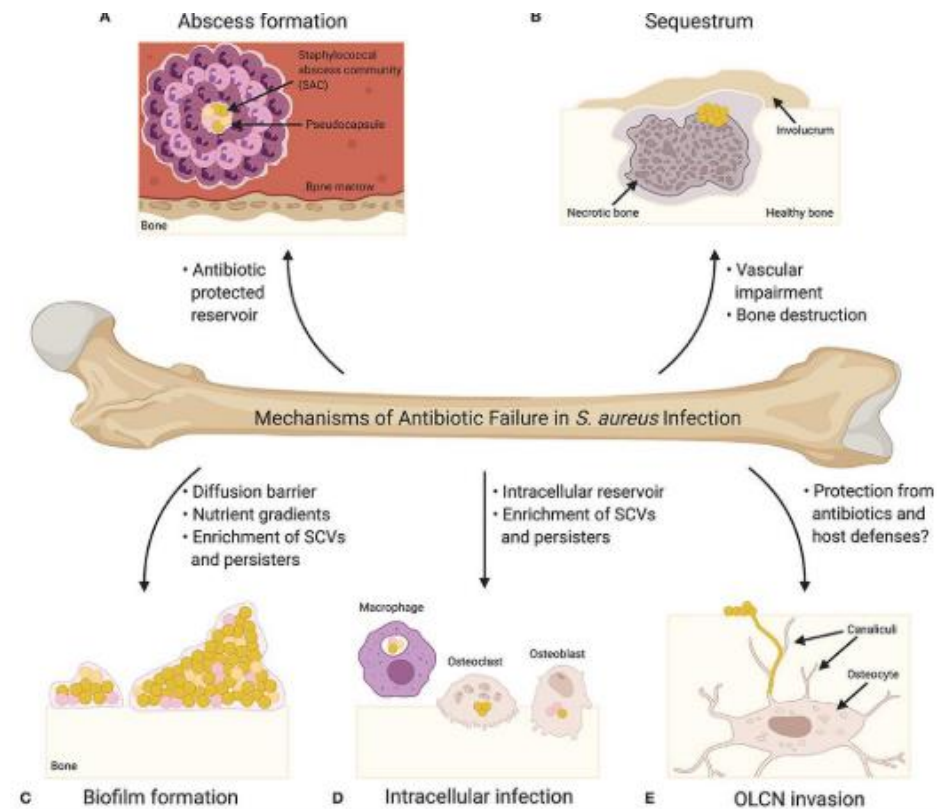
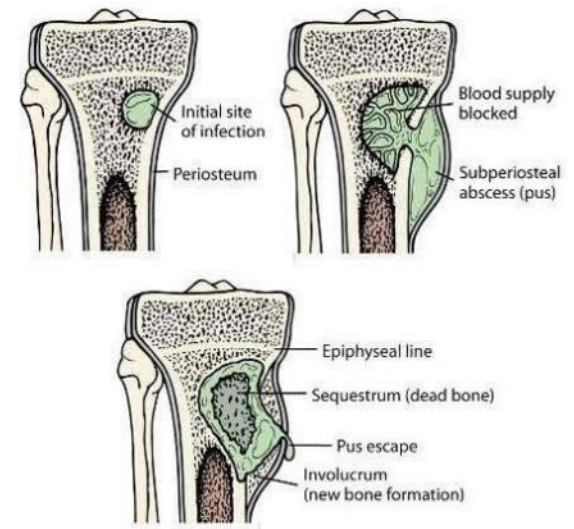


1. Osteomyelitis

An infection involving bone.

Classification	a. Hematogenous vs non-hematogenous b. Acute vs chronic (Acute can progress to chronic).	
Epidemiology	<u>Hematogenous:</u> The most common form of osteomyelitis in children. Vertebral osteomyelitis is the most common form of hematogenous osteomyelitis in >50 years.	<u>Non-hematogenous:</u> Younger adults: occurs most commonly in the setting of trauma and surgery. Older adults: occurs most commonly due to contiguous spread of infection. Risk factors: poorly healing wounds (decubitus ulcers), prosthesis, diabetes, peripheral vascular disease, neuropathy.
Etiology	<u>Hematogenous:</u> Monomicrobial S. aureus is most common Aerobic G(-) rods in 30% of cases. TB osteomyelitis: Reactivation of TB in the bone during the mycobacteremia at the time of the primary infection.	<u>Non-hematogenous:</u> Polymicrobial or monomicrobial. Most common are: – S. aureus (including MRSA) – Coagulase-negative staphylococci – Aerobic gram-negative rods
Pathogenesis (multifactorial and poorly understood)	<u>Hematogenous:</u> Microorganisms seed the bone in the setting of bacteremia.	<u>Non-hematogenous:</u> - Contiguous spread of infection from adjacent tissues. - Direct inoculation into the bone (trauma or surgery).
	To cause osteomyelitis we need: – Large inoculation of organisms. – Bone damage. – Prosthesis/ implants. Virulence factors of S.aureus: Adherence: to components of bone matrix (fibrinogen, laminin, collagen, clumping factor A,..). - Can survive intracellularly in osteoblasts. - When digested by osteoblasts, S.aureus gets more resistant (high relapse if treated with abx for a short time).	

Manifestations (Hematogenous manifestations are the same as nonhematogenous)	<u>Acute osteomyelitis:</u> Gradual onset of symptoms over days. – Dull pain at the involved site. – Local signs of inflammation, may be with systemic symptoms (fever, rigors). – Osteomyelitis of the hip, vertebrae, or pelvis tend to manifest few symptoms other than pain.	<u>Chronic osteomyelitis:</u> – Intermittent flares of pain and swelling, no fever. – The presence of a sinus tract is pathognomonic.
Diagnosis	<u>Bone biopsy and culture.</u> However, biopsy is not required if: - Clinical and radiographic findings are typical + positive blood cultures with a likely pathogen. - Histopathology consistent with osteomyelitis with no positive culture data. The hallmark of chronic osteomyelitis is the presence of sequestrum. (others: Involucrum; reactive bony encasement of the sequestrum, local bone loss, and sinus tracts). - Clinical and typical radiographic findings with elevated inflammatory markers, but no positive culture data. (and if a biopsy is not feasible). Sequestra can be seen radiographically. They form due to necrosis (blood vessel compression due to elevated medullary pressure)	
Treatment	Bone cultures should guide abx therapy, unless blood cultures are positive for a likely pathogen. Patients with negative culture results should be treated with abx against the common causes of osteomyelitis.	
Complications	– Sinus tract formation – Contiguous soft tissue infection – Abscess – Septic arthritis – Systemic infection – Bony deformity and Fracture – Malignancy	



2. Septic arthritis

Infection of the joints.

Etiology	Usually monomicrobial. S. aureus is the most common. Other G(+) organisms such as streptococci are also important causes. Strep. In splenic dysfunction Neisseria gonorrhea in sexually active patients Borrelia (spirochete) from tick bites TB, fungi, brucella among others
Pathogenesis	a. Hematogenous seeding (most common) b. Direct inoculation c. Contiguous spread from an adjacent infection. More likely to localize in a joint with pre-existing arthritis (rheumatoid arthritis, osteoarthritis, gout,..)
Manifestations	Present acutely with a single swollen and painful joint (monoarticular arthritis). Pain, swelling, warmth, and restricted movement in 80% of patients. Fever is common but older patients may be afebrile. The knee is involved in more than 50% of cases. 
Diagnosis	Based on synovial fluid analysis and culture. (prior to administration of abx). If synovial fluid cannot be obtained with needle aspiration, it should be aspirated under radiographic guidance.
Treatment	<u>Drainage:</u> needle aspiration, arthroscopic drainage, or arthrotomy. <u>Antibiotics:</u> G(+) cocci: empiric treatment with vancomycin. G(-) rods: treat for Pseudomonas infection.
Prognosis	Amputation, prosthetic surgery, or severe deterioration occurs in some patients with pre-existing joint disease.

3. Animal bites

Epidemiology	Dog bites (90%) mostly in children. Cat bites (10%) mostly in adult women. Infections are more common after cat bites than dog bites.
Etiology	Bite wound culture yields five types of bacterial isolates. - Oral flora of the animal and human skin flora Mixed aerobes and anaerobes (60%), Skin flora (40%) Capnocytophaga canimorsus can cause sepsis - Pasteurella in 50% of dog bites and 75% of cat bites. B. henselae - Anaerobes (Bacteroides, fusobacteria, Porphyromonas, Prevotella).
Manifestations	In children: Dog bites involve the head and neck In adults: Dog bites involve the extremities. Cat bites usually occur on the extremities and tend to penetrate deeply. Infections may be: - Superficial (cellulitis): fever, swelling, warmth, purulent drainage, lymphangitis, superficial abscess. - Deep (Septic arthritis, osteomyelitis, necrotizing infection).
Evaluation and treatment	Ensure that the patient is hemodynamically stable and assess for injuries to adjacent structures. Neurovascular assessment should be performed in areas distal to the wound.

Bartonella is facultative intracellular G(-) rod with fastidious growth requirements.

The incubation period is 7-14 days.

Transmitted by fleas, disease acquired **after exposure to cats** 1–3 weeks after inoculation.

Non-painful bump or blister at the site of injury and painful, swollen lymph nodes

Human incidental host



Cat-scratch disease in immunocompetent person