MSK block
Osteomyelitis and Septic arthritis

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Objectives

- Understand the etiology, pathogenesis and clinical features of osteomyelitis.
- Be familiar with some of the terminology used in bone infections like: sequestrum, involucrum, Brodie abscess and Pott's disease.
- Understand the clinicopathological features of tuberculous osteomyelitis
- Identify he bacteria commonly involved in septic arthritis, the clinicopathological features and the characteristics of the joint fluid

Osteomyelitis

- Inflammation of bone and marrow, virtually always secondary to infection.
- Can be: 1) part of systemic infection

  2) primary solitary focus of disease.
- All organisms: viruses, fungi, parasite, bacteria… Pyogenic bacteria and Mycobacteria.

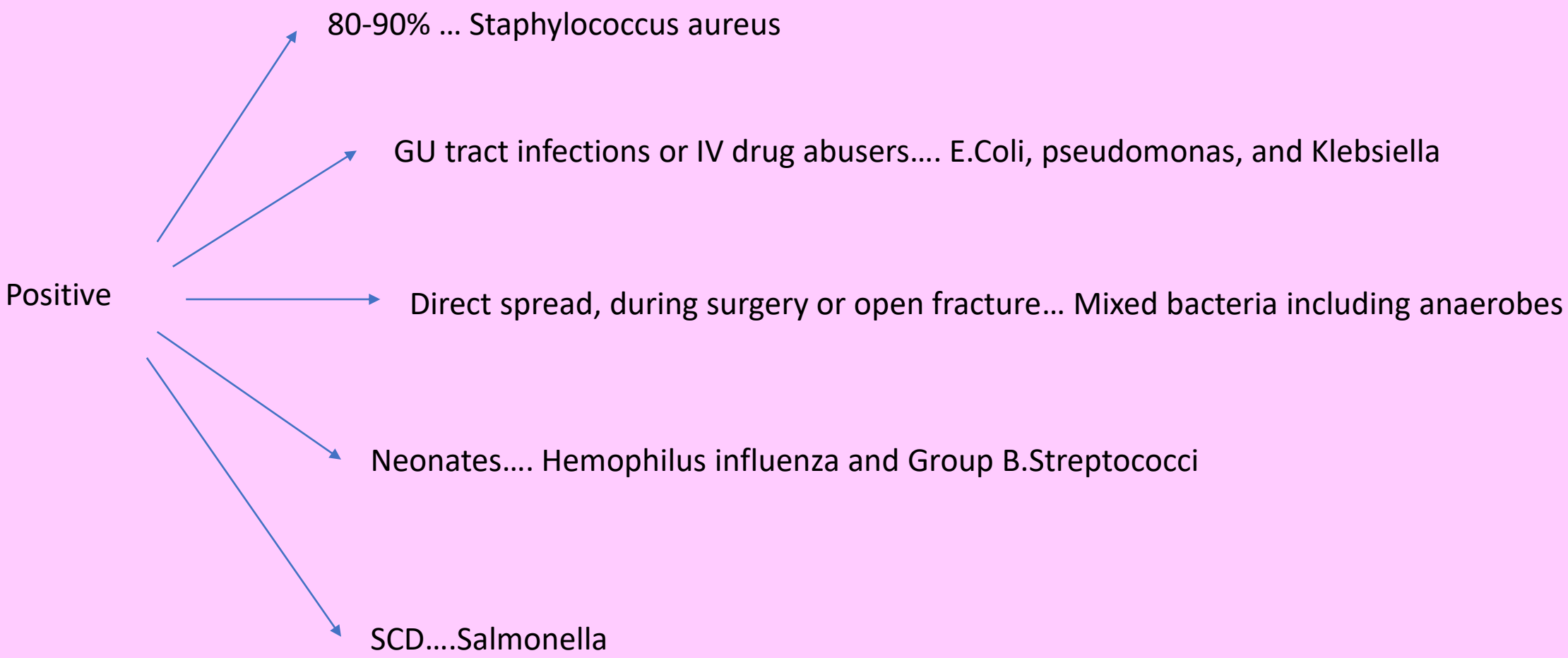
Pyogenic Osteomyelitis

- Almost always caused by bacteria and rarely by fungi.
- Reach bone by: 1) Hematogenous spread
  2) Extension from contiguous site
  3) Direct implantation after compound fractures or orthopedic procedures.

HEALTHY CHILDREN
- Hematogenous.
- Long bones.

ADULTS
- As complication of open fracture, surgical procedures.
- Diabetic foot.

In 50% of cases .. No organisms isolated

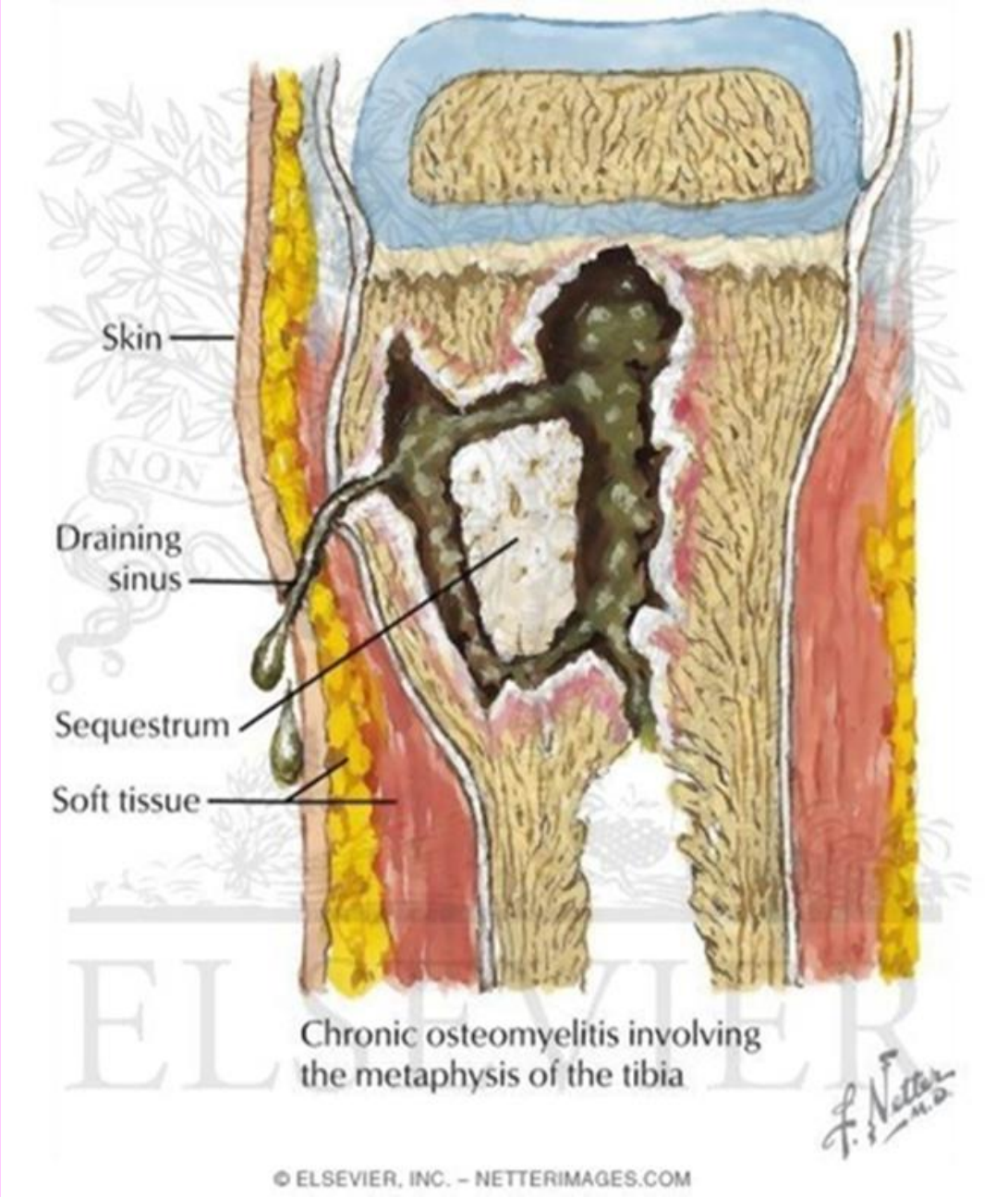


ACUTE

- Bacteria, neutrophil, necrosis (48 hours).
- Spread to reach periosteum.
- Children .. subperiosteal abscess, lift the periosteum and impair blood supply.
- Rupture of periosteum, abscess..skin (draining sinus).
- Dead bone **(SEQUESTRUM).**
- Viable organisms can persist in the sequestrum for years after the original infection

CHRONIC

- After first week.. Chronic inflammatory cell release cytokines..osteoclast, fibrous tissue, deposition of reactive bone at periphery (shell/**INVOLUCRUM**).
- Protean.. Marrow fibrosis, sequestrum, lymphocytes and plasma cell.


Skin
Draining sinus
Sequestrum
Soft tissue
Chronic osteomyelitis involving the metaphysis of the tibia
F. Netter M.D.
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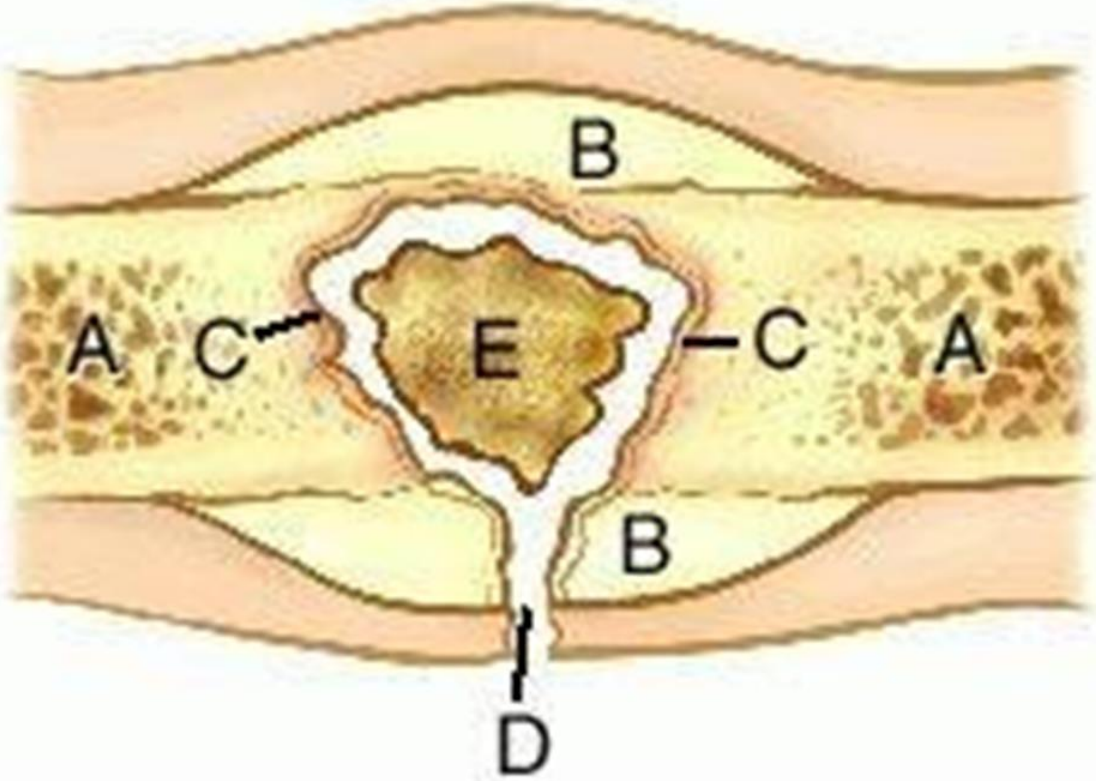
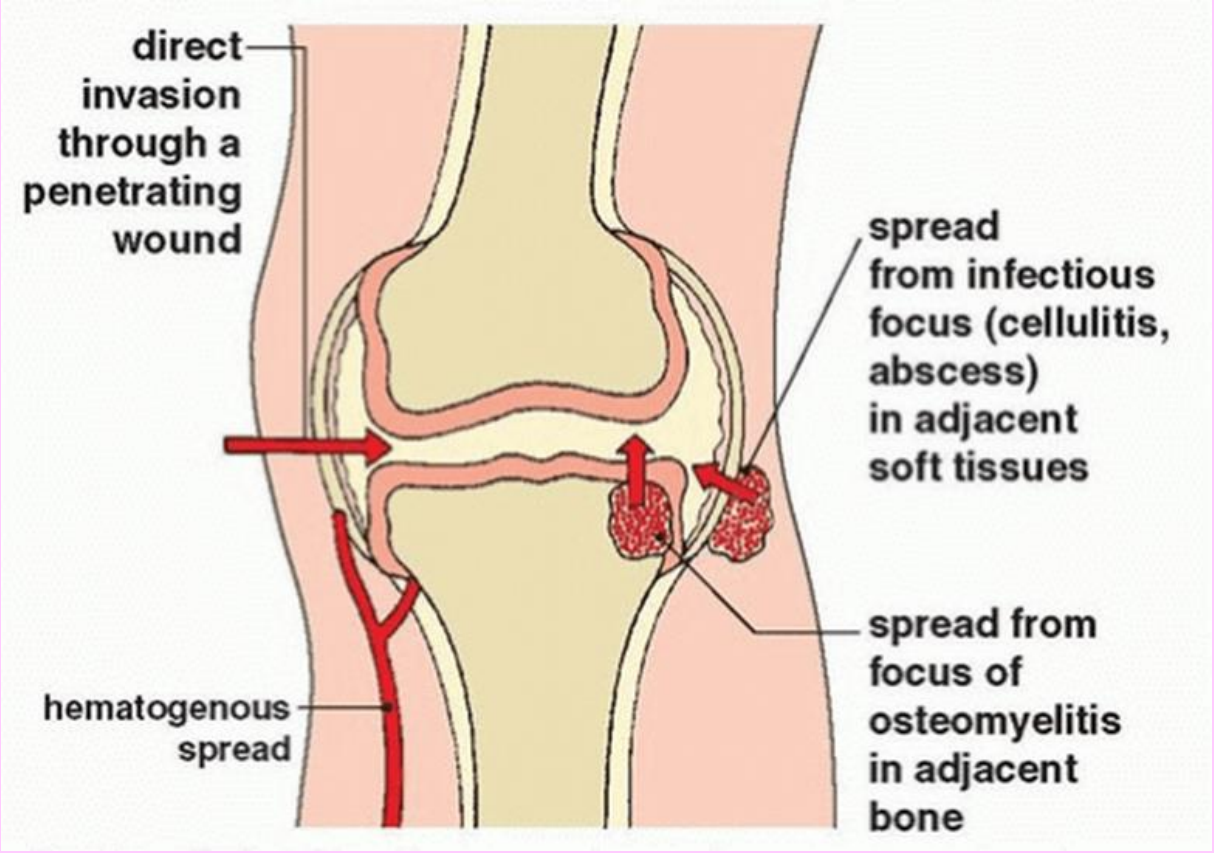


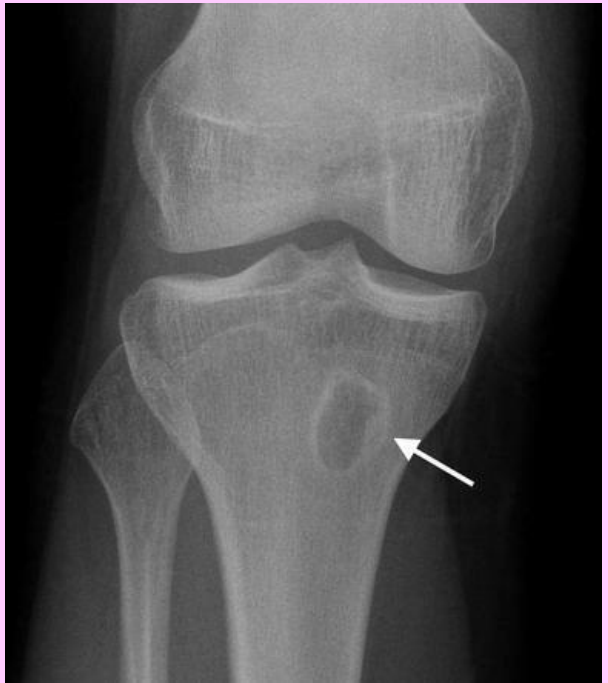
A: healthy bone
B: periosteum
C: involucrum
D: sinus tract
E: sequestrum

Septic (suppurative) arthritis

- Infants (uncommon in adults).
- Infection of epiphysis.. articular surface or along the capsule (tendoligamentous insertion)… Joint.
- Cause destruction to the articular carctilage and permanent disability.



- An analogous process can involve vertebrae, with an infection destroying intervertebral discs and spreading into adjacent vertebrae.
- Brodie abscess is a small intraosseous abscess that frequently involves the cortex



Clinical features

- Acute systemic illness with malaise, fever, chills, leukocytosis, and marked throbbing pain over the affected region.
- Subtle, with only unexplained fever (infants) or localized pain (adults).
- Diagnosis:

1) Signs and symptoms.
2) Radiology (lytic focus of bone destruction surrounded by a zone of sclerosis)
3) Biopsy
4) Bone culture

- Treatment: Treatment requires aggressive antibiotic therapy. Inadequate treatment of acute osteomyelitis may lead to chronic osteomyelitis which is notoriously difficult to manage. Surgical removal of bony tissue may be required.

5-25%.. Chronic osteomyelitis

1. delay in diagnosis
2. extensive bone necrosis
3. inadequate antibiotic therapy
4. inadequate surgical debridement,
5. weakened host defenses.

Acute flare-ups.

COMPLICATIONS:

1. Pathologic fracture.
2. Secondary amyloidosis
3. Endocarditis
4. Sepsis
5. Squamous cell carcinoma if the infection creates a sinus tract.
6. Rarely sarcoma in the affected bone

Mycobacterial Osteomyelitis

Routes of entry:

1. Usually blood borne and originate from a focus of active visceral disease.
2. Direct extension (e.g. from a pulmonary focus into a rib or from tracheobronchial nodes into adjacent vertebrae) or spread via draining lymphatics.

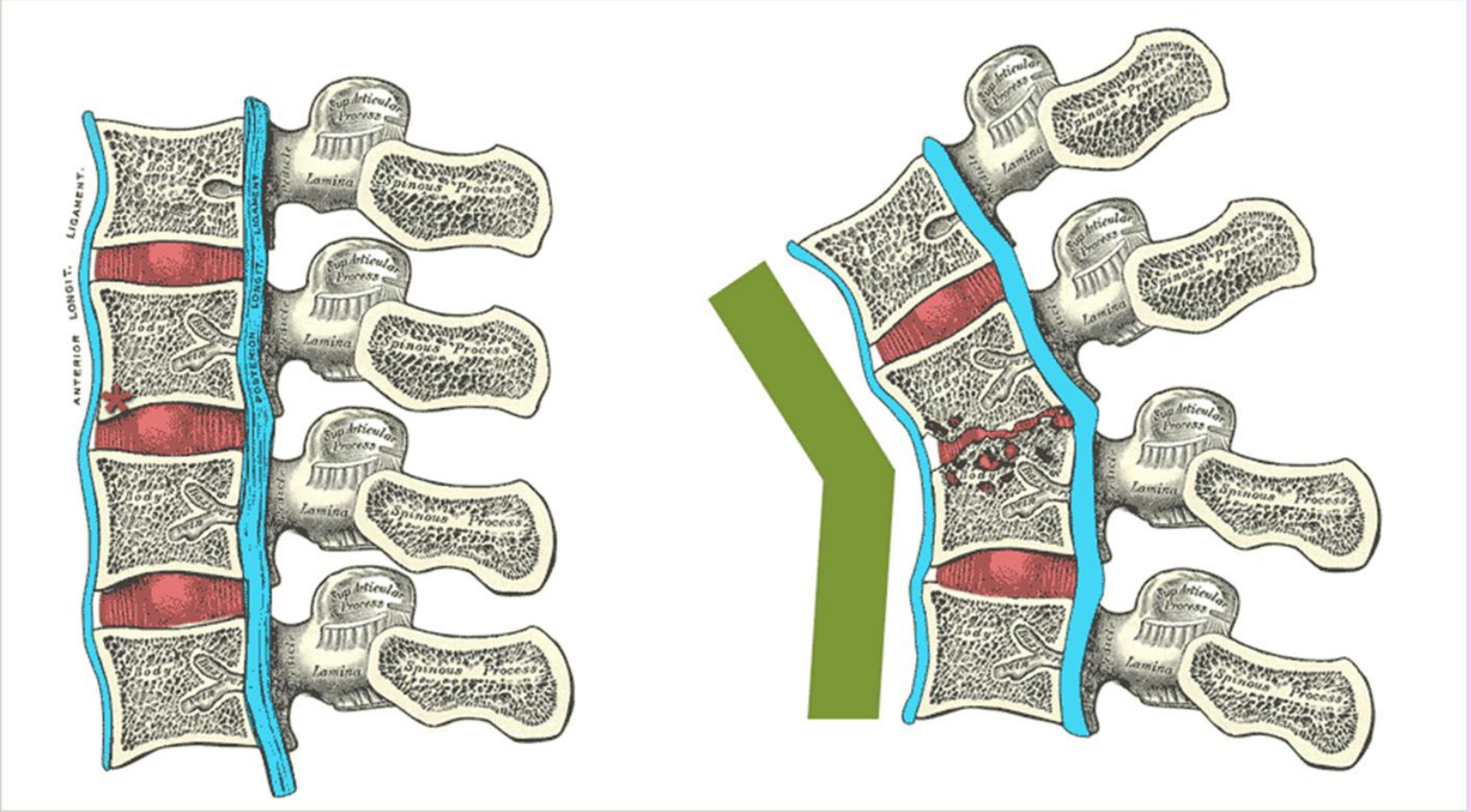
- The bone infection may persist for years before being recognized.
- Approximately 1% to 3% of individuals with pulmonary or extrapulmonary tuberculosis exhibit osseous infection.

- Symptoms: pain, low-grade fever, chills, weight loss.
- Usually solitary except in immunocompromised patients (AIDS).
- Caseous necrosis and granuloma are typical.
- It tend to be more destructive and resistanr to control compared to pyogenic osteomyelitis.
- The most common sites of skeletal involvement are:
  - thoracic and lumber vertebrae (40%) followed by the knees and hips
- Pott’s disease is the involvement of spine.

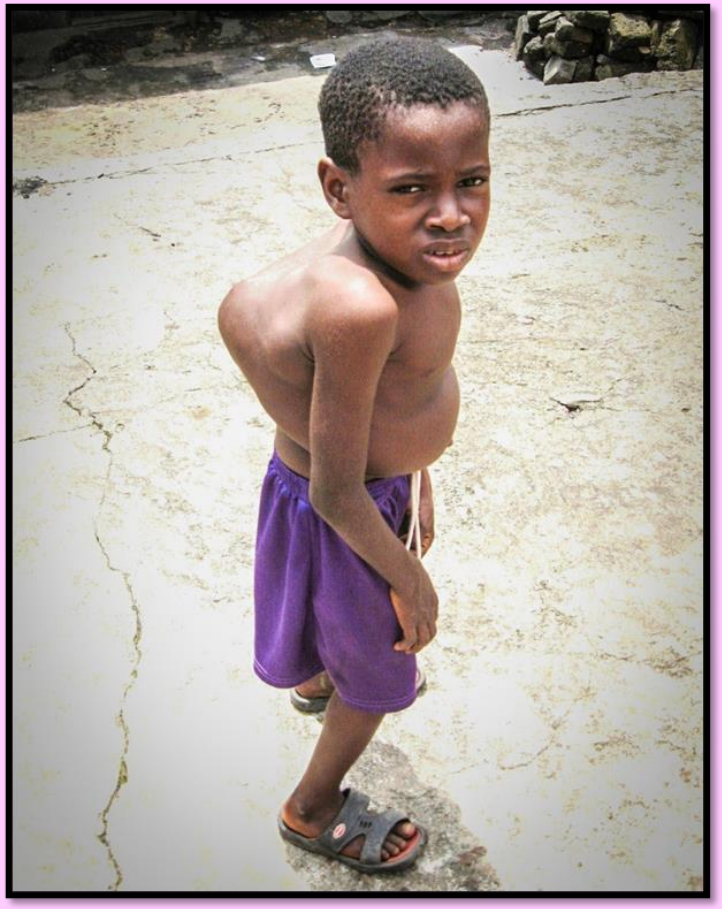
Tuberculous spondylitis

- Pott disease
- Destructive infection of vertebrae.

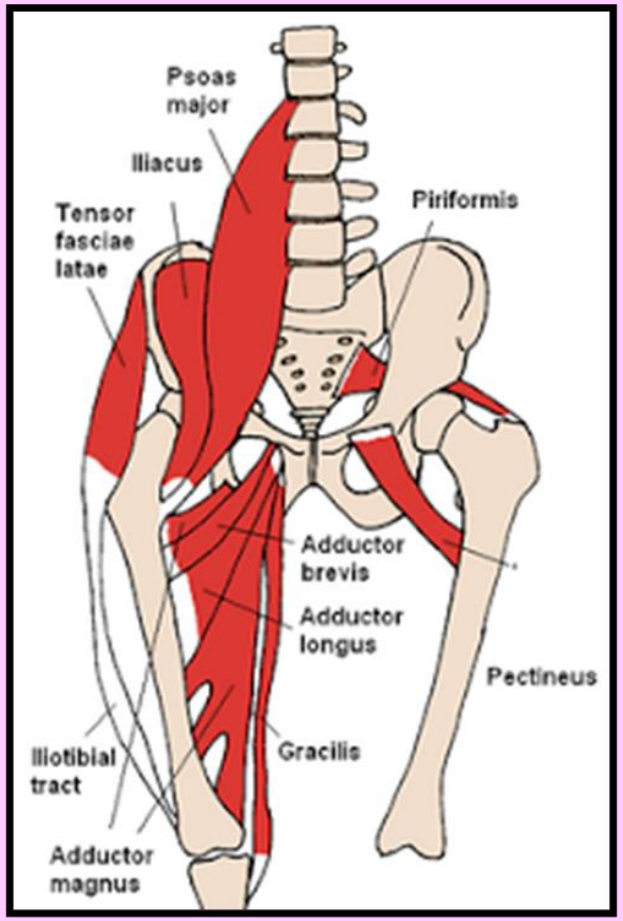
The infection breaks through the intervertebral discs and extends into the soft tissues forming abscesses.

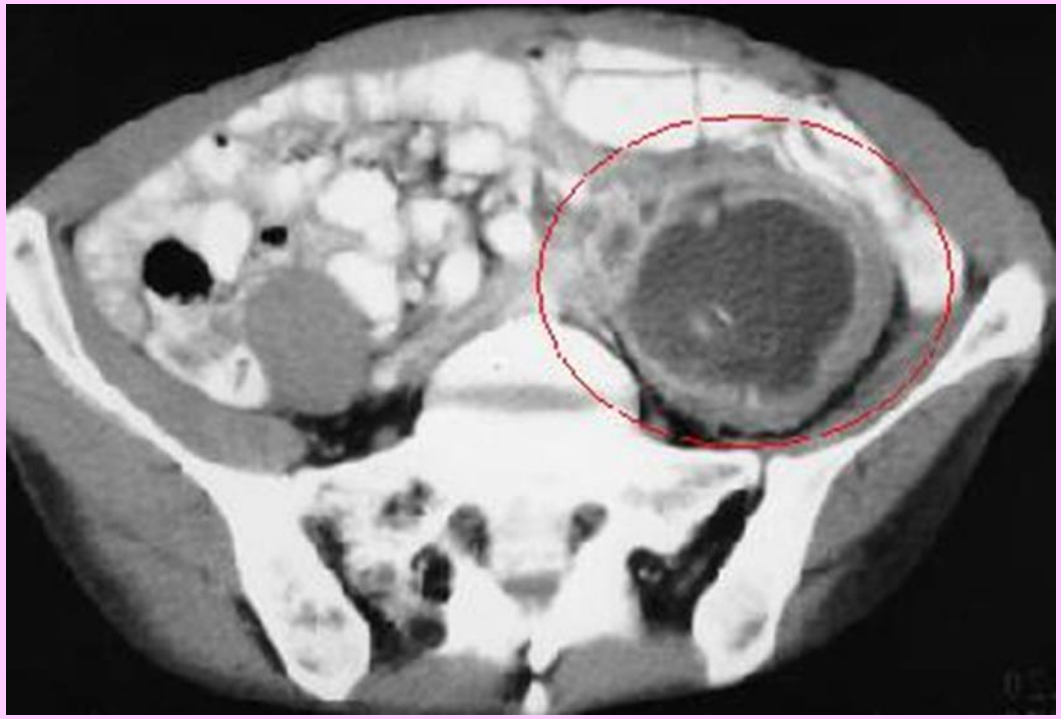


Scoliosis or kyphosis and neurologic deficits secondary to spinal cord and nerve compression

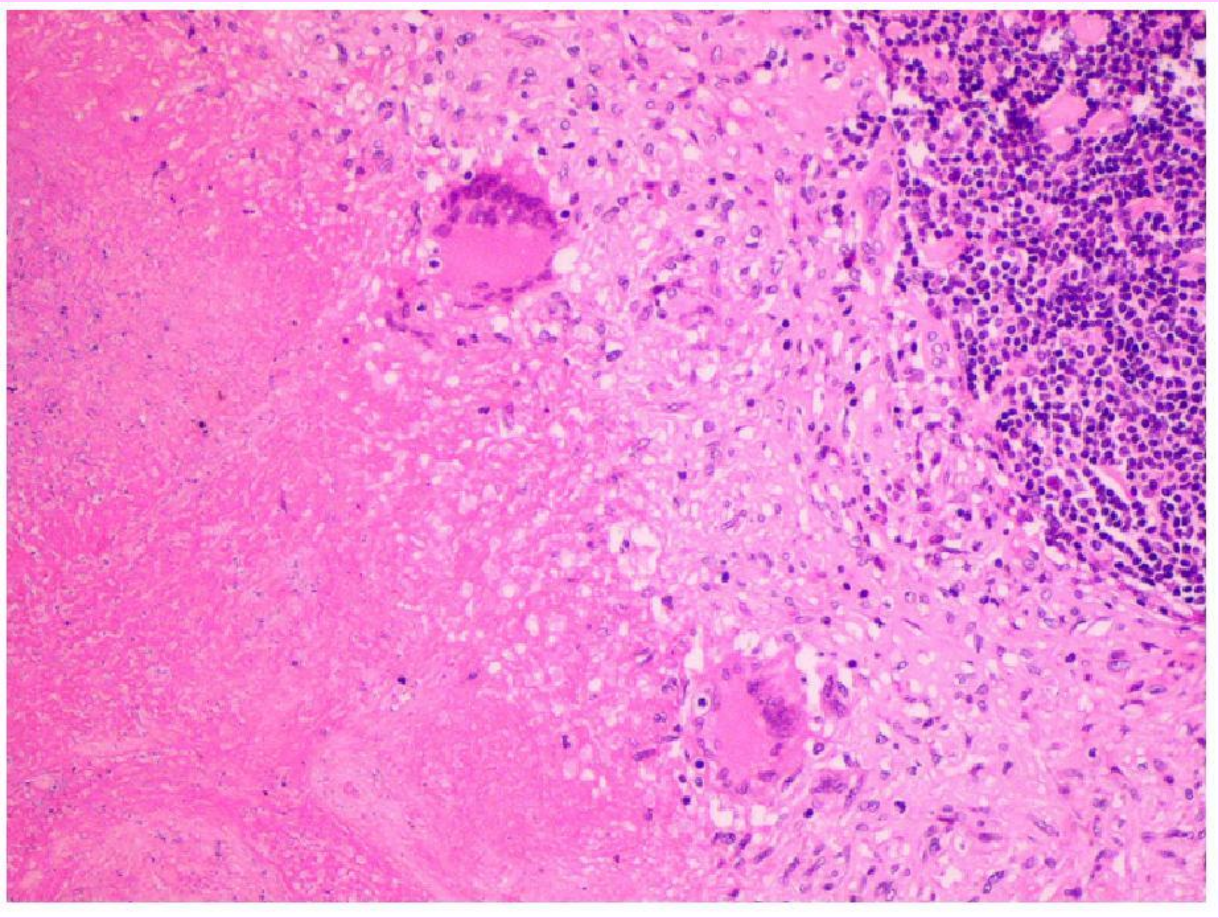


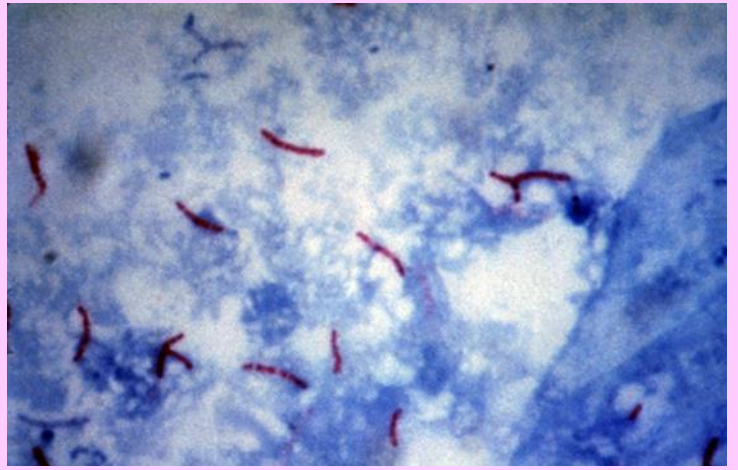
In Pott's disease, the infection may breaks through the intervertebral discs and extends into the muscle forming Psoas abscesses





Histopathology: collections of epithelioid histiocytes and lymphocytes with caseation necrosis





Ziehl Neelsen stain
(ZN or AFB)

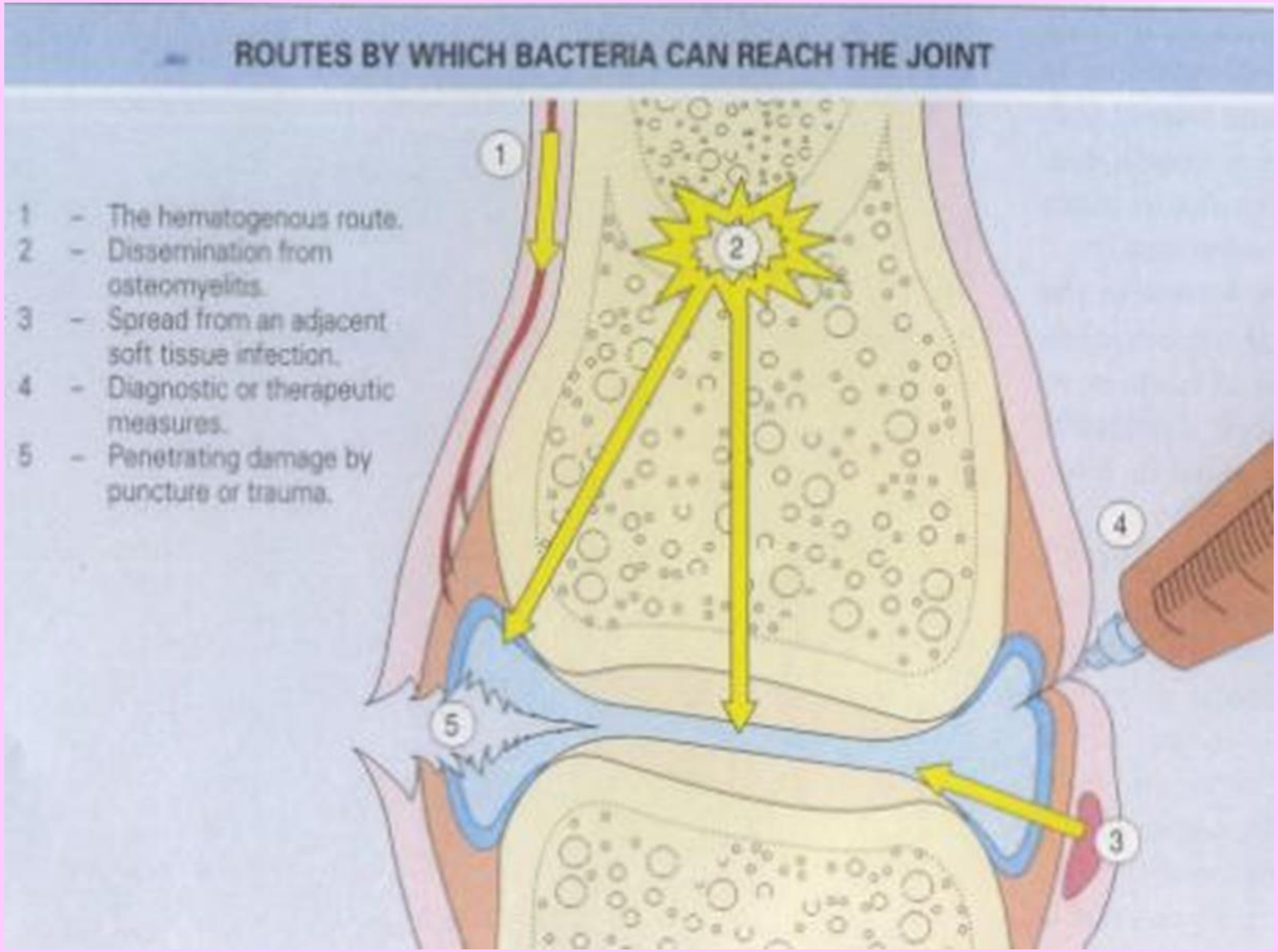
Complications

- Bone destruction
- Tuberculous arthritis
- Sinus tract formation
- Amyloidosis

Infectious arthritis

- Microorganisms of all types can seed joints during hematogenous dissemination.
- In neonates, however, contiguous spread from underlying epiphyseal osteomyelitis may occur
- Articular structures can also become infected by direct inoculation through skin or from contiguous spread from a soft tissue abscess or focus of osteomyelitis.
- Infectious arthritis is potentially serious, because it can cause rapid destruction of the joint and produce permanent deformities

1- hematogenous
2- osteomyelitis
3- adjacent soft tissue infection
4- iatrogenic
5- trauma



Suppurative arthritis

H.Influenza
- Children younger than 2 years.

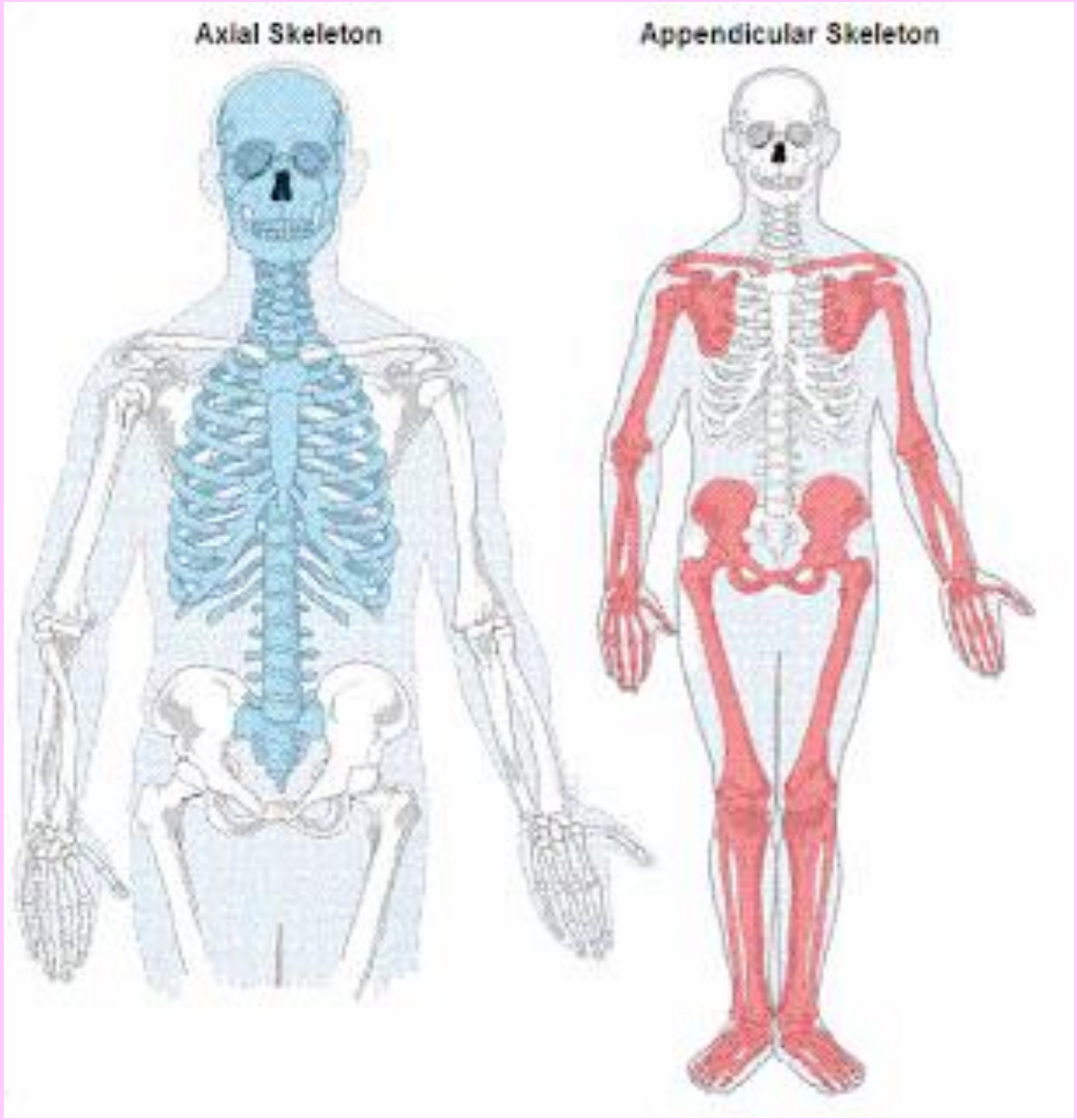
S.Aureus
- Older children and adults.

Gonococcus
- Late adolescence and young adulthood.
- Sexually active women
- Disseminated gonococcal infection in Individuals with deficiencies of complement components (C5, C6, C7, or C9)

……:
- SCD

Risk factors

1. Immune deficiencies (congenital and acquired)
2. Debilitating illness
3. Joint trauma
4. Intravenous drug abuse (axial joints).


Axial Skeleton
Appendicular Skeleton

- The infection involves only a single joint (in 90% of nongonococcal cases).
- Usually the knee, followed in order by hip, shoulder, elbow, wrist, and sternoclavicular joints.
- Joint aspiration is diagnostic and typically purulent
- Culture allows identification of the causal agent.

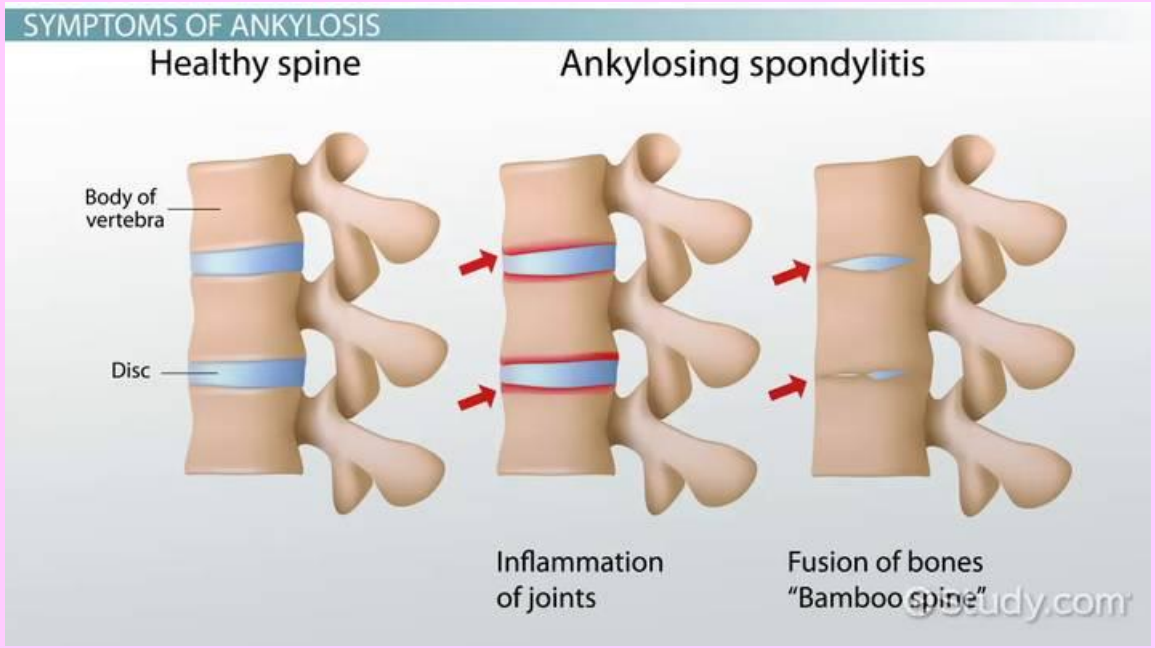
Clinical presentation

- Sudden development of an acutely painful, warm, and swollen joint that has a restricted range of motion.
- Systemic findings of fever, leukocytosis, and elevated sedimentation rate are common.
- Cartilage has limited repair potential, so prompt recognition and effective anti-microbial therapy is vital to prevent permanent joint destruction.

Figure 1
Knee monoarthritis with inflammatory signs.

Complications

- Septic arthritis can lead to ankylosis and even fatal septicemia.
- However, prompt antibiotic therapy and joint aspiration or drainage cures most patients.



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