# Osteomyelitis

Osteomyelitis is an infection of the bone that also affects the bone marrow and surrounding soft tissue. Staphylococcus aureus is the most common offending organism, although other organisms may cause osteomyelitis as well. Osteomyelitis persisting longer than one month is considered chronic. Patients with this condition experience constant bone pain that is unrelieved by rest and is worsened with activity. Other symptoms of osteomyelitis include local warmth and edema at the site of infection, fever, chills, nausea, night sweats, and restlessness. Treatment of osteomyelitis includes antibiotic therapy and surgical removal of poorly vascularized tissue and/or necrotic bone. Hyperbaric oxygen may also be used in patients with chronic osteomyelitis that is refractory to treatment.




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## Cause/Mechanism

### Bone Infection

Bone with Infectious-bacteria

Osteomyelitis is a bone infection that affects the bone, bone marrow, and surrounding soft tissue. Staphylococcus aureus is the most common offending organism, although other organisms such as E. coli, Pseudomonas, and Salmonella may cause osteomyelitis as well. Invasion of the bone by microorganisms may occur via indirect entry in which infection spreads from the blood to the bone, or by direct entry through an open wound or medical implant. Osteomyelitis persisting longer than one month is considered chronic. In patients with chronic osteomyelitis, granulation tissue will eventually turn into scar tissue, which may perpetuate the growth of microorganisms.

## Assessment

### Warmth

Warm-fire

The site of the infection may also be warm and tender to the touch. Increased skin temperature is due to increased blood flow associated with the inflammatory process, secondary to infection.

### Edema

Edamame

Edema may be present at the site of infection. Swelling is one of the five cardinal signs of the inflammatory process.

### Constant Bone Pain

Around-the-clock Bone Pain-bolt

Patients with this type of infection experience constant bone pain that is unrelieved by rest and is worsened with activity. Movement of the affected area may be restricted, depending on the extent and severity of the infection.

### Fever

Fever-beaver

Patients with osteomyelitis may present with a fever, chills, and nausea. These patients may also report having night sweats or feeling restless.

## Interventions

### IV Antibiotics

IV ABX-guy

Treatment of osteomyelitis involves prolonged intravenous antibiotic therapy. Remember, cultures and/or bone biopsies should be obtained prior to administering antibiotics. Antibiotics commonly used include: penicillin, nafcillin, neomycin, vancomycin, cephalexin (Keflex), cefazolin (Ancef), and gentamicin (Garamycin). For adult patients with chronic osteomyelitis, fluoroquinolone antibiotics are administered orally for 6-8 weeks. Analgesics such as NSAIDs and opioid medications may also given to control pain.

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**Implanted Beads**

Implanted Beads

During surgery to remove dead or damaged bone, antibiotic beads may be implanted at the site of infection. The beads are often kept in place for six weeks before they are removed.

**Hyperbaric Oxygen**

Oxygen-mask

Hyperbaric oxygen therapy with 100% oxygen can be used in patients with refractory, chronic osteomyelitis to stimulate circulation and encourage healing of affected tissue.

**Surgical Removal of Ischemic Tissue**

Surgeon with scalpel Eye-ski-mask

For patients with chronic osteomyelitis, surgery is necessary to remove poorly vascularized tissue and necrotic bone. A muscle flap, or skin graft may be used to fill the resulting empty space in the bone. After surgery, a suction and irrigation system may be put in place, and casts and braces may be applied to the limb or surgical site for protection. Amputation of the affected limb is a last resort.

## Considerations

**Elevated ESR**

Up-arrow ESR Tubes

An elevated erythrocyte sedimentation rate can help diagnose osteomyelitis. ESR will be elevated due to inflammation, secondary to infection. The WBC will be elevated, too.