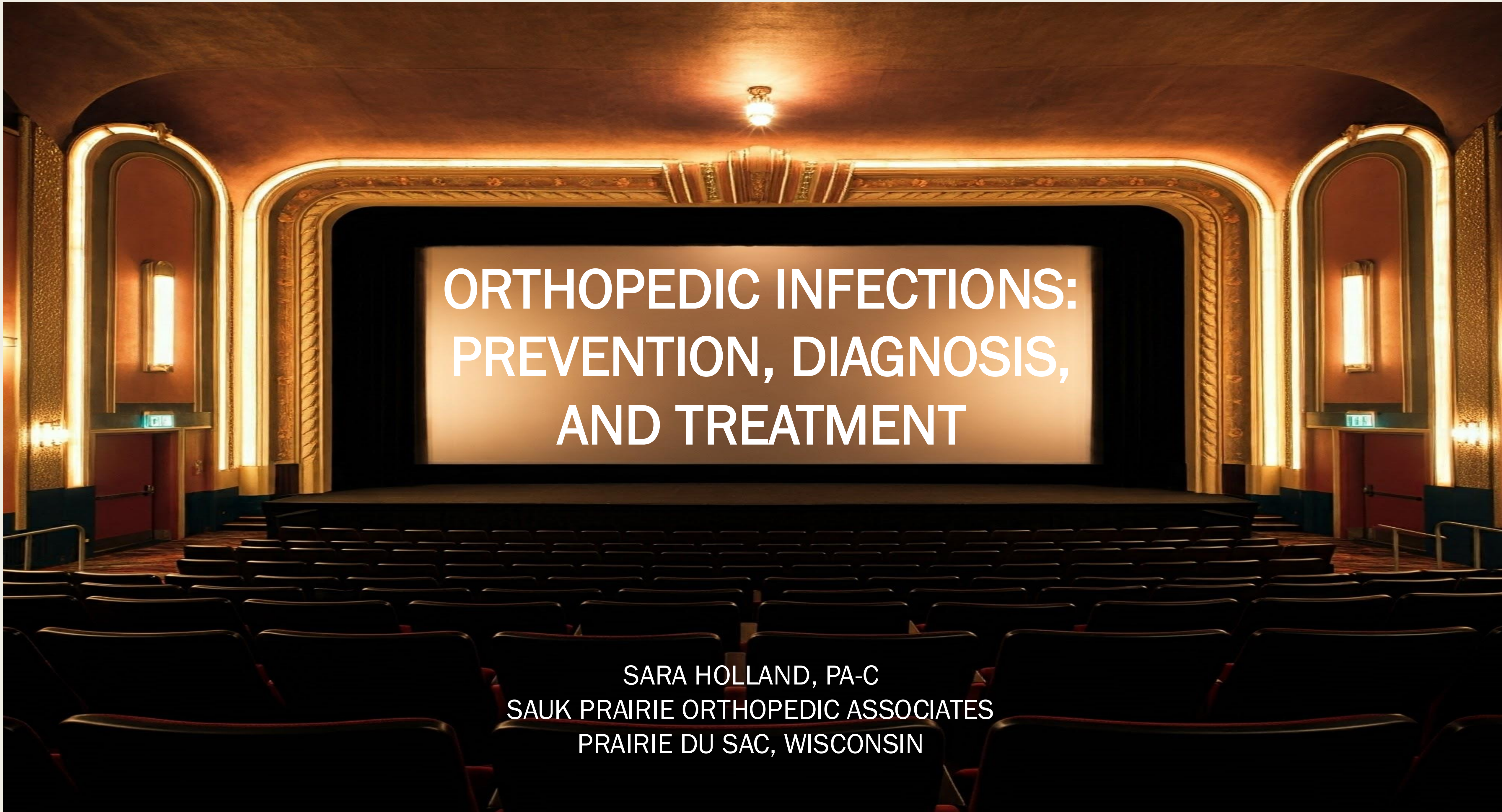

ORTHOPEDIC INFECTIONS: PREVENTION, DIAGNOSIS, AND TREATMENT

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Look at me! How dare you! Close your eyes!

OBJECTIVES

- PERIOPERATIVE ANTIBIOTIC PROPHYLAXIS
- IDENTIFYING AND MANAGING PROSTHETIC JOINT INFECTIONS
- IDENTIFYING AND MANAGING SEPTIC BURSITIS
- IDENTIFYING AND MANAGING SEPTIC ARTHRITIS

PERIOPERATIVE ANTIBIOTIC PROPHYLAXIS

- MRSA screening
  - *Primary reservoir (nares)*
    - Nasal Swab
    - *Nasal mupirocin-mainstay of treatment of MRSA decolonization*
    - *Povidone/iodine solution to nares day of surgery*
  - *Secondary reservoir*
    - Groin or skin swab
    - Povidone/iodine wipes or chlorhexidine gluconate wipes

Carriers of MRSA have a 9 times higher risk of developing a surgical site infection (SSI)

PERIOPERATIVE ANTIBIOTIC PROPHYLAXIS

Perioperative Antibiotic Selection

- **Cefazolin**
  - 1 g IV q 8 hours for 24 hours total
- **Cefuroxime** is alternative
- **Clindamycin**
  - 900 mg IV q 8 hours for 24 hours total
  - Use for β-lactam allergy
- **Vancomycin**
  - 1 g Iv or 15 mg/kg IV
  - For high infection risk individuals
    - MRSA positive
    - history of previous infection

IDENTIFYING AND MANAGING PROSTHETIC JOINT INFECTIONS

- 64 y/o male
- History of right total knee replacement 3 years ago.
- Did well initially, but developed knee pain, swelling, and stiffness about 6 months ago.
- Denies any recent illness/infection
- Denies any fevers/chills
- Physical Exam:
  - *Scaly desquamation to right lower extremity*
  - *Right knee joint effusion present*
  - *Right knee range of motion: 0-120 degrees*

Case courtesy of Henry Knipe, Radiopaedia.org, rID: 48799

IDENTIFYING AND MANAGING PROSTHETIC JOINT INFECTIONS

- Labs
  - *CBC with differential*
  - *ESR*
  - *CRP*

  - *Synovial fluid cell count with differential*
  - *Synovial fluid gram stain, culture & sensitivity*
  - *16s ribosomal RNA*
  - *Synovasure alpha-defensin*

IDENTIFYING AND MANAGING PROSTHETIC JOINT INFECTIONS

Lab Results:

- 5 mL of cloudy yellow fluid
- Synovial Color: Yellow
- Synovial Appearance: Turbid
- **Synovial WBC: 84191 WBCs/mm3**
- Synovial RBC: 17447 RBCs/mm3
- **Synovial Neutrophils: 92%**

- **CRP: 4.45 mg/dL (0.02-0.50)**
- **ESR: 55 mm/hr (0-20)**

IDENTIFYING AND MANAGING SEPTIC BURSITIS

- Olecranon bursa
- Prepatellar bursa
- Infrapatellar bursa
- Calcaneal bursa

Case courtesy of Ian Bickle, Radiopaedia.org, rID: 86031

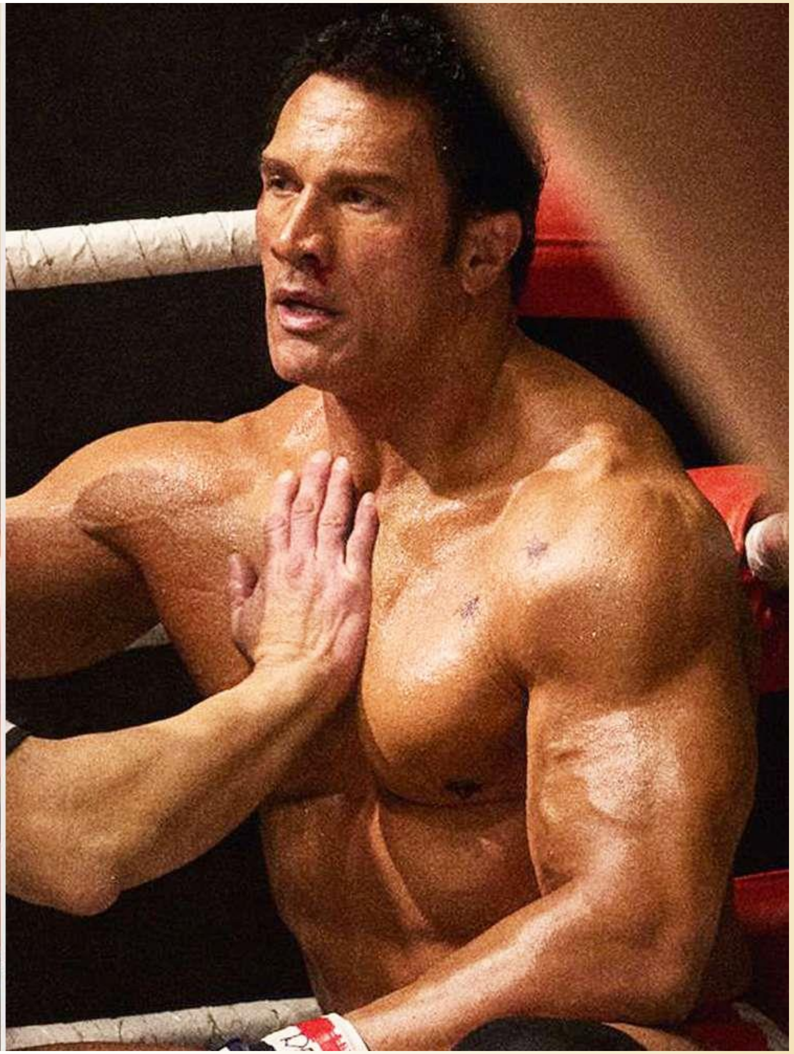
CASE COURTESY OF AHMED ABDRABOU, RADIOPAEDIA.ORG, RID: 30674

Table 1. Overview of Common Superficial Bursitis

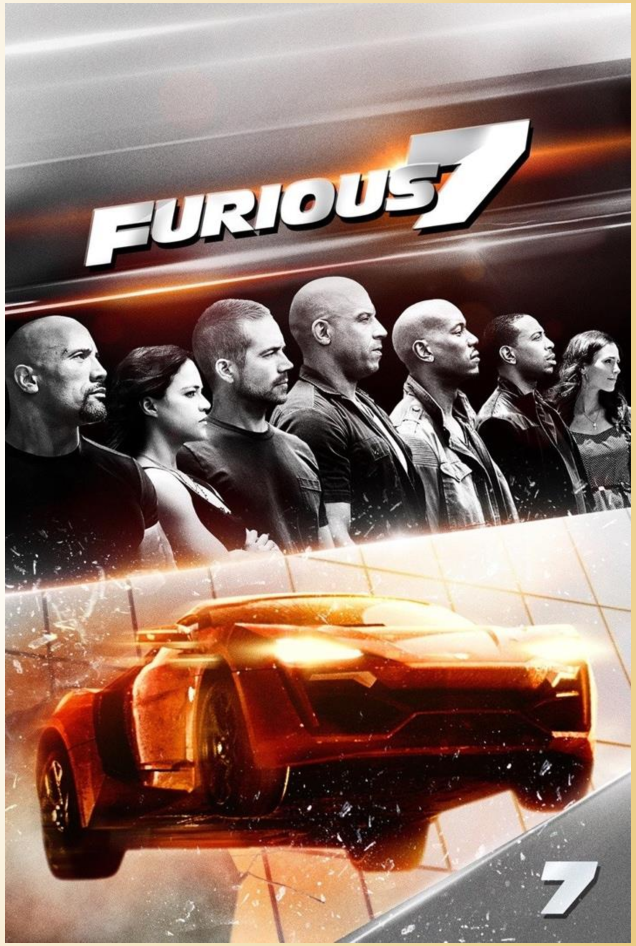
		Major risk factors			
Location	*Prevalence*	*Occupation, type of athlete, and other contributors*	*Body positions*	*Most common pathophysiologic mechanism*	*Other pathophysiologic mechanisms*
Olecranon	Common	Miners, students, draftsmen, plumbers, heating and air conditioning technicians and making movies Chronic hemodialysis	Leaning on elbows	Chronic microtraumatic	Traumatic/hemorrhagic, aseptic inflammatory, septic
Prepatellar	Relatively common	Coal miners, carpet layers, housemaids, plumbers, concrete finishers, roofers, wrestlers	Kneeling and crawling	Chronic microtraumatic	Traumatic/hemorrhagic, septic
Superficial infrapatellar/ pretibial	Rare	Same as prepatellar bursitis	Kneeling and crawling	Chronic microtraumatic	Traumatic/hemorrhagic
Subcutaneous calcaneal	Rare	Figure skaters, dancers, rowers	Feet in improperly fitted footwear (e.g., too tight) or high heels	Chronic microtraumatic	Traumatic/hemorrhagic

The Smashing Machine

2025



Managing Septic Bursitis



Managing Septic Bursitis

- Oral antibiotics unless:
  - Immunocompromised
  - Systemic signs/symptoms of infection
  - Joint involvement

IDENTIFYING AND MANAGING SEPTIC ARTHRITIS

Presentation:

Atraumatic right knee pain

Knee swelling

Fever

Risk Factors for Septic Arthritis

Contiguous spread

Skin infection, cutaneous ulceration

Direct inoculation

Previous intra-articular injection

Prosthetic joint (within two years)

Recent joint surgery

Hematogenous spread

Diabetes mellitus

HIV infection

Immunosuppressive medication use

Intravenous drug abuse

Osteoarthritis

Other causes of sepsis

Prosthetic joint (more than two years)

Rheumatoid arthritis

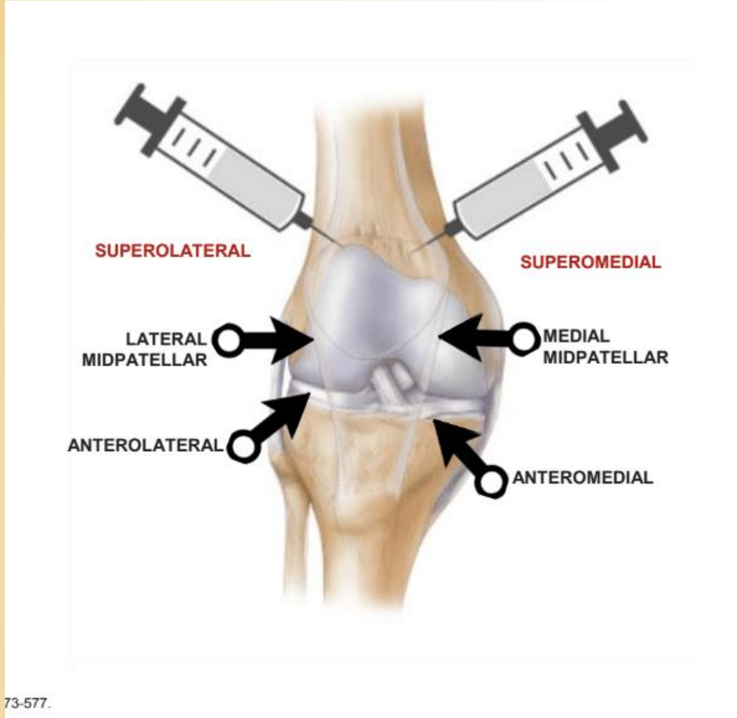
Sexual activity (gonococcal arthritis)

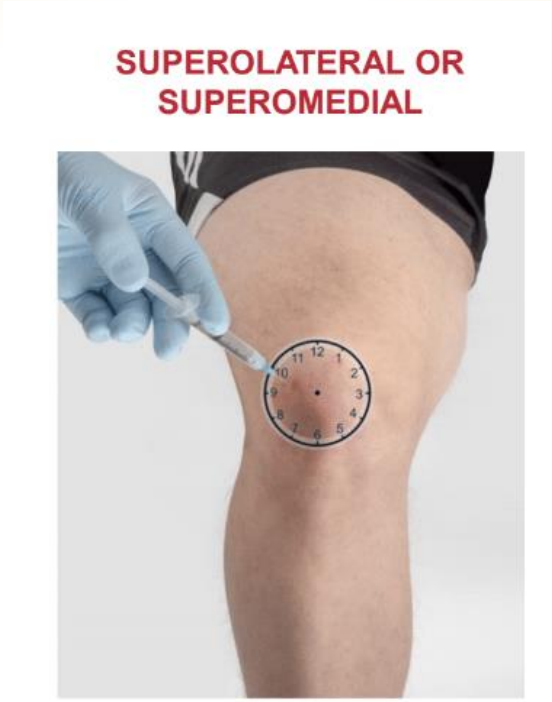
Other

Age older than 80 years

Smoking

Knee intra-articular approaches for aspiration





Superolateral or Superomedial

Extended knee, when aspiration is needed
10 o’clock or 2 o’clock position

IDENTIFYING AND MANAGING SEPTIC ARTHRITIS

	Class I (Noninflammatory)	Class II (Inflammatory)	Class III (Septic)	Class IV (Hemorrhagic)
Color	Clear/yellow	Yellow/white	Yellow/white	Red
Clarity	Transparent	Translucent/opaque	Opaque	Opaque
Viscosity	High	Variable	Low	NA
Mucin Clot	Firm	Variable	Friable	NA
WBC Count	<2,000	2,000-100,000	>100,000	NA
Differential	<25% PMNs	>50% PMNs	>95% PMNs	NA
Culture	Negative	Negative	Positive	Variable

Clinical Presentations of Septic Arthritis

Clinical history or exposure	Joint involvement	Pathogen
Cleaning fish tank	Small joints (fingers, wrists)	*Mycobacterium marinum*
Dog or cat bite	Small joints (fingers, toes)	*Capnocytophaga species, Pasteurella multocida*
Exposure to soil or dust containing decomposed wood (North Central and Southern United States)	Monoarticular; knee, ankle, or elbow	*Blastomyces dermatitidis*
Ingestion of unpasteurized dairy products	Monoarticular, sacroiliac joint	*Brucella* species
Intravenous drug abuse	Axial joints, such as sterno-clavicular or sacroiliac joint	*Pseudomonas aeruginosa, Staphylococcus aureus*
Nail through shoe	Foot	*P. aeruginosa*
Older age	—	Increased risk of gram-negative infections
Prosthetic joint	Any prosthetic joint	Coagulase-negative staphylococci, *Pseudomonas* species, *Pneumococcus* species
Sexually active	Tenosynovial component in hands, wrists, or ankles	*Neisseria gonorrhoeae*
Soil exposure/gardening	Monoarticular; knee, hand, or wrist	*Nocardia* species, *Pantoea agglomerans, Sporothrix schenckii*
Southwestern United States, Central and South America (primary respiratory illness)	Knee	*Coccidioides immitis*
Underlying medical conditions		
Diabetes mellitus or immunocompromise	—	Increased risk of fungal infection (most commonly *Candida*), *Pseudomonas*, and *Escherichia coli*

Antibiotic Therapy for Suspected Septic Arthritis

Gram stain result	Antibiotics
Empiric antibiotics based on Gram stain result	
Gram-positive cocci	Vancomycin or daptomycin (Cubicin), plus a cephalosporin, carbapenem, or fluoroquinolone Alternative: oral clindamycin plus fluoroquinolone
Gram-negative cocci	Ceftriaxone
Gram-negative rods	Ceftazidime (Fortaz), cefepime, piperacillin/ tazobactam (Zosyn), or carbapenem Penicillin or cephalosporins allergy: IV aztreonam (Azactam) or IV fluoroquinolone
Negative result on Gram stain but strong clinical suspicion for septic arthritis	Vancomycin plus ceftazidime or an aminoglycoside

Isolated species	Antibiotics
Antibiotics based on culture, acid-fast stain, RNA probe, or antibody findings	
Borrelia burgdorferi	Oral doxycycline, amoxicillin, or cefuroxime; IV ceftriaxone if no resolution after oral therapy
Mycobacterium tuberculosis	Rifampin, often with a multidrug regimen (in consultation with an infectious disease specialist)
Neisseria gonorrhoeae	IV ceftriaxone or cefotaxime; switch to oral after 2 days, following antimicrobial susceptibility testing and substantial clinical improvement, for at least 7 days total

IV = intravenous.

What do

Christopher Columbus,

Benjamin Franklin,

Queen Ann,

Ludwig Van Beethoven,

and Dick Cheney

have in common?

Gout

"great mimicker"

Look at me! How dare you! Close your eyes!

Looking for an in-flight movie recommendation?

<u>Washington Post</u> describes the film's Queen Anne as "half-mad with gout and grief."

"a disgustingly beautiful look at love, rivalry and gout."

Dual Energy CT

Case courtesy of Mohammad Taghi Niknejad, Radiopaedia.org, rID: 54276

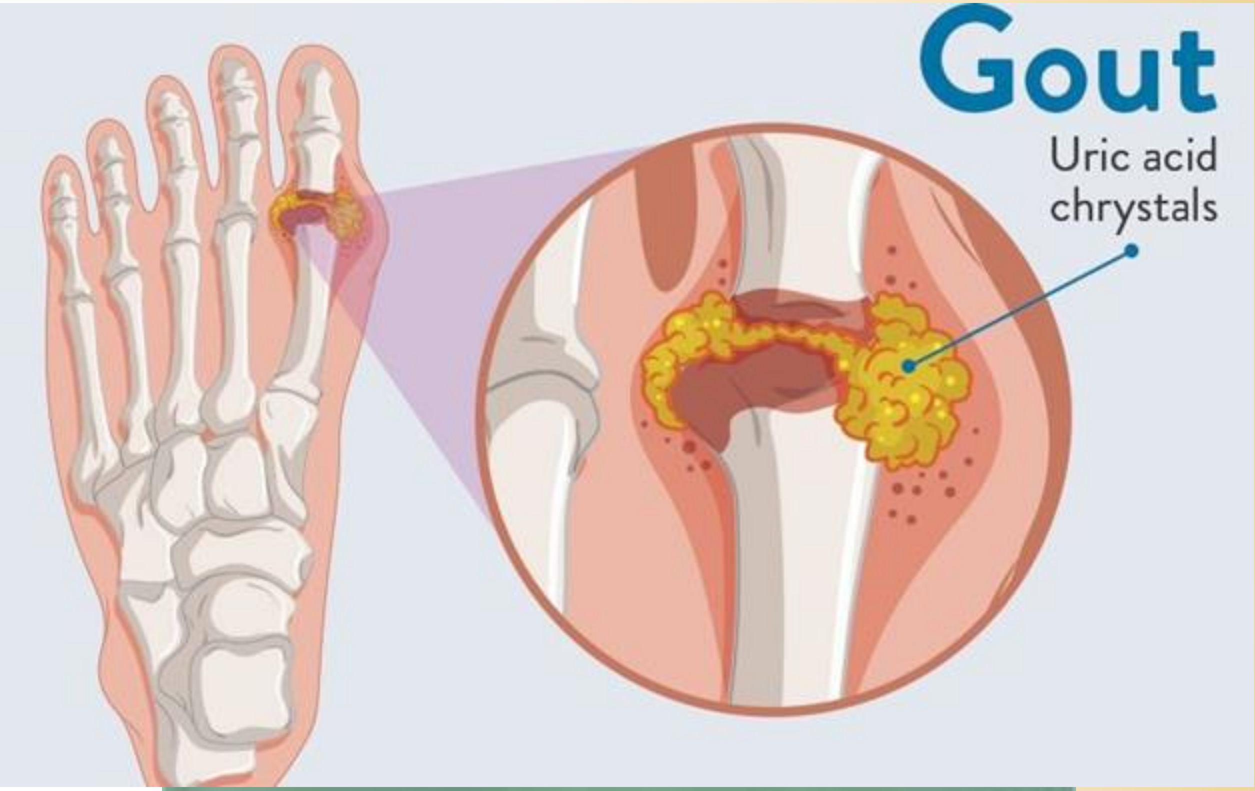
CASE COURTESY OF YASSER ASIRI, RADIOPAEDIA.ORG, RID: 77478

IDENTIFYING AND MANAGING GOUT

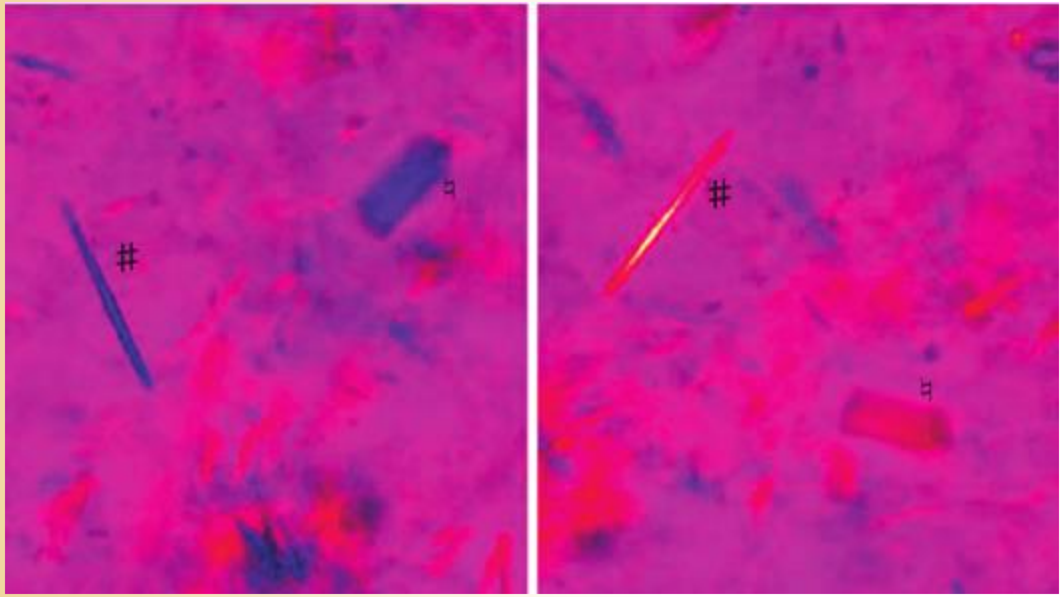
- Labs
  - *Uric acid*
  - *Kidney function*

  - *Cell count with differential*
  - *Crystal analysis*
  - *Gram stain*
  - *Culture (aerobic and anaerobic)*

Aspiration of MTP joint



Uric acid crystals



Needle shaped

Negatively birefringent

IDENTIFYING AND MANAGING GOUT

	Class I (Noninflammatory)	Class II (Inflammatory)	Class III (Septic)	Class IV (Hemorrhagic)
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WBC Count	<2,000	2,000-100,000	>100,000	NA
Differential	<25% PMNs	>50% PMNs	>95% PMNs	NA
Culture	Negative	Negative	Positive	Variable

ACUTE GOUT TREATMENT

NSAIDs

- Naproxen 500 mg q 6 hours for first day, then 500 mg bid and maintain until 3 days after resolution

Colchicine 0.6 mg tablet

- Take 1.2 mg at onset, then 0.6 mg one hour later, then 0.6 mg bid and maintain until 3 days after resolution

Steroids

- Intra-articular injection
- Intramuscular injection
- Oral

CHRONIC GOUT PREVENTION

Lifestyle Modifications

Drinking history
History of kidney stones
Impaired renal function
Hypertension
Diet
Family history
Menopausal state
Trauma
Obesity
Prescription drugs
Type II DM

Medication Options

Urate Lowering Medications
- Xanthine oxidase inhibitors
- Allopurinol
- Febuxostat

Uricosuric Medications
- Increase amount of uric acid eliminated by kidneys
- Probenecid

Biologic
- Krystexxa (Pegloticase)
  - enzyme that changes urate to allantoin that is excreted by kidneys more efficiently

Questions?

THANK YOU CREDITS

- Starring
  - Sara Holland, PA-C
  - The Rock's biceps
  - Curacao
- Directed by
  - Sara Holland, PA-C
- Written by
  - Sara Holland, PA-C
- Featuring
  - Queen Ann
  - Uncle Buck
  - Ron Burgundy
- With special thanks to
  - Veterans Caucus