Bone Infection

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Infection

- The micro-organisms may reach bones &joints either
- **directly** (skin wound, open # or operation) or
- **indirectly** via blood stream (from GIT, GUT, respiratory tract). Depending on type of micro-organism &body reaction, the result could be: pyogenic osteomyelitis or arthritis, chronic granulomatous reaction (TB), fungal infection or hydatid (parasite) disease.

What is Osteomyelitis?

Osteomyelitis is a term used to describe a bone infection. An infection that has migrated from nearby tissue or through the bloodstream might cause osteomyelitis.

Acute hematogenous osteomyelitis

- Is a disease of **children**, if adults are affected, their resistance should be low by disease (DM, AIDS) or drugs.
- **Trauma** may determine the site of infection by causing small hematoma or fluid collection in the bone.

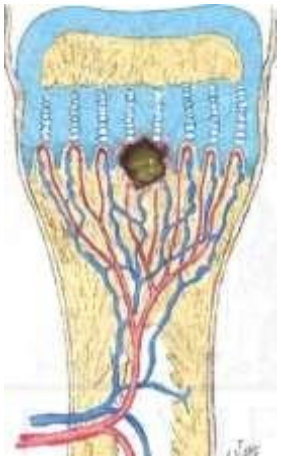
Micro-organism

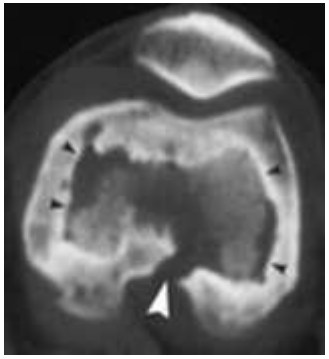
- the most common are: Staphylococcus aureus, Streptococcus species, Enterobacter species, and Haemophilus influenzae. Depending on the age:

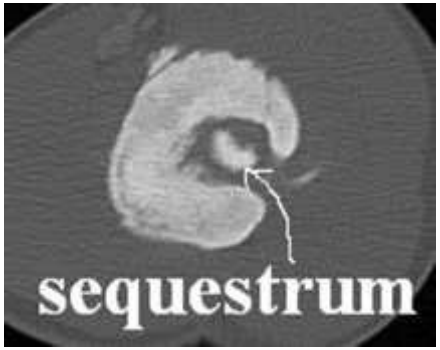
- Above 4years→ 90% is G +ve: mostly S. aureus.
- Under 4years→ 50% is G−ve mostly H. influenzae.
- Immune compromised patients may have unusual organism.

Site

- These may invade the blood from a skin abrasion, boil, septic tooth or urethral catheter. In children, they **settle** in the metaphysis (often tibia or femur), while in adults, in the vertebral body than in the long bones



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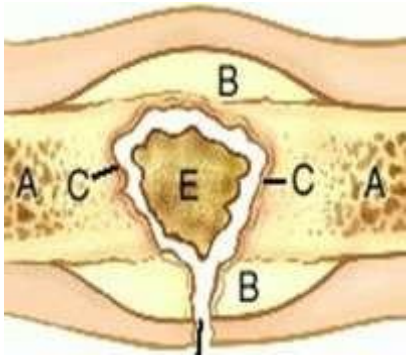
B
A
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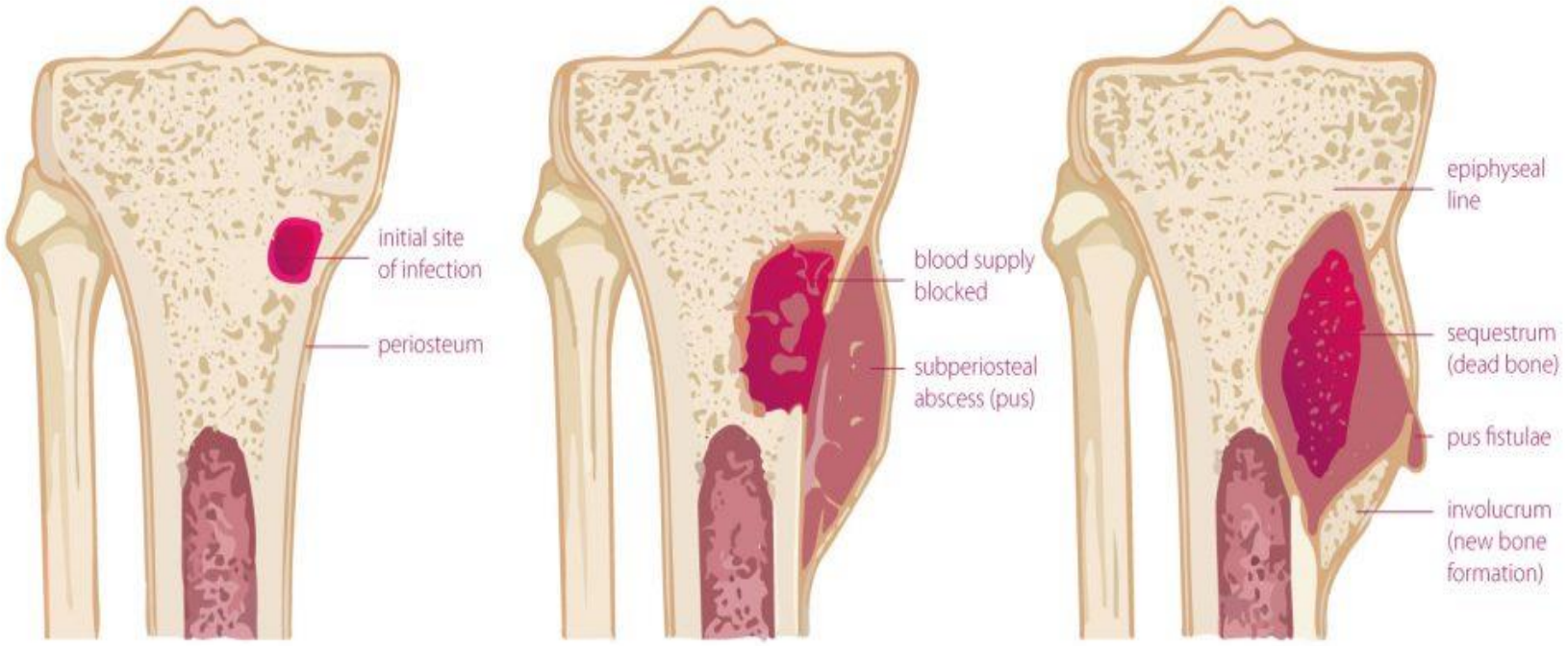
Healthy Bone
CROSS SECTION
Cortical bone
Bone marrow (in medullary cavity)
Osteomyelitis
CROSS SECTION
Pus
New, brittle bone
Decreased medullary cavity
Dying bone marrow
X-ray
Radiograph: John L. Zoller, MD, PhD

Clinical features

- **A child** in severe pain, malaise, fever, toxemia with still limb.
- **O/E:** acute finger-tip tenderness near one of the large joints; painful limitation of joint movement. Later, when pus escapes from inside bone to soft tissue →local redness, swelling, warmth &edema.
- **Infants:** irritability &metaphyseal tenderness with resistance to joint movements may be the whole picture.

Clinical features

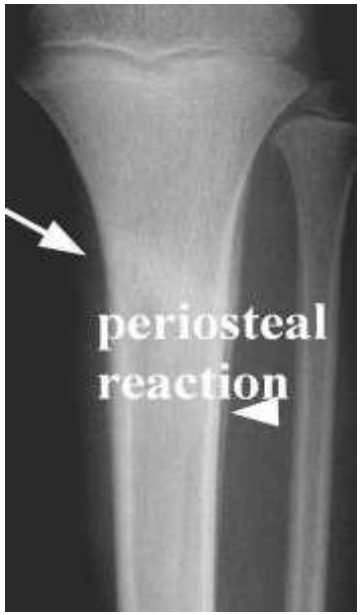
- **Adults:** the common site is thoracolumbar spine: CF: mild fever with local tenderness.
- in elderly &those with immune deficiency, the systemic features are mild.

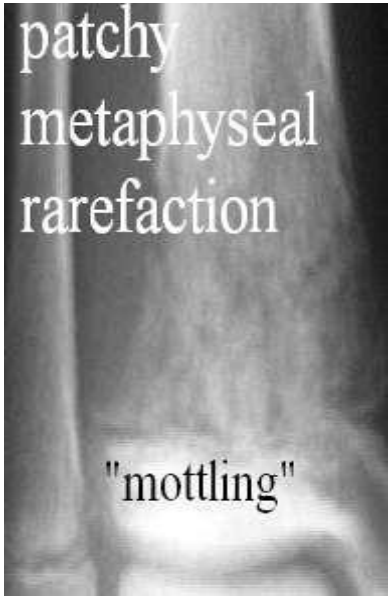


development of osteomyelitis

Diagnostic imaging

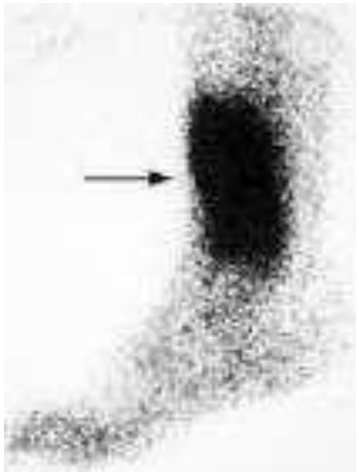
- **X-ray:** during first 10 days→ only soft tissue swelling. After 2 weeks→ faint periosteal reaction. Later→ thick periosteal reaction + metaphyseal mottling. Still later→ sequestrum &involucrum (chronic OM).





Diagnostic imaging

- **U/S:** may detect subperiosteal abscess.
- **Radioactive bone scan:** using ^{99m}**Tc**→ very sensitive but less specific while ^{67}**Ga-citrate** &^{111}**Ind-**labeled leucocytes are more specific.
- **MRI:** is very sensitive &can differentiate between OM &soft tissue infection.



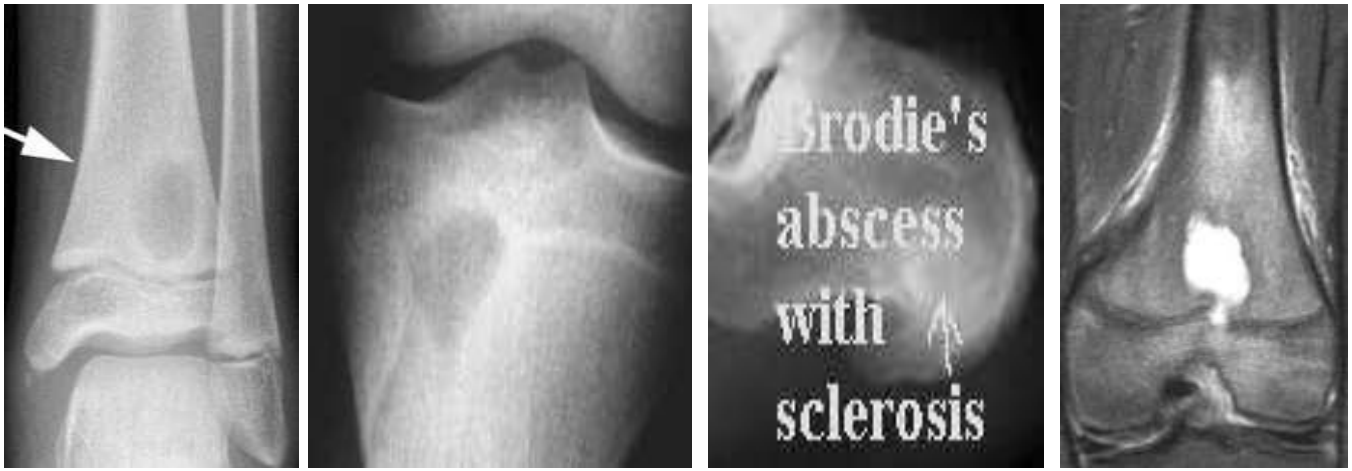
Complications

- Metastatic infection: to other organs (infants).
- Suppurative arthritis.
- Physeal damage→ bone shortening.
- Chronic OM: in neglected or immune depressed patients

Subacute haematogenous OM

- Is more mild than acute HOM possibly due to less virulent organism &/or the patient is more resistant.
- *Site:* distal femur, proximal/distal tibia

- *Clinical features:* an adolescent having pain for several weeks with slight swelling &tenderness near one of the larger joints. Temp &WBC are normal but ESR is often ↑.
- *X-ray*: round or oval 1-2cm cavity in metaphyssis; it may be surrounded by a hallo of sclerosis (**Brodie's** abscess).



Postoperative OM

Risk factors

- ***Local*** : open #, use of implant, multiple operation, hematoma formation, soft tissue damage &bone death.
- ***General*** : elderly, obese, diabetic &immune suppressed patient.

Clinical features

- superficial infection is mild; deep infection→ persistent pain, fever, inflamed discharging wound, ↑WBC&ESR;

X-ray

- Bone resorption &periosteal reaction. MRI &scan: may help.

Chronic OM X-ray

- areas of bone resorption, sclerosis &thickening with dense sequestra. **Sinogram:** see connection of sinus to bone. **Bone scan, CT &MRI.**