Malignant bone tumors

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Osteosarcoma

- Malignant osteoid

Epidemiology

- 3 new cases /1 milion/ year
- 2. decade
- Metaphysis of long bones

  1/2 in knee region

  distal femur

  proximal tibia

  proximal humerus

Classification

- Primary
  - Central
    - High-grade
      - Conventional high-grade (80 – 90%)
        - Osteoblastic
        - Chondroblastic
        - Fibroblastic
      - Telangiectatic
    - Low-grade

Peripheral

High-grade

Low-Grade

Parosteal

Periostal

- Secondary

  - in Paget´s disease of bone
  - post radiation

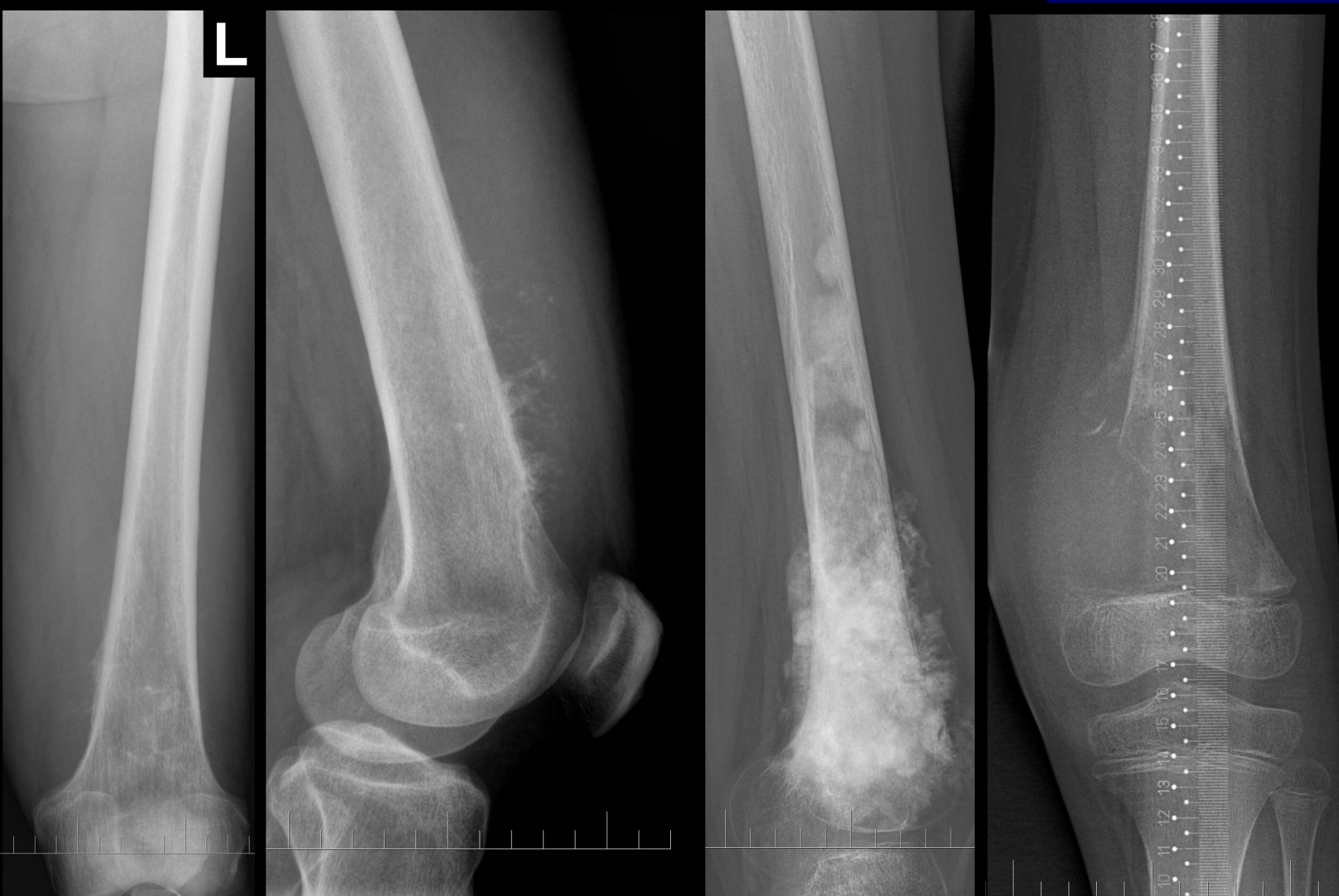
Symptoms

- pain
  - during night, in rest
- swelling
- pathological fracture
- metastases in the time of diagnosis in 10-25 % of patients

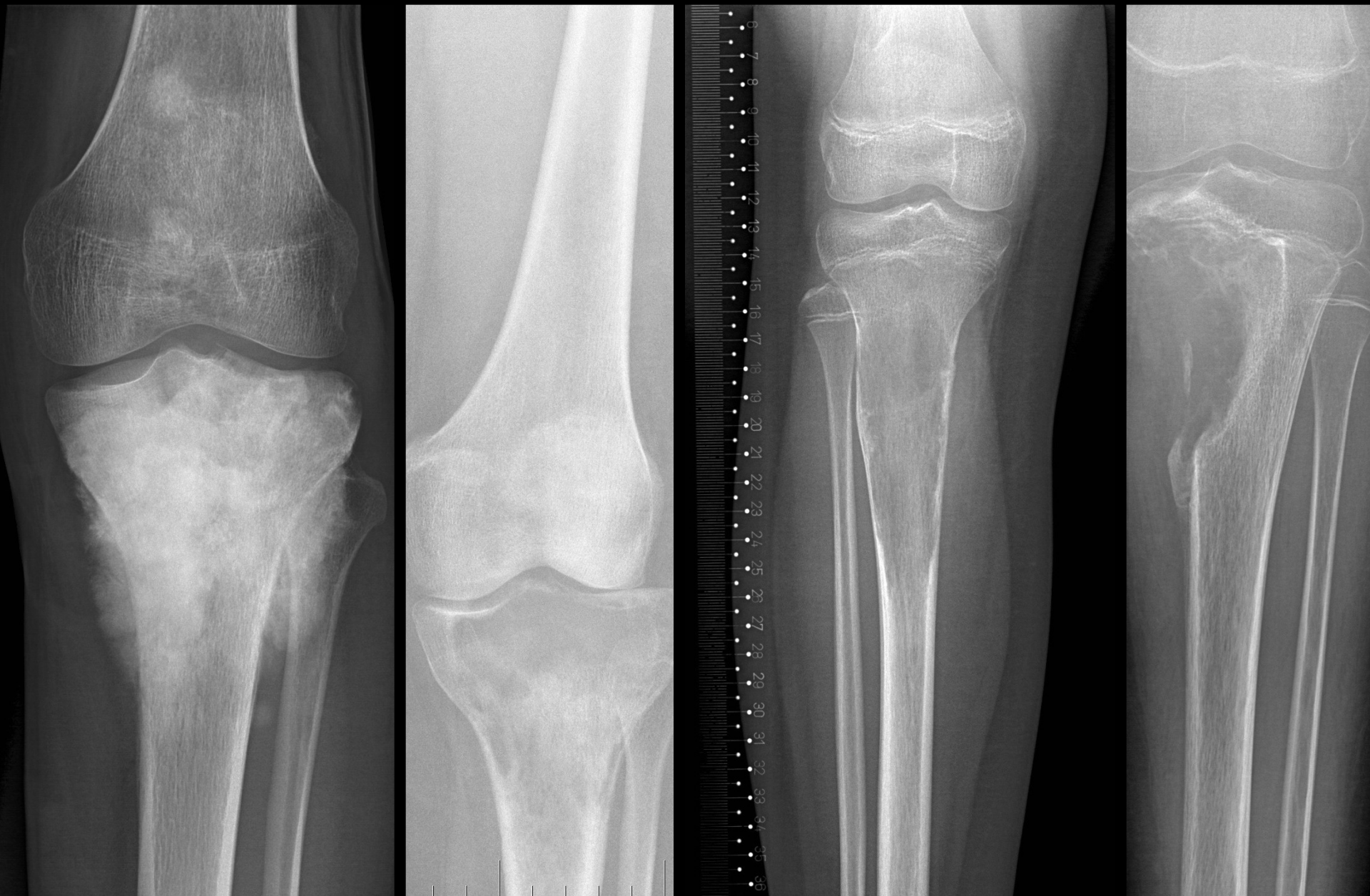
Diagnostics

- X-ray
- CT / MRI
- Scintigraphy
- Chest X- ray or spiral CT
- Ultrasonography
- Biopsy – excisional, needle

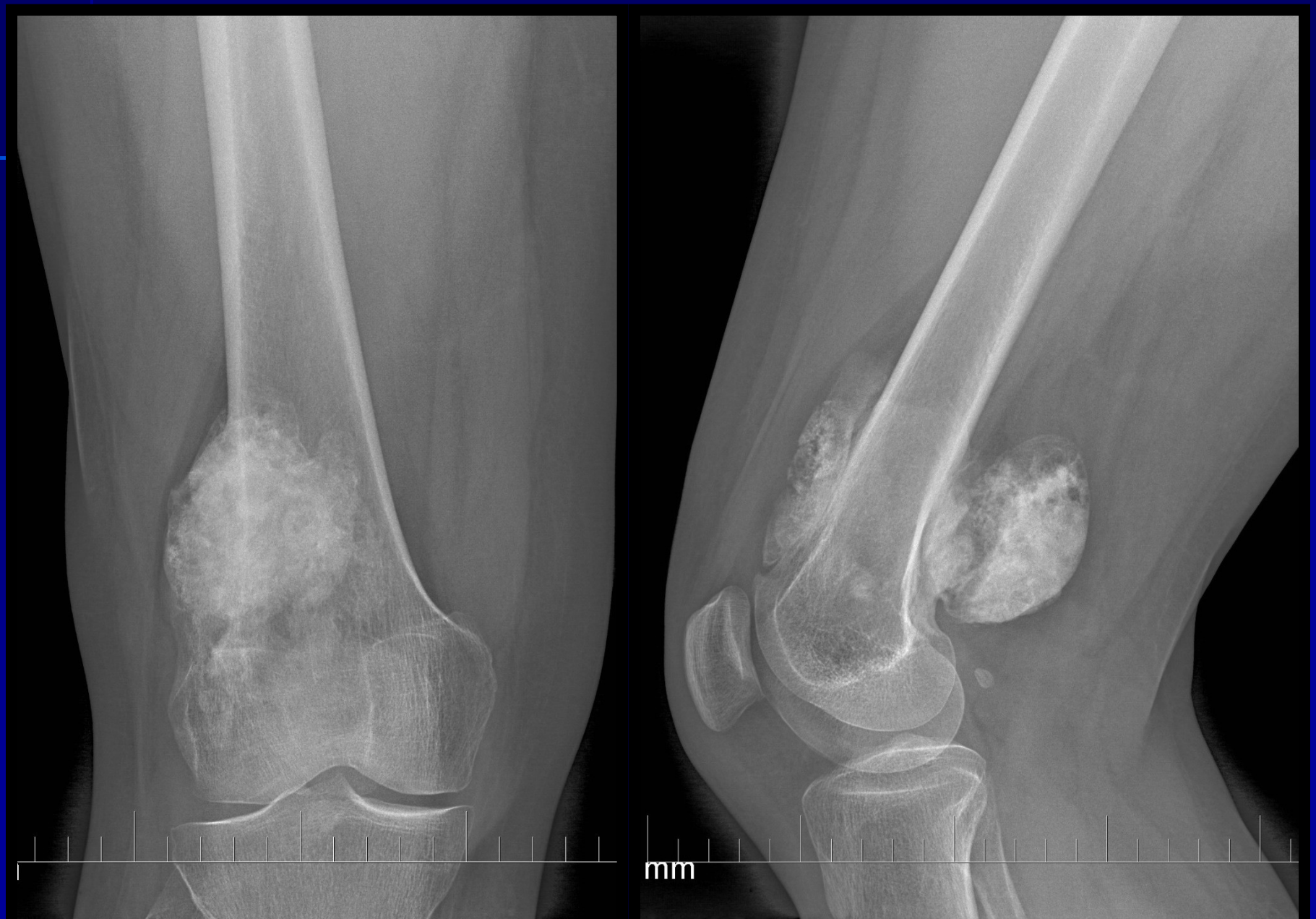
Conventional osteosarcoma



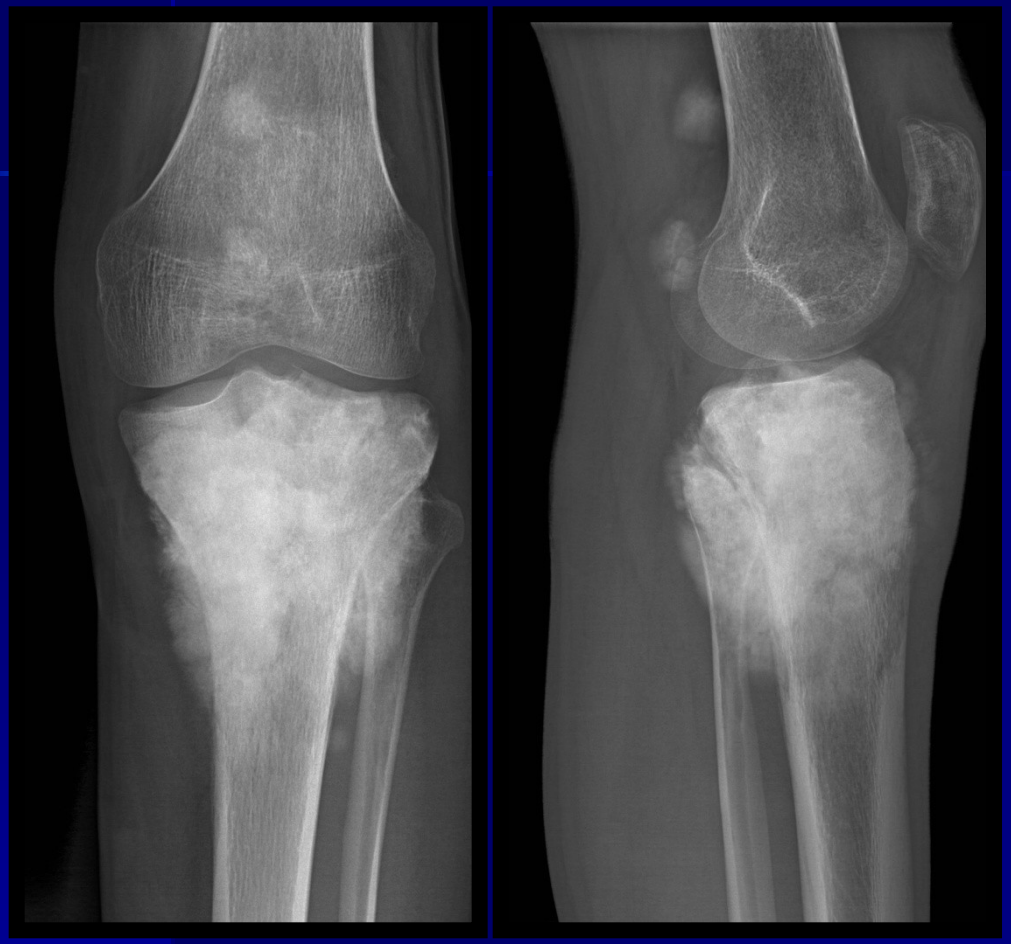
Conventional ostesarcoma



Parosteal osteosarcoma



OSA



- Missed case
- Wrong prognosis

Oncologic reflex

Therapy

- neodjuvant chemotherapy
- surgery – radical resection / amputation
- adjuvant chemotherapy
- Metastasectomy in lungs

- Chemotherapy: (EURAMOS protocol)
  - metotrexat, doxorubicin, adriamycin, cisplatina, ifosfamid, etoposid.
- In low-grade OSA – only surgical treatment

- OSA is a radioresistant tumor

Prognostic factors

- Metastases
- Size of the tumor
- Axial localisation
- Radicality of surgery
- Response to chemotherapy

Prognosis – 5 years survival

- 70% - conventional high-grade OSA without MTS and with good respone to chemotherapy (to 10 % of vital tumor cells)

- 90% - u low-grade OSA after radical surgery

Chondrosarcoma

Epidemiology

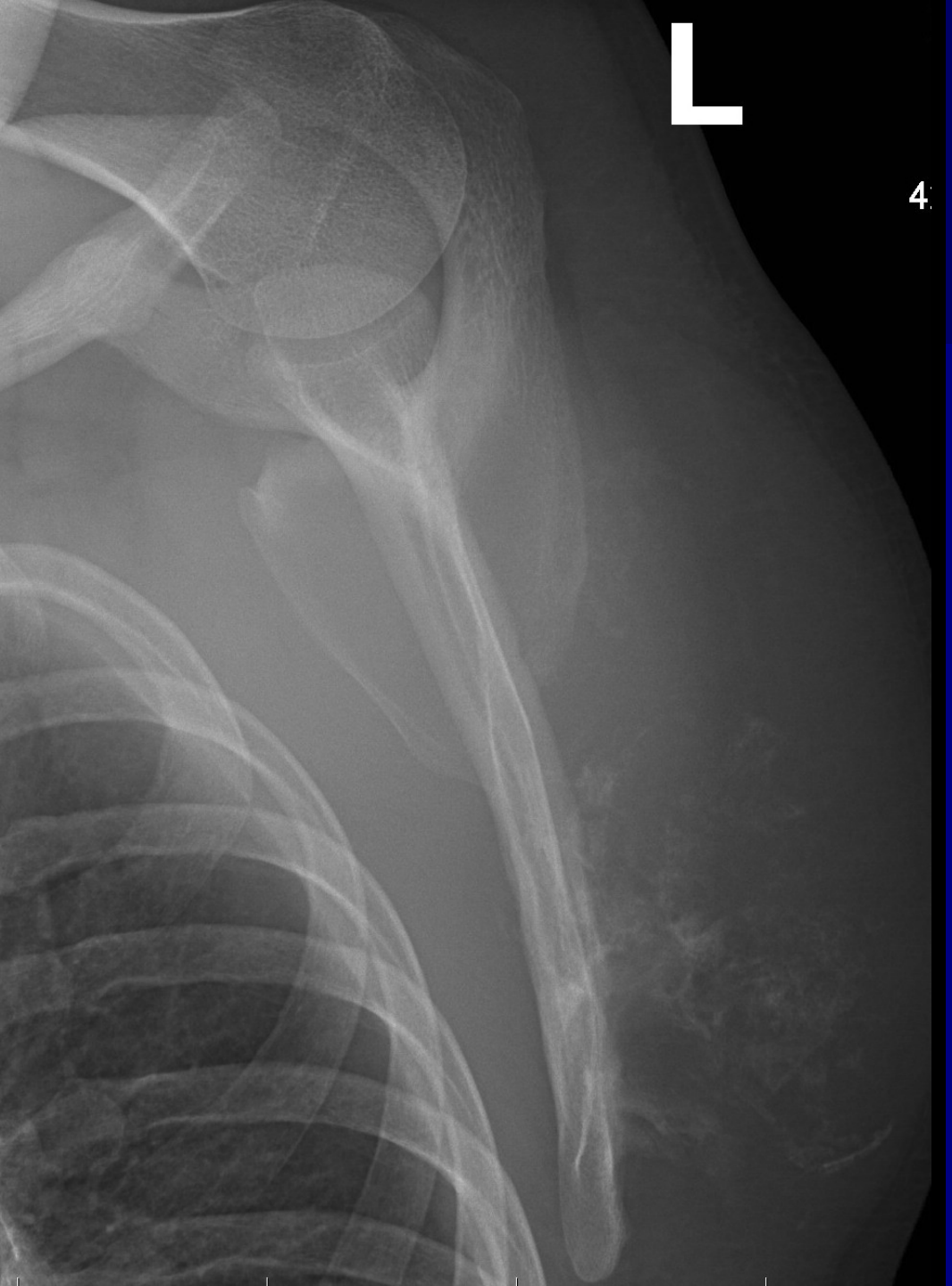
- 10% of primary malignant bone tumors
- Age:
  - primary: 40 – 60 years
  - secondary: 25 – 45 years
- Localisation-

  pelvis, proximal femur, proximal humerus

Etiology

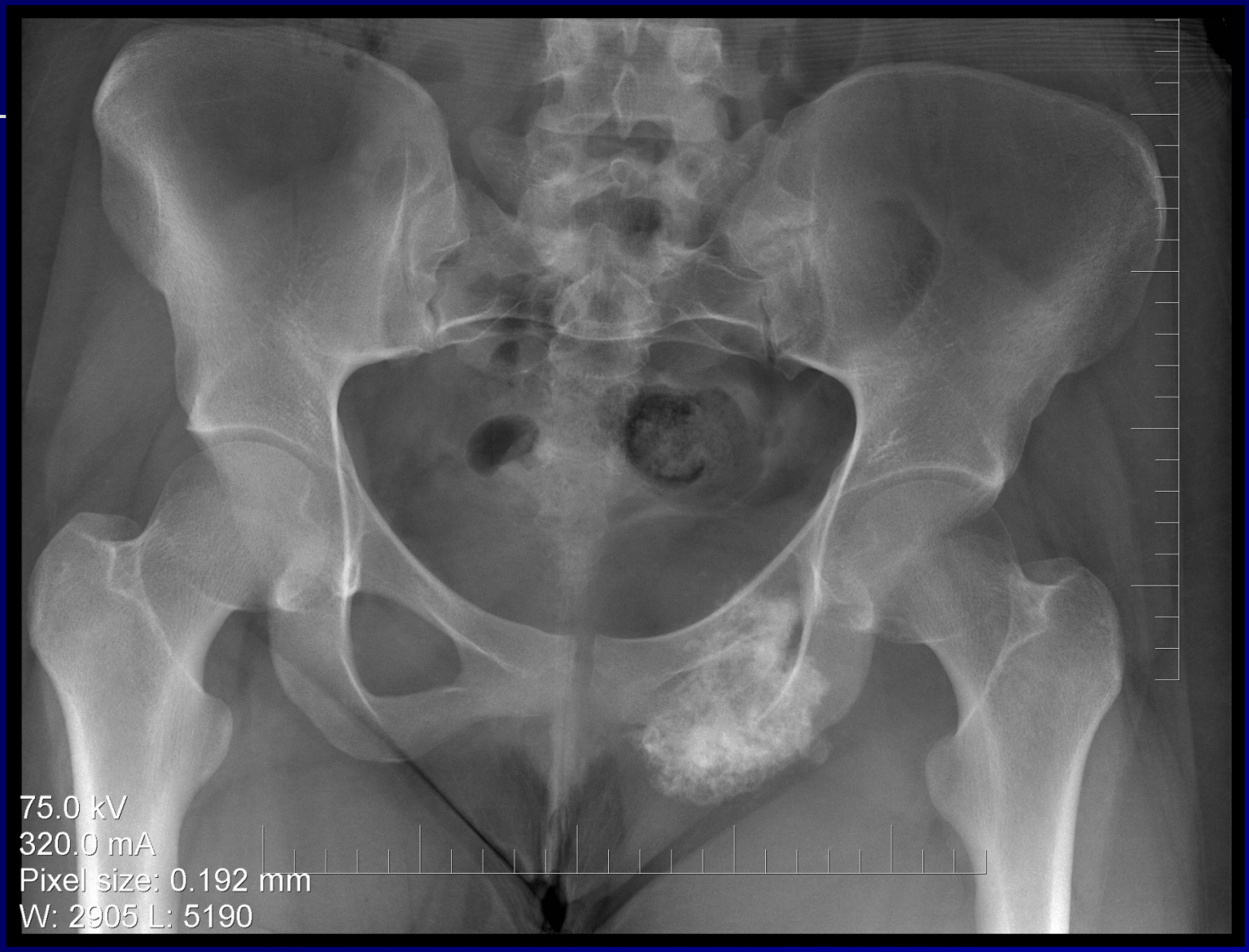
- Secondary
  - Multiple enchondromas (M.Ollier, Maffucci sy
  - Exostosis disease

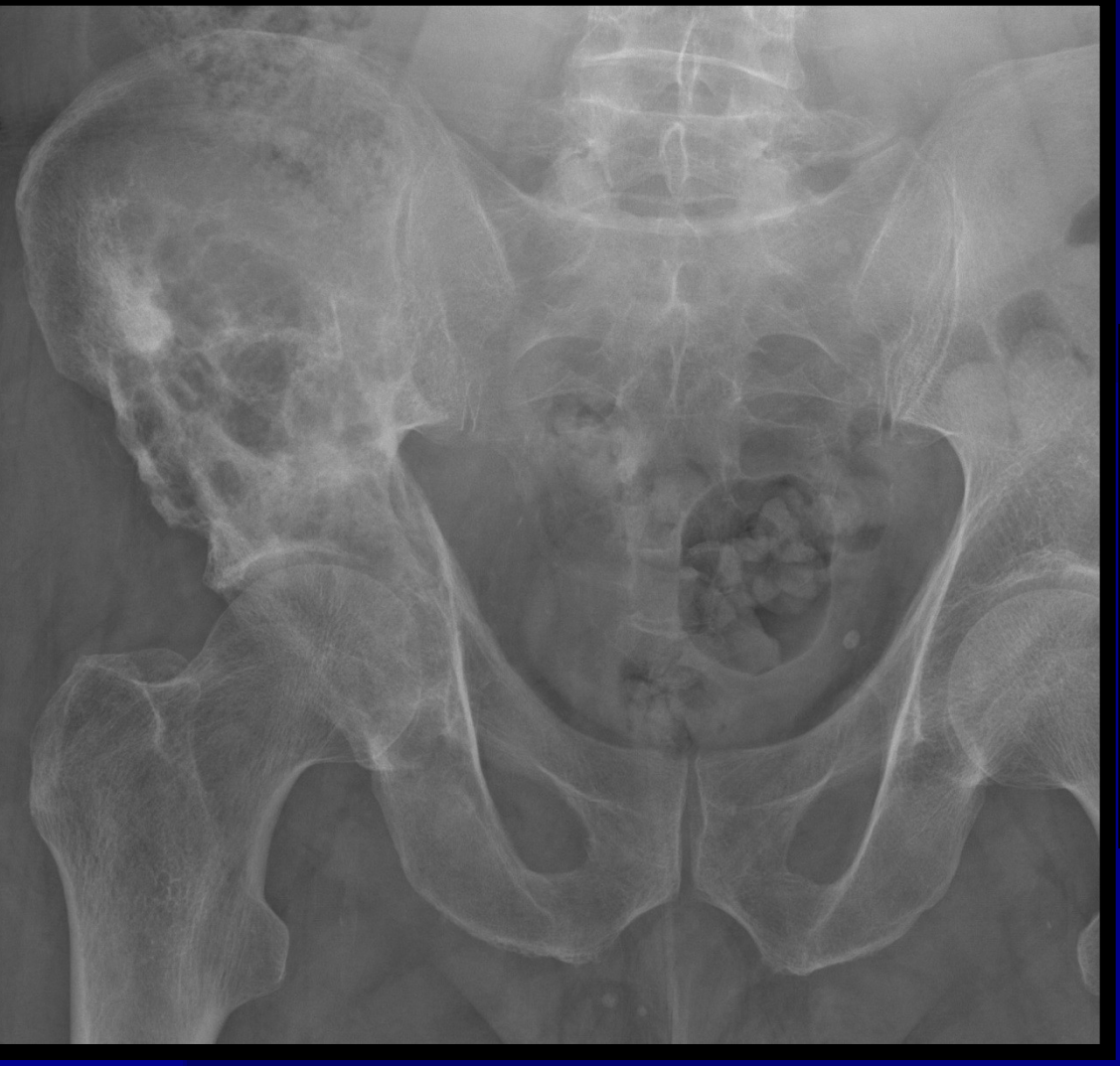
    cartilage over 2 cm
  - Chondroblastoma, chondromyxoid fibroma …

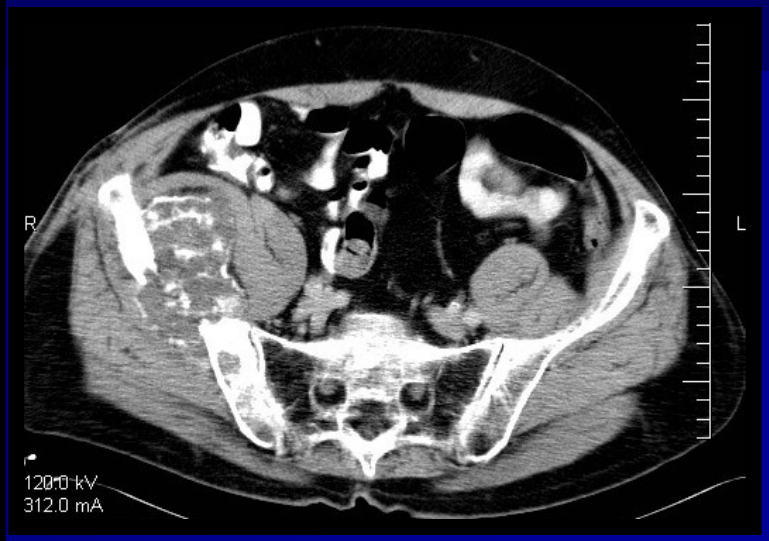


Calcifications

Chondrosarcoma



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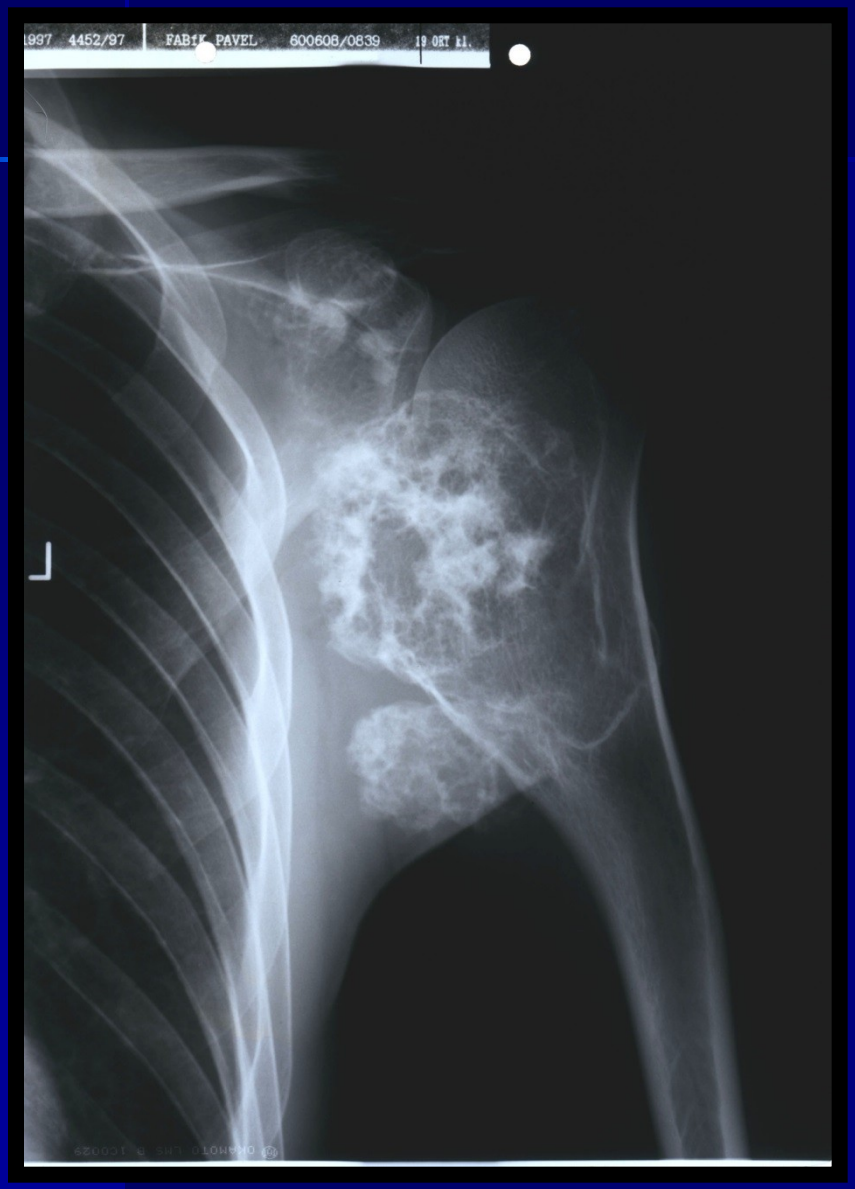
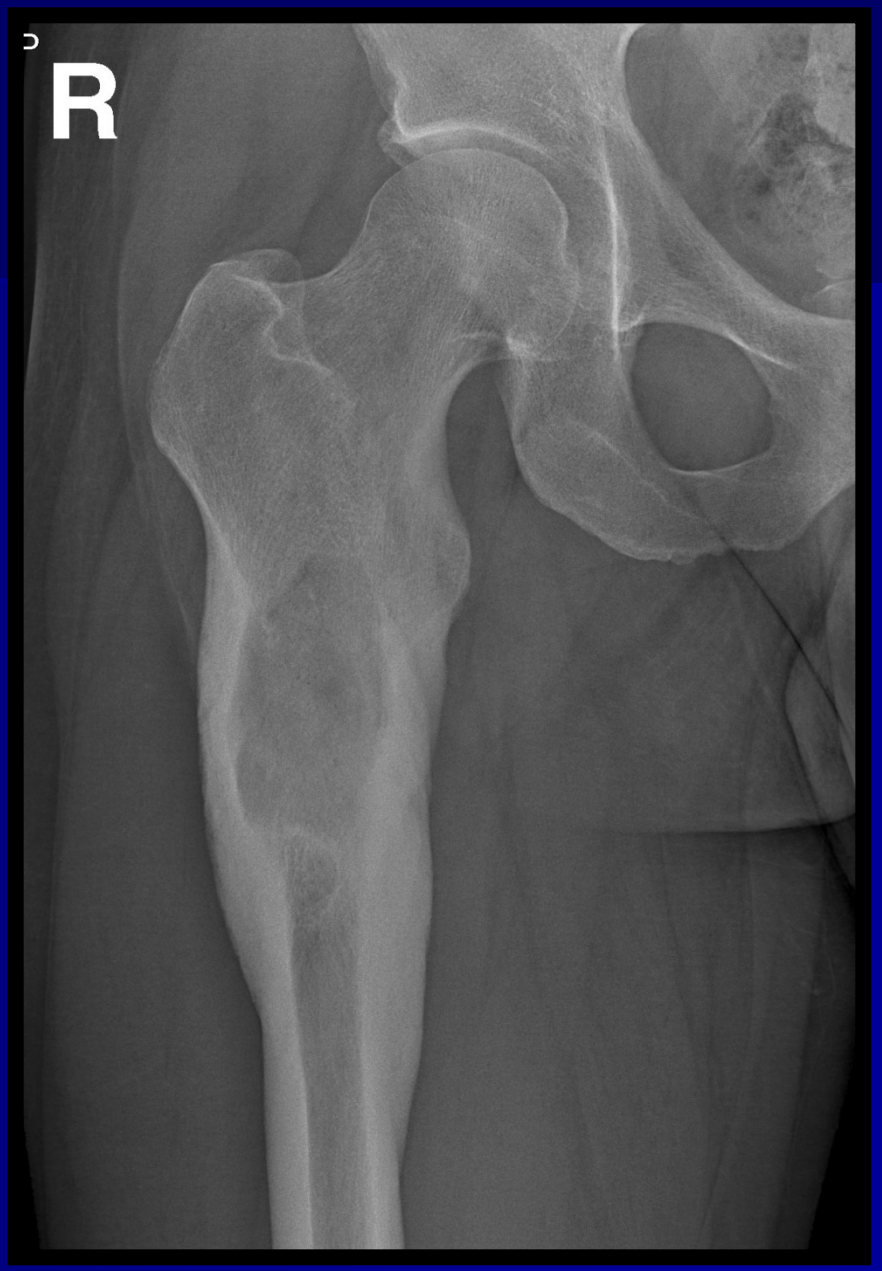
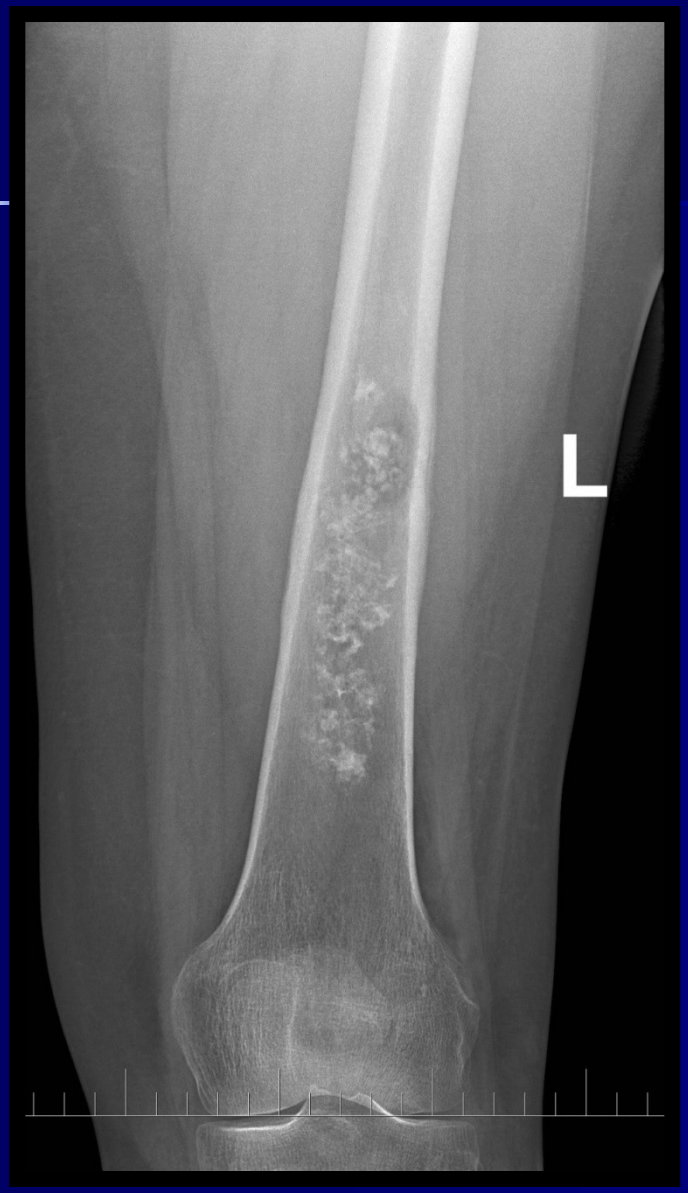
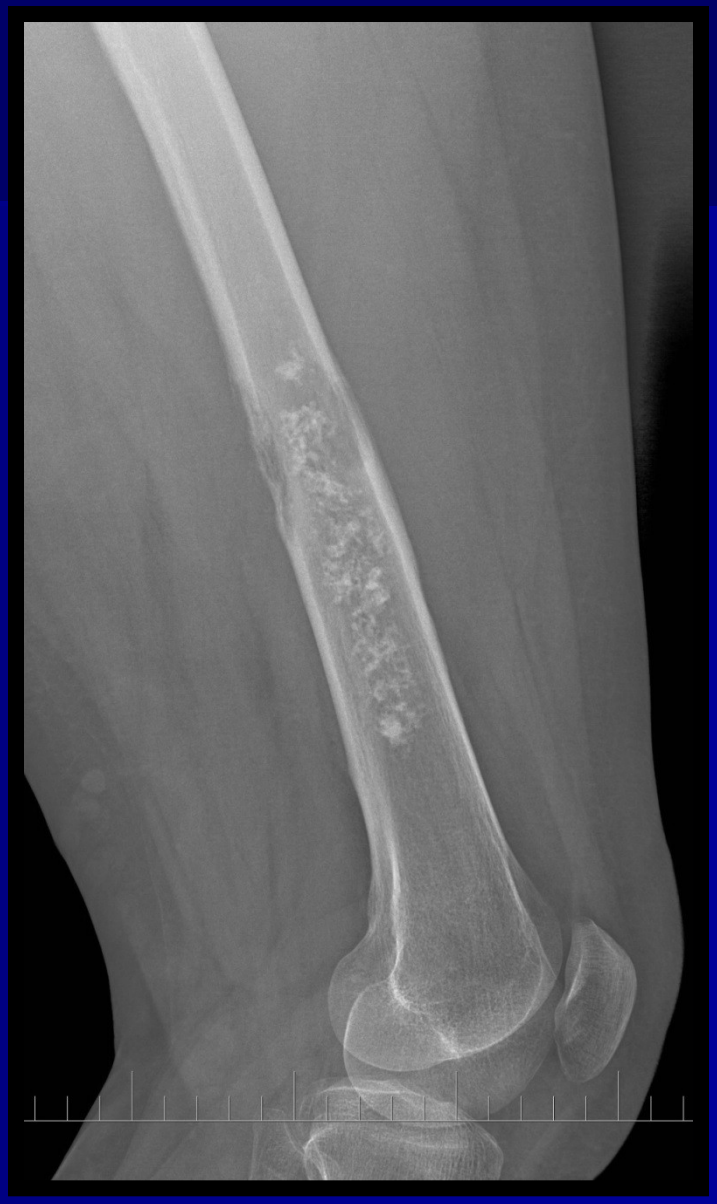
Chondrosarcoma



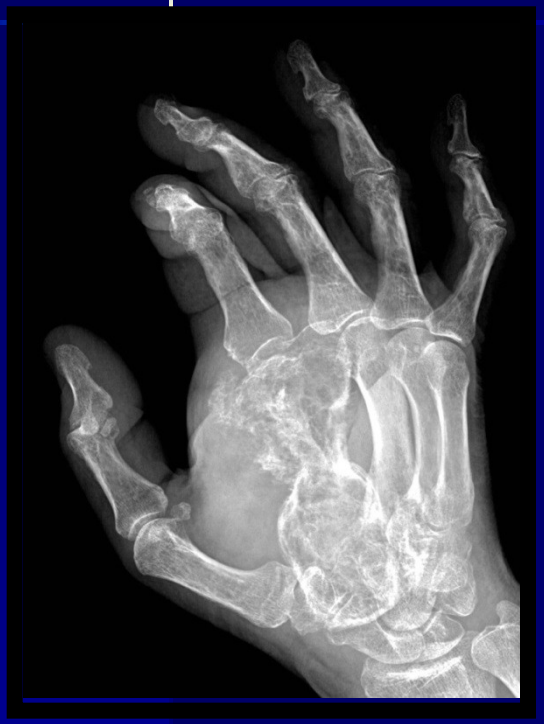


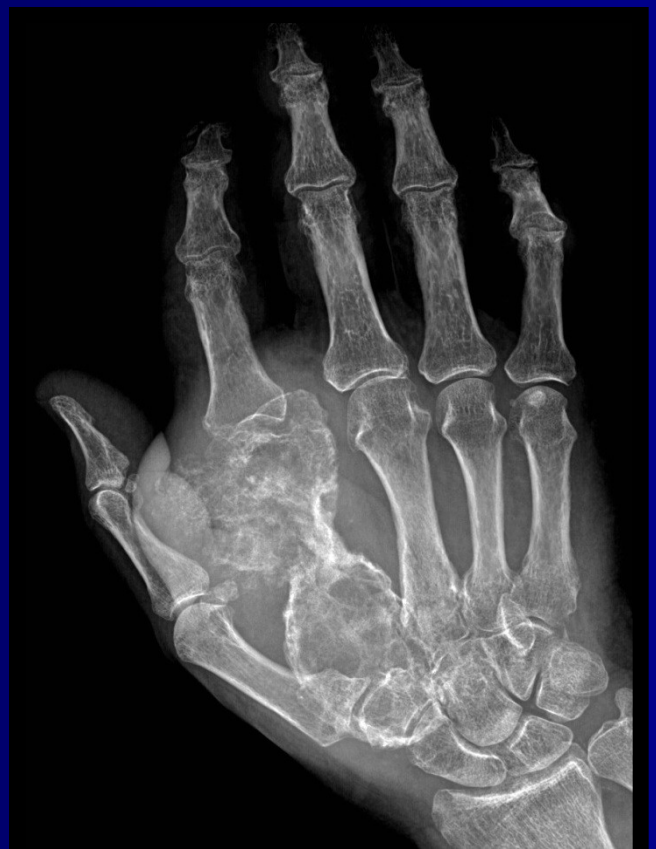
Chondrosarcoma

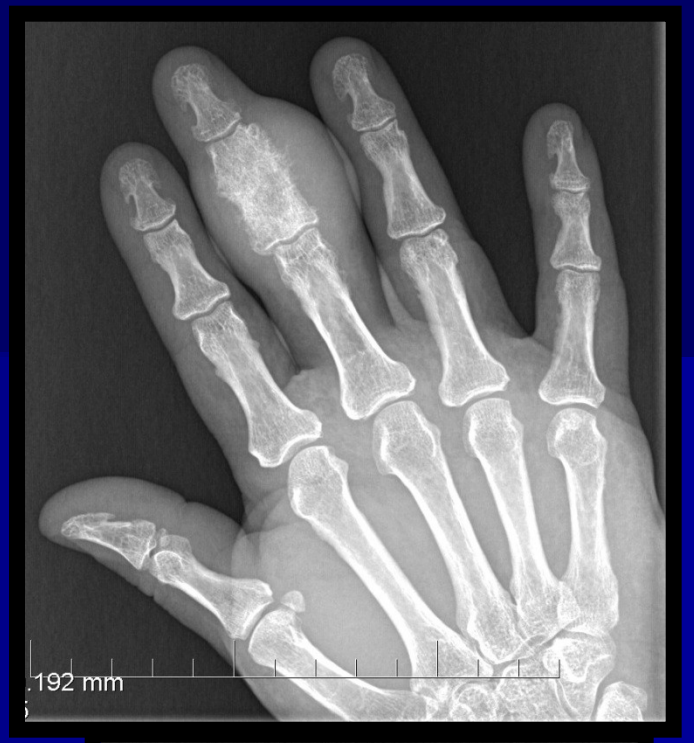


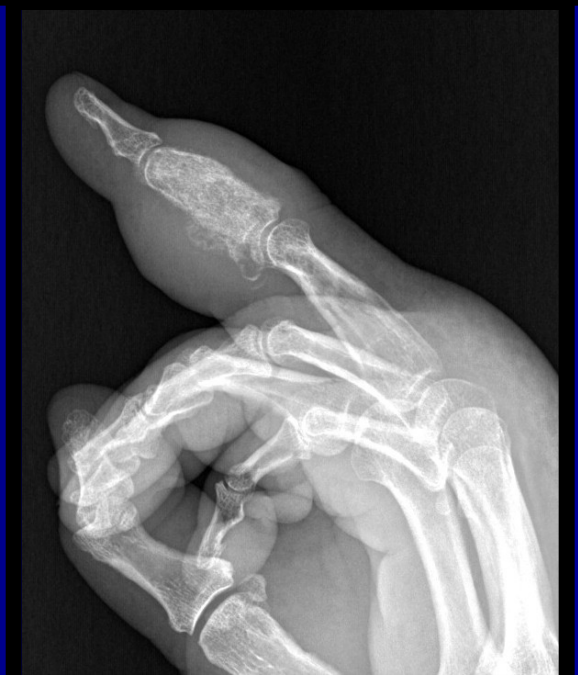


Chondrosarcoma









Therapy

- Radical resection – wide resection, amputation
- Metastasectomy in lungs
- Chemoresistant tumor
- Radioresistant tumor

Prognosis

- Prognostic factors:
  - Radicality of surgery
  - Size
  - Histological grading
- In intralesional surgery – 90% risk of local recurrence and lung metastases

- Prognosis:
  - Conventional low-grade 90% 10 years
  - Conventional high-grade 20-40% 10 years
  - Dediferenciated sarcoma 15% 5 years

Ewing sarcoma family

Group of high grade malignant round cells bone tumors with neuroectodermal differentiation and specific translocation.

- Ewing sarcoma
- PNET (periferal neuroectodermal tumor
- Askin tumor of the chest wall
- Neuroblastoma in adults

Epidemiology

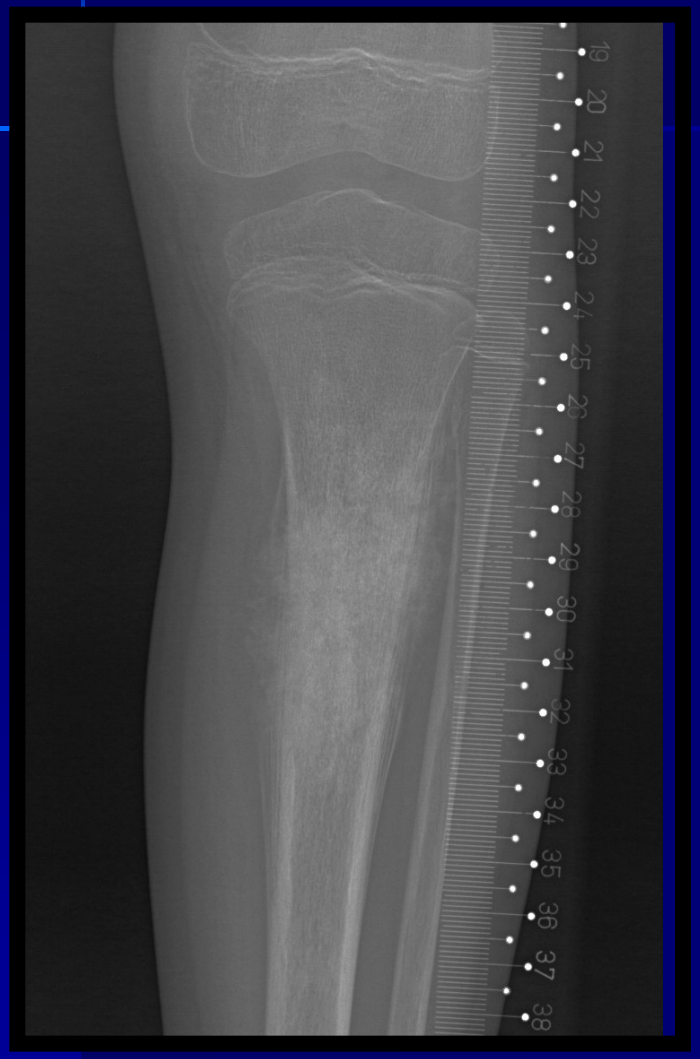
- One new case /1 mil./ 1 year

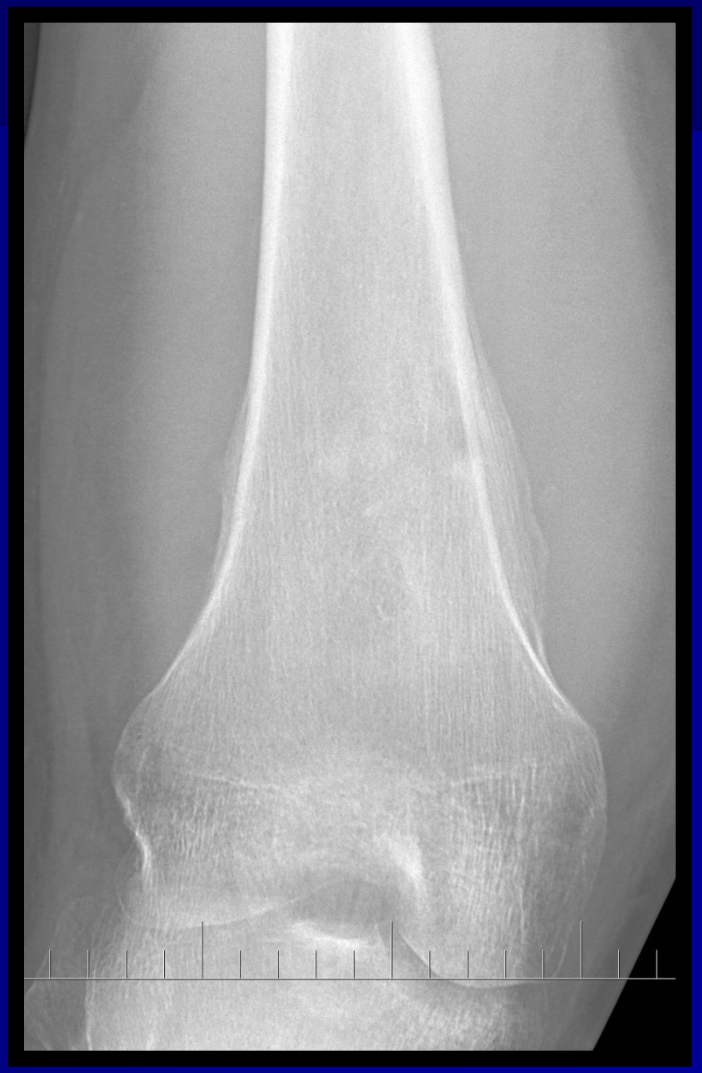
- 5-25 years
- In metaphysis of long bones with extension into diaphysis and
  in flat bones (pelvis, scapulla)

Symptoms

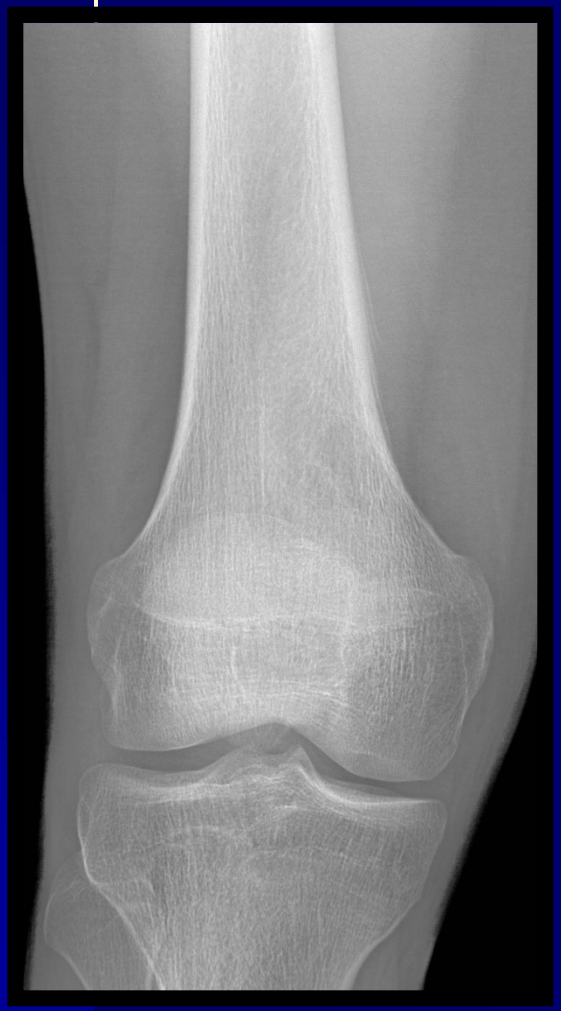
- pain
- swelling
- Fever, redness,
- Leucocytosis, ESR elev.
- Biopsy- + identification of specific gene translocation t(11,22)q(24,12)

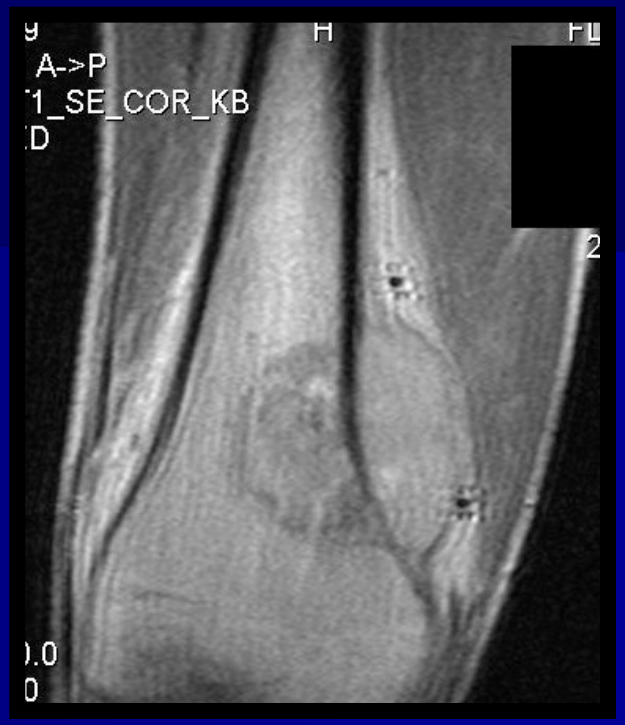
Ewing sarcoma

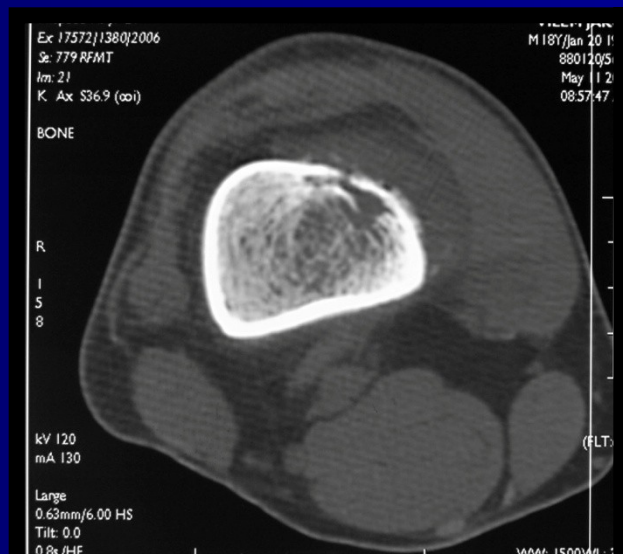


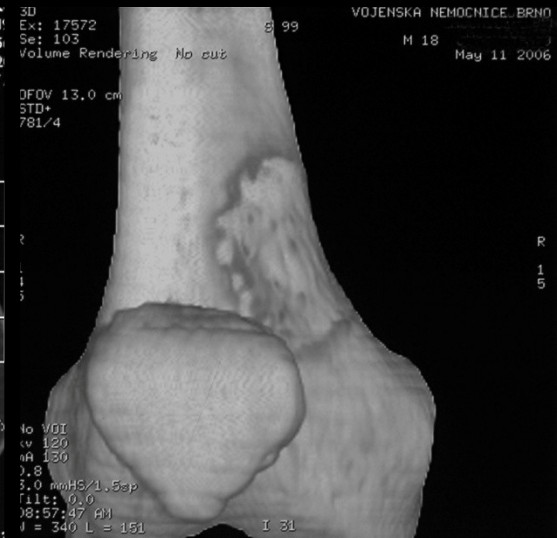


Ewing sarcoma

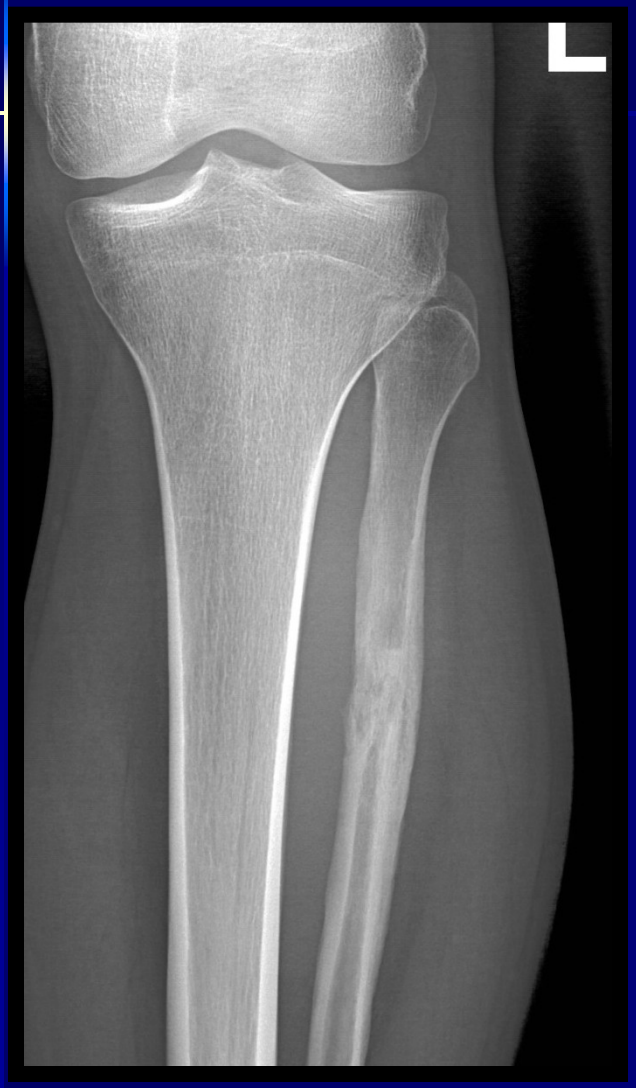


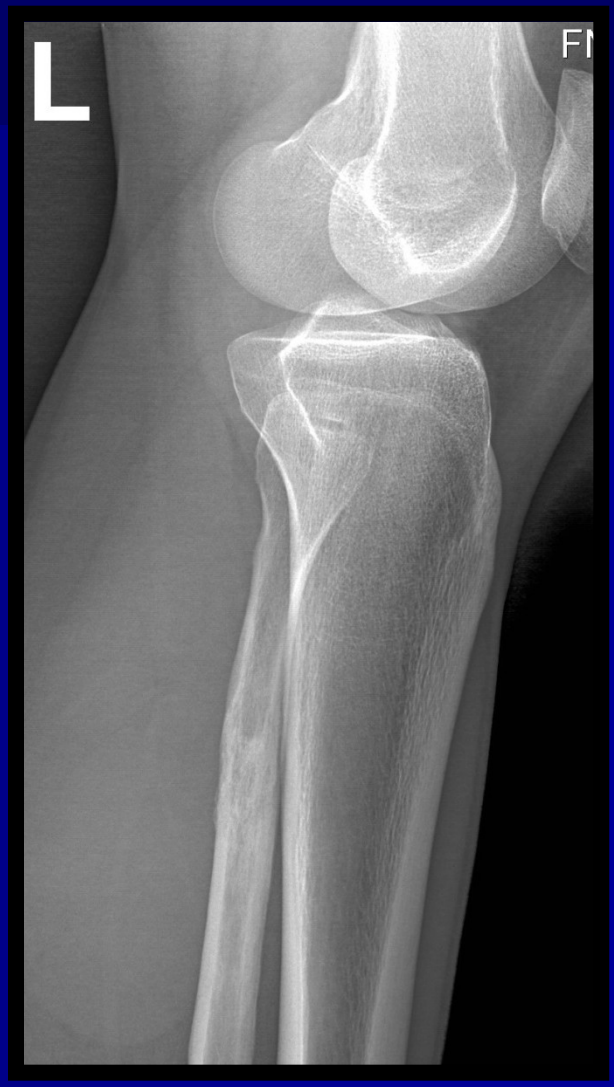




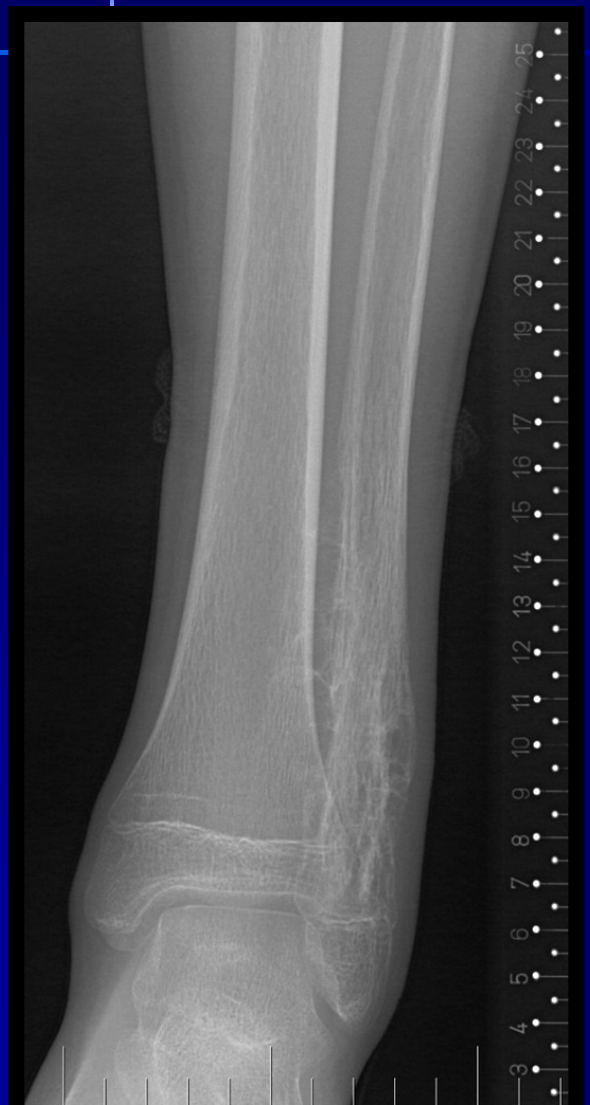


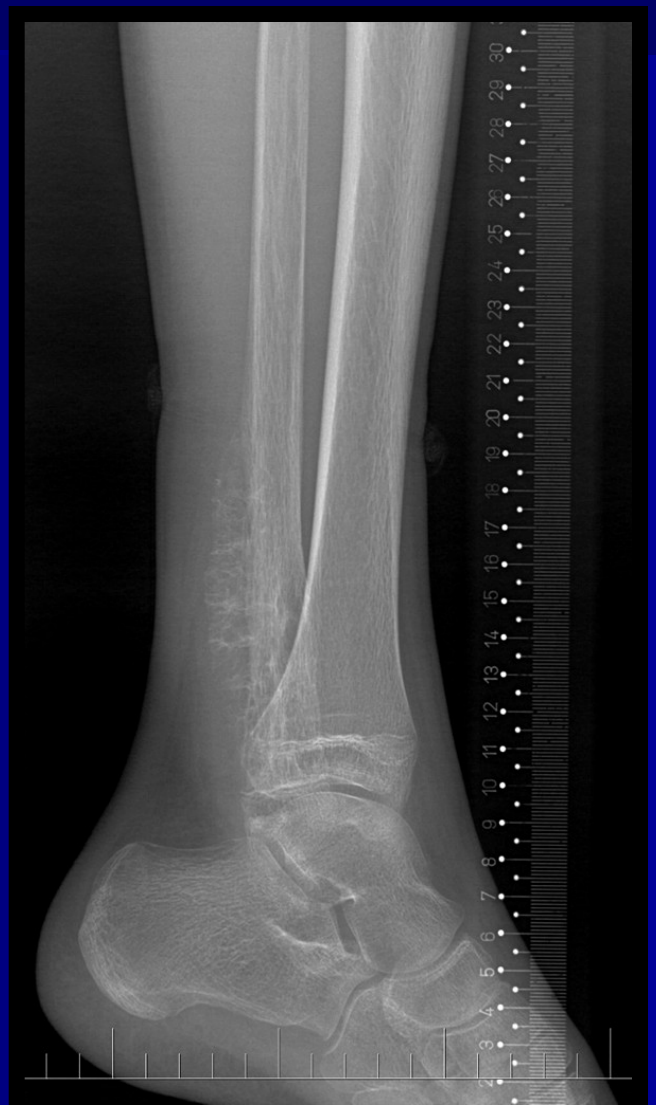
Ewing sarcoma



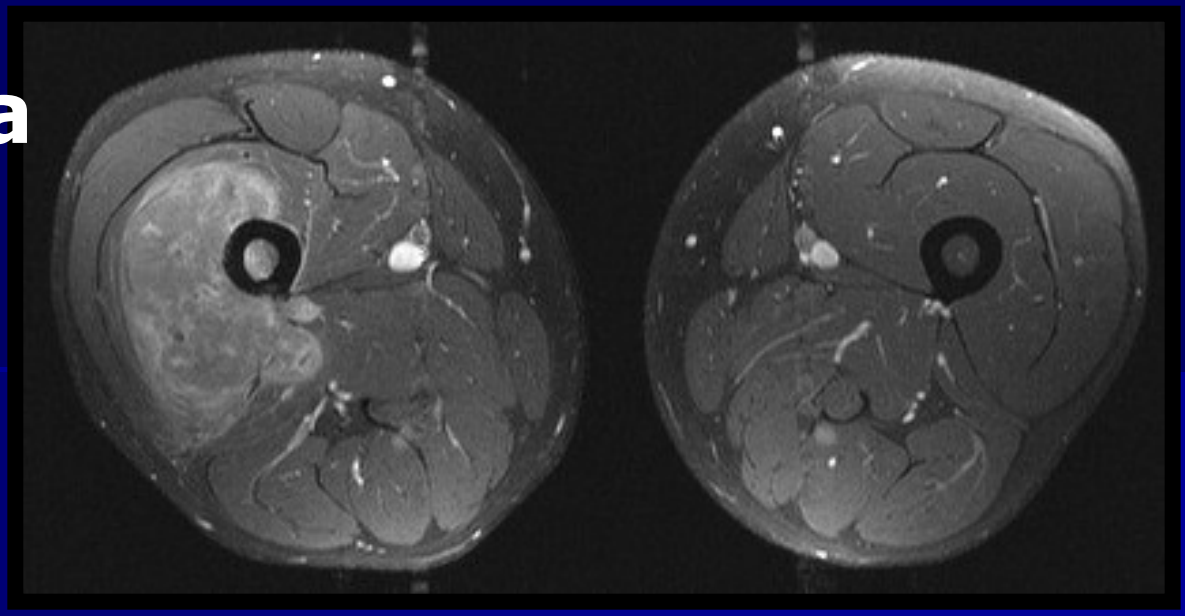


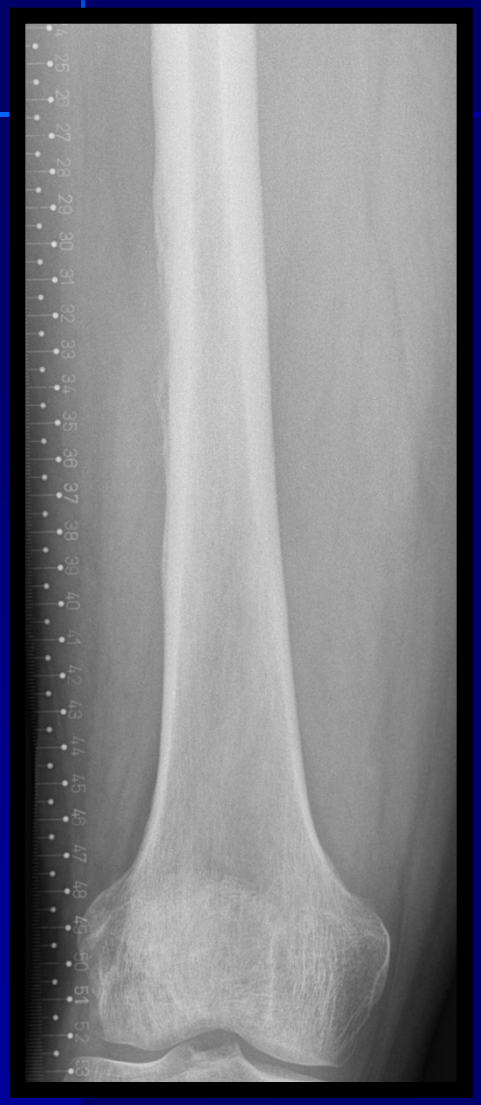
Ewing sarcoma

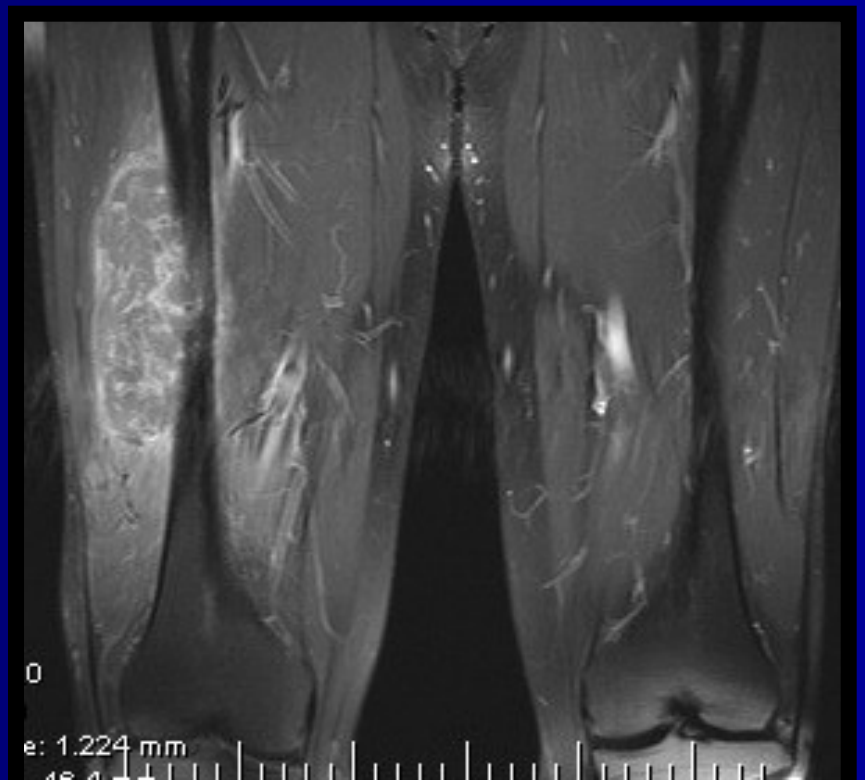




Ewing sarcoma







Therapy

- Chemo and radio sensitive tumor
- Neoadjuvant chemotherapy
- Local therapy:
  - Radiotherapy
  - Wide resection
  - Radiotherapy and wide resection
- Adjuvant chemotherapy
- In risk patients: transplantation of bone marow
- Metastasectomy in lungs

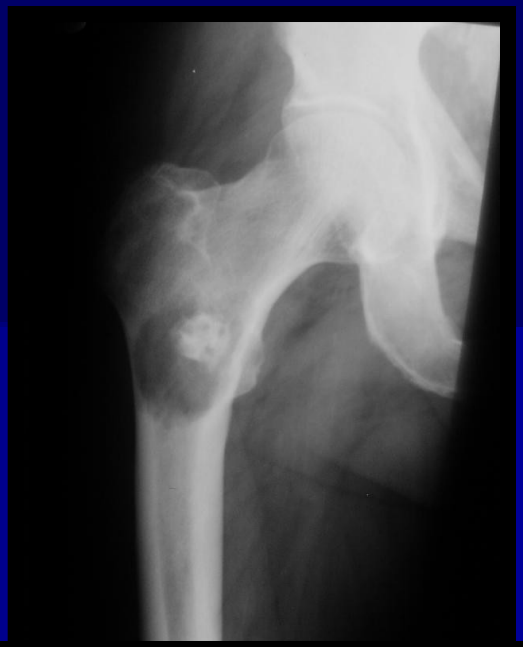
Prognosis

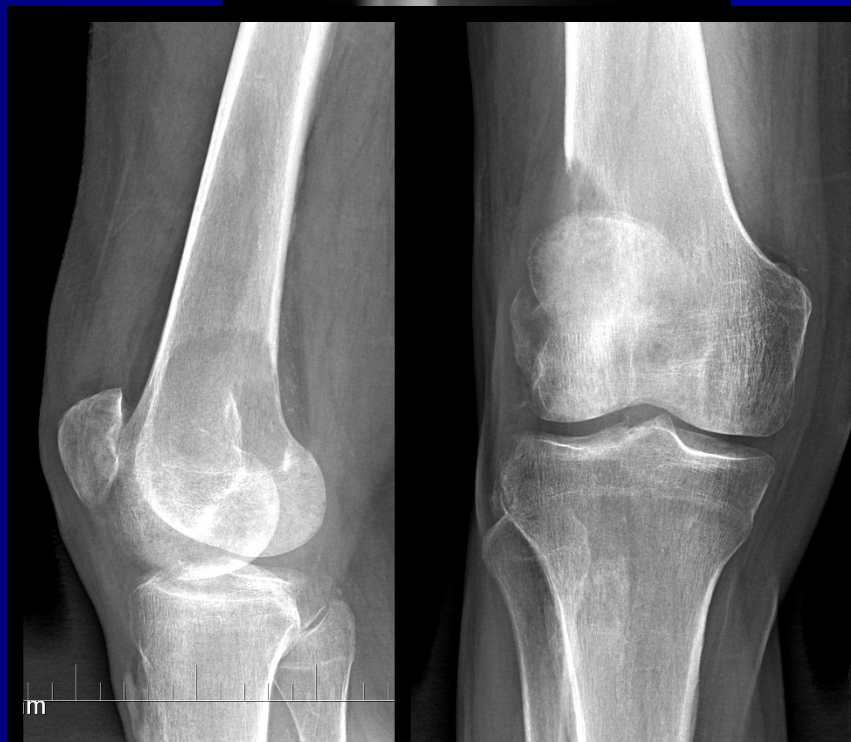
- Response to chemotherapy (systemic disease)
- **5-years survival in 60 % of patients**
- **Worse prognosis:**
  - **metastases**
  - **Size over** $100cm^3$
  - **Surgery not possible**
  - **Axial localisation**
  - **Local recurrence**
  - **Some genetic variants**

Malignant fibrous histiocytoma in bone

- **In 5. decade**
- **In long bones – femur, tibia**
- **X- ray osteolytic lesion + cortical erosions, soft tissue mass**

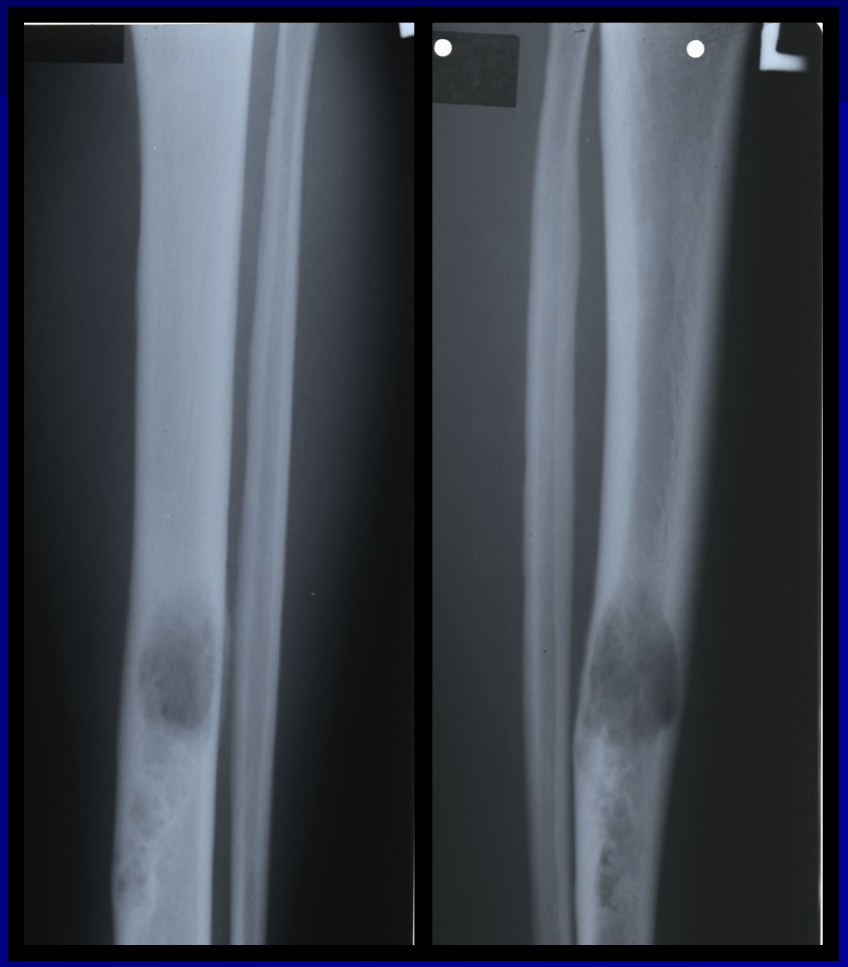
- **Therapy: neoadjuvant chemotherapy + wide resection or amputation + adjuvant chemotherapy**
- **It is a radioresistant tumor**
- **Survival 35 % 5 years**





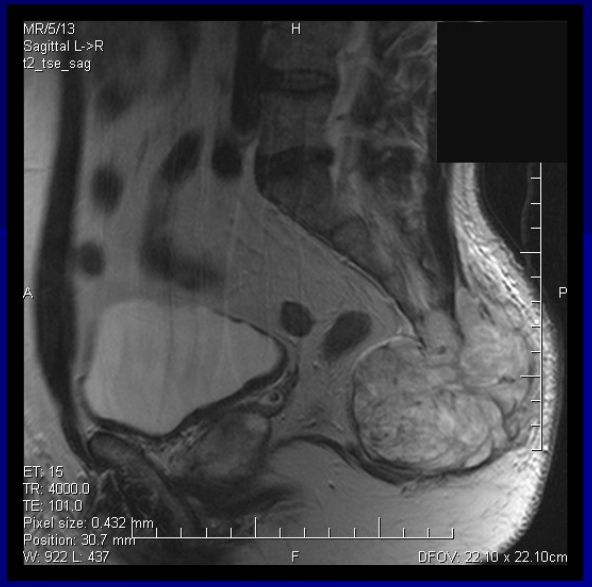
Adamantinoma

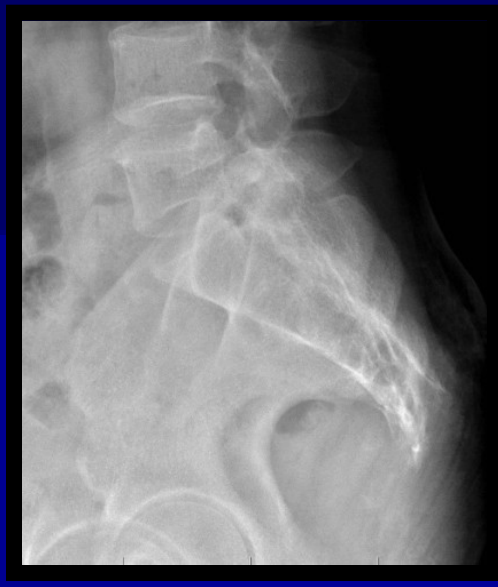
- Very rare
- 90 % in tibia
- Therapy: radical resection
- Radioresistant tumor
- Prognosis – unclear

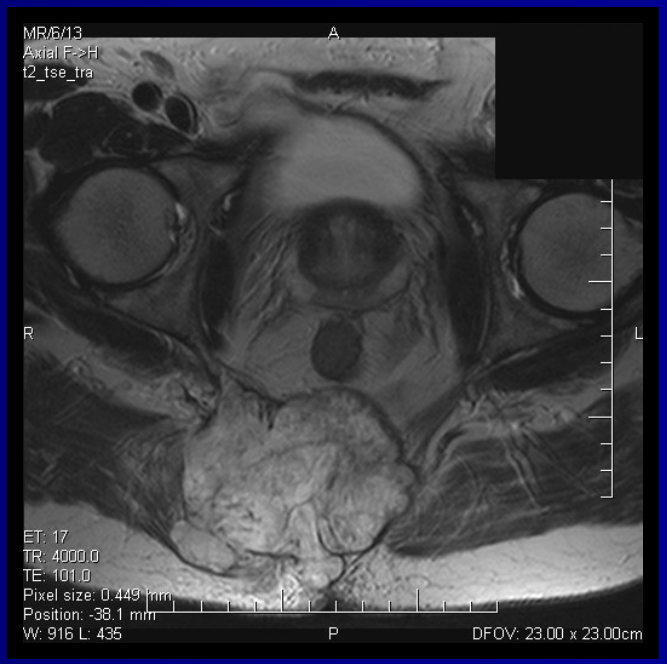


Chordoma

- Axial localisation
- Osteolytic lesion
- Th- radical surgery or radiotherapy
- Prognosis- bad







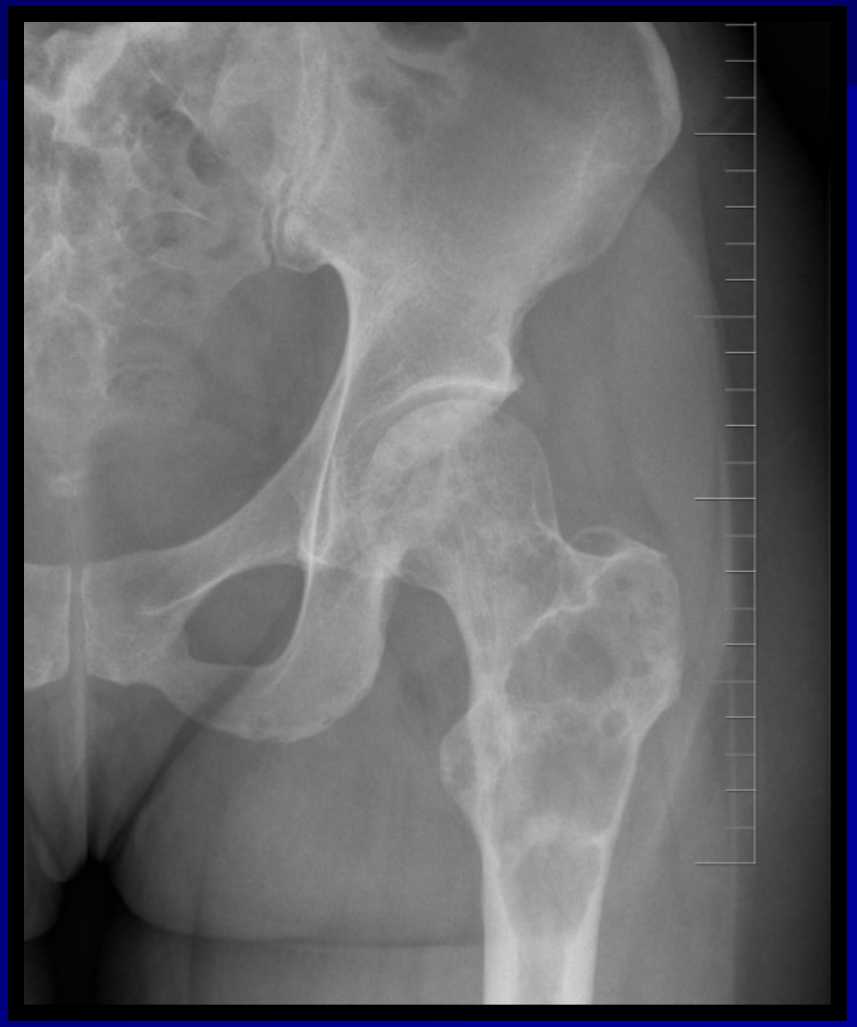
Malignant vascular tumors

- **Hemangioendothelioma**
- **Hemangiopericytoma**

- **Angiosarcoma**

- Osteolytic lesions
- Therapy: wide resection or amputation
- Chemotherapy in high grade

- Radiotherapy in non oper. cases



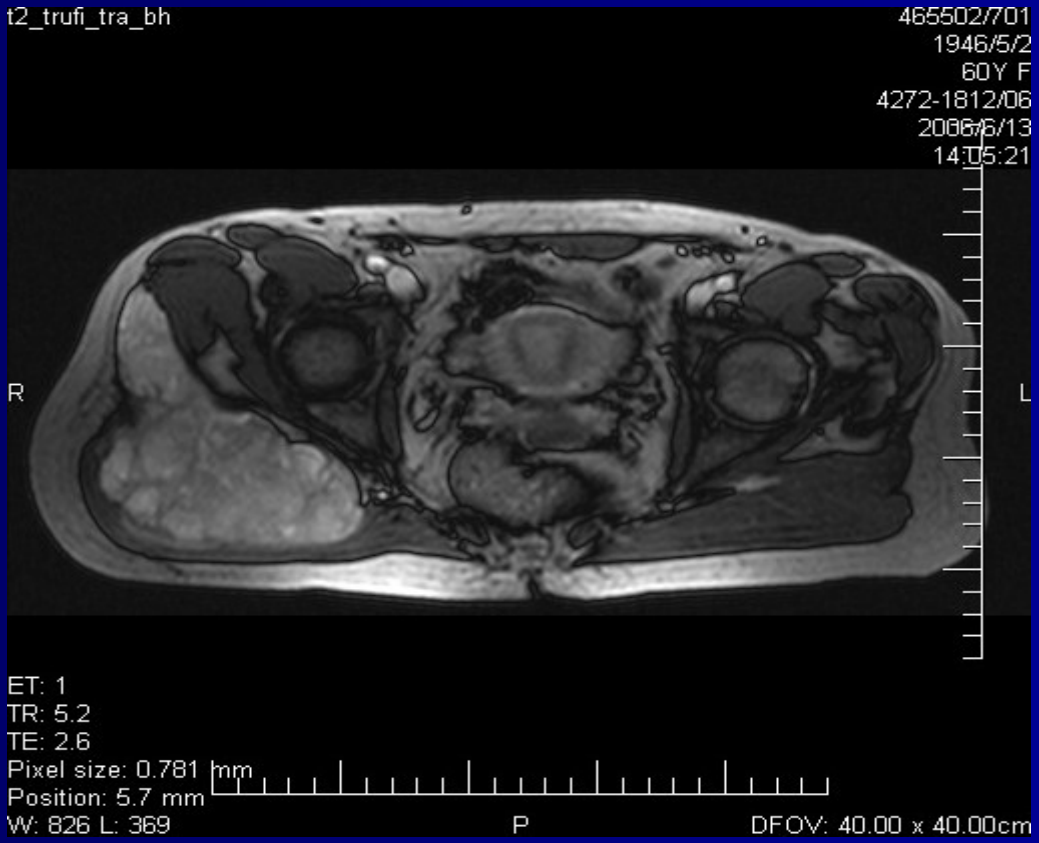
Primary malignant soft tissue tumors - sarcomas

- MFH
- Synovialo-Sa
- Lipo-Sa
- Leiomyo-sa
- Fibro-sa
- Malignant schwannoma

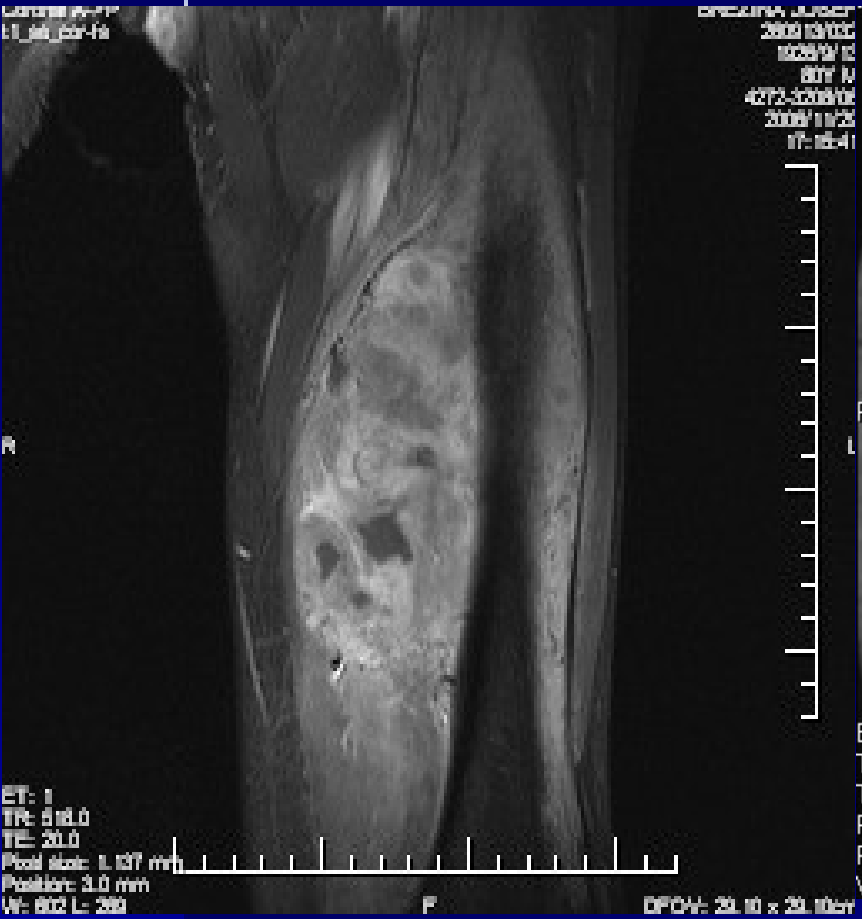
Primary soft tissue sarcomas

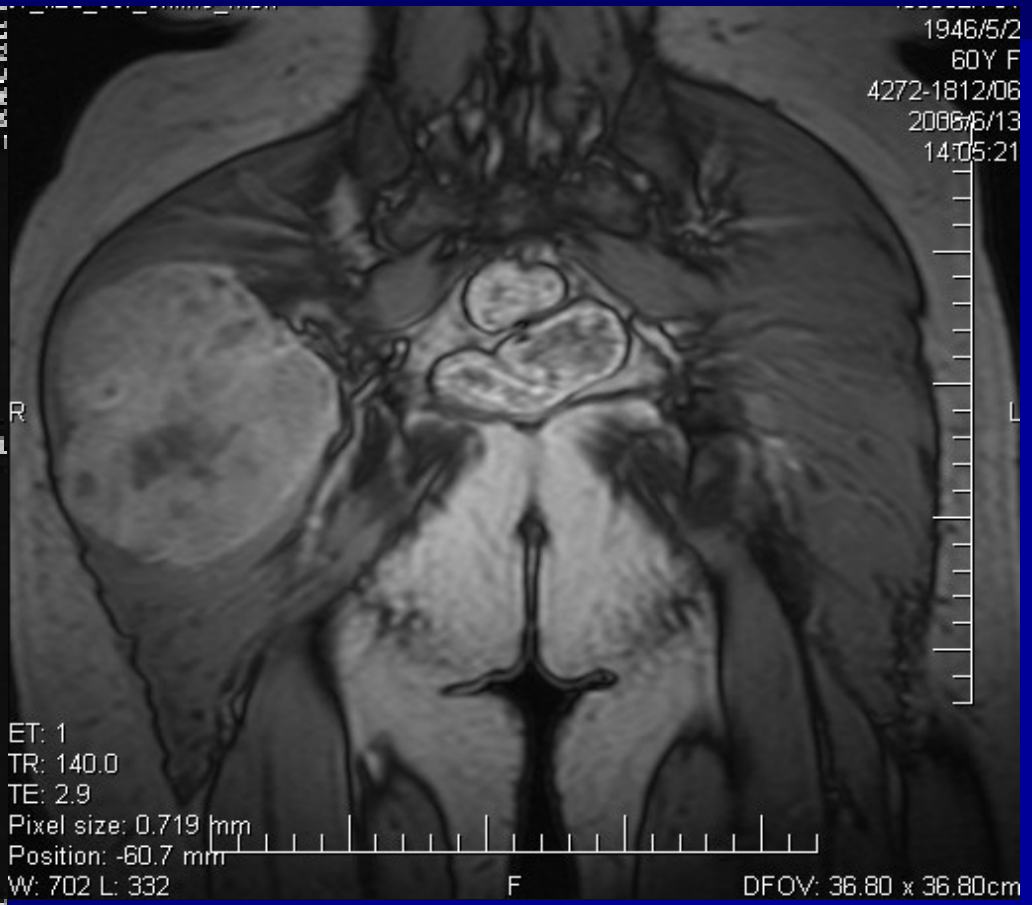
- Chondrosarcoma of soft tissue
- Lymphoma
- Malignant mesenchymal sarcoma

Malignant fibrous histiocytoma MFH



MFH

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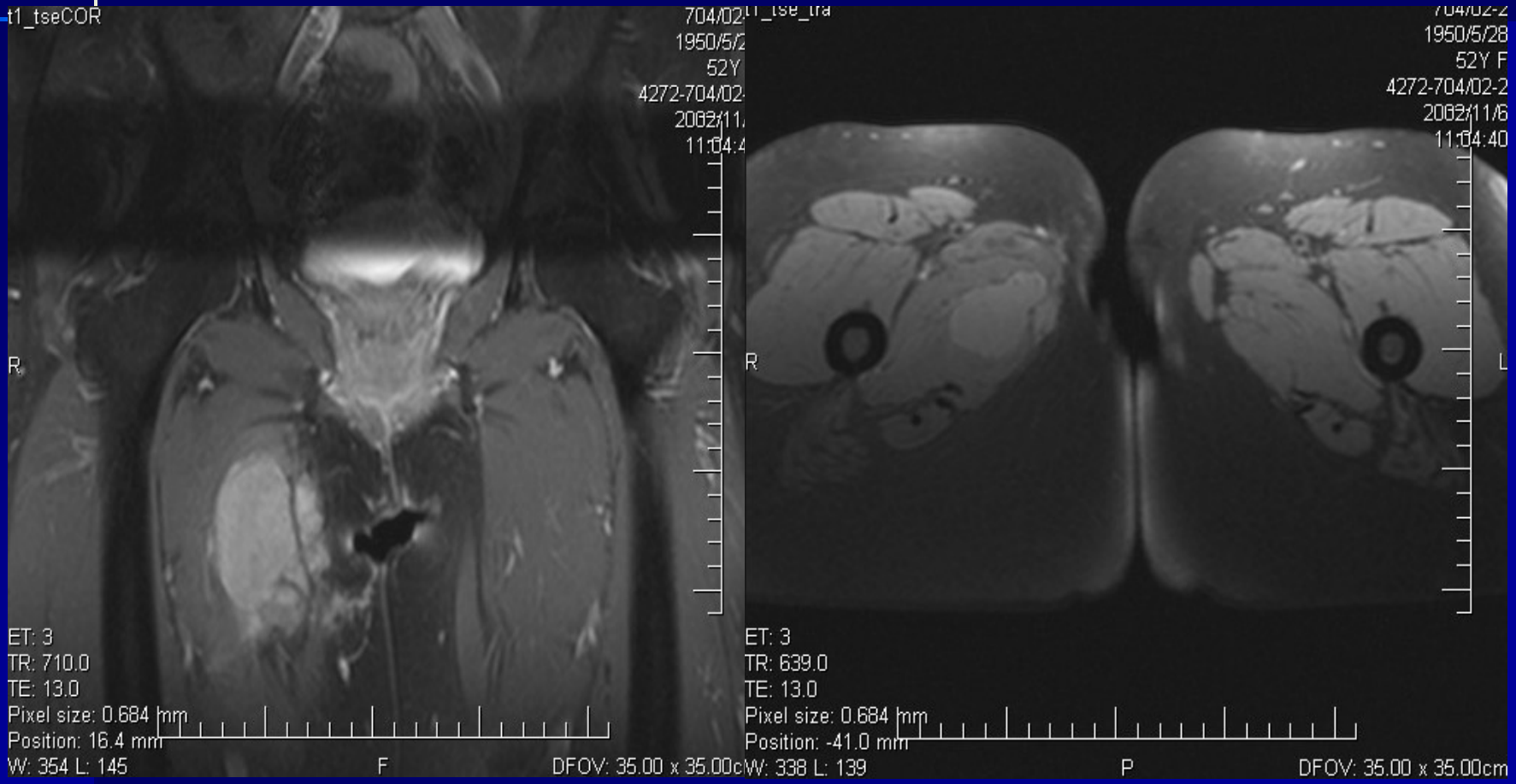
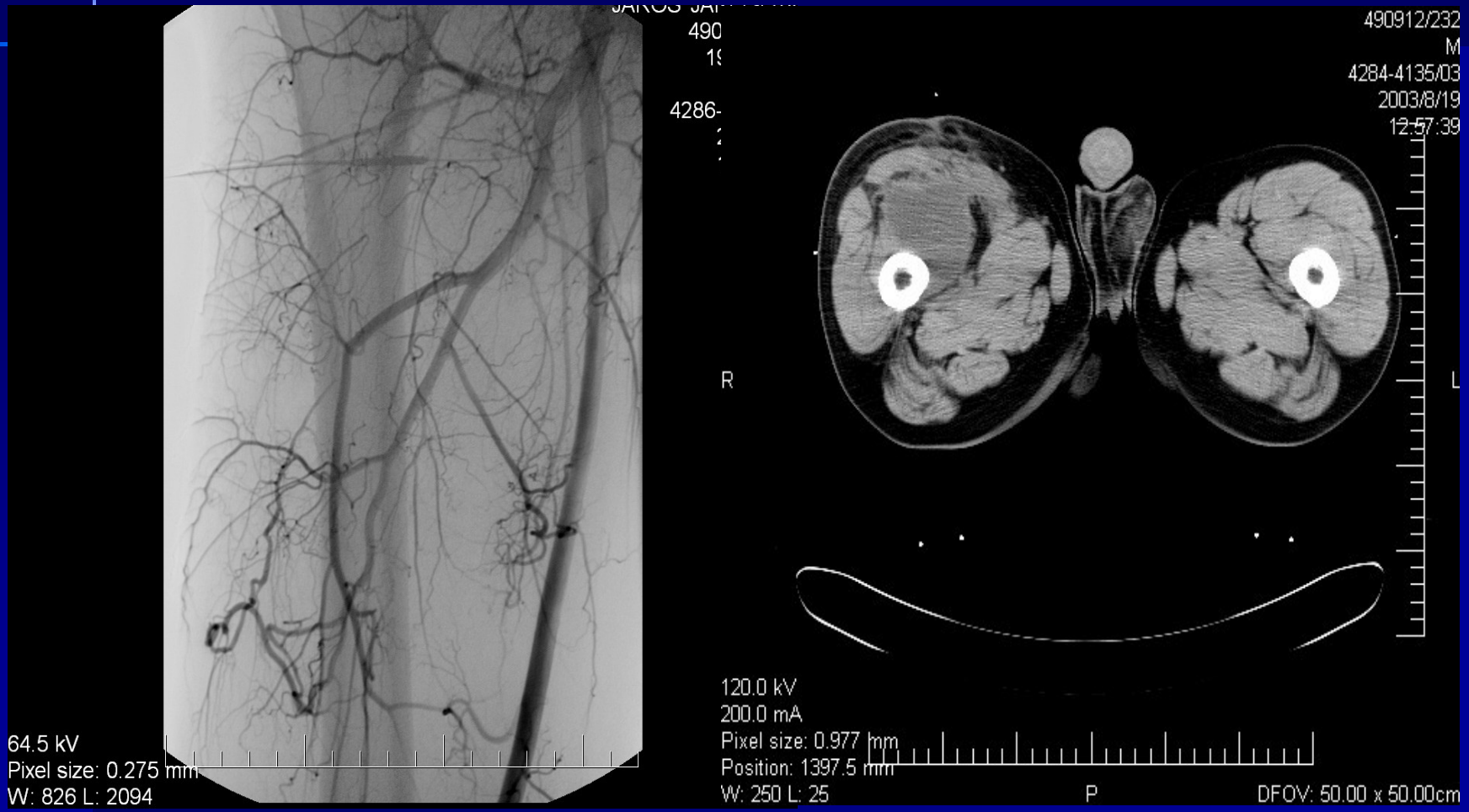
Therapy

- Neoadjuvant chemotherapy in G III
- Radical resection
- Adjuvant chemotherapy
- Radiotherapy in inoperable tumors

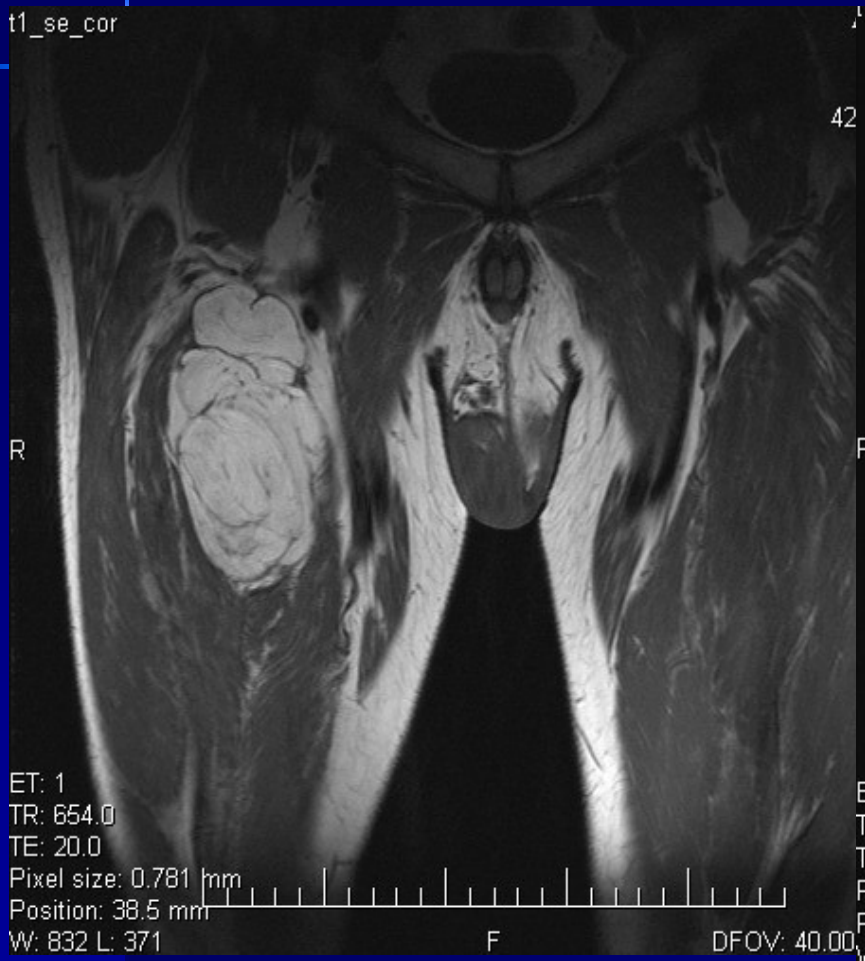
Synovialo-Sa

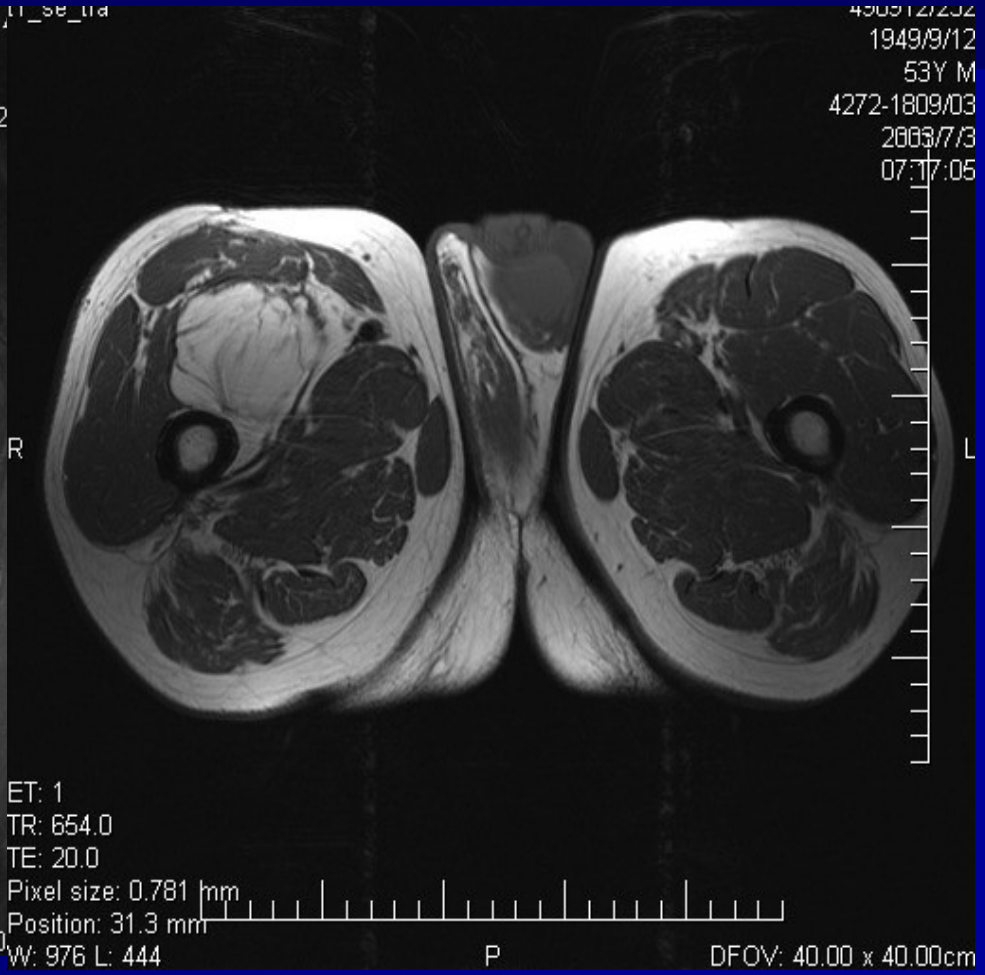


Liposarcoma

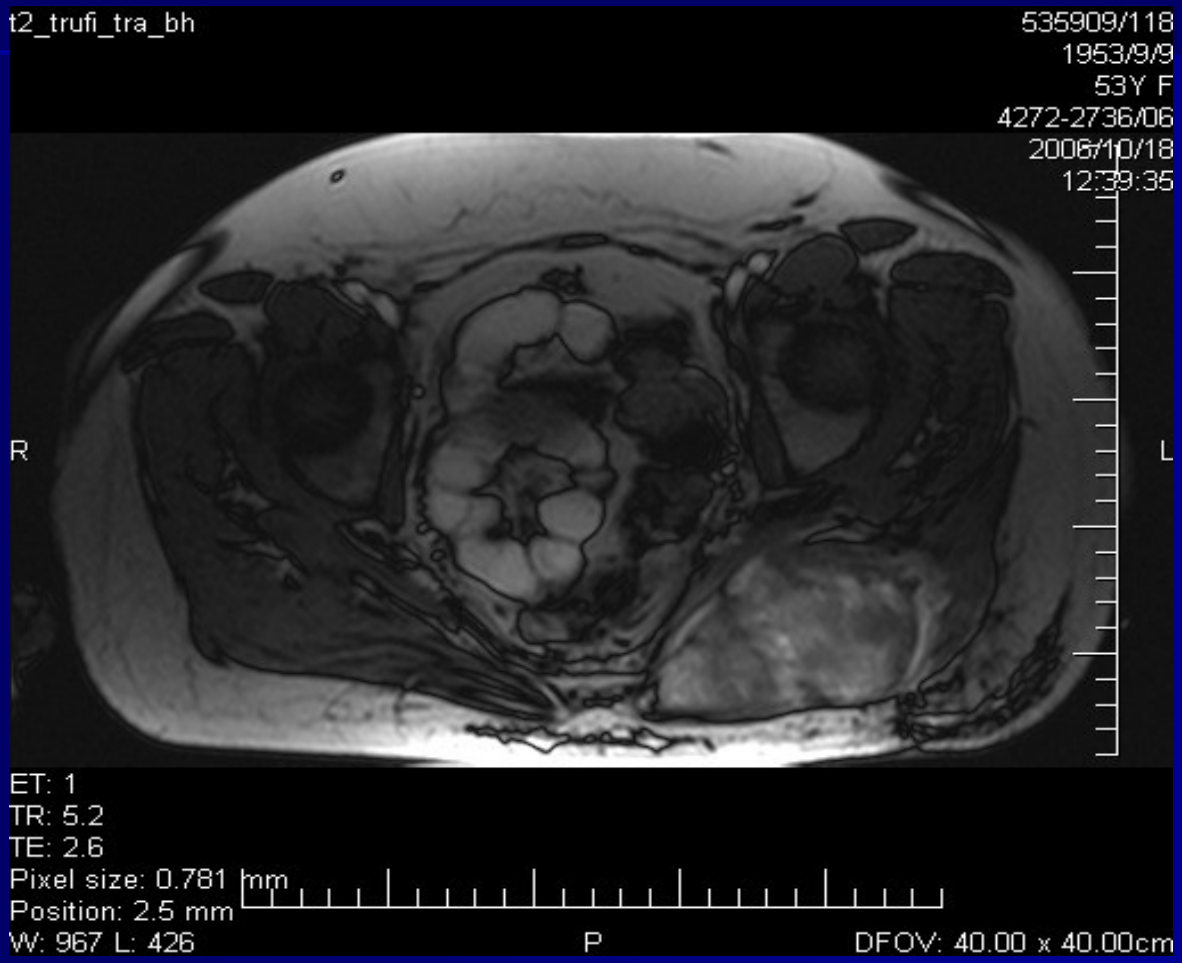


Liposarcoma





Leiomyo-Sa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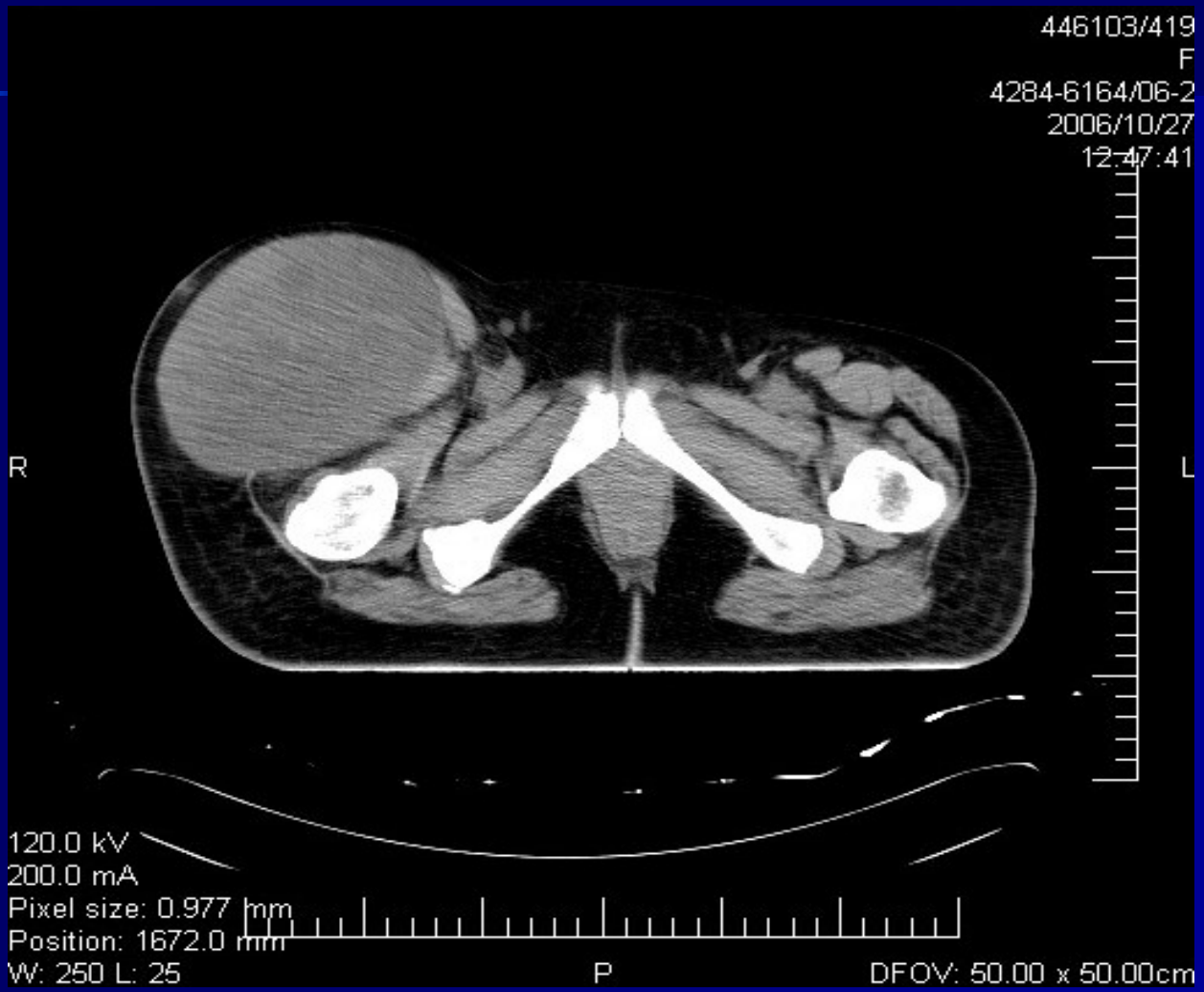
Fibro-Sa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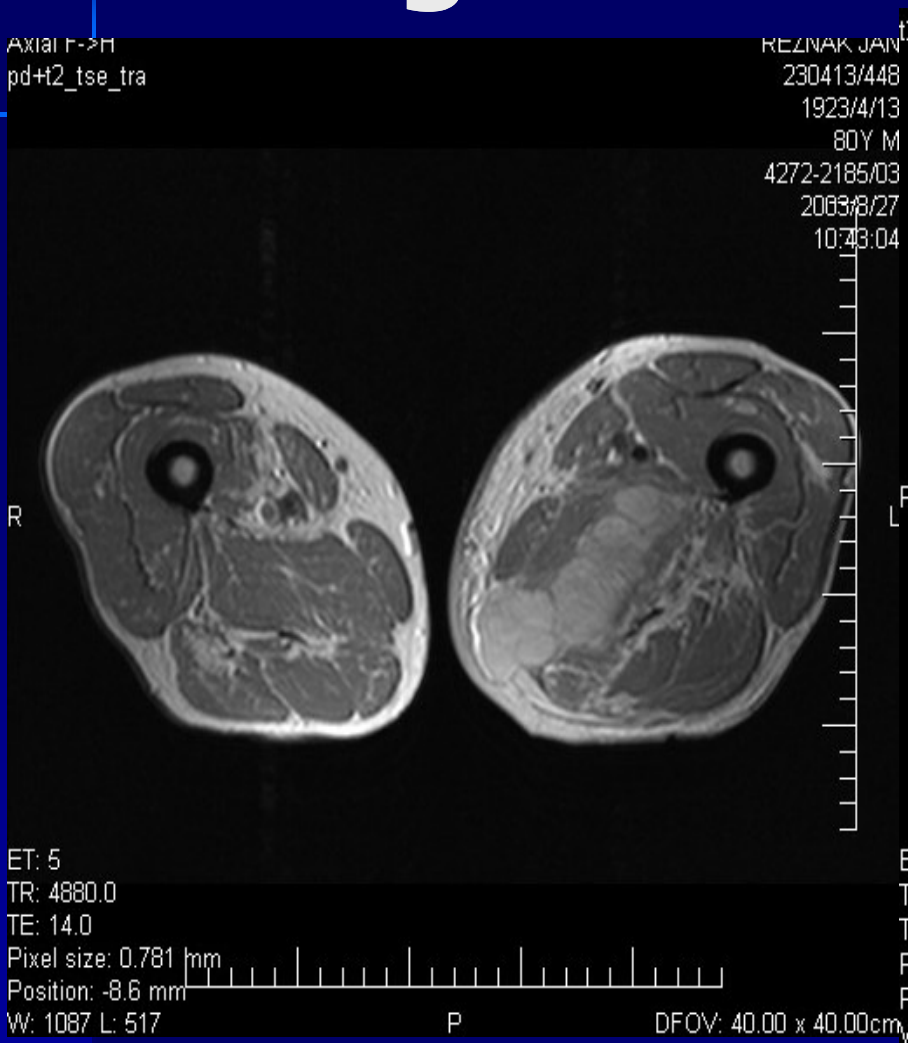
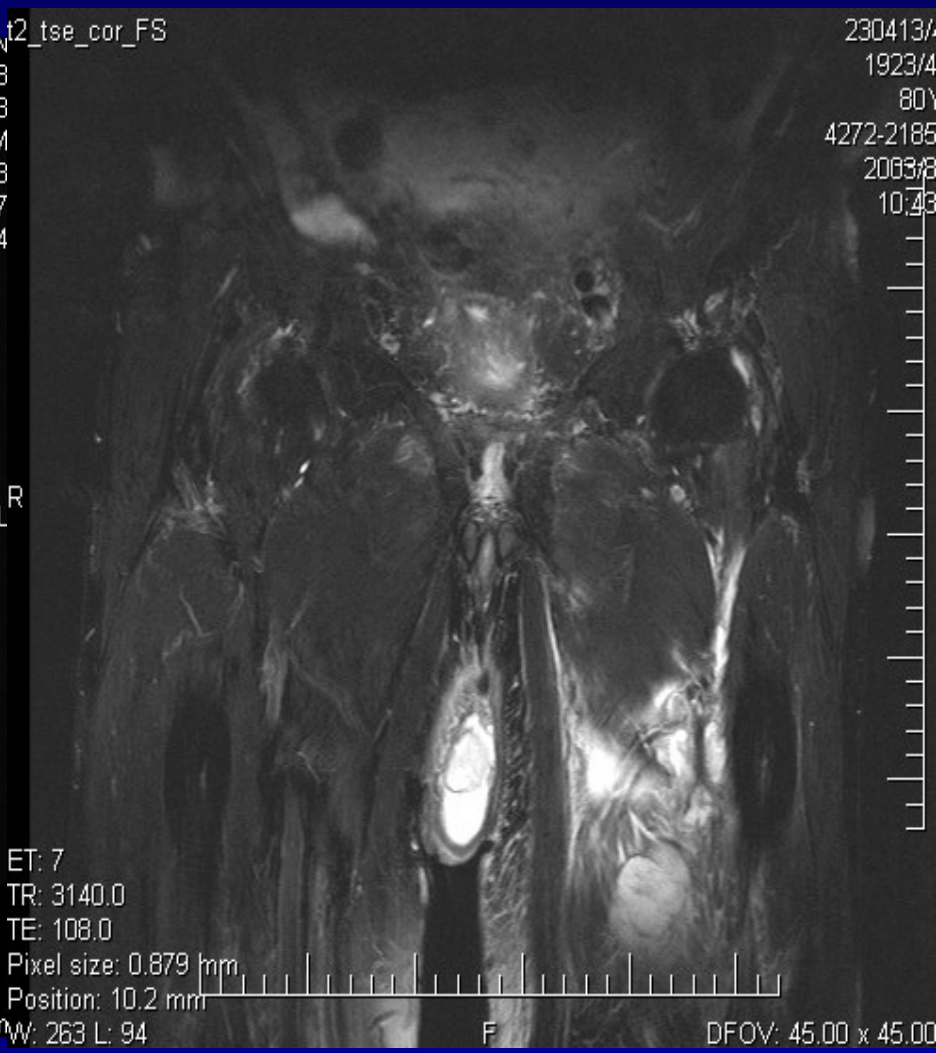
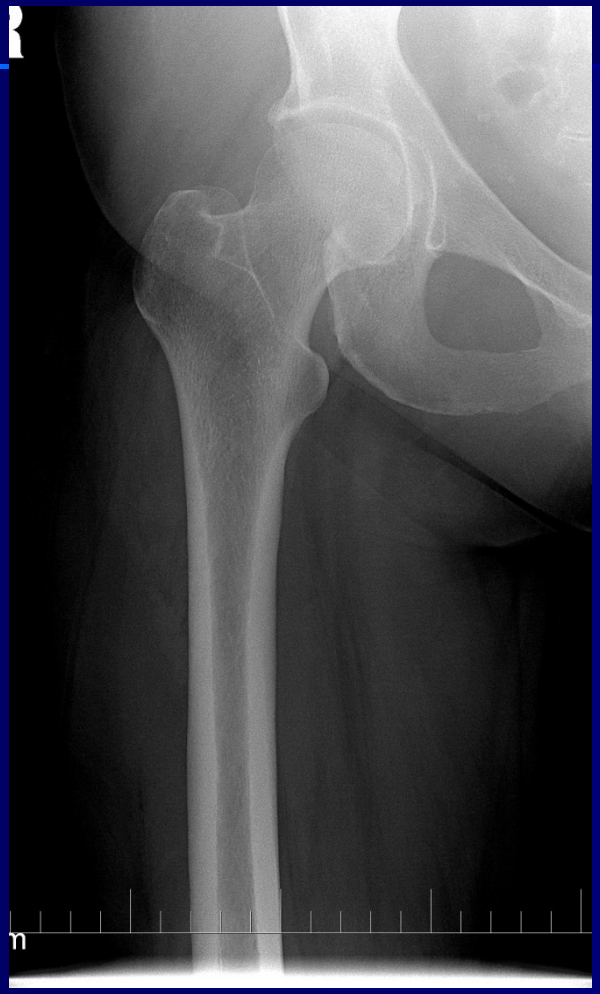
DFOV: 50.00 x 50.00cm

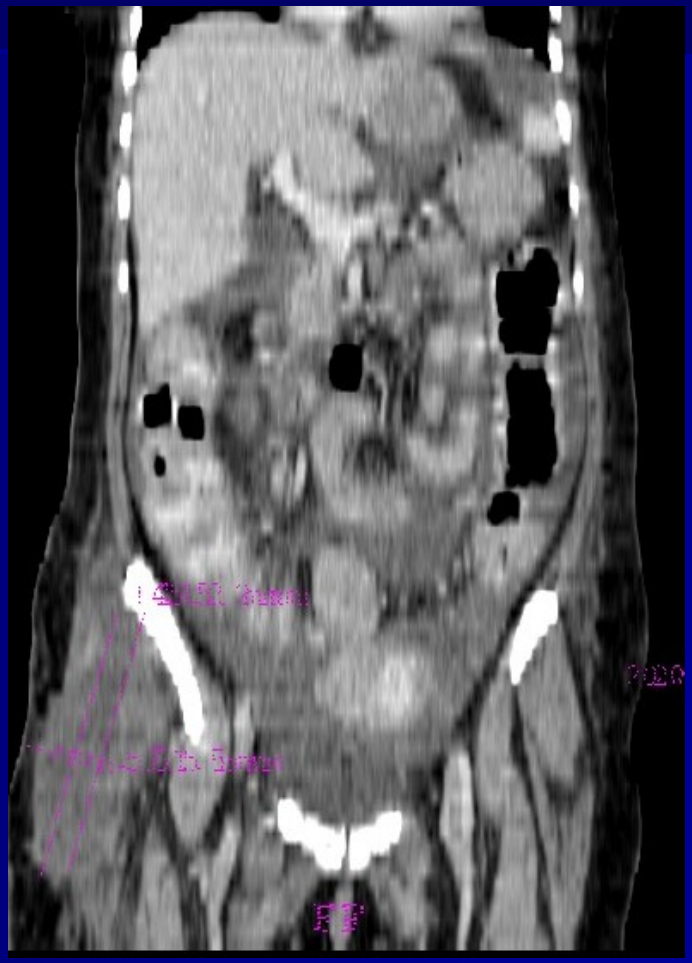
Malignant schwanoma



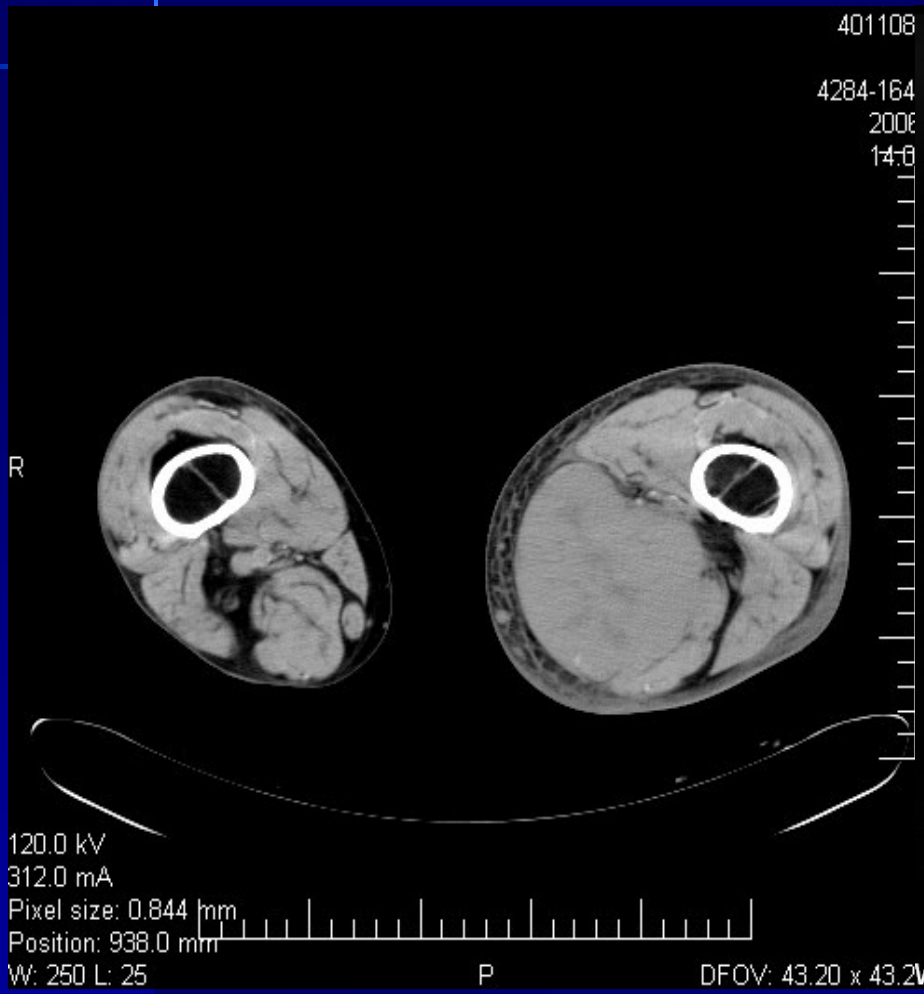


Extraskeletal chondrosarcoma





Lymphoma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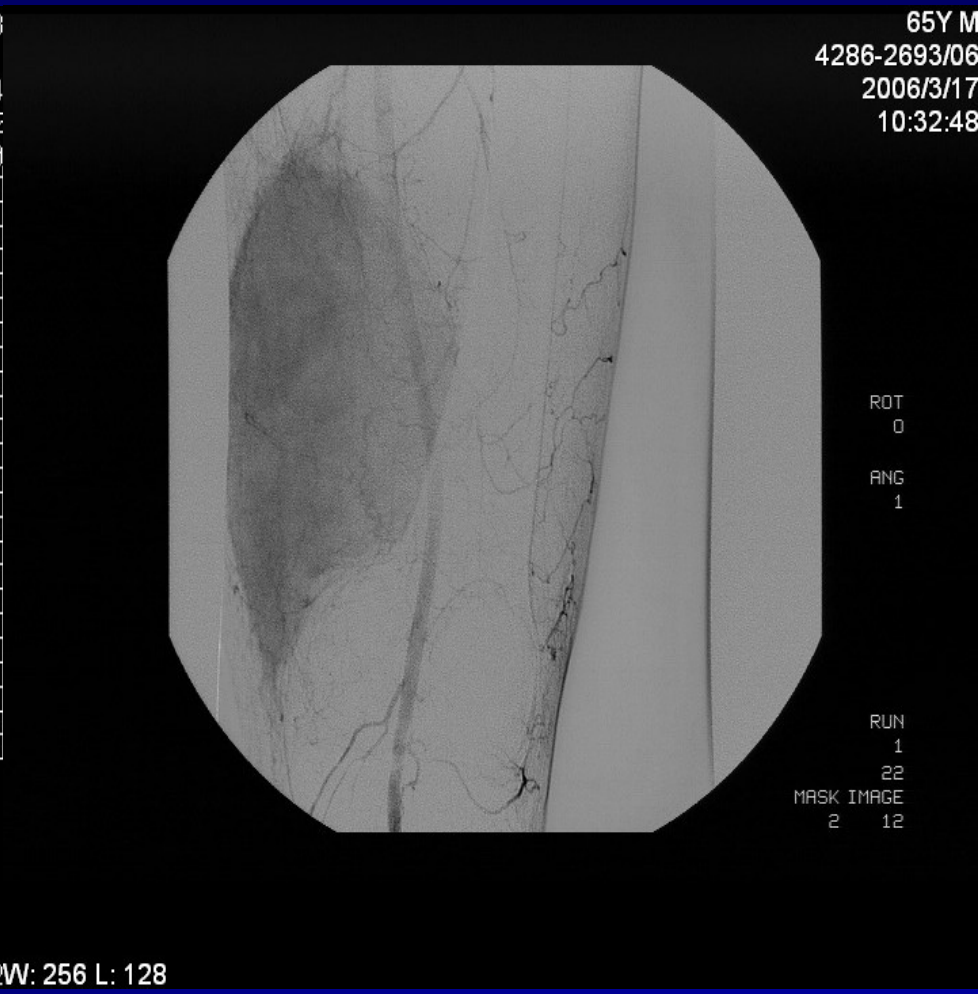
P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4286-2693/06
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10:32:48
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MASK IMAGE
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DFOV: 43.20 x 43.2W: 256 L: 128

Hemoblastosis in skeleton

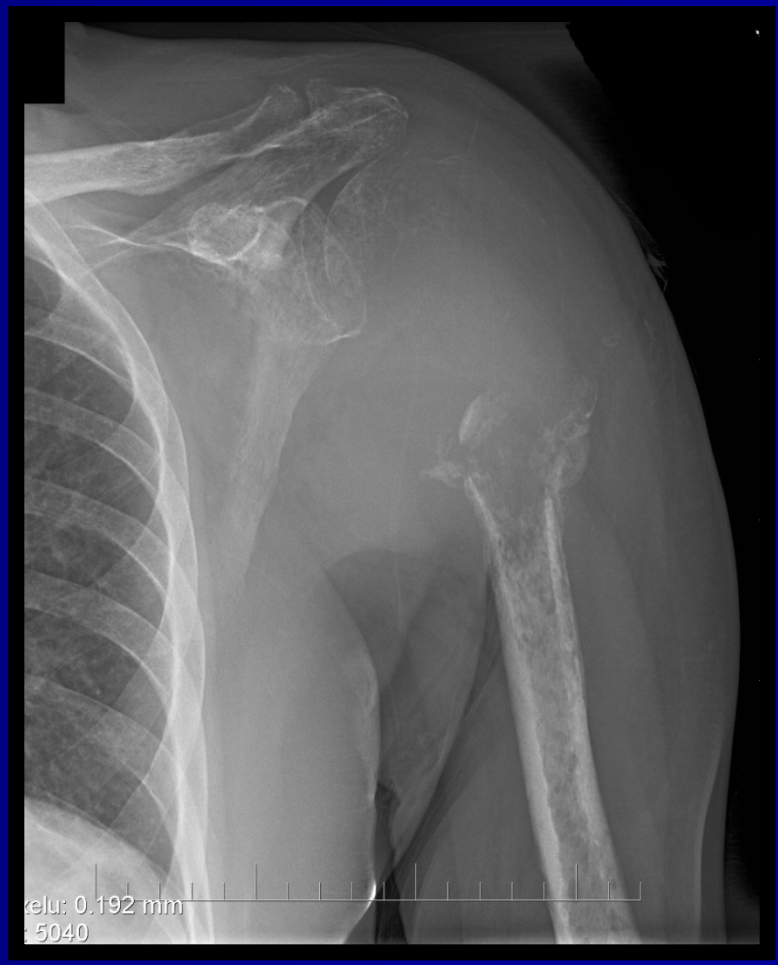
- Primary bone tumors
  - Multiple myeloma (plasmocytoma)
  - Solitary plasmocytom (myelom)
  - Primary bone lymfoma

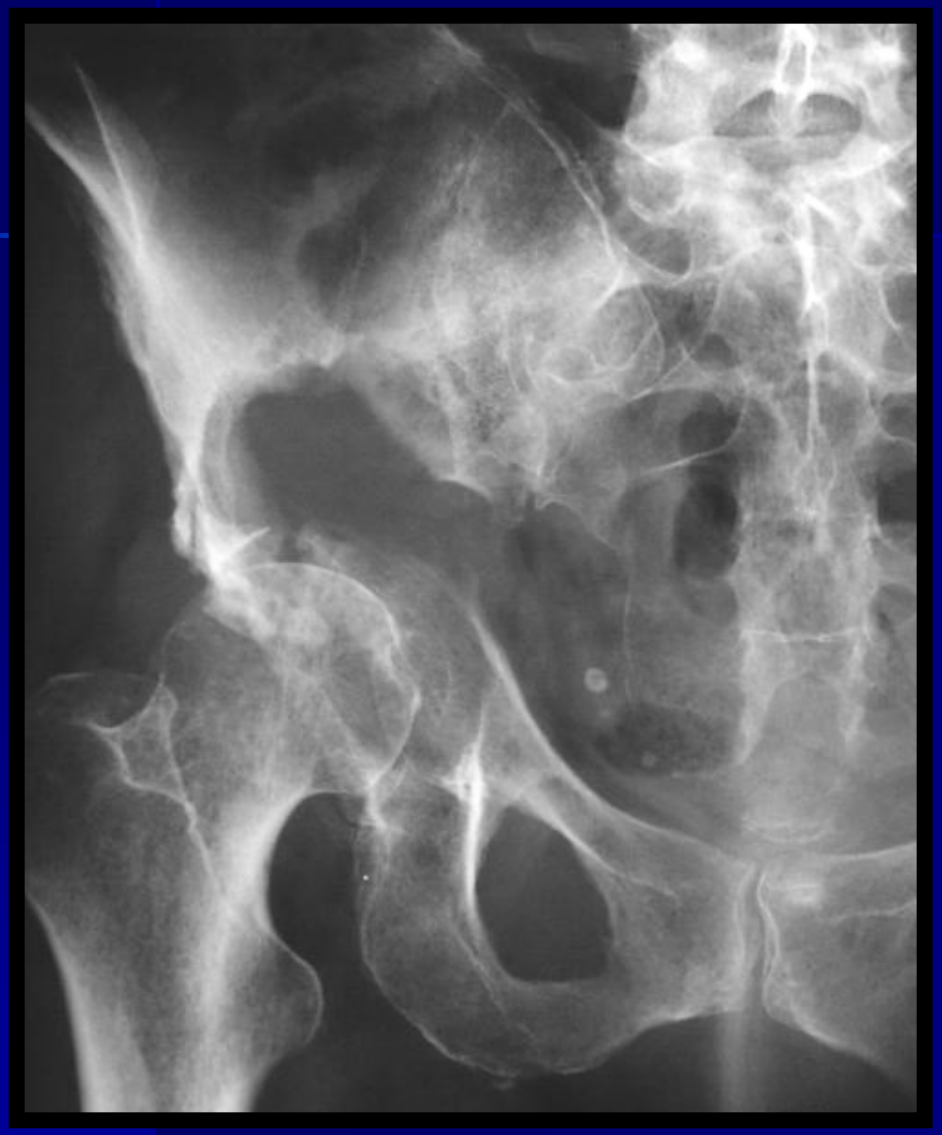
- Secondary lesions
  - Hodgkin lymfoma
  - Non-Hodgkin lymfoma
  - Leukemia

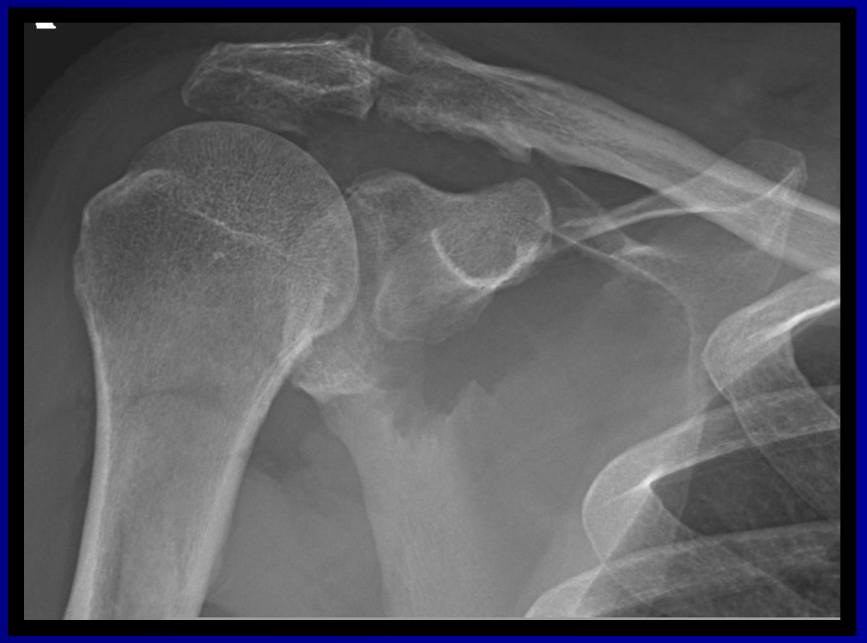
Therapy- chemotherapy and radiotherapy in hematooncology

Multiple myeloma

- Most frequent bone tumor
- **5 – 6. decade**
- **Symptoms:**
  - **pain**
  - **Pathological fracture**
  - **weaknes**
  - **letargy**
  - **infections**
  - **Renal failure**
  - **Headache**



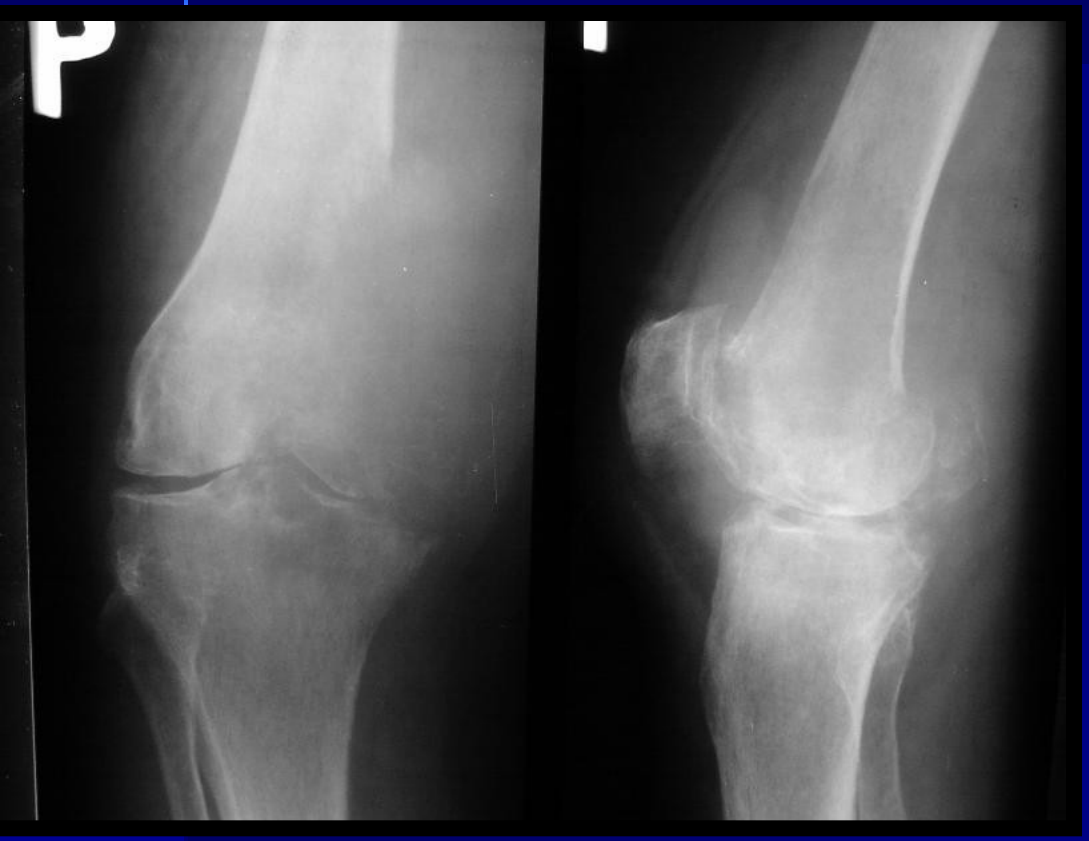


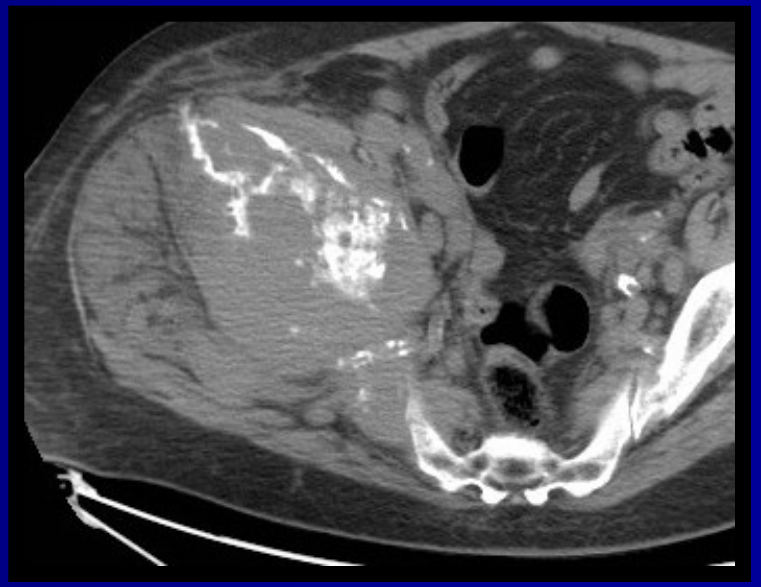


Solitary plasmocytoma

- Rare
- Osteolytic lesion
- Resection with replacement + chemotherapy
- Prognosis- better than in multiple myeloma

Primary bone lymphoma





Skeletal metastases

Carcinoma with MTS into the skeleton

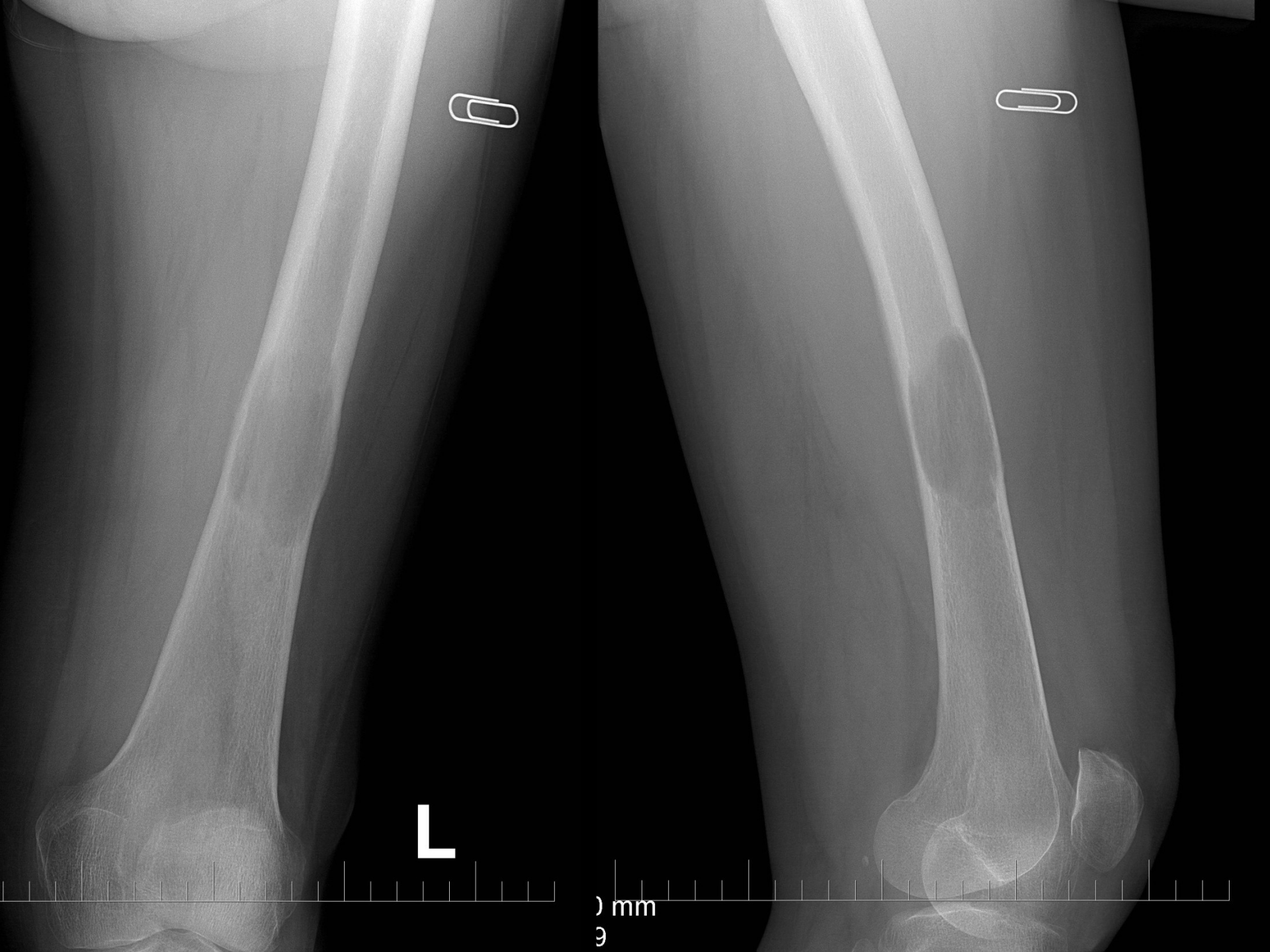
- Breast
- Prostate
- Lung
- Kidney
- Thyreoidal gland

Localisation

- Axial skeleton, pelvis, ribs, proximal femur and humerus

X-ray

- Osteolysis, osteosclerosis, periostal reaction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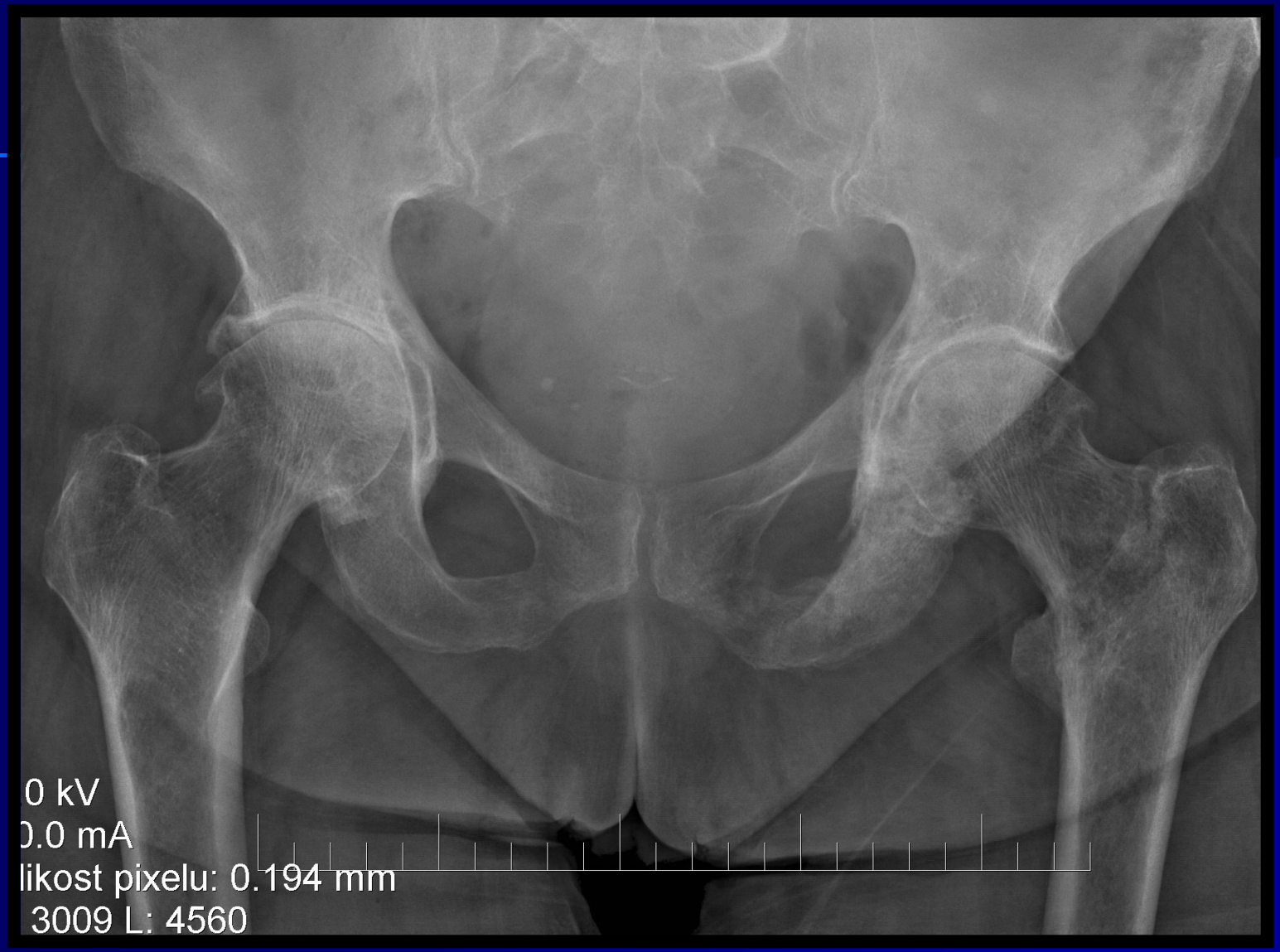
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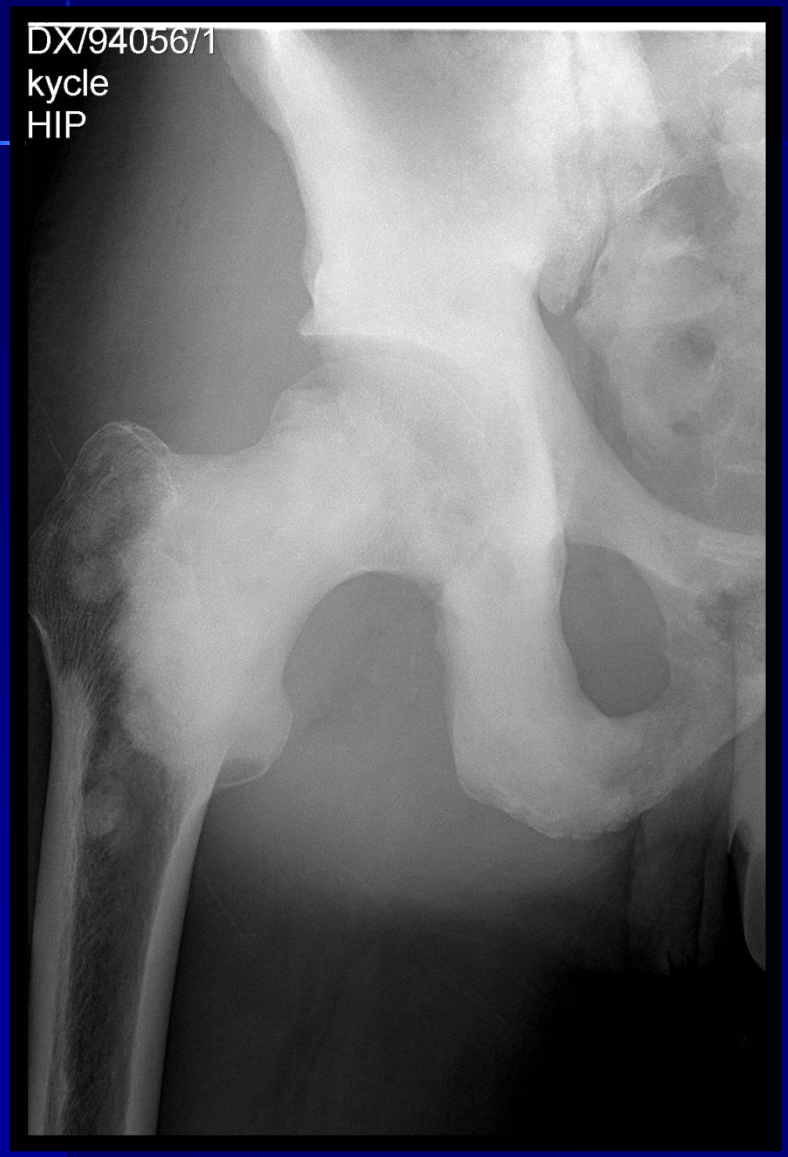
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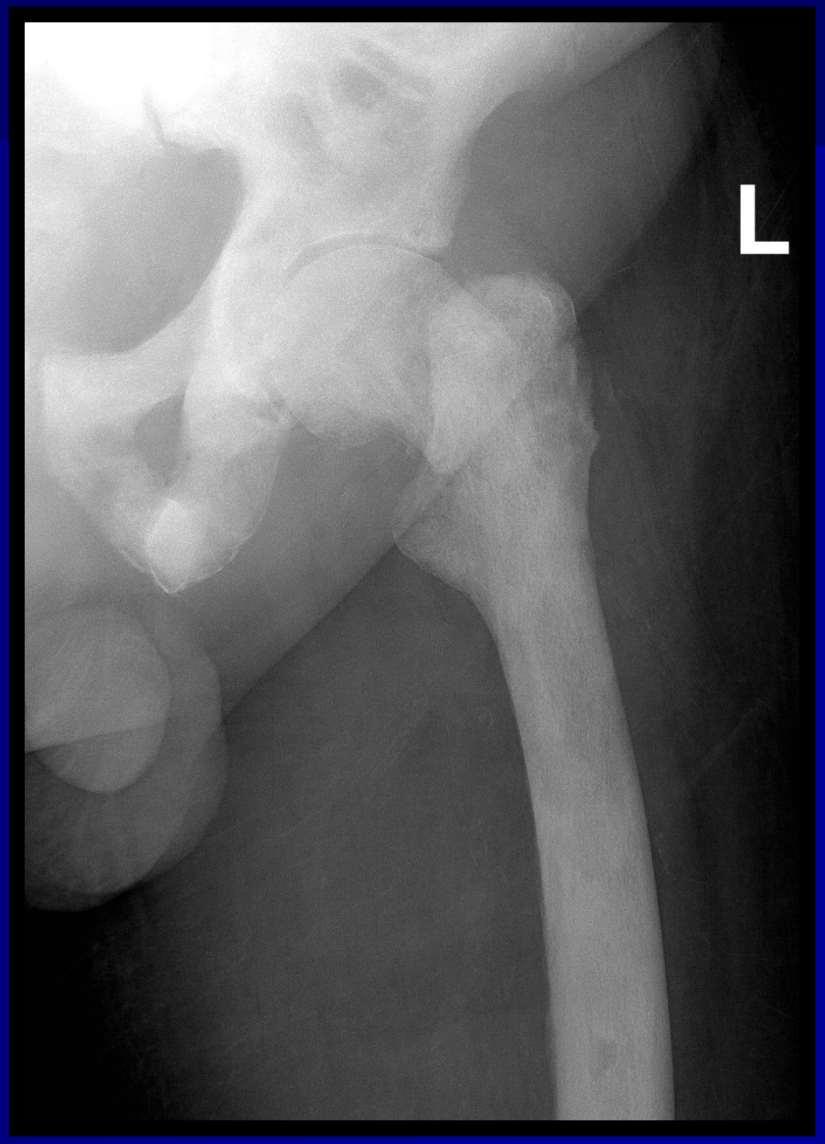
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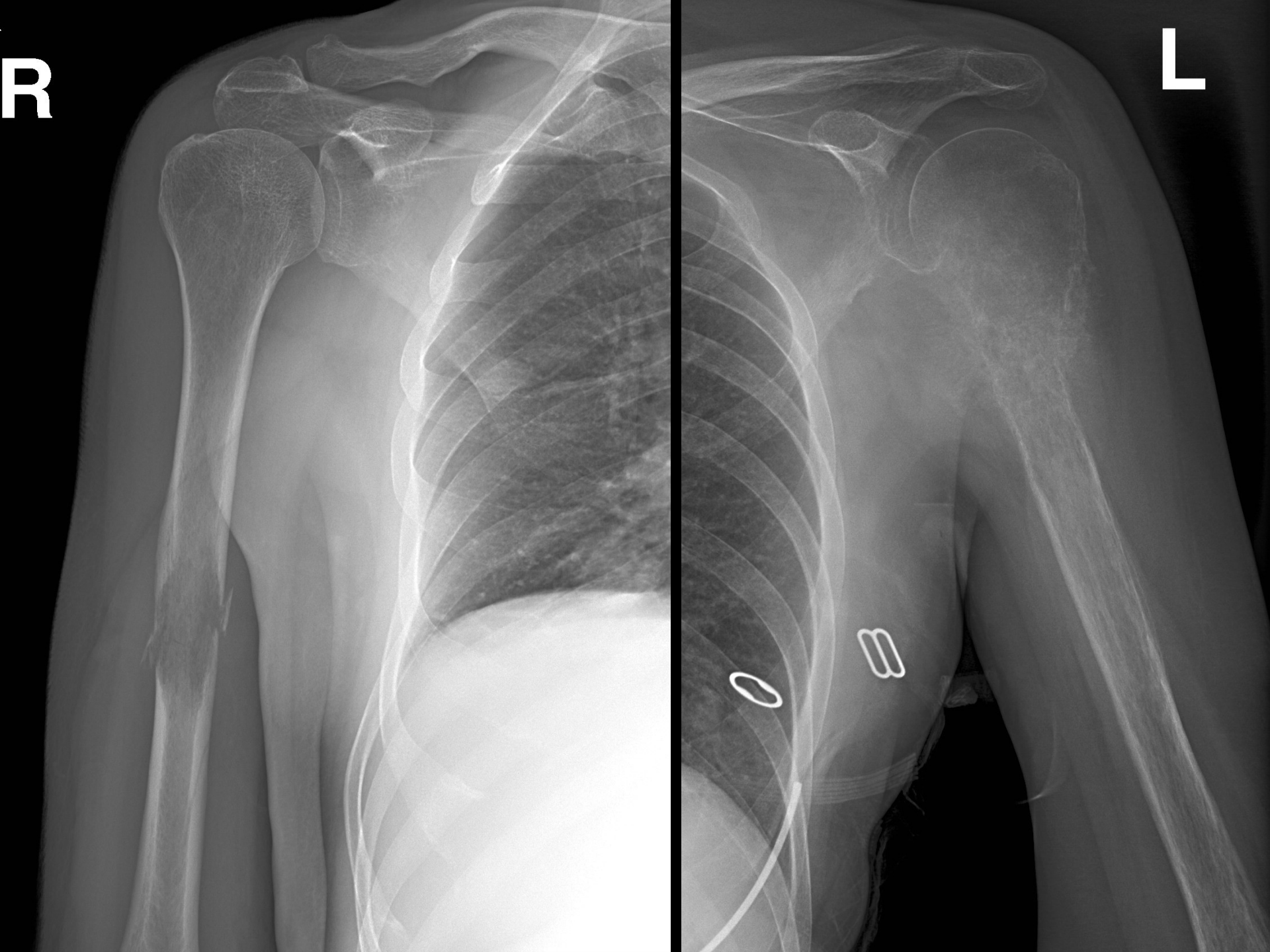
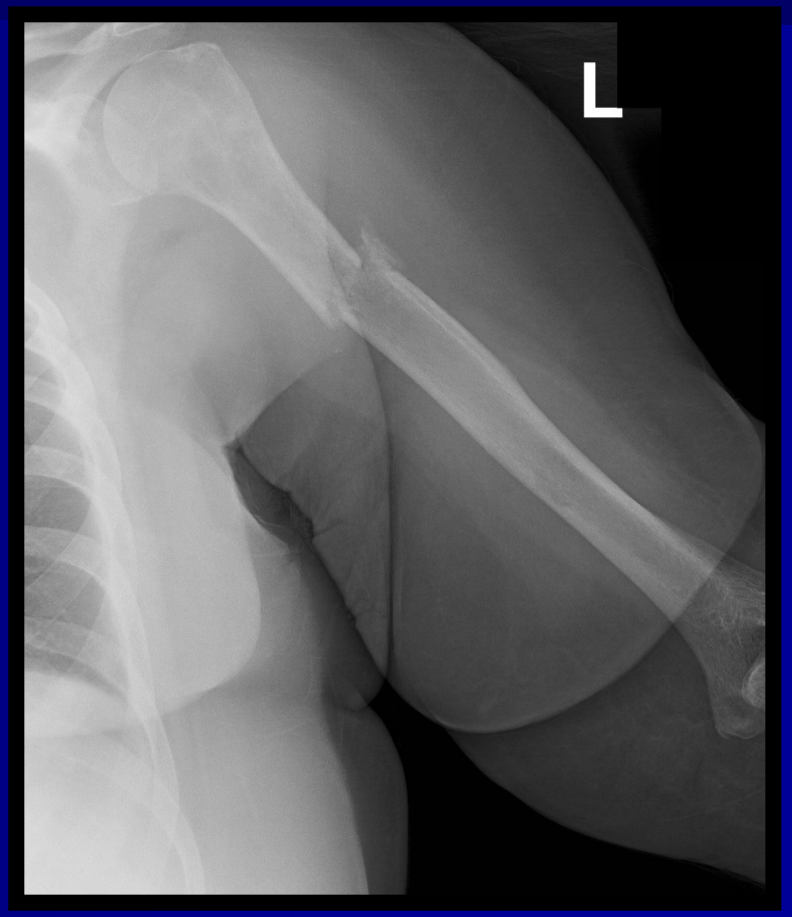

R
L

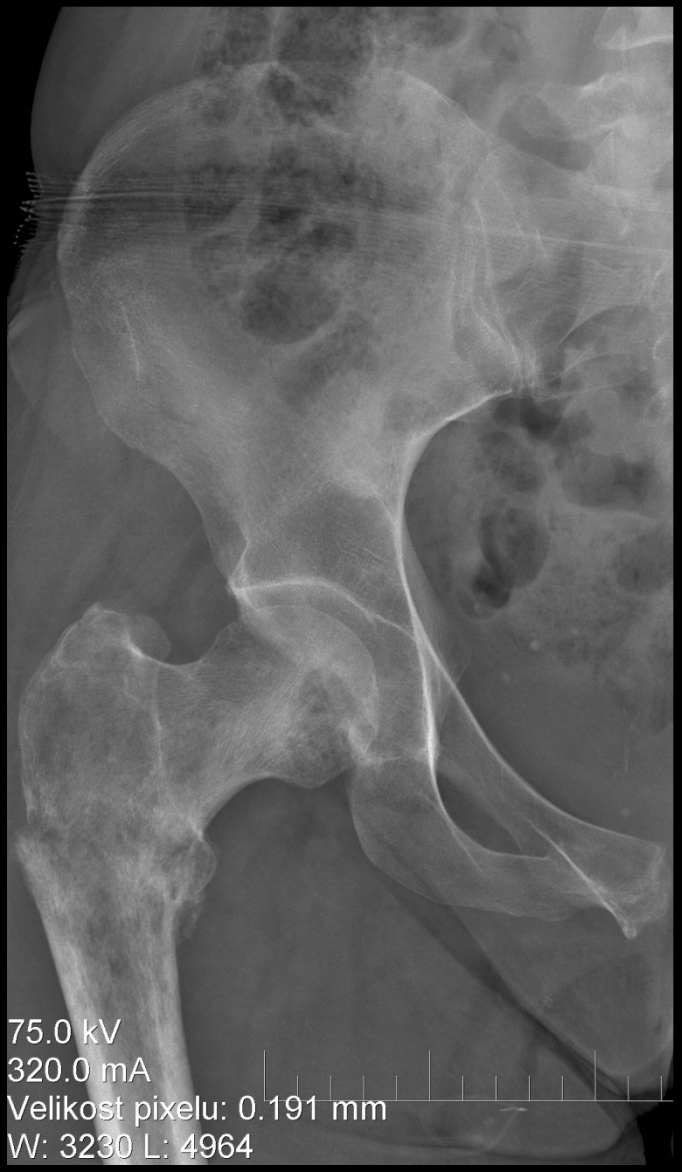
Diagnostics

- History
- Radiological findings
- Scintigraphy
- Oncoscreening
- Biopsy

Complications

- Pathological fracture
- Hypercalcemia
- Spinal cord lesion
- Anemia

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Velikost pixelu: 0.191 mm
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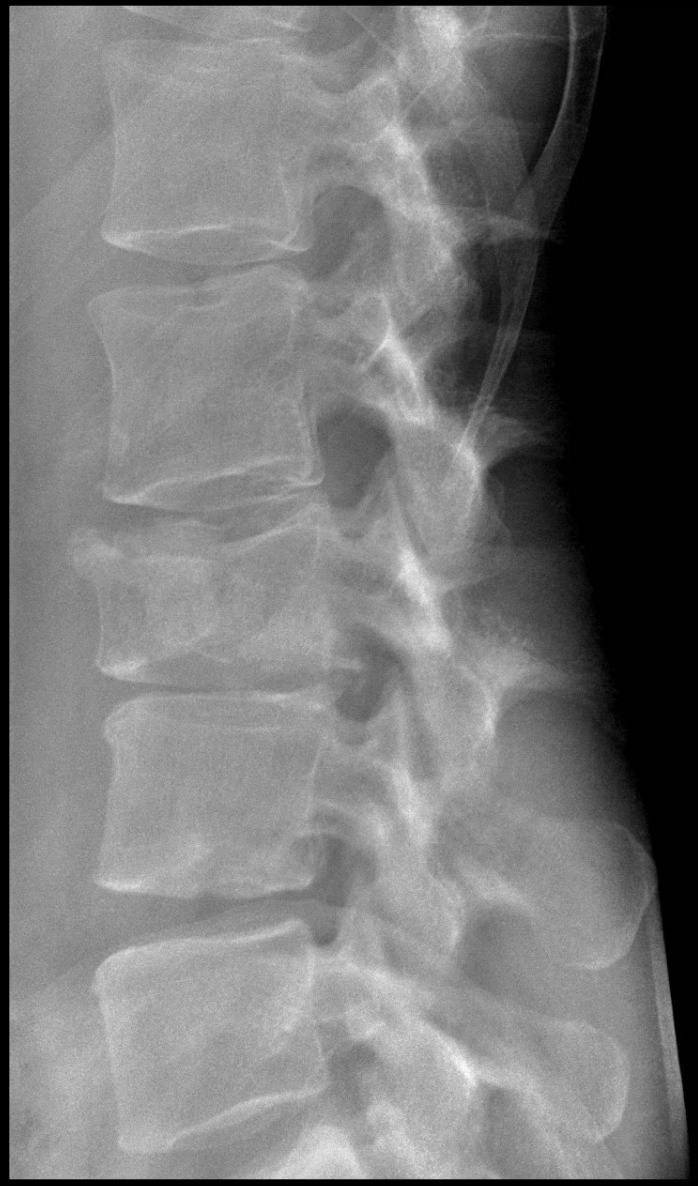
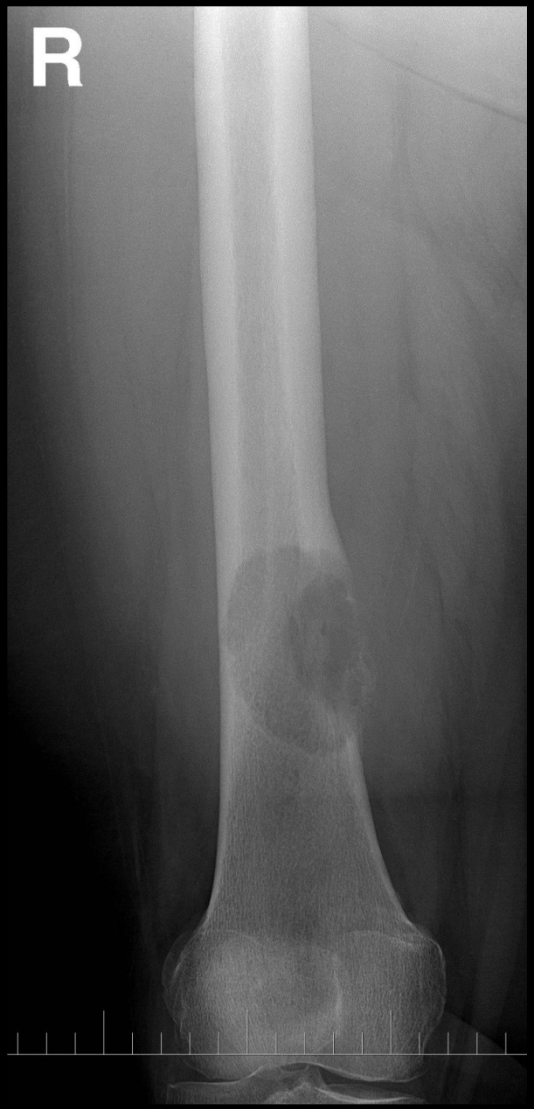


Mirel´s score- risk of pathological fx

Points	1	2	3
Localisation	Upper extremity	Lower extremity	Trochanteric region
Pain	Mild	Moderate	Severe
Type	Osteoplastic	Mixed	Osteolytic
Size	<1/3 of diameter	1/3 – 2/3 diameter	>2/3 diameter

≤ 7 points	Risk 4%	Preventive OS not indicated
8 points	Risk 15%	OS ??
≥ 9 points	Risk 33% and more	OS is indicated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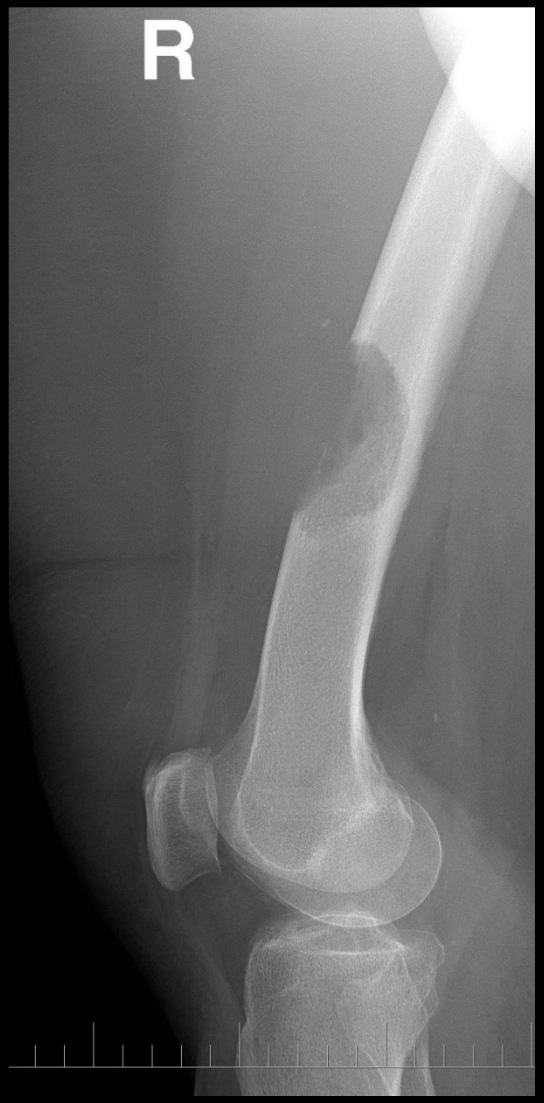
R

Therapy

- Systemic therapy of carcinoma
  - Chemotherapy
  - Hormonal therapy
  - Imunotherapie, biological therapy …
- Therapy of bone metastases
  - Bisphosphonates
  - Radioterapy
  - Surgery: radical, paliative
  - Conservative treatment
  - Others - RFA, embolisation …
- Paliative management

Surgery of bone metastases

Radical surgery – solitary MTS
good prognosis

Simple surgery with mobilisation –
multiple metastases
- worse prognosis

Types of surgery in MTS

Removal of tumor	operation
No	Intramedullary nailing
Curretage	Cementoplasty + osteosynthesis
resection	Total replacement Intercalary spacer
Amputace	No
Spinal surgery	Instrumentation + fusion