

Plan of lecture

- **Osteomyelitis: classification, pathogenesis**
- **acute haematogenic osteomyelitis .**
X-rays
- **Chronic haematogenic osteomyelitis.**
Video: treatment of osteomyelitis
- **Posttraumatic osteomyelitis**

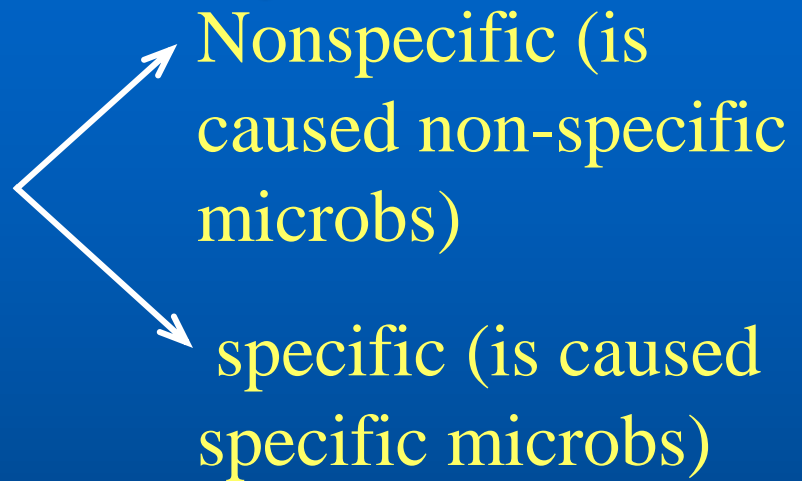
osteomyelitis

- **Osteon - bone**
- **myelos - bone marrow**
- **itis - inflammation**

osteomyelitis

infectious disease characterized by the inflammation of bone tissue in which the pathological process involves not only the bone marrow but also the compact bony part, periosteum and often the surrounding soft tissues

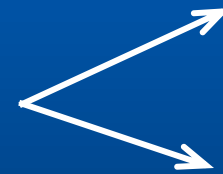
Classification of osteomyelitis

- To their etiological factors
 - Nonspecific (is caused non-specific microbs)
 - specific (is caused specific microbs)
- 

Classification of osteomyelitis

- To their etiological factors

- to the mode of infection



acute

haematogenic

Non-haematogenic:

- traumatic
- gunshot
- contact

Classification of osteomyelitis

- To their etiological factors

- to the mode of infection

- to the clinical manifestation

acute

Secondary
chronic

Primary-
chronic

Etiology of osteomyelitis

- **Staphylococcus** - **80-85%**
- **Proteus** - **2-4%**
- **association of microbes** - **6-7%**

Pathogenesis of acute haematogenous osteomyelitis

Endogenous microbes
(tonsillitis)

exogenous microbes (furunculosis,
otitis, small trauma)



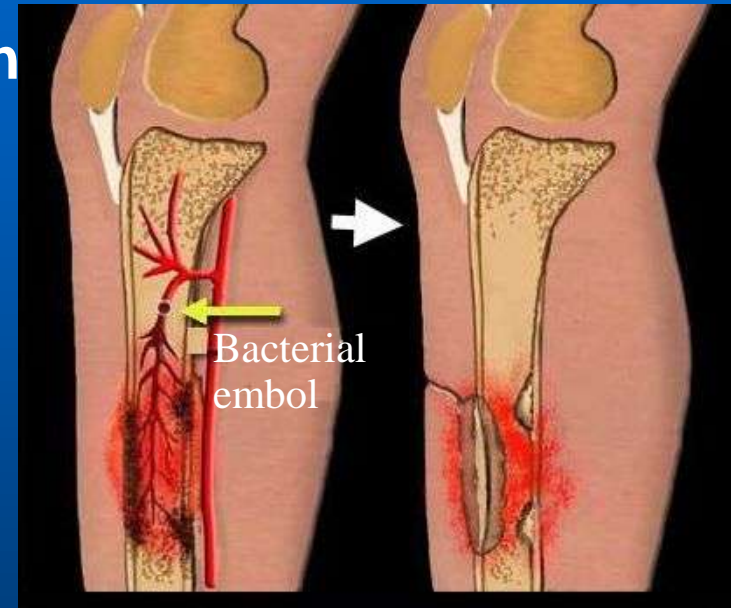
BACTERIEMIA



Entering of infection into bone

Predisposing factors of osteonecrosis

- Feature of blood supply of children (blood supply of epiphys and metaphys characterized by small vessels with blind ends, in which bacterial embols is fixed)
- immune feature of organizm (inflammation process is developed only with presence of sensibilisation condition after infection disease)
- Trigger-factors: trauma of bone, hypovitaminosis



Forming of osteomyelitis focus

Hyperemia and swelling of bone marrow

Forming of osteomyelitis focus

Hyperemia and swelling of bone marrow

- Purulent exudate spreads through the bone marrow canal to the diaphysis of the bone
- Purulent infiltration leads to development of bone marrow flegmon, trombosis of vessels and necrosis of bone



Forming of osteomyelitis focus

Hyperemia and swelling of bone marrow

- Purulent exudate spreads through the bone marrow canal to the diaphysis of the bone
- Purulent infiltration leads to development of bone marrow flegmon, trombosis of vessels and necrosis of bone

Purulent exudate spreads through the osteon (Haversian) canal to outside, beneath periosteum, with development of periostitis



Forming of osteomyelitis focus

↓

Accumulation of pus beneath periosteum with development of subperiosteal abscess

→



Forming of osteomyelitis focus

Accumulation of pus beneath periosteum with development of subperiosteal abscess

Destruction of periosteum, development of intermuscular phlegmon



Forming of osteomyelitis focus

Accumulation of pus beneath periosteum with development of subperiosteal abscess

Destruction of periosteum, development of intermuscular phlegmon

Involvement subcutaneous tissue, development of subcutaneous phlegmon



Forming of osteomyelitis focus

Accumulation of pus beneath periosteum with development of subperiosteal abscess

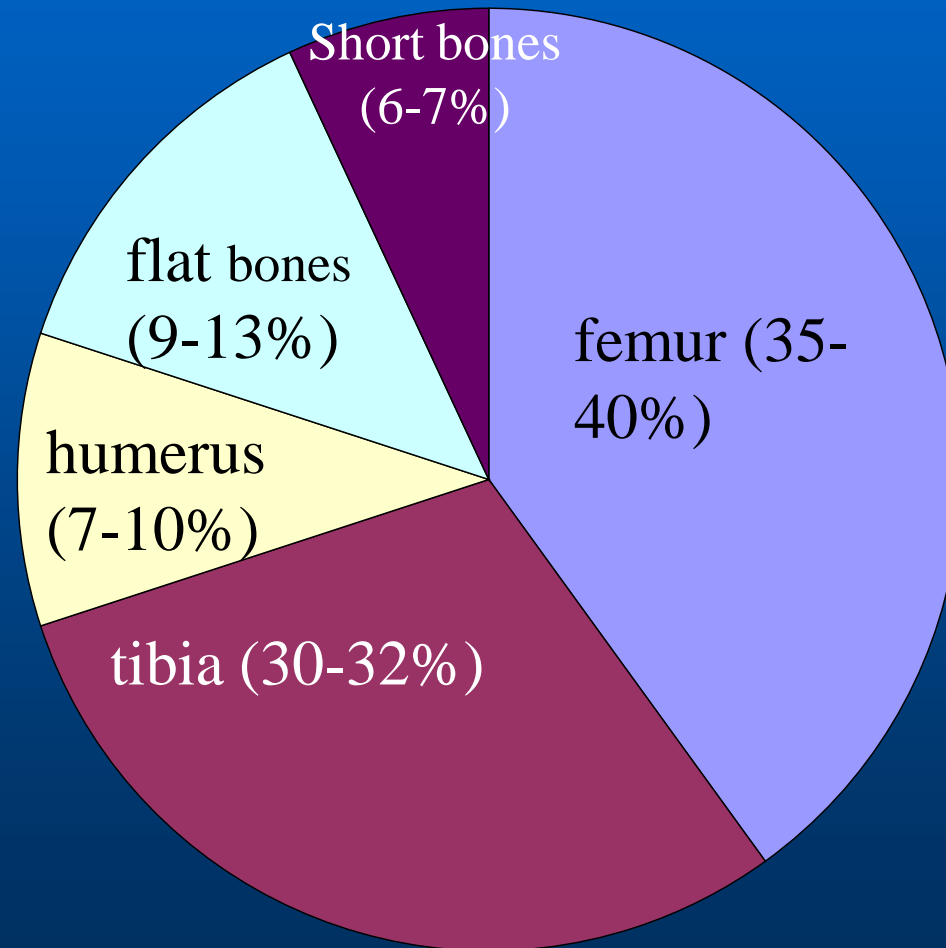
Destruction of periosteum, development of intermuscular phlegmon

Involvement subcutaneous tissue, development of subcutaneous phlegmon

Spontaneous opening of phlegmon with forming of fistula



Rate of bone lesion in the presence of osteomyelitis



Clinical forms of acute haematogenous osteomyelitis

- **Toxic** (is characterized by development of extreme septic intoxication from early stage of disease. Disease progresses rapidly, local pathological signs have no time to develop)
- **Septicophyaemic** (is characterized by development of several suppurative-destructive foci in several bones and abscesses in several parenchymatous organs as the lungs, liver and kidney)
- **Localized**

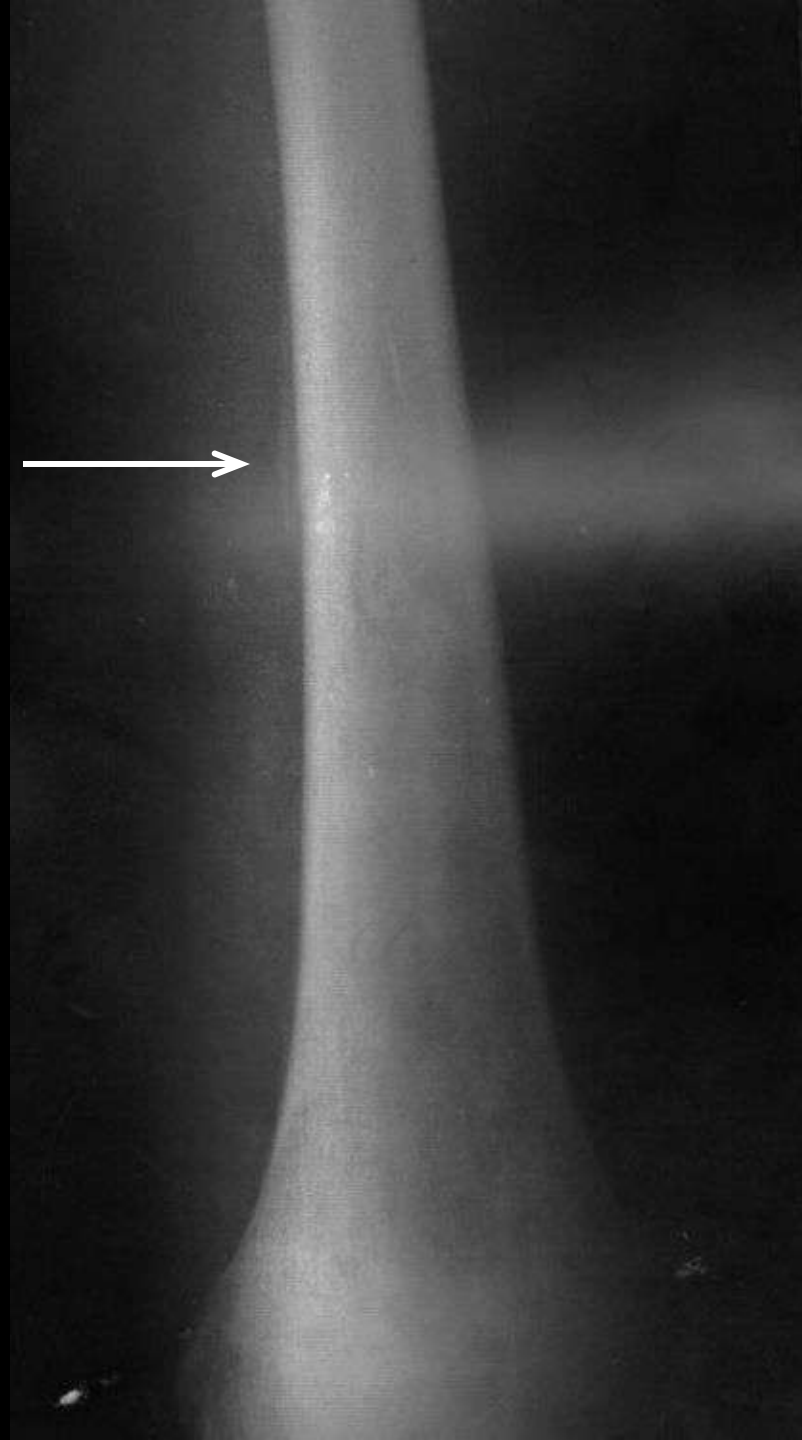
Swelling of extremity



Signs of localized form of acute haematogenic osteomyelitis

Muscular pain, severe pain in the bone	complaints
Forced position of extremity with the affected limb in a bent position; extreme swelling, local hyperthermia, hyperemia, tenderness and fluctuation	Clinical investigation
leucocytosis of up to 20×10^9 /l with an increase of neutrophils	Laboratory analyzes
<p>X-ray signs appear after 10-14 days from the onset of disease:</p> <ul style="list-style-type: none"> • Thickening of periosteum • formation of cavity in the bone • increase in the soft tissue markings adjacent to the bone 	<ul style="list-style-type: none"> • X-ray
Hyper-fixation of the pharmacological preparation to the affected bone segment	<ul style="list-style-type: none"> • radionuclide investigation

periostitis

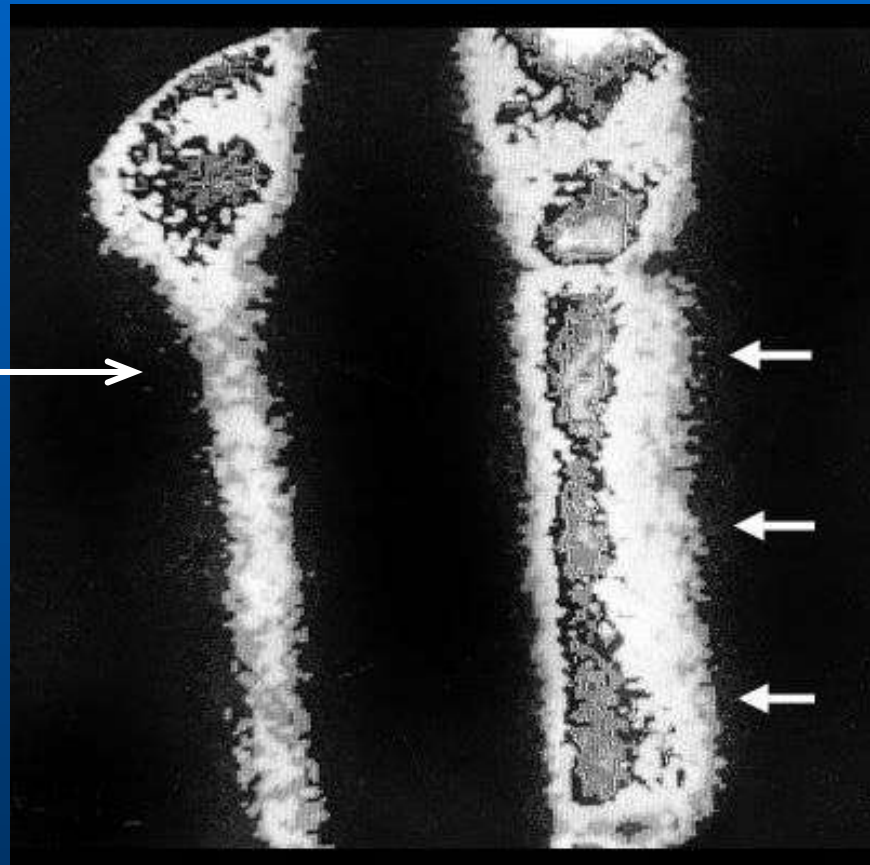




← periostitis

Radionuclide investigation

Heal bone



Affected bone

Treatment of acute haematogenic osteomyelitis

- **Operative :**
 - early incising of soft tissue and decompress drainage of the bone by way of drilling several holes in the area of osteomyelitis.
 - Drainage tube is passed through perforated holes
- **Antibiotic therapy**
- **Immunotherapy**
- **Infusion therapy, detoxication**
- **Immobilization of extremity**

Chronic haematogenous osteomyelitis

sequestrum

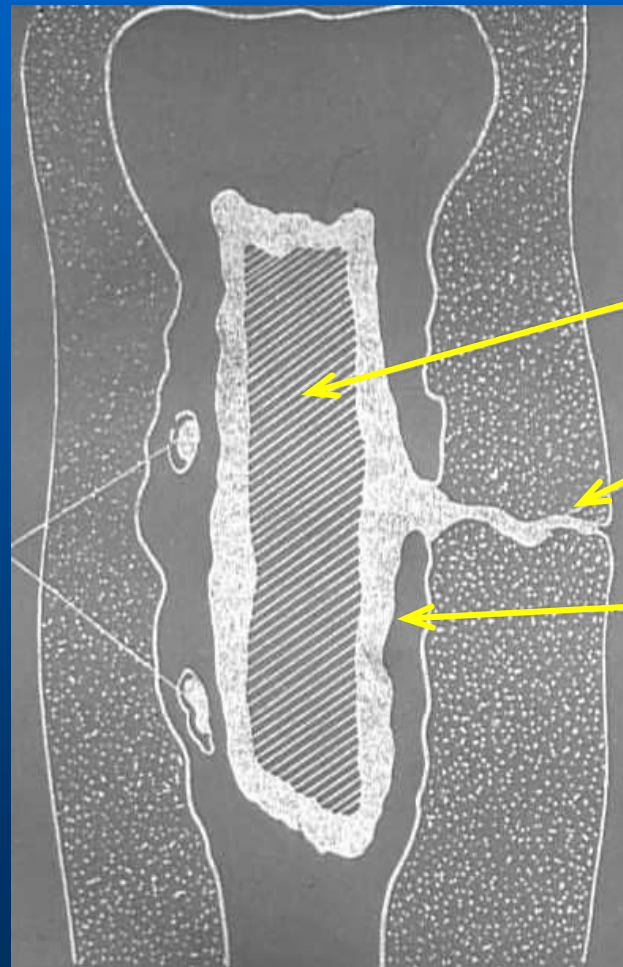
Necrotized bone fragment, which has divided from main bone and is placed in purulent cavity



sequestrum box

- **sequestrum box is form from bone tissue around purulent cavity, in which sequestrum is placed**
- **sequestrum box has many holes, through that pus discharge into surrounding tissue with forming abscess, fistula**

Schema of sequestrum, fistula and sequestrum box in presence of osteomyelitis

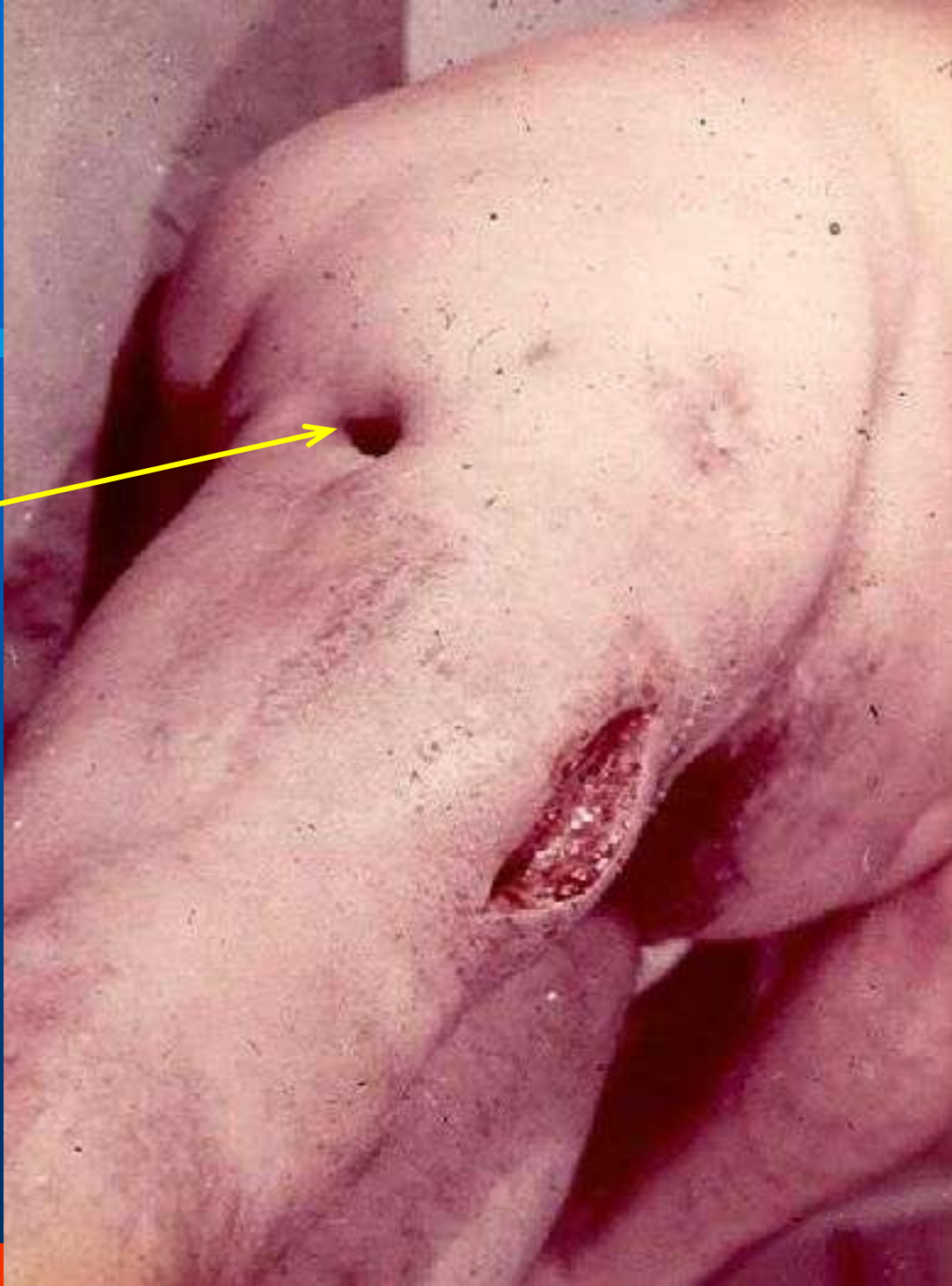


sequestrum

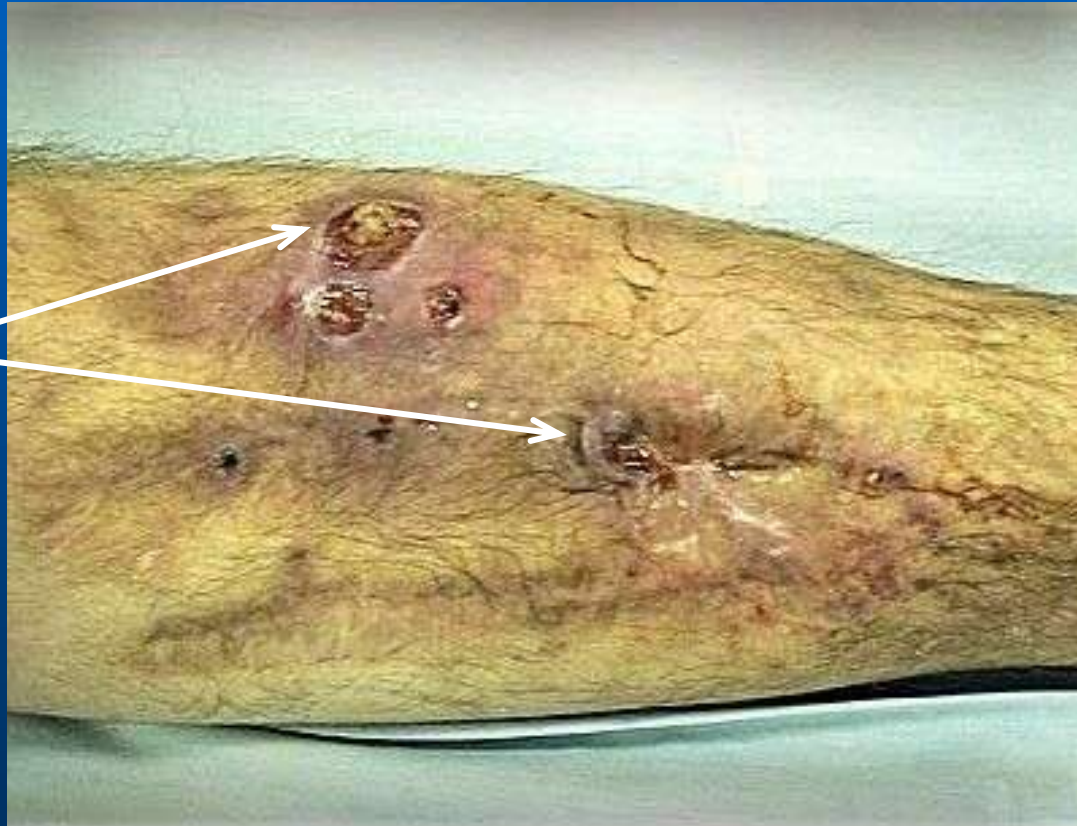
fistula

sequestrum box

fistula



fistula



Main triad of signs characterizes chronic osteomyelitis:

- Relapsing trend
- formation of sequestrum
(or osteomyelitic cavity)
- purulent fistula

X-ray signs of chronic osteomyelitis

- **sequestrum**
- **osteomyelitic cavity**
- **chronic periostitis**



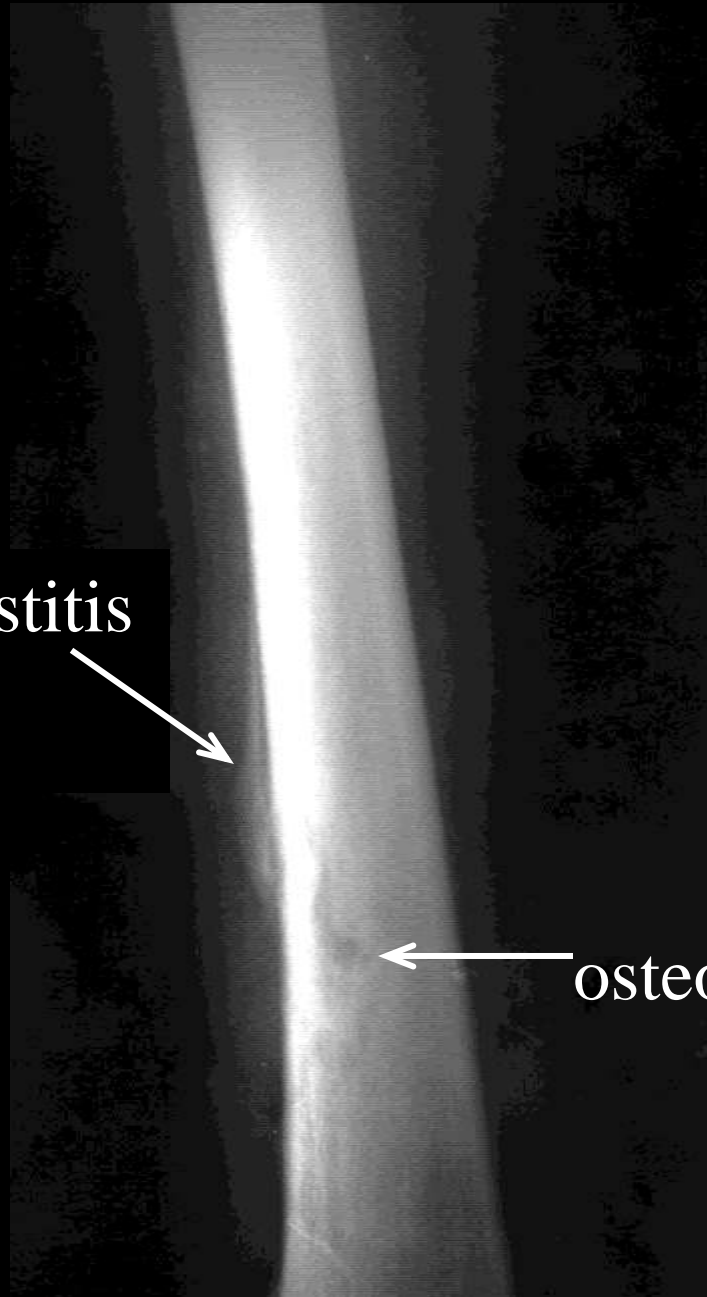
Bone
sequestrum



chronic periostitis

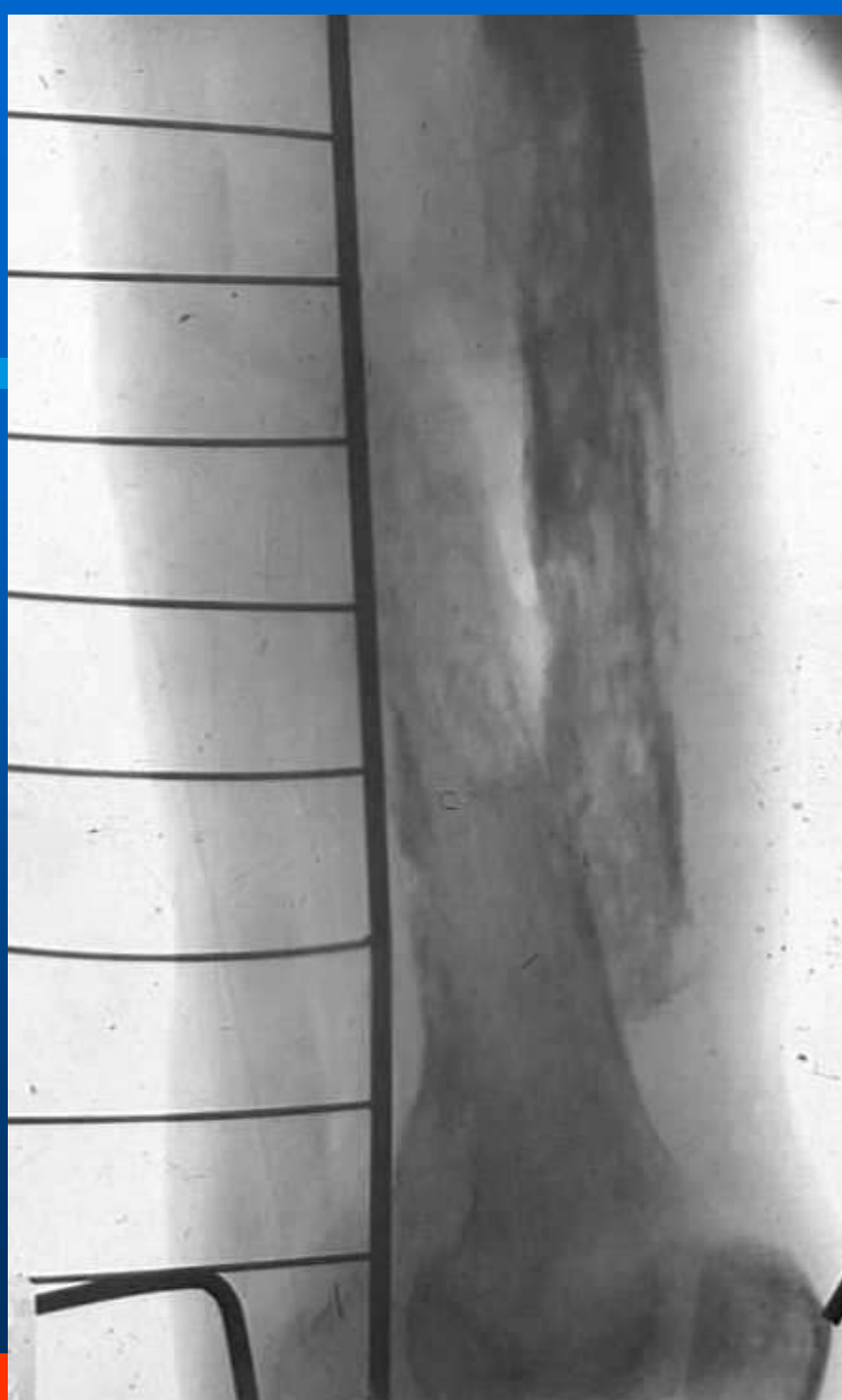


osteomyelitic cavity





Pathological
fracture



Pathological
fracture

Additional method of diagnostic of chronic osteomyelitis

- **Fistulography** →

(gives evidence of the direction of the fistula tract, its connection with the bone cavity, which is necessary in planning surgery to determine surgical approach)

- **Computer tomography** →

- **bacteriological investigation**



Painting of fistula

- **Painting through fistula with green dye is used for revealing and subsequent excision all fistula tract**



Indications for surgical treatment of chronic osteomyelitis

- **Presence of sequestrum, osteomyelitic cavity, purulent fistula**
- **osteomyelitic ulcers, malignancy**
- **pseudoarthrosis**
- **frequent relapse with severe pain, intoxication**
- **dysfunction of locomotive system**
- **functional and morphological changes in the internal organs caused by the chronic suppurative infection**

Contraindication for surgical treatment of chronic osteomyelitis

- **Severe renal failure associated with amyloidosis**
- **Decompensated cardiovascular and respiratory system**

Radical operation: sequestrum- necrectomy

**Aim of operation : elimination of
the chronic focus of infection in
the bone and its surrounding
tissues**

Content of operation

- **Removal of sequestrum, all osteomyelitic cavities together with their internal wall granulations and detritis, all purulent fistulas**
- **sanitation and plasty of the bone cavity**

Methods of plasty of the bone cavity

- **Muscle pedicle flaps**
- **bone plates (autogenous or conserved bone tissue)**
- **chondroplasty (conserved cartilage)**
- **biopolymer material: collagen sponge impregnated with antibiotics, glue compositions with different ingredients and biopolymer plombs containing antiseptics (activate bone tissue regeneration)**



Non-haematogenic osteomyelitis

- **traumatic**
- **gunshot**
- **contact**

Causes of non-haematogenous osteomyelitis

- **Open bone fractures**
- **Spread of purulent inflammation to bone from surrounding soft tissue**

Treatment of open fracture in presence of posttraumatic osteomyelitis is method of extramedullar compression osteosynthesis

