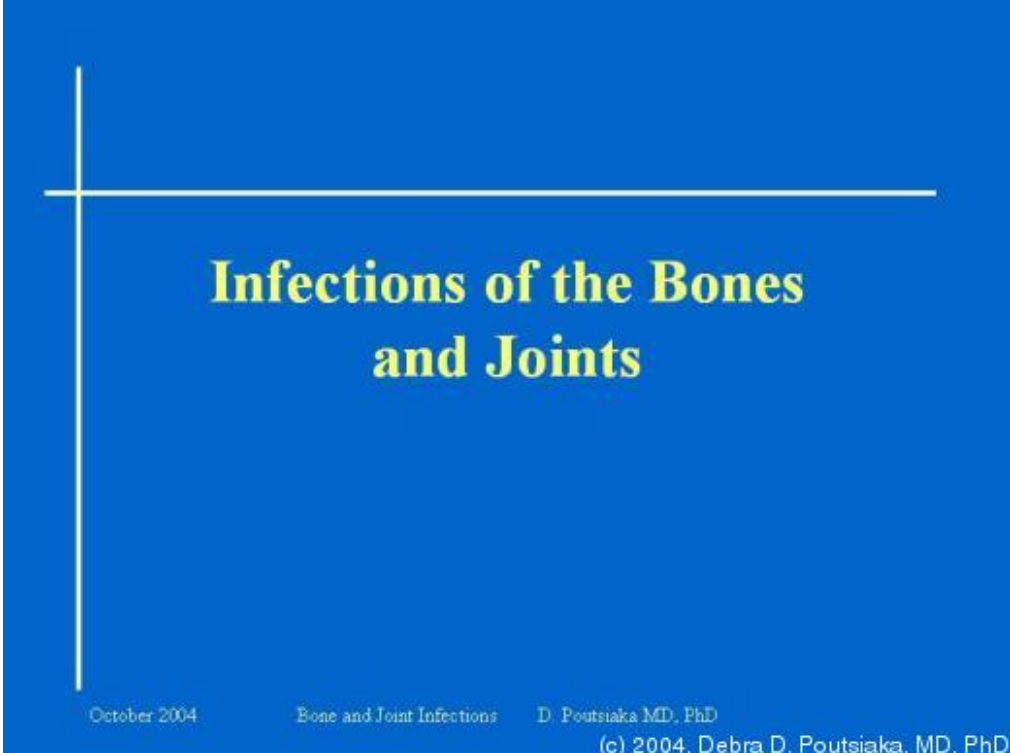


1. Infections of the Bones and Joints

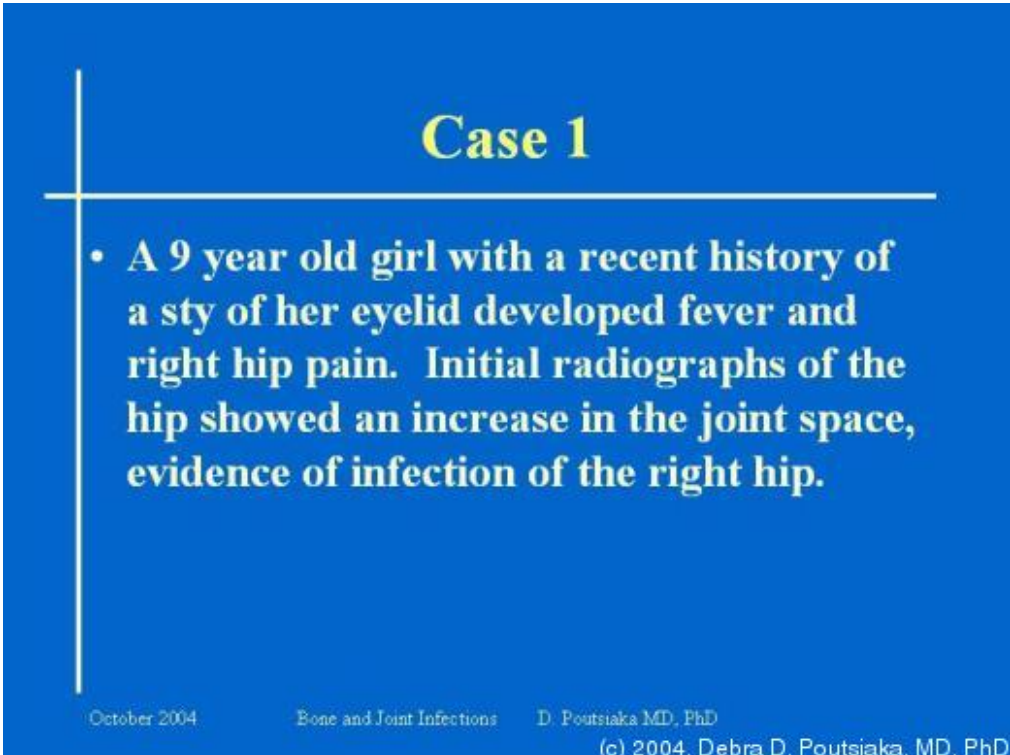


**Infections of the Bones  
and Joints**

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This slide features a blue background with a white crosshair. The title 'Infections of the Bones and Joints' is centered in a large, bold, yellow font. At the bottom, there is a line of small white text containing the date, course name, presenter's name, and copyright information.

2. Case 1



**Case 1**

- **A 9 year old girl with a recent history of a sty of her eyelid developed fever and right hip pain. Initial radiographs of the hip showed an increase in the joint space, evidence of infection of the right hip.**


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This slide features a blue background with a white crosshair. The title 'Case 1' is centered in a large, bold, yellow font. Below the title, a single bullet point in white text describes a clinical case. At the bottom, there is a line of small white text containing the date, course name, presenter's name, and copyright information.

3.

### Case 1: Radiograph 1

**Case 1: Radiograph 1**



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4.

### Case 1 (continued)

**Case 1 (continued)**


**Four weeks later, a repeat radiograph showed progressive destruction of the joint with the loss of joint space and bony lesions involving the proximal femur, ileum and ischium. This case illustrates septic arthritis progressing to osteomyelitis.**

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5.

## Case 1: Radiograph 2

**Case 1: Radiograph 2**



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6.

## Osteomyelitis

**Osteomyelitis**

**Definition: Infectious process involving the various components of bone characterized by progressive inflammatory destruction of bone, necrosis and new bone formation**

- Acute osteomyelitis
- Chronic osteomyelitis

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7. Pathophysiology of Osteomyelitis (1)


## Pathophysiology of Osteomyelitis

- **Hematogenous spread**  
Children – distal femur, proximal tibia  
Adults – axial skeleton
- **Contiguous spread**
- **In association with vascular insufficiency**

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8. Brodie's Abscess

## Brodie's Abscess



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9. Pathophysiology of Osteomyelitis (2)

**Pathophysiology of Osteomyelitis**

- **Hematogenous spread**  
Children – distal femur, proximal tibia  
Adults – axial skeleton
- **Contiguous spread**
- **In association with vascular insufficiency**

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10. Risk Factors for Osteomyelitis

**Risk Factors for Osteomyelitis**

Foreign materials	Soft tissue infection
Sickle cell disease	Surgery
Diabetes	Trauma?
Congenital PMN defects	

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11. Diagnosis of Osteomyelitis (1)

## Diagnosis of Osteomyelitis

### History

- Presence of risk factors
- Symptoms of inflammation

### Physical examination

- Signs of inflammation
- Decreased range of motion
- Drainage, sinus tracts, ulceration

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12. Diagnosis of Osteomyelitis (2)

## Diagnosis of Osteomyelitis

### Radiographic studies

- routine radiographs
- bone scan
- computed tomography (CT scan)
- magnetic resonance imaging (MRI)


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13. Radiographic Findings of Osteomyelitis

## Radiographic Findings of Osteomyelitis

**Salmonella osteomyelitis of the tibia:**

- cortical destruction
- new bone formation
- fissure in cortical bone



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14. Diagnosis of Osteomyelitis (3)

## Diagnosis of Osteomyelitis

**Radiographic studies**


- routine radiographs
- bone scan
- computed tomography (CT scan)
- magnetic resonance imaging (MRI)

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15. Diagnosis of Osteomyelitis: Radiograph 1

## Diagnosis of Osteomyelitis: Radiograph 1

MRI of the lower extremities of a 45 year old man with several weeks of leg pain and low grade fevers. An abscess cavity is evident.




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16. Diagnosis of Osteomyelitis: Radiograph 2

## Diagnosis of Osteomyelitis: Radiograph 2

Transverse view of the MRI from the same patient. Notice the high signal intensity of the bone marrow.



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17. Diagnosis of Osteomyelitis (4)

## Diagnosis of Osteomyelitis

**Bone biopsy**

- **Pathology: abundant PMN**
- **Microbiology: positive culture**

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18. Major Pathogens in Osteomyelitis

## Major Pathogens in Osteomyelitis

**Neonates:**

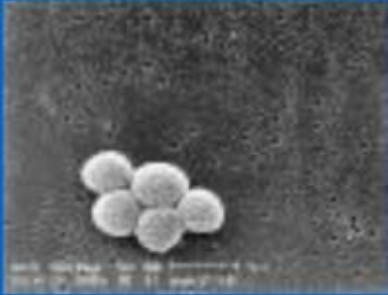
- *S. aureus*, streptococci

**Infants:**

- *S. aureus*

**Later in life:**

- *S. aureus*
- “Mixed infections”



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19. Special Pathogens in Osteomyelitis

**Special Pathogens in Osteomyelitis**

- *Salmonella* - immunocompromised, sickle cell disease
- *Pasteurella multocida* - cat bites
- *M. tuberculosis* - hematogenous spread during primary disease
- Fungi - intravenous device infections or immunosuppression

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20. Treatment of Osteomyelitis

**Treatment of Osteomyelitis**

**INDIVIDUALIZE!**

**Medical and surgical modalities**

**Treatment “failures”**

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21. Medical Treatment of Osteomyelitis

**Medical Treatment of Osteomyelitis**

**Antibiotics**

- Treats live infected bone
- Ex. *S. aureus* osteomyelitis – oxacillin +/- aminoglycoside
- Duration – long-term

**Optimal management of underlying conditions (ex. diabetes)**

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22. Surgical Treatment of Osteomyelitis

**Surgical Treatment of Osteomyelitis**

**Debridement**

**Revascularization**

**Ablation or amputation**

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23.

### Case 3

**Case 3**

---

**A 53 year old woman presents to the emergency room with a 2 to 3 day history of fever and chills, followed by the abrupt onset earlier in the day of wrist pain, swelling and redness.**

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24.

### Case 3: Picture 1

**Case 3: Picture 1**

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25. Septic Arthritis

**Septic Arthritis**

**Definition: Infection of the joint space**

- Monoarticular
- Polyarticular
- Suppurative
- Nonsuppurative

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26. Pathogenesis of Septic Arthritis

**Pathogenesis of Septic Arthritis**

**Hematogenous spread**

**Direct inoculation**

**Contiguous infection**

**Rapidly destructive process**

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27. Groups at High Risk for Septic Arthritis

**Groups at High Risk for Septic Arthritis**

<b>Elderly</b>	<b>Patients with</b>
<b>Children &lt; 2 y of age</b>	<b>• Cancer</b>
<b>Injection drug users</b>	<b>• Rheumatoid arthritis</b>
<b>Hemodialysis patients</b>	<b>• Joint prostheses</b>
<b>Sexually active persons</b>	<b>• Trauma</b>
<b>Persons taking steroids</b>	<b>• Intravenous catheters</b>
<b>Diabetics</b>	

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28. Diagnosis of Septic Arthritis

**Diagnosis of Septic Arthritis**


- History**
- Physical examination**
- Radiographs?**

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29. Tuberculous Arthritis of the Hip

## Tuberculous Arthritis of the Hip

- Extensive destruction of the femoral head and neck due to bony resorption
- Protrusio Acetabula
- Soft tissue abscess



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30. Laboratory Examination in Septic Arthritis

## Laboratory Examination in Septic Arthritis

**Blood Culture – 10-50% are positive**

**Synovial Fluid**

- WBC usually  $> 50,000/\text{mm}^3$
- Gram stain – 1/3 are positive
- Culture – 25-80% are positive

**Causative organisms identified in 2/3 of cases**

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31. Microbiology of Septic Arthritis

**Microbiology of Septic Arthritis**

Gram positive bacteria (70-80%)

- *S. aureus* - most common (> 35 to 40% of cases)
- *Streptococcus* species

Gram negative aerobic rods (9-20% of cases)

Gram negative cocci – *Neisseria gonorrhoeae*

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32. Gonococcal Septic Arthritis

**Gonococcal Septic Arthritis**

Incidence: 3 to 7.5 % of all cases

Sexually active persons

Disseminates from a mucosal site

Two presentations:

- Monoarticular septic arthritis
- Dermatitis-septic arthritis syndrome

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33.

Case 3: Picture 2

**Case 3: Picture 2**

Rash of dermatitis-septic arthritis syndrome. Notice the petechial skin lesion.




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34.

Treatment of Septic Arthritis

**Treatment of Septic Arthritis**

**INDIVIDUALIZE!**

**Medical and Surgical Modalities**

**Outcome related to how rapidly treatment was instituted**

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35. Medical Treatment of Septic Arthritis

**Medical Treatment of Septic Arthritis**

**Antibiotics**

- Longterm
- Ex: *S. aureus*: oxacillin +/- aminoglycoside
- Ex: *N. gonorrhoeae*: ceftriaxone

**Percutaneous arthrocentesis**

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36. Surgical Management of Septic Arthritis

**Surgical Management of Septic Arthritis**

**Arthroscopic or open surgical drainage for:**

- Poorly accessible joints (hip)
- Suspected soft tissue extension
- Inadequate response to antibiotics
- Previously damaged joints (ex. rheumatoid arthritis)

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