

Concepts in Orthopaedic Care: Hand Infections

Scott M Wein MD
Raleigh Orthopaedic Clinic
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Hand Infections

- Infections may be a source of considerable morbidity
- Expeditious treatment is necessary

General Principles

- **Microbiology**
 - Staphylococcus aureus (50%-80%)
 - Streptococcal species
 - Gram negatives

General Principles

- **Microbiology**
 - Work & Home acquired infections
 - single gram + species
 - IV drugs, bites, diabetics
 - polymicrobial
 - Chronic indolent infections
 - suggestive of atypical Mycobacterium or fungi

General Principles

- MRSA
 - Increase in past decade
 - Risk factors
 - DM, history of antibiotic use, immunocompromise, IVDU...
 - Some recommend empiric treatment of all hand infections for MRSA, pending culture results

General Principles

- Culture and Staining
 - Routine
 - aerobic & anaerobic, gram stain
 - Atypical mycobacterium
 - AFB
 - Fungi
 - KOH prep
 - Herpes
 - Tzanck smear

General Principles

- Etiology
 - Direct penetration
 - Spread from local compartments
 - Hematogenous dissemination

General Principles

- May involve
 - Skin and subcutaneous tissue
 - Fascia
 - Tendon sheaths
 - Joint
 - Bone

General Principles

- History
 - Complain of pain, swelling, redness
 - Trauma
 - Comorbidities
 - IVDU, recent infections, etc.

General Principles

- Physical Exam
 - Swelling, erythema, warmth, tenderness, painful motion, fluctuance, drainage, etc.
 - Lymphangitis, adenopathy
 - Systemic symptoms

General Principles

- Labwork
 - CBC with diff, ESR, CRP
- Imaging
 - Xrays
 - Ultrasound
 - MRI
 - Bone Scan

General Principles

- Treatment
 - Rest, elevation, splint immobilization
 - Empiric abx
 - Tetanus booster
 - I&D if indicated



Types of Infections

- Cellulitis
- Subcutaneous abscess
- Paronychia
- Felon
- Septic flexor tenosynovitis
- Deep space infections
- Septic joint
- Osteomyelitis
- Necrotizing fasciitis
- Infections secondary to bites, atypical mycobacteria, viruses, fungi

Cellulitis

- Inflammation of skin & subcutaneous tissue
- Characterized by hyperemia, leukocytic infiltration & edema
- May be initiated by skin trauma, ulceration, dermatitis, lymphedema or nothing at all
- Most often caused by group A beta hemolytic strep
- *S. aureus* causes less extensive cellulitis

Cellulitis

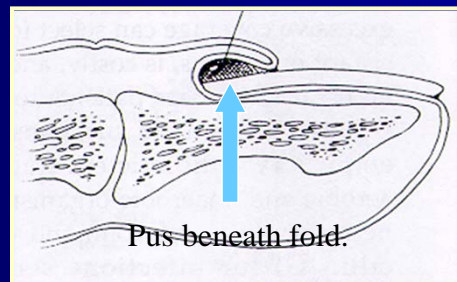
- Diagnosis is primarily clinical
- Examine closely to rule out abscess, deep space infection, or septic joint
- Oral vs IV antibiotics
- Splint, frequent reassessment

Subcutaneous Abscess

- Usually results from a puncture wound
- Local area of fluctuance and edema with surrounding cellulitis
- *S. aureus* most common organism
- I&D
 - leave wound open
- Abx appropriate to clinical scenario

Paronychia

- Abscess beneath the nail fold



Paronychia

- Very common
- Usually *S. Aureus*
- May extend between nail & matrix
- Early soaks, abx
- May require I&D



Paronychia

- Incision and drainage
 - Digital block
 - Lift nail fold from nail plate to decompress
 - If suspect abscess between nail & matrix, then remove part of the nail
 - Place wick for continued egress
 - Daily dressing changes and warm soaks

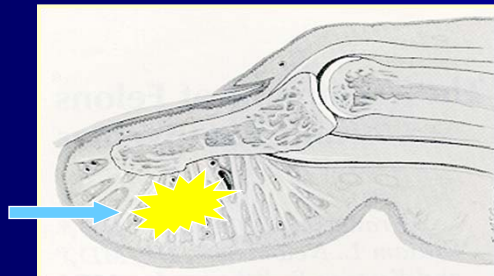
Chronic Paronychia

- Important to differentiate from acute paronychia
- Intermittent inflammation around the eponychium
- Often recalcitrant to Rx
- Marsupialization & removal of nail plate.
- Topical steroid-antifungal ointment



Felon

- Closed space infections of the volar pulp space

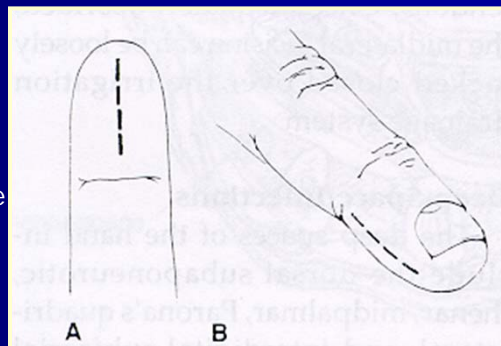


Felon

- Present with severe, throbbing pain
- Penetrating injury to pulp
- Staph Aureus most common organism
- Early
 - elevate, oral abx & warm soaks
- Late
 - I&D critical to avoid pulp space necrosis, osteomyelitis and flexor tenosynovitis

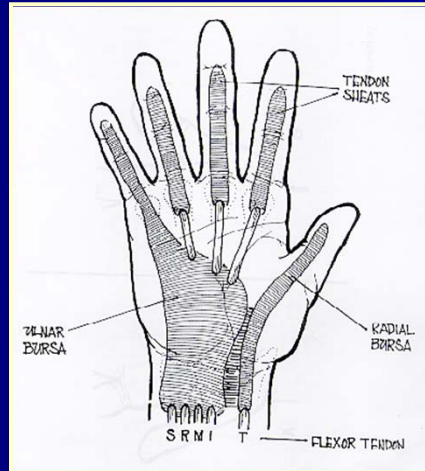
Felon

- I&D
 - High lateral (B) & mid-volar (A) incisions preferred.
 - Try to avoid high lateral on ulnar side of thumb & radial side index
- Pack open, soaks



Septic Flexor Tenosynovitis

- Distal palmar crease to distal phalanx
- Thumb sheath contiguous with radial bursa
- Small sheath contiguous with ulnar bursa
- Both radial & ulnar extend to carpal tunnel
- Radial & ulnar bursa communicate in over 50% of individuals – horseshoe abscess



Septic Flexor Tenosynovitis

- Rapidly spreading bacterial infection within sheath as a result of penetrating trauma
- Staph Aureus most common organism
- Chronic, often indolent, infections may be due to atypical mycobacterium

Septic Flexor Tenosynovitis

- Kanavel's Four Cardinal Signs
 - Flexed posture of affected digit
 - Tenderness along flexor tendon sheath
 - Diffuse swelling
 - Pain with passive extension

Septic Flexor Tenosynovitis



Septic Flexor Tenosynovitis

- Very early cases
 - IV abx, splint, elevate
- Surgery
 - limited incision
 - Extensile incision
- Institute mobilization with OT early

Septic Flexor Tenosynovitis



Septic Flexor Tenosynovitis

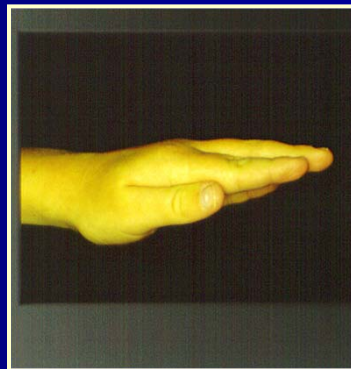


1 week follow-up



3 week follow-up

Septic Flexor Tenosynovitis



Final Result

Septic Flexor Tenosynovitis w/Proximal Extension



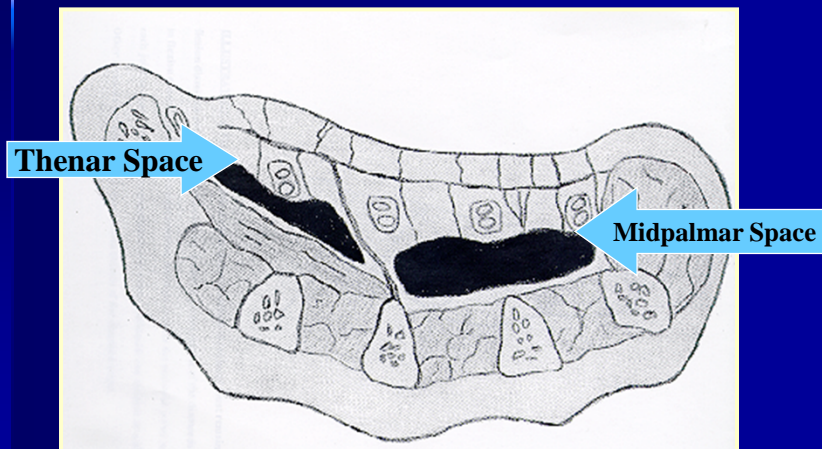
Septic Flexor Tenosynovitis w/Proximal Extension



Deep Space Infections

- Closed compartments of the hand
 - Dorsal subaponeurotic space
 - Thenar space
 - Midpalmar space
 - Interdigital subfascial web space
 - Parona's quadrilateral space
- These are prone to infection from penetrating trauma, local spread and hematogenous dissemination.

Deep Space Infections



Septic Arthritis

- Aspirate to differentiate from crystalline arthropathies
- Early drainage important to prevent destruction

Osteomyelitis

- History of open fracture, penetrating trauma
- S. Aureus & Strep. most common
- Present w/ pain, erythema, swelling
- MRI for early marrow edema
- Xrays
 - local osteopenia, periosteal rxn
 - Erosions and destruction

Osteomyelitis

- Index of suspicion should be heightened when a presumed soft tissue infection does not respond to standard Rx
- Debridement and IV abx hallmarks of Rx with extended coverage for 4-6 weeks

Osteomyelitis



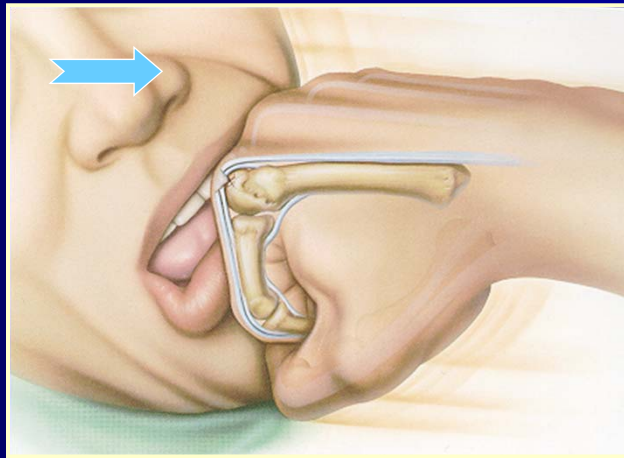
Osteomyelitis



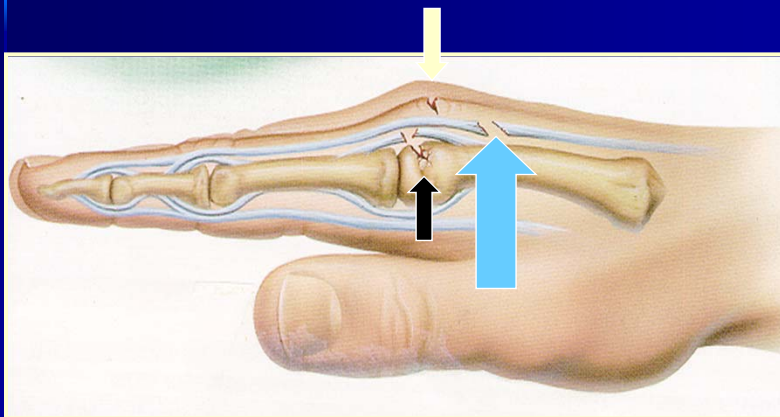
Human Bites

- Typically clenched fist injuries from punch to mouth
- Over 40 different strains of bacteria
- May seem innocuous due to multiple planes of injury that alter alignment in different hand positions
- Wound over MCP should be considered intrarticular until proven otherwise to avoid potential consequences of untreated septic arthritis

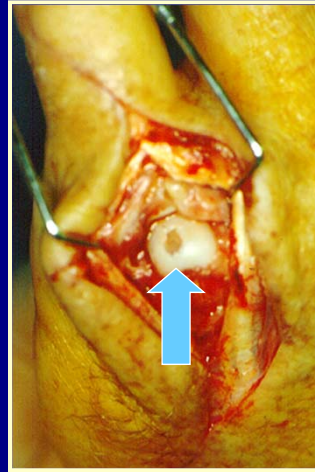
Human Bites



Human Bites



Human Bites



Animal Bites

- Dogs > cats > rodents
- *Pasteurella multocida* very common along with Staph, Strep & anaerobes
- Careful exploration and debridement if infection or suspicion of tendon, nerve, bone, or joint involvement

Dog bite s/p debridement



Alloderm tx



10 weeks postop



10 weeks postop



Necrotizing Fasciitis

- LIFE & LIMB THREATENING EMERGENCY
- Some cases are polymicrobial, although group A Strep is most common

Necrotizing Fasciitis

- Severe pain, rapid advancement, cellulitis w/ poor margins, tense swollen skin
- Unstable pt should raise index of suspicion

Necrotizing Fasciitis



Necrotizing Fasciitis



Necrotizing Fasciitis



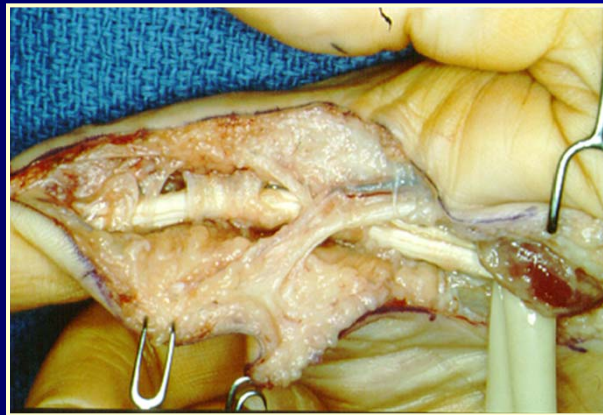
Necrotizing Fasciitis



Mycobacterial infections

- 75% of atypical mycobacteria infections are in the hand
- *M. marinum* is most common
- May be cutaneous, subcutaneous or deep
- Typically indolent course

M. marinum infection



Herpetic Whitlow

- Herpes simplex infection involving the hand
- Clear vesicles mature, unroof & leave ulcerated base
- Ulcer subsides over the ensuing weeks

Herpetic Whitlow



Thank You

