

Difference Between Osteomyelitis and Septic Arthritis

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Key Difference – Osteomyelitis vs Septic Arthritis

Both osteomyelitis and septic arthritis are two [infections](#) affecting the skeletal system. These infections can affect any joint or bone in the body and are most commonly caused by *Staphylococcus aureus*. **An infection of the bones is identified as osteomyelitis whereas an infection of the joints is called septic arthritis.** This is the key difference between osteomyelitis and septic arthritis. It is important to identify the difference between osteomyelitis and septic arthritis in order to manage and treat these conditions properly.

What is Osteomyelitis?

[Bacteria](#) is the commonest cause of osteomyelitis. The chance of [fungi](#) giving rise to this condition is very remote. A majority of fungal causes are associated with chronic osteomyelitis.

Pyogenic Osteomyelitis

This is the commonest type of osteomyelitis, and it mainly affects children. The disease pattern varies with the changes in the anatomical structure of the bone in different age groups.

How do Pathogens Enter the Bones?

The commonest route of entry is blood. Transient [bacteremia and septicemia](#), following a dental procedure or laparoscopic surgery, can spread into the bones, giving rise to osteomyelitis. IV drug abusers are at a high risk of developing this condition via the hematogenous spread of [pathogens](#) entering the body from contaminated needles.

Organisms can spread into the bones from the adjacent suppurative foci as in chronic mastoiditis. Direct implantation of the pathogens can happen in compound fractures.

Causative Agents

In children and adults

- *Staphylococcus aureus*
- *Streptococcus spp.*
- aerobic gram negative bacteria
- Bacteroides
- Salmonella spp classically causes osteomyelitis in children with the sickle cell disease.

Neonates

- *Haemophilus influenza*
- Group B streptococci

Variation of the Disease Pattern with Age

In children, the metaphyses of the long bones have the highest perfusion because of their high metabolic demand. But in adults, [vertebrae](#) get the richest blood supply. Therefore, metaphyses of long bones and vertebrae are the most vulnerable sites to in children and adults, respectively.

The epiphyseal circulation and metaphyseal circulation happens separately in children. But in the neonates, the epiphyseal vessels communicate with the metaphyseal vessels, increasing the likelihood of an infection in the metaphyses spreading into the epiphyses. Neonatal osteomyelitis mostly occurs in shoulder and hip. These two have intraarticular metaphyses. Therefore, the subperiosteal tracking of puss from these metaphyses into the joint space can cause septic arthritis.

Pathogenesis

Colonization of bacteria in the bones following bacteremia or septicemia gives rise to acute inflammation and suppuration. With the accumulation of the inflammatory infiltrate the intraosseous pressure rises. This phase is called the acute osteomyelitis in clinical medicine. The patient is usually febrile and complains of severe pain at the infected site.

If not treated, the increased intraosseous pressure can compromise the blood supply to the affected region, leading to the stasis of blood and subsequent thrombosis. The ultimate result of this process is the ischemic death of the bone forming fragments called the sequestra. Once these sequestra are formed, it is impossible to eradicate the bacteria from them due to the lack of blood supply. Eventually, the disease progresses into chronic osteomyelitis. As a healing mechanism, the periosteum starts to produce a new bone called the involucrum around the sequestra. This is a characteristic feature of the chronic osteomyelitis.

Complications

- Formation of [abscesses](#)
- Septic arthritis
- Bone deformities
- Pathological fractures- pathological fractures in the vertebrae can cause neurological deficits
- Squamous cell metaplasia of the [sinus](#) tracts can cause [squamous cell carcinoma](#)
- Secondary amyloidosis
- Septicemia

Investigations

- X-ray
- Total white cell count and differential count
- ESR and C reactive protein



Figure 1: Osteomyelitis of the first MTP

Tuberculous Osteomyelitis

In developed countries, this mainly occurs in the immune-compromised individuals. Usually, it is the vertebrae that are commonly affected by tuberculous osteomyelitis.

Organisms can reach the bones via blood, lymph or as a direct extension from the affected sites such as lungs and hilar lymph nodes.

Brodie's abscess

This is a localized, subacute and indolent form of osteomyelitis.

What is Septic Arthritis?

Septic arthritis is the inflammation of the joints due to the invasion of synovial membrane by microbes.

Risk Groups

- Children
- Diabetic patients

- People with joint prostheses
- IV drug abusers

Common Pathogens

- *Staphylococcus aureus*
- *Hemophilus influenza*
- *Neisseria gonorrhoeae*
- Gram negative bacilli

Routes of Entry

- Hematogenous spread
- Direct extension from osteomyelitis
- Direct trauma such as penetration injuries

Clinical Features

- Fever
- Malaise
- [Edema](#) around the affected joint

Complications

- If not treated properly damages to the underlying structures can give rise to limp. Septic arthritis is known to increase the risk of osteoarthritis in the later life.
- Septicemia



Figure 02: Septic arthritis as seen during arthroscopy

What are the similarities between Osteomyelitis and Septic Arthritis?

- Both conditions are infections affecting the skeletal system.
- *Staphylococcus aureus* is the commonest causative agent of both osteomyelitis and septic arthritis.

What is the difference between Osteomyelitis and Septic Arthritis?

Osteomyelitis vs Septic Arthritis	
An infection of the bones is identified as the osteomyelitis.	Septic arthritis is the inflammation of the joints due to the invasion of the synovial membrane by the microbes.
Effect	
This affects the metaphyses or epiphyses of the bones.	This affects joints.

Summary – Osteomyelitis vs Septic Arthritis

Osteomyelitis is the infection of bones whereas septic arthritis is the inflammation of the joints due to the invasion of the synovial membrane by the microbes. This is the main difference between septic arthritis and osteomyelitis. These two conditions should be suspected whenever a patient complains of any related symptoms. Assessment of the risk factors and identifying the individuals with risk factors is important in reducing the incidence of the disease.

References

1. Kumar, Vinay, Stanley Leonard Robbins, Ramzi S. Cotran, Abul K. Abbas, and Nelson Fausto. Robbins and Cotran pathologic basis of disease. 9th ed. Philadelphia, Pa: Elsevier Saunders, 2010. Print.

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