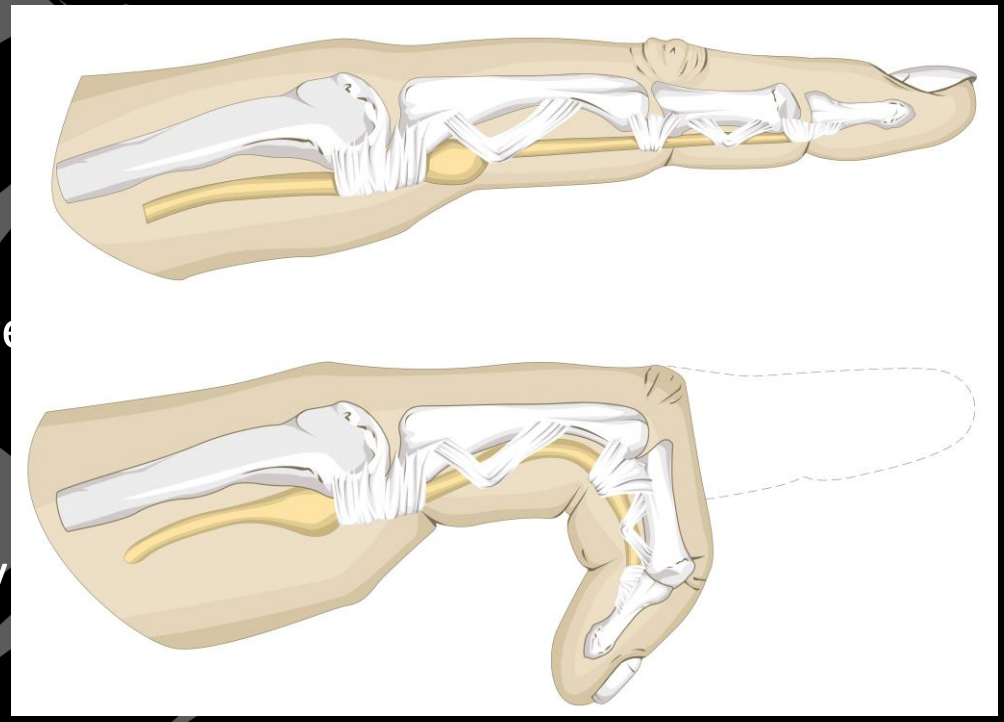
TRIGGER FINGER

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TRIGGER FINGER

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 Finge
- 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
Kuczmarski AS, Harris AP, Gil Jam Weiss APC, Management of Diabetic Trigger Finger, J Hand Surg Am 2019;44(2):150-153

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TRIGGER FINGER

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

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TRIGGER FINGER

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

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TRIGGER FINGER

Quinnell Trigger Finger Grading system	
Grade 0	Pain with Flexion, No mechanical symptoms
Grade 1	Uneven Motion during Flexion/Clicking
Grade 2	Locked digit that is actively corrected
Grade 3	Locked digit that is passively corrected
Grade 4	Locked digit, uncorrectable/fixed flexion contracture

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

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TRIGGER FINGER

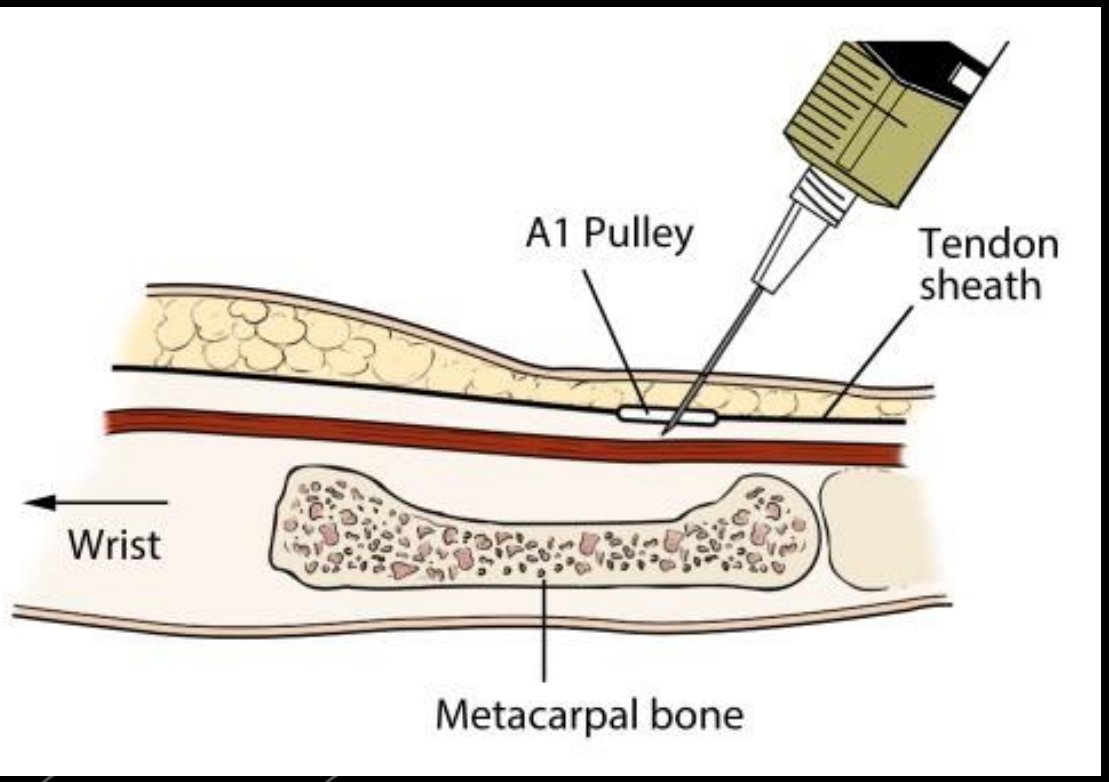
Non-operative Treatment

- Splints (sole joint) 6-10 weeks full time (nighttime), Variable results (Lundsford 2019)
- NSAIDS- low efficacy 2nd 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 2nd or 3rd injection & long-term relief
    - 50% got relief of symptoms > 1 year

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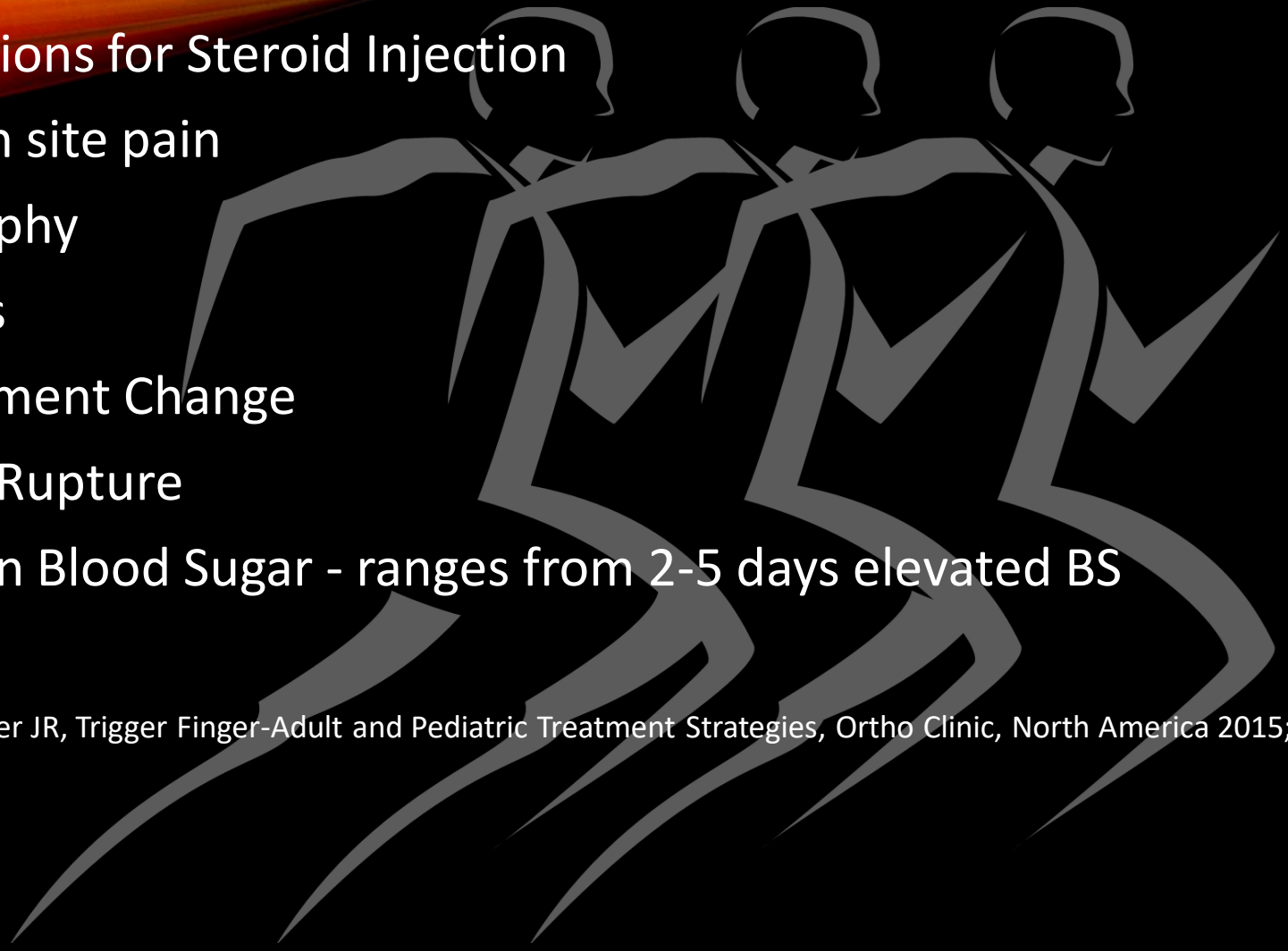
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TRIGGER FINGER

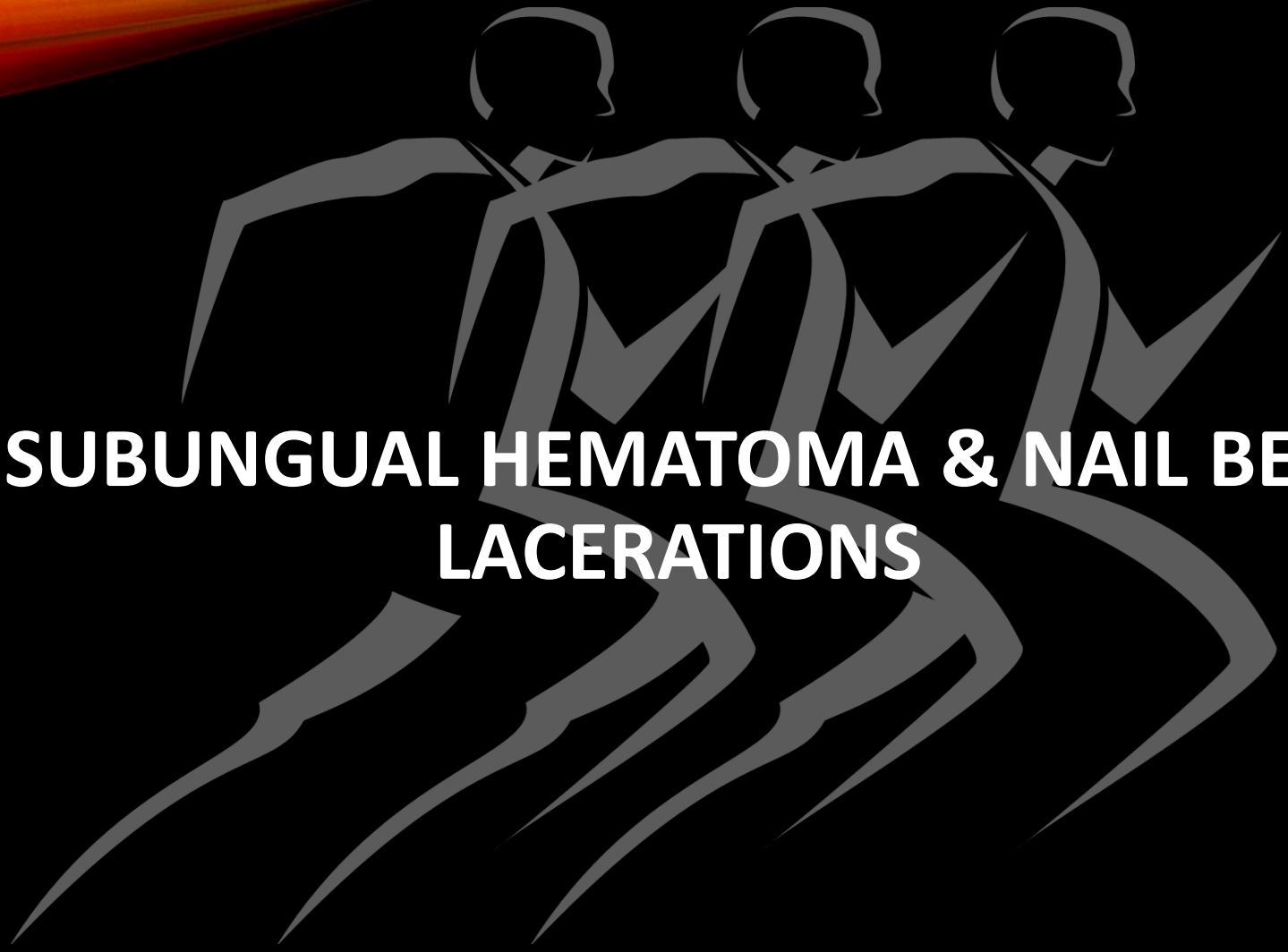


Complications for Steroid Injection

- Injection site pain
- Fat Atrophy
- Cellulitis
- Skin Pigment Change
- Tendon Rupture
- Elevation Blood Sugar - ranges from 2-5 days elevated BS

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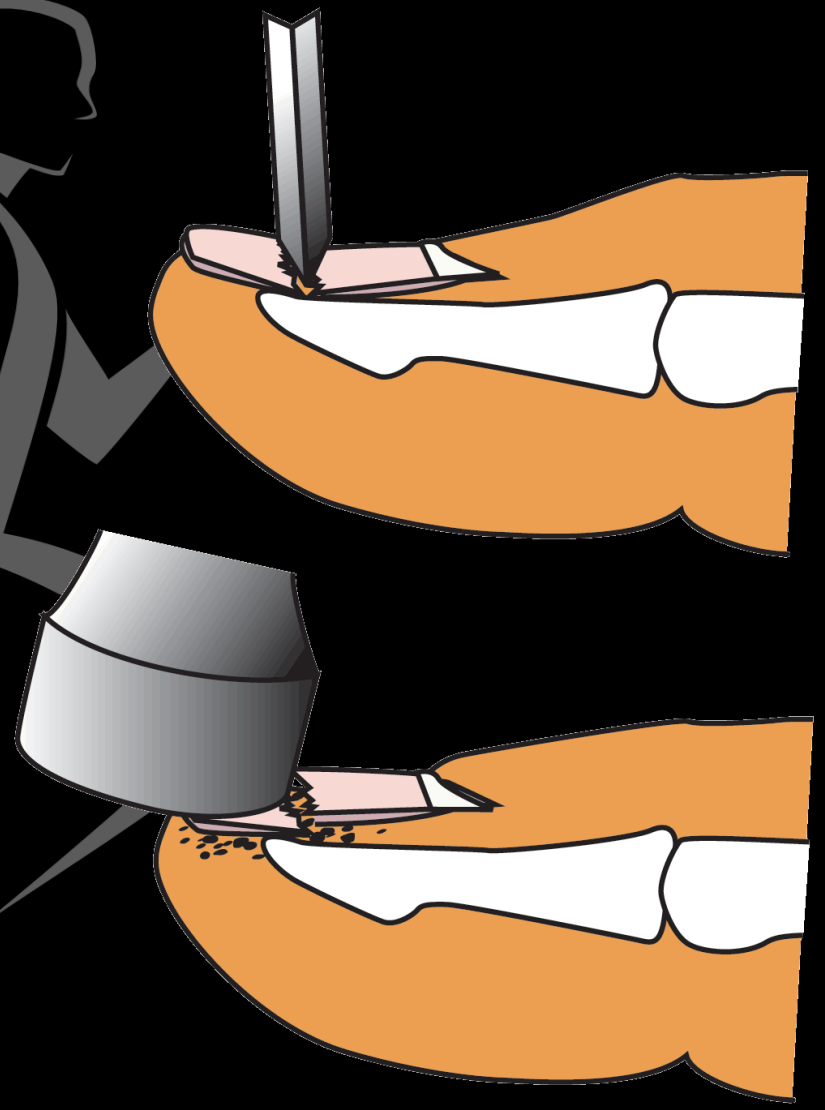


SUBUNGUAL HEMATOMA & NAIL BED LACERATIONS

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FINGERTIP INJURIES

- Subungual hematoma
  - Results form blunt trauma to the fingertip
  - Displaced fx distal phalanx – open fx
  - Matrix trauma results in bleeding under the nail
- Presentation
  - Swollen
  - Throbbing
  - painful



Wang QC, Johnson BA, Fingertip Injuries, Am Fam Physician 2001;63(10): 1961-6

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SUBUNGUAL HEMATOMA

- > 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



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FINGERTIP INJURIES

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



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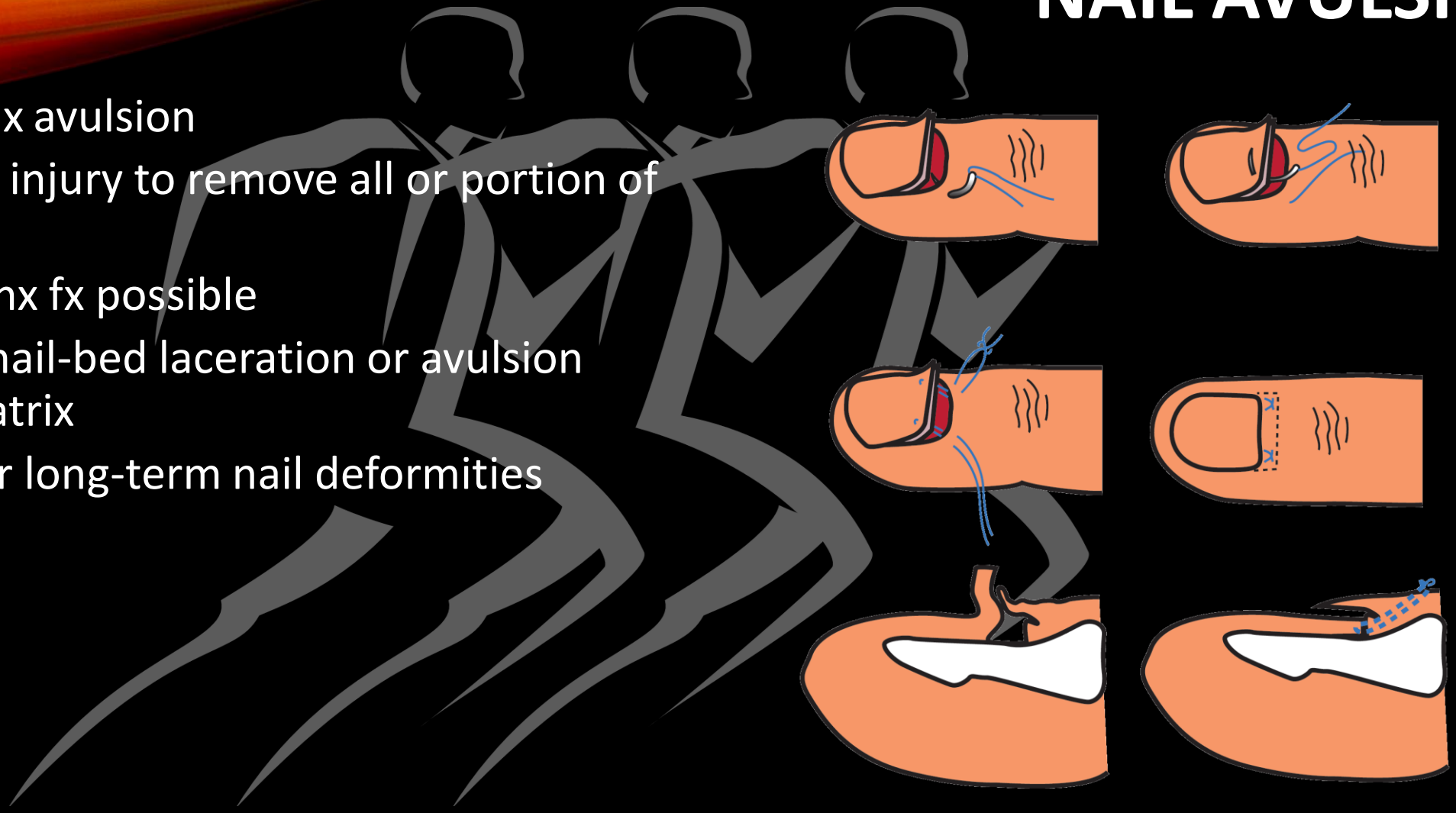


NAIL AVULSION INJURIES

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NAIL AVULSION I

- 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



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NAIL AVULSION

- **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



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NAIL AVULSION INJURIES

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



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NAIL AVULSION INJURIES





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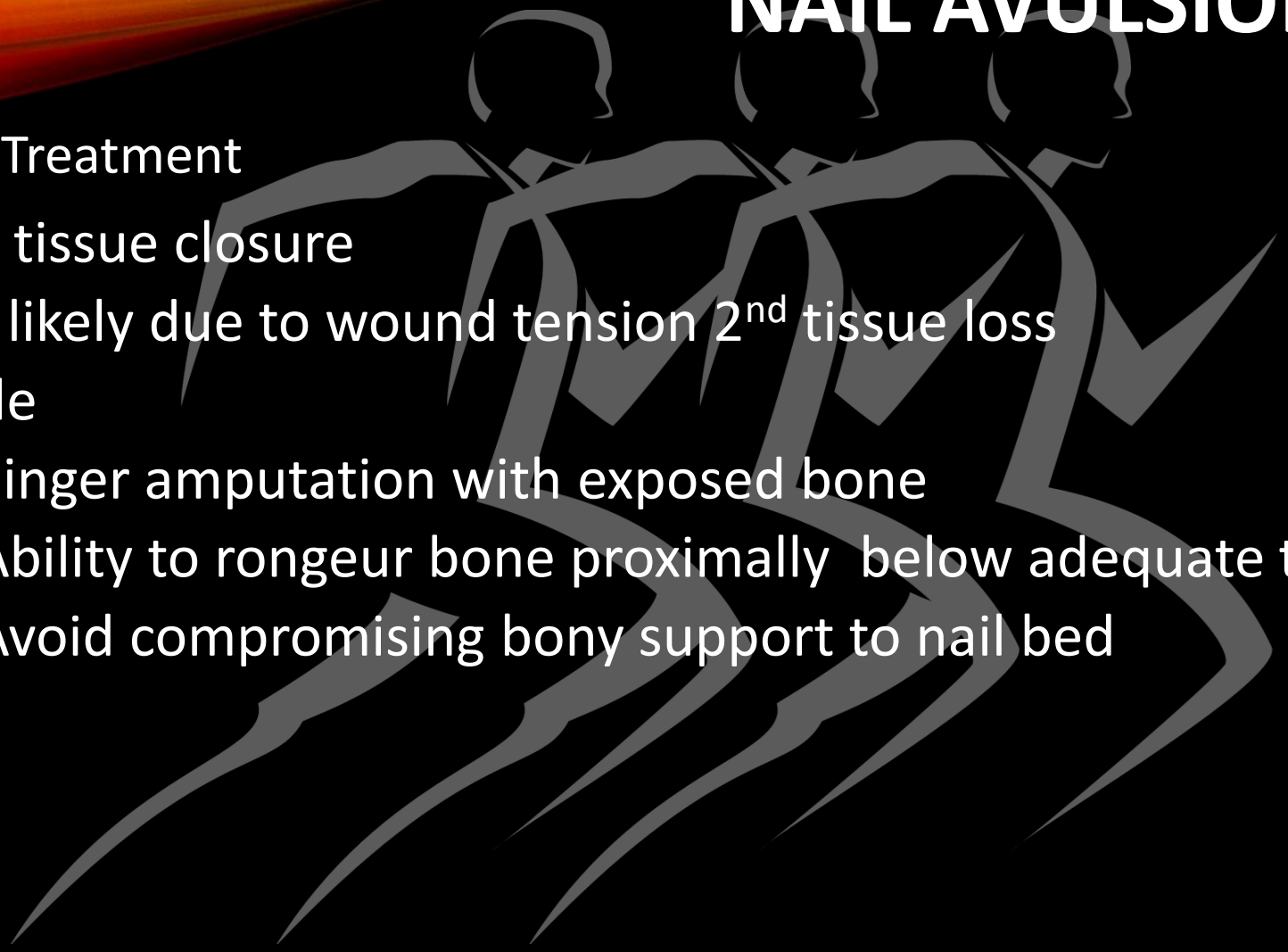
NAIL AVULSION INJURY

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

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NAIL AVULSION INJURIES



Operative Treatment

- Primary tissue closure
  - Less likely due to wound tension 2nd tissue loss
  - Guide
    - Finger amputation with exposed bone
    - Ability to rongeur bone proximally below adequate tissue sleeve
    - Avoid compromising bony support to nail bed

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NAIL AVULSION INJU

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

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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

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SUPERFICIAL FINGER INFECTIONS

- Abscess
- Acute paronychia
- Chronic Paronychia
- Felon



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ABSCESS

- 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
  - ACephalosporin, doxycycline, TMP/SMX, Clindamycin


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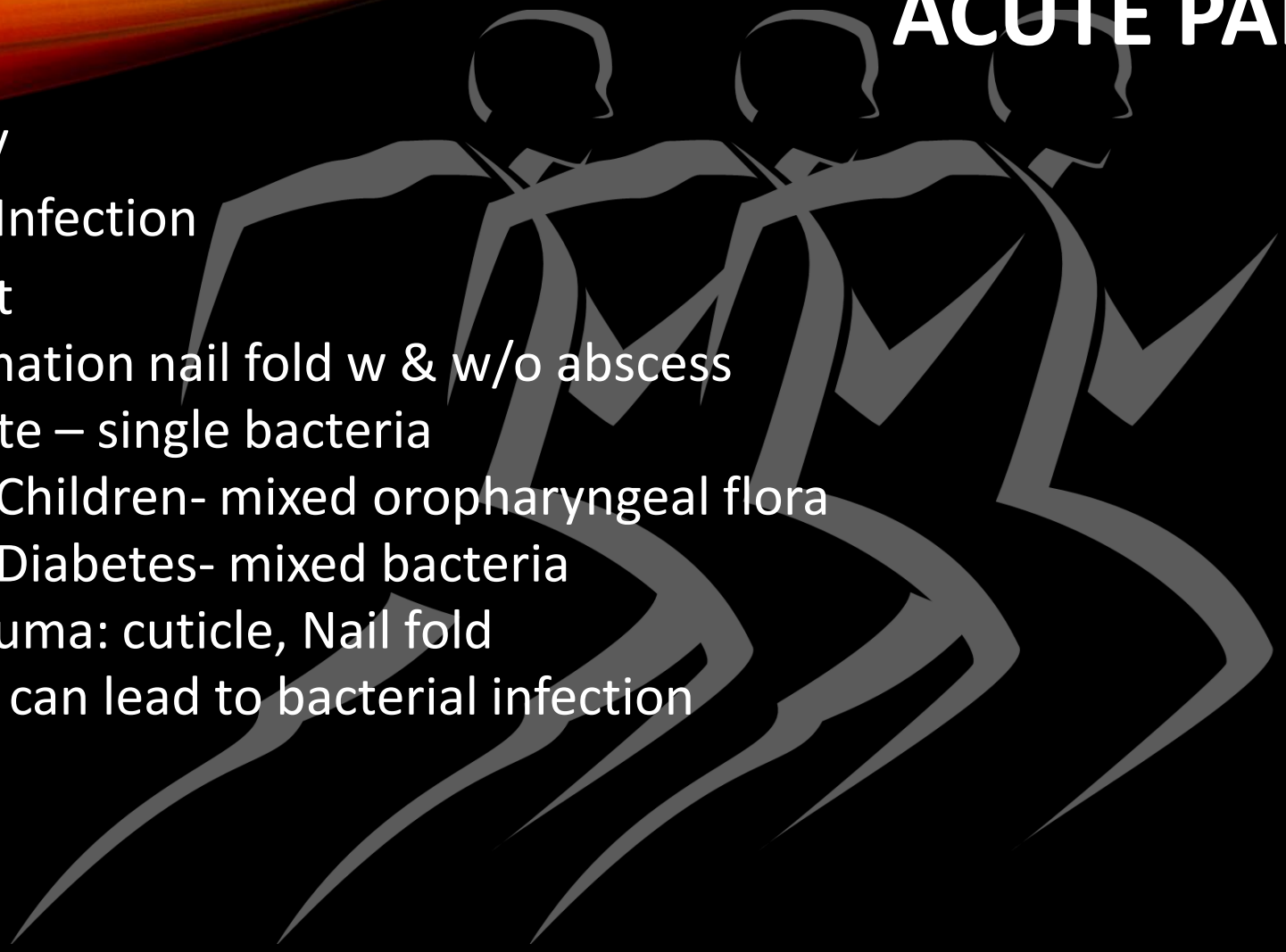
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ACUTE PARONYCHIA

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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

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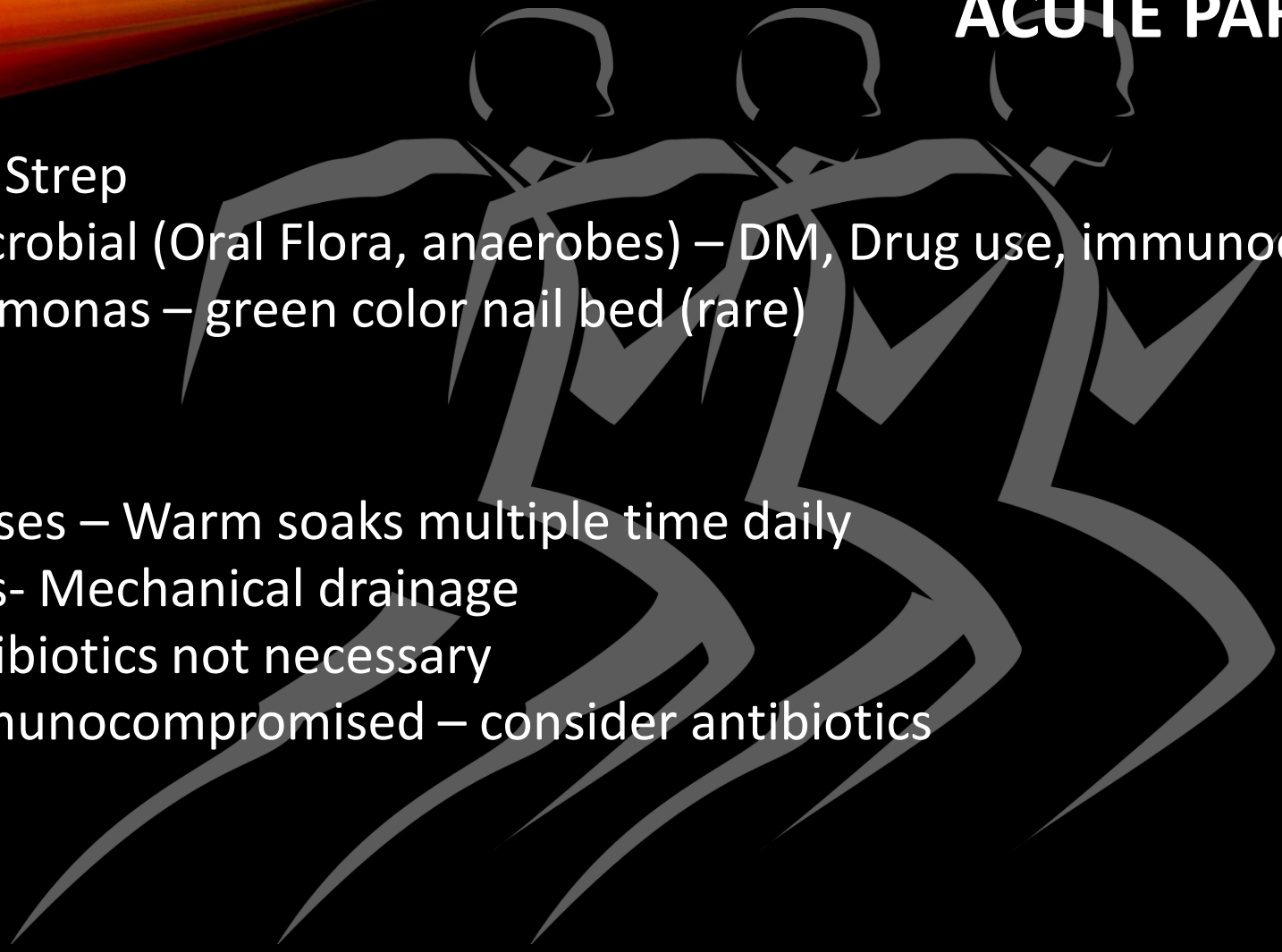
ACUTE PARONYCHIA

- 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

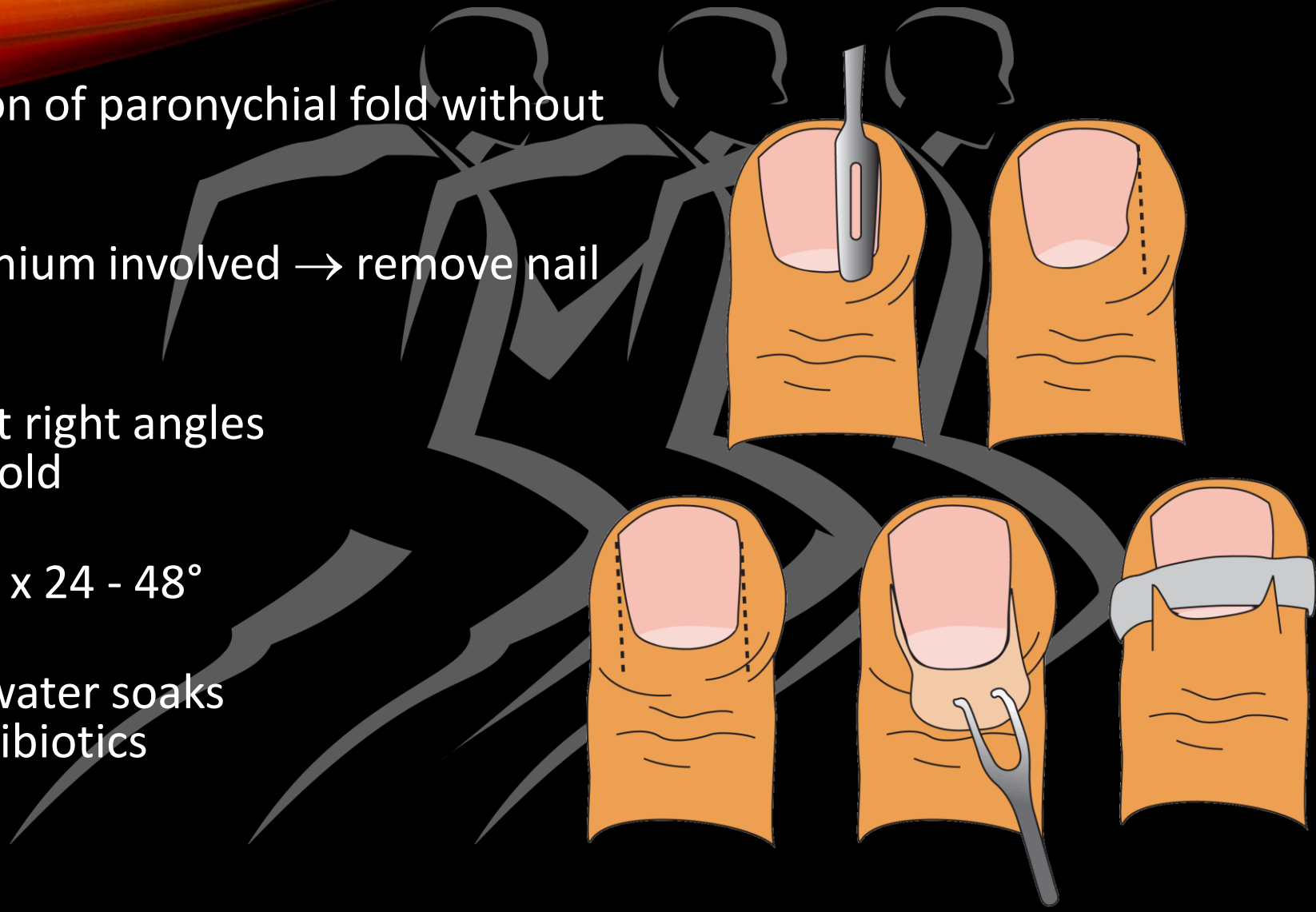


- Organisms
  - Staph / Strep
  - Polymicrobial (Oral Flora, anaerobes) – DM, Drug use, immunocompromised
  - Pseudomonas – green color nail bed (rare)
  - MRSA
- Treatment
  - Mild cases – Warm soaks multiple time daily
  - Abscess- Mechanical drainage
    - Antibiotics not necessary
    - Immunocompromised – consider antibiotics

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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



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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

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CHRONIC PARONYCHIA



TREATMENT

- Non-op:
  - Warm soaks, antifungal meds, Limit wet exposures
- Operative
  - Marsupialization: excise dorsal eponychium to germinal matrix
  - Failed Conservative treatment

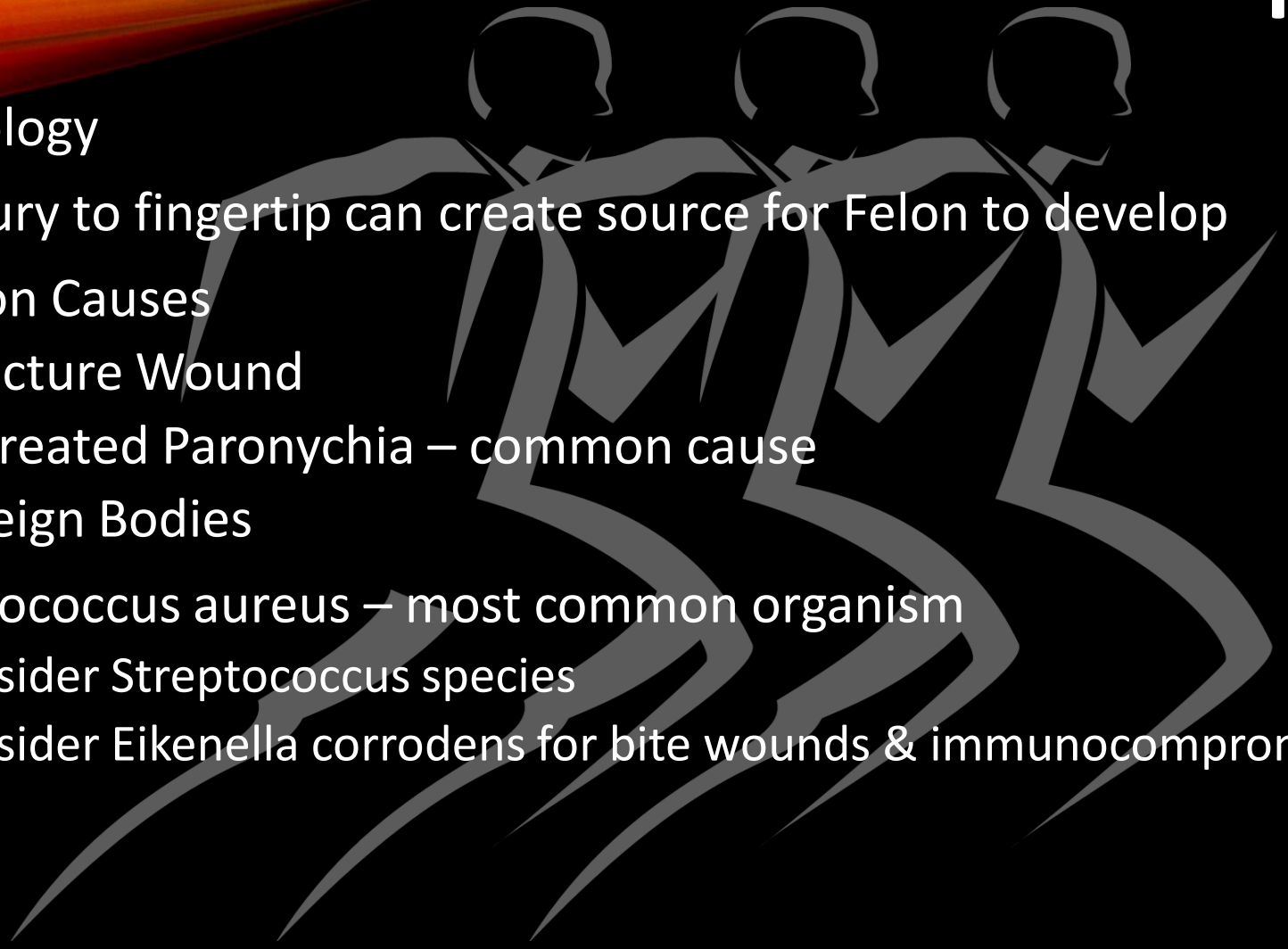
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FELON

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FELON



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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FELON

Pathophysiology

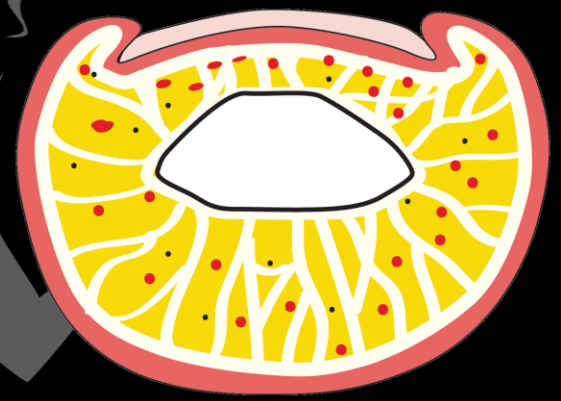
- Defined as Subcutaneous infection involving the pulp of fingertip
- Pulp has many compartments separated by fibrous septae
- Swollen pad/Septae create pressure and cause pain
  - Can Contribute to :
    - Tissue Necrosis
    - Osteomyelitis
    - Pyogenic Flexor Tenosynovitis

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FELON

Clinical presentation

- Erythema
- Intense throbbing
- Tense swelling
- Volar Pulp pain
- NO swelling proximal to DIP Fel
  contained within pulp



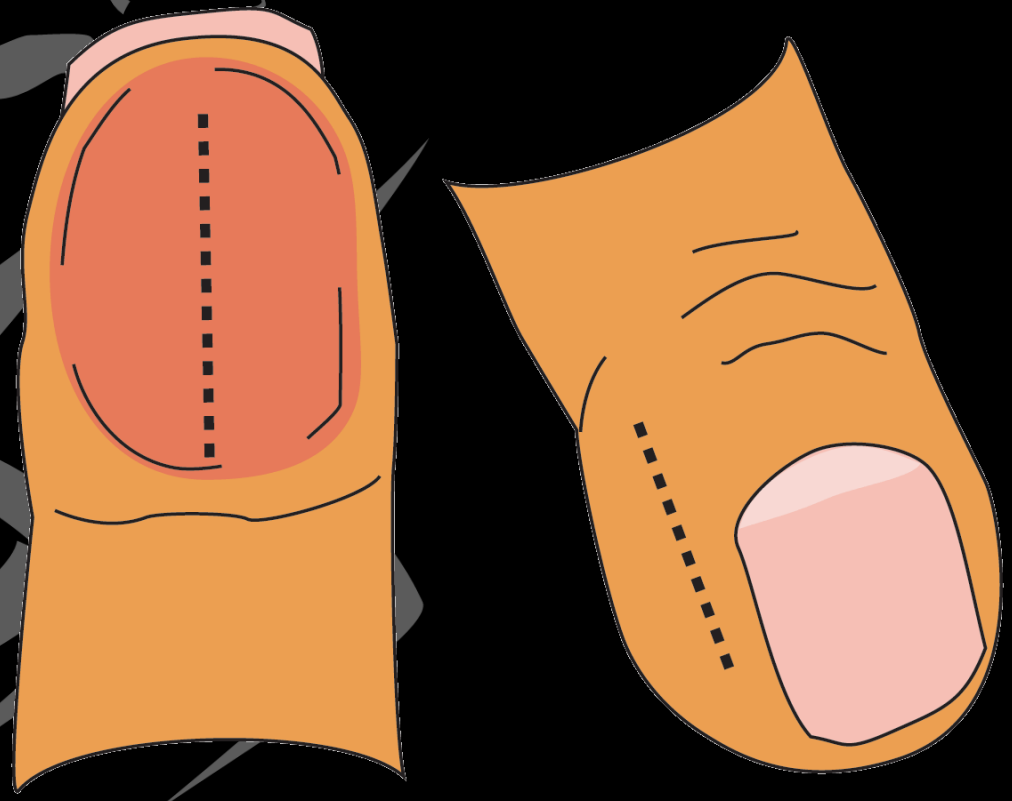




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FELON TREATMENT

- 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?



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HERPETIC WHITLOW

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HERPETIC WHITLOW

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



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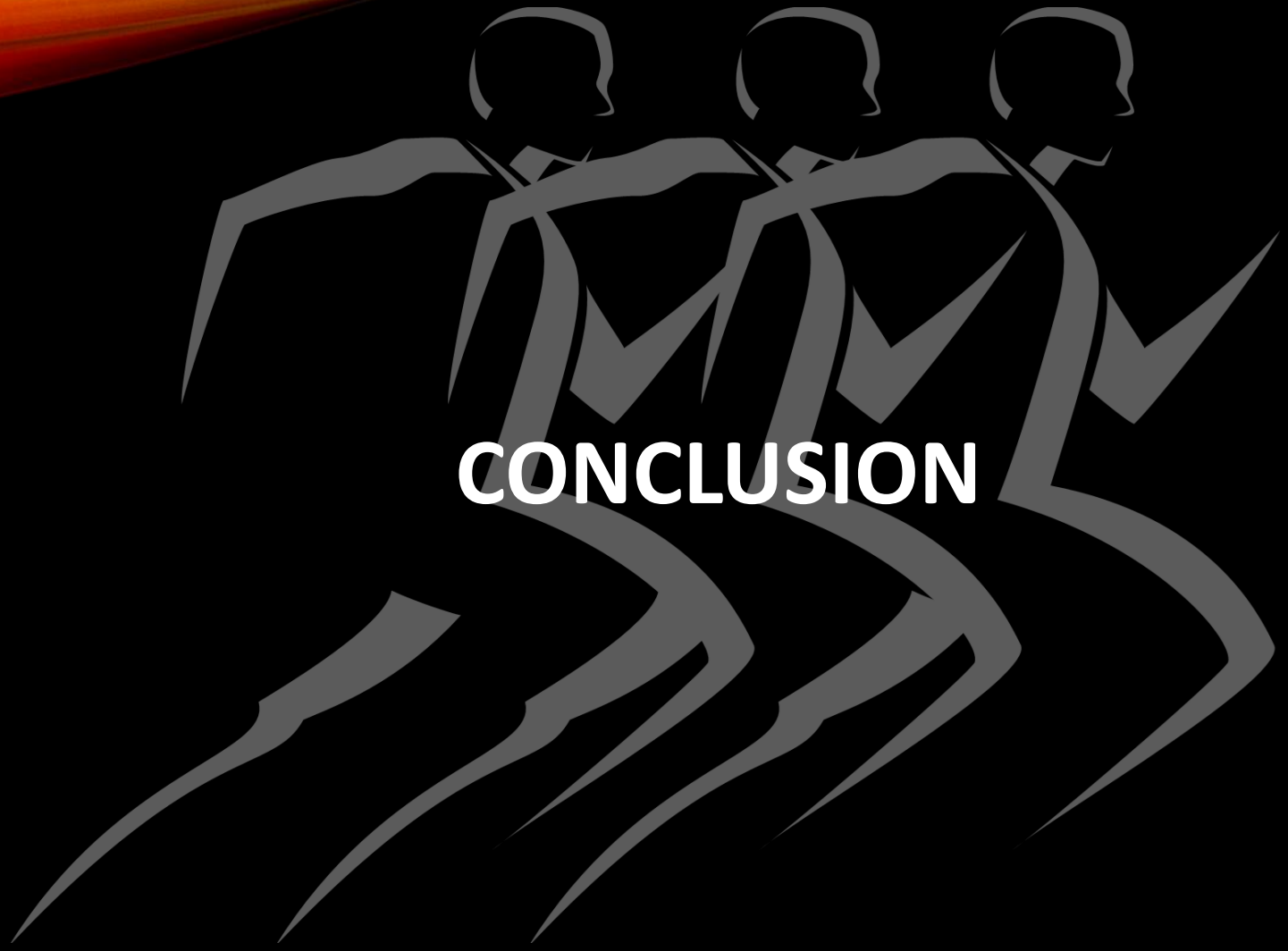
HERPETIC WHITLOW

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 ?



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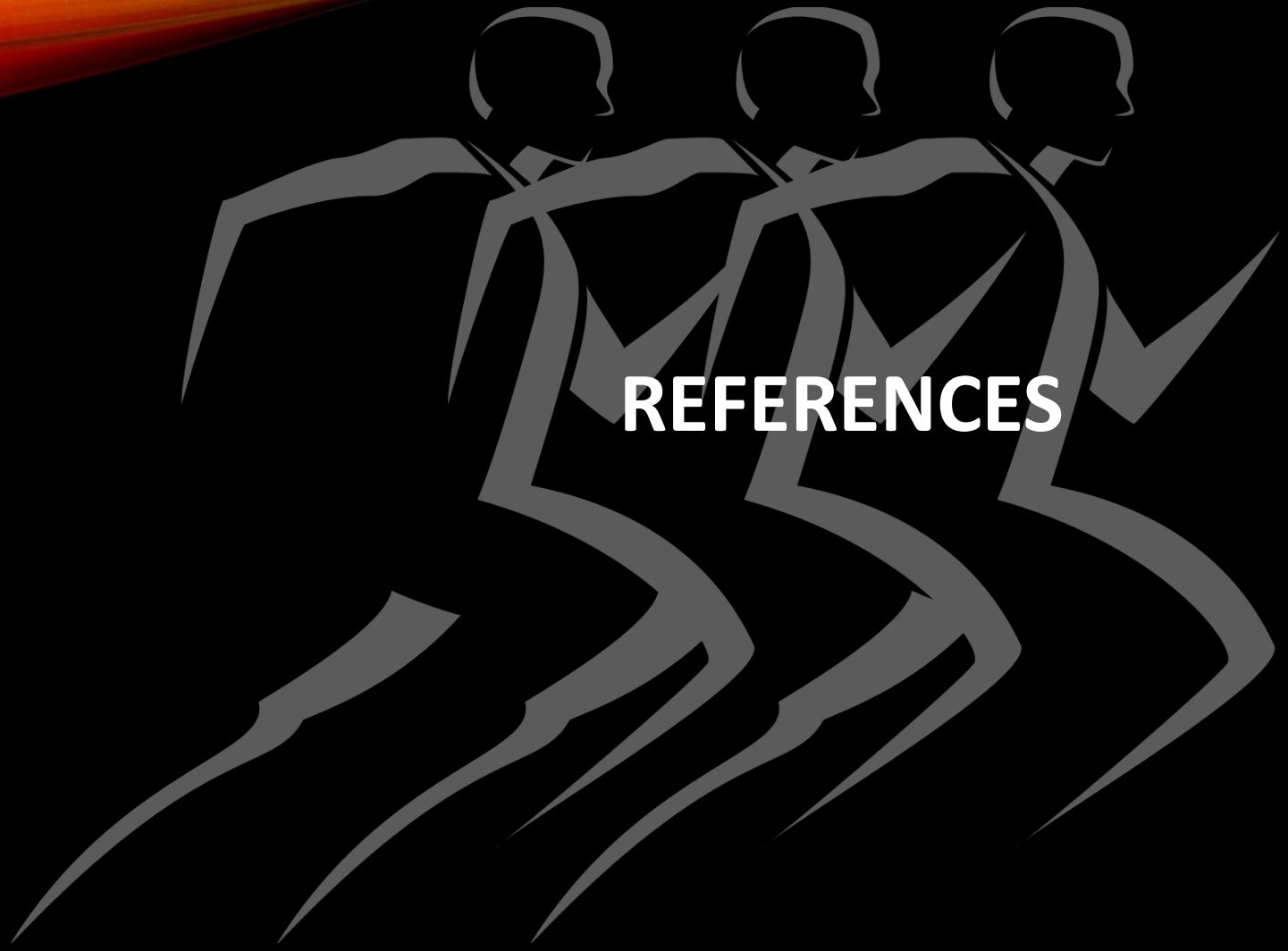
CONCLUSION

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CO

- 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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