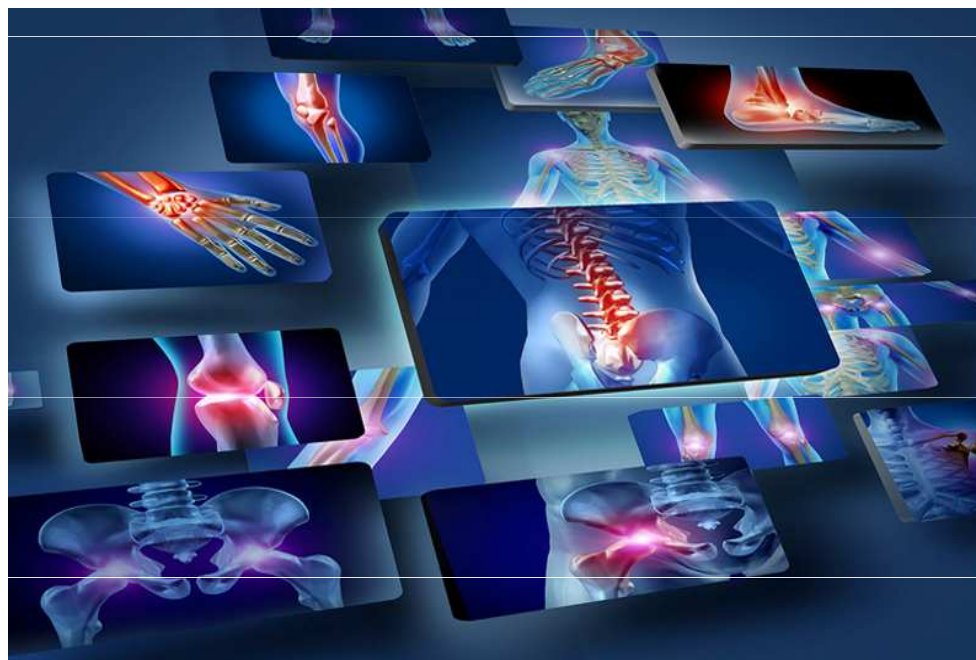


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Basics of Orthopaedics



MUDr. Robert Vyskočil

Orthopaedic Dpt., University Hospital Brno

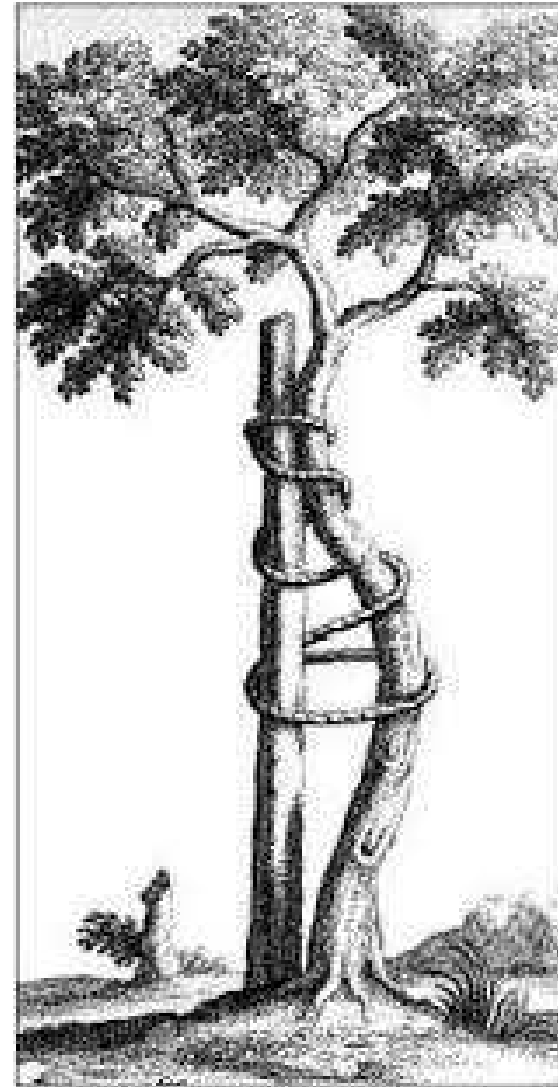
Head of Dpt: Prof. MUDr. Martin Repko PhD.

Orthopaedic surgery:

- Degenerative diseases
- Congenital disorders
- trauma / post-traumatic changes
- Inflammation and Tumours

of

Musculoskeletal system



literature

ZÁKLADY ORTOPEDIE

Antonín Sosna, Pavel Yavřík,
Martin Krbec, David Pokorný
a kolektiv



TRITON

GRADA

ORTOPEDIE

2., PŘEPRACOVANÉ A DOPLNĚNÉ VYDÁNÍ

Pavel Dungal
a kolektiv

SIXTH EDITION

CAMPBELL'S OPERATIVE ORTHOPAEDICS

EDITORS
EDMONSON • CRENSHAW

VOLUME TWO

Tumors	1277
Affections of muscles, tendons, and associated structures	1379
Anterior poliomyelitis	1418
Miscellaneous affections of the nervous system	1597
Peripheral nerve injuries	1642
Miscellaneous affections of the foot	1703
Congenital anomalies	1748
The spine	1939
Arthroplasty	2166

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Orthopaedic Dpt. University Hospital Brno

Spondylosurgery:

- Deformities - Scoliosis
- Degeneration
- Tumours
- Trauma of the Spine



General Orthopaedics:

- TJRs and revisions
- Arthroscopy - knee, hip, shoulder, ankle, wrist, elbow
- Hand and Foot surgery
- Chondral lesions and defects, osteoporosis

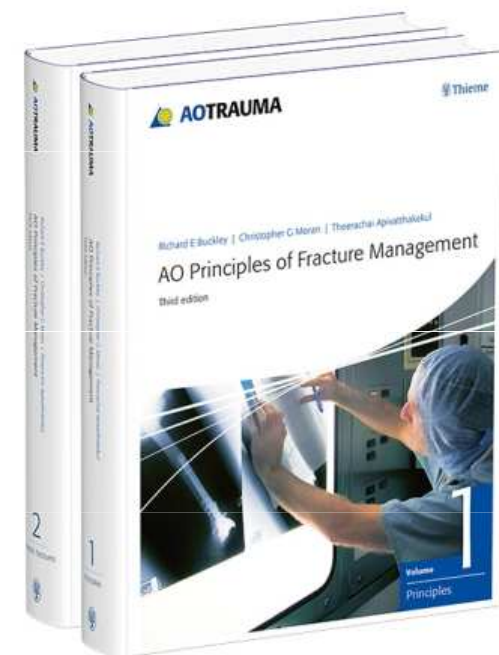
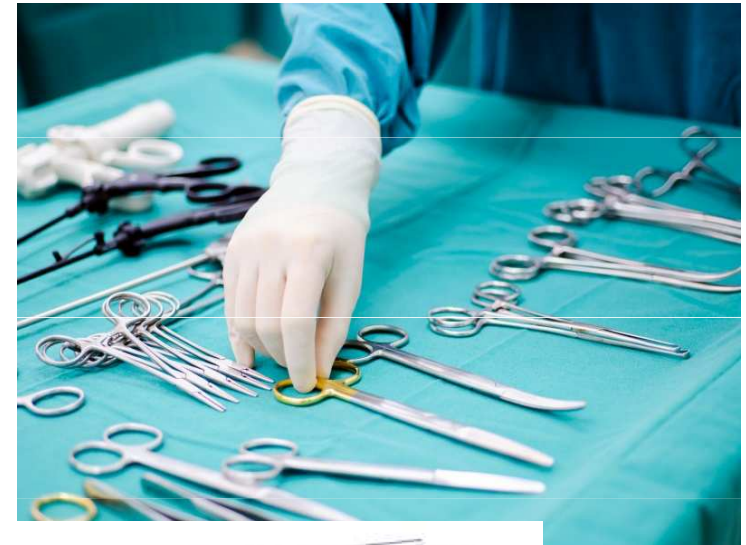


Traumatology and General surgery

- trauma of bones and pathology of visceral organs follow AO principles. !!

<https://www2.aofoundation.org/wps/portal/surgery>

- acute /elective surgery
- operations of soft tissues



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Neurosurgery

- CNS – brain and spinal cord

intra–dural pathology

- **IVD** herniations

- **Tumours of CNS**

- **Entrapment syndromes /CTS/,
chronic and acute neuropathies**



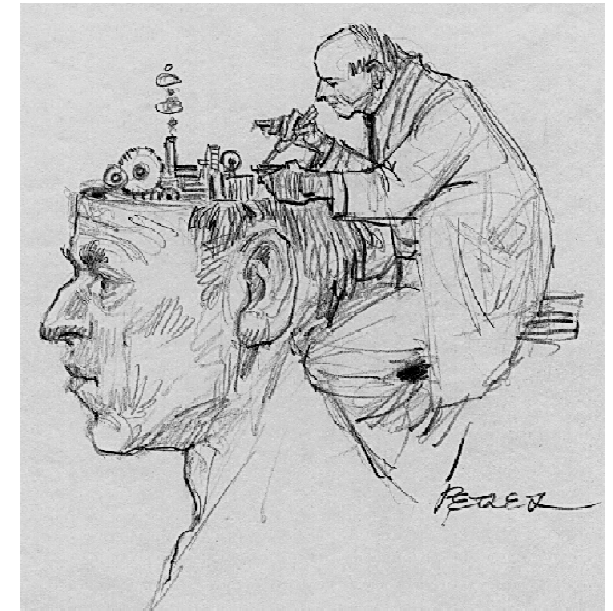
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Neurology

- **Neurological description** of symptoms and nerve pathology specification
irritation or **damage** of nerve roots
- **Degenerative spine disorders – LIS, CB, CC syndromes**
- Clinical examination, **EMG, SSEP, MEP**



Rheumatology

- **Diagnosis and conservative treatment**
of **systematic disorders** of muscles and bones
- RA, Ankylosing Spondylitis /Bechterw's disease/,
arthritis and autoimmune diseases of MS system



Fysio and Rehabilitation

- **Conservative treatment** – soft techniques, mobilisation of joints, improvement of ROM stretching, fysikal therapy, kinesiotaping
- **Degenerative and trauma pathologies** of muscles, periarticular soft tissues
- **Entesopathies** - muscle insertion pain, myalgies
- poostoperative RHB



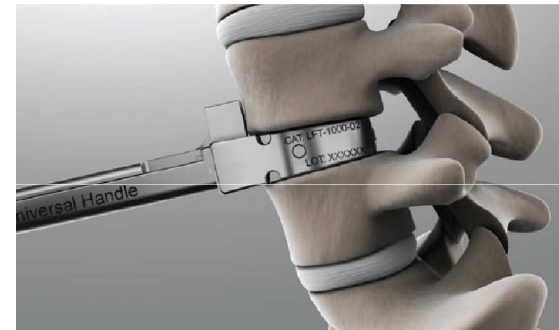
Orthopaedics...

- **Operative** / conservative treatment
- **Elective surgery**
- **Strict Asepsis**
- Development of „**medical industry**“
- **Super-specialisation** –

teams: TJRs, Arthroscopy, Spine,...

lower extremity – hip, knee, ankle and foot surgery

upper extremity – shoulder, elbow, wrist and hand



Orthopaedics – examination methods

Anamnesis

Clinical examination

Imaging methods– **Xray**, US, CT, **MRI**

Scintigraphy, PET, PET – MRI

Lab tests – FBC, FW, CRP, procalcitonin

Microbiology - PCR

Histology



Anamnesis

Family and **personal anamnesis**

– Present disease – complains, difficulties, pain –

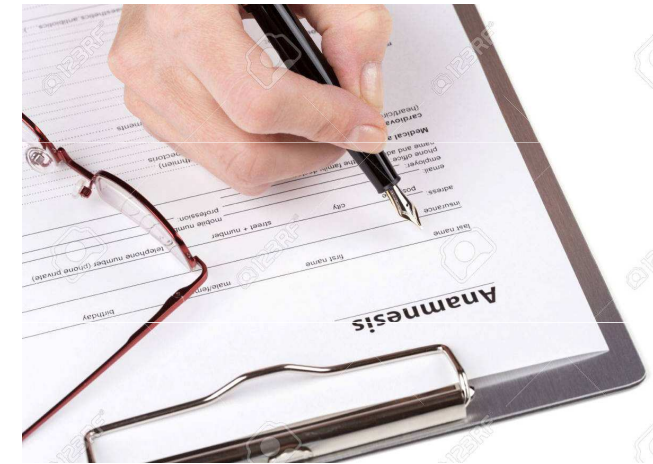
resting / stress pain

manuevers causing pain / pain free position

localized / spreading, irradiation to periphery

time of develompent, **progression** / **regression** in time

calm effect/ effect of conservative treatment



Clinical examination

- Skin cover - swelling, temperature, redness, joint effusion, haematoma
- Function examination - Range of Movement
S, F, T, rotation
- Provocation tests - **Shoulder** - Neer, Hawkins – Kennedy, Appley, Jobe,..
Knee - McMurray, Appley / meniscus tear /
Lachman, Pivot shift /instability-rpt LCA/
Spine - Thomayer, Lassegue, Schober, Stibor

Clinical examination

– ROM S 0-0-120, F 40-0-20

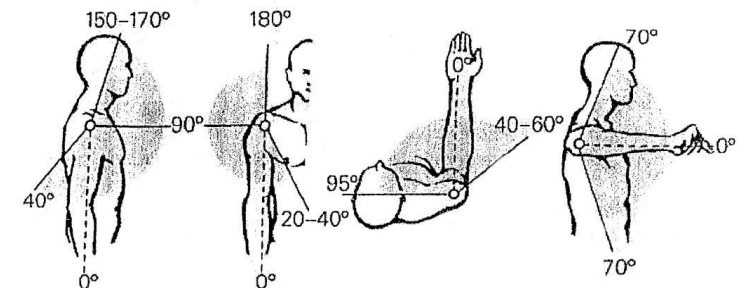
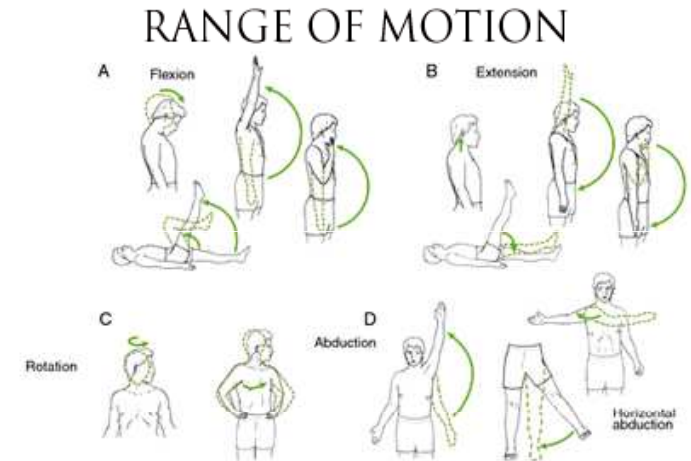
3 planes + rotation

– Sagittal, Frontal, Transverzal + rotation

1. movement out of the body / **extension**, abduction, ER /

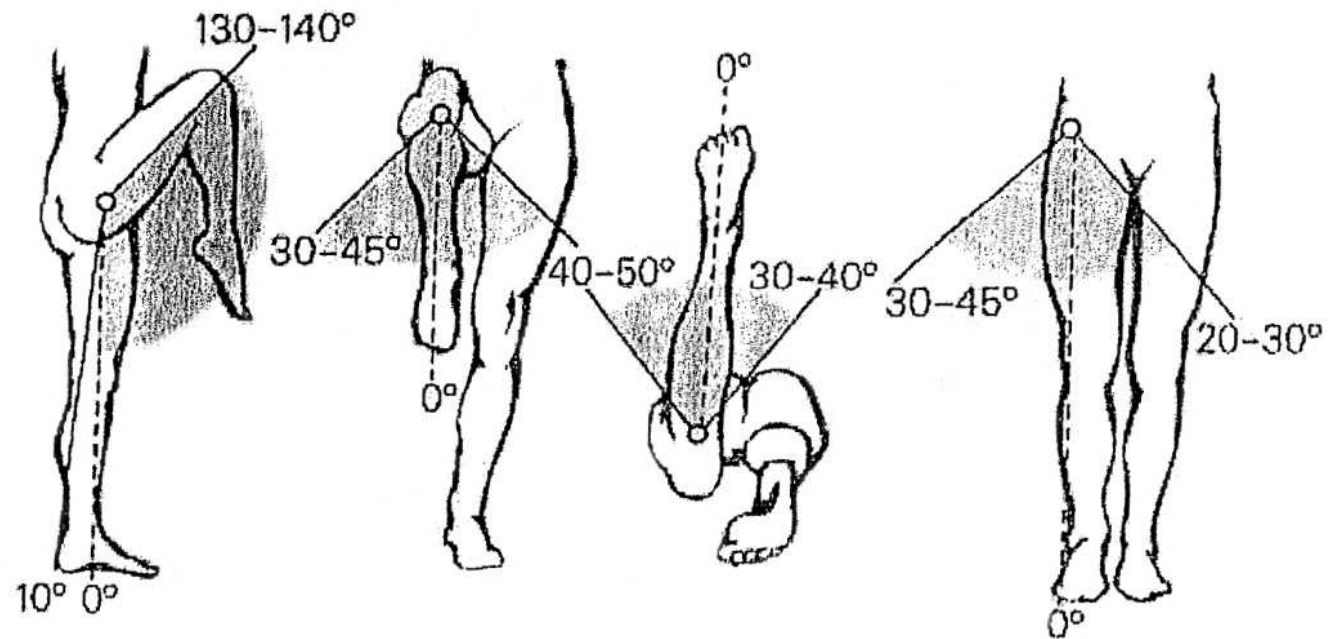
2. zero position / **neutral** joint position

3. movement to the body / **flexion**, adduction, IR /



ROM of the hip

- S 15 - 0 - 140
- F 45 - 0 - 30
- T 80 - 0 - 30
- R90 50 - 0 - 40



Clinical examination

Examples of clinical test– videos / Youtube /

- 1. **knee instability**– Anterior drawer test, lachman test, pivot- shift
- 2. **McMurray, Appley** – menisci rpt
- 3. **Patella Balottment** – Joint effusion
- 4. **Aprehension test** – anterior shoulder luxation
- 5. **Drop Arm test** – Rotator cuff tear

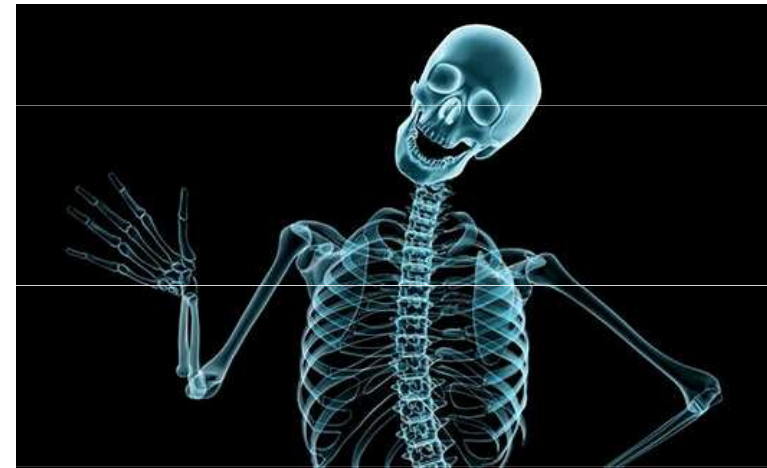
Imaging methods

X ray

Basic examination of bones

– 2 perpendicular projections, AP + lateral view

- Oblique /axial/, special projections +
navicular quartet /os scaphoideum/
hyperflexion and hyperextension of the spine
sun – rise view /PF/
outlet view transthorakal /shoulder/...



- **CAVE!! stress fractures/fatigue**
delayed X ray findings
repeat X ray after 4-6 weeks
MRI, scintigraphy



Don't rely always on X rays

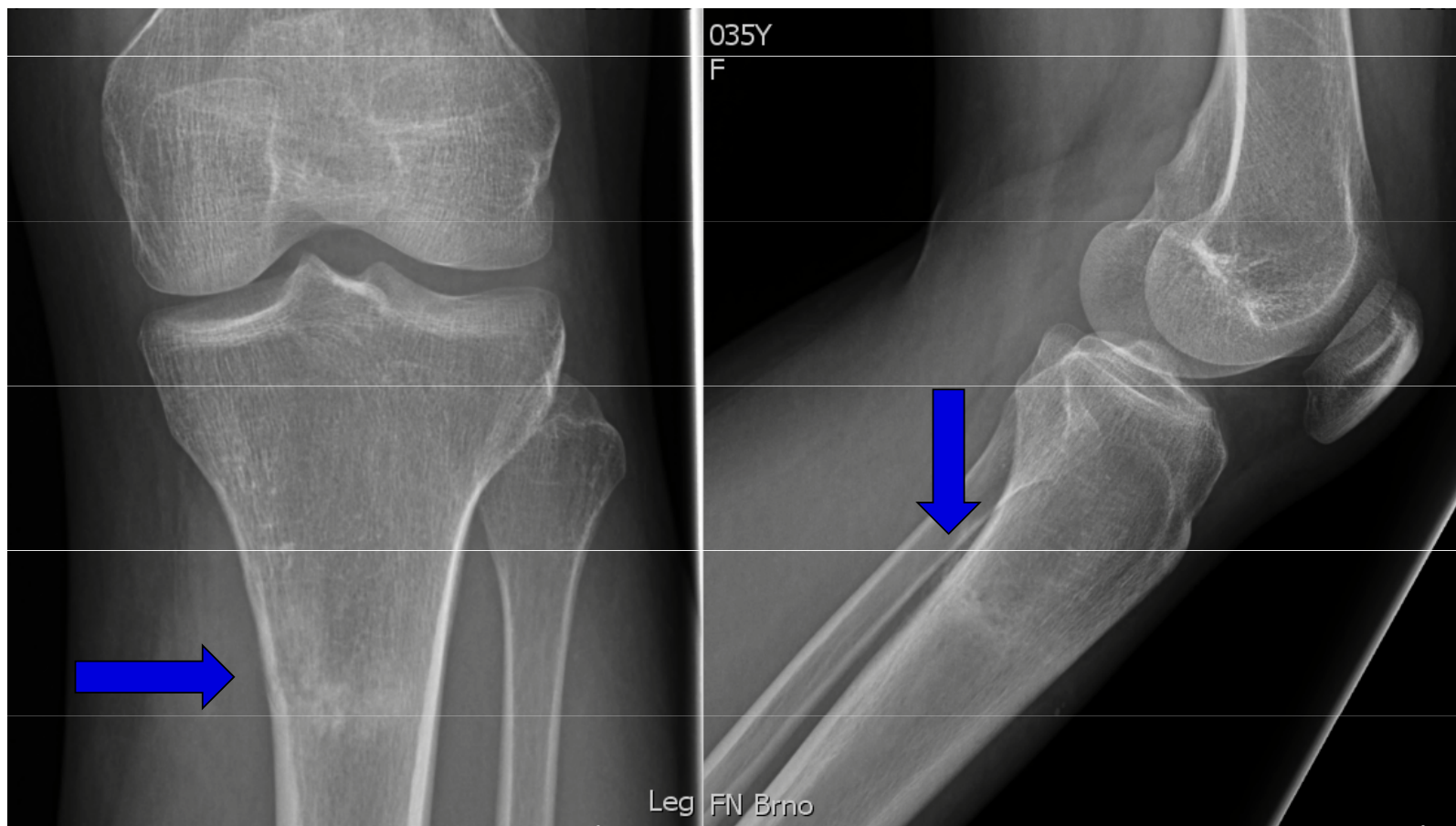


Case report

- Young man, Painful left shin after running
- X ray negative



– 1 month later...



MRI, dg. Stress fracture of the Tibia, treated with POP, healed up conservatively



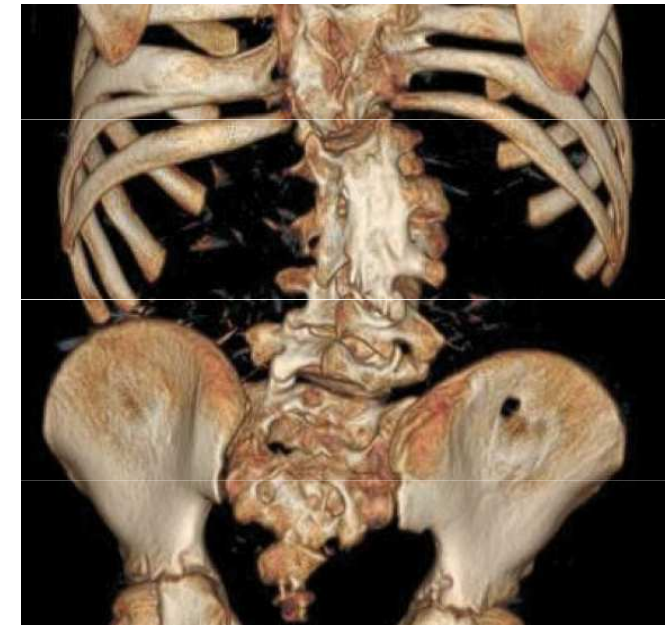
Ultrasound

- **fast, non-invasive, radiation free**
- Basic evaluation of newborns hip –
DDH (development dysplasia of the hip)
- **FAST US Focussed Assessment Sonograph Trauma**
- Soft tissues – muscles
 - tendons, insertions** – rotator cuff
 - joint effusion** / gonitis, children **coxitis!!** /



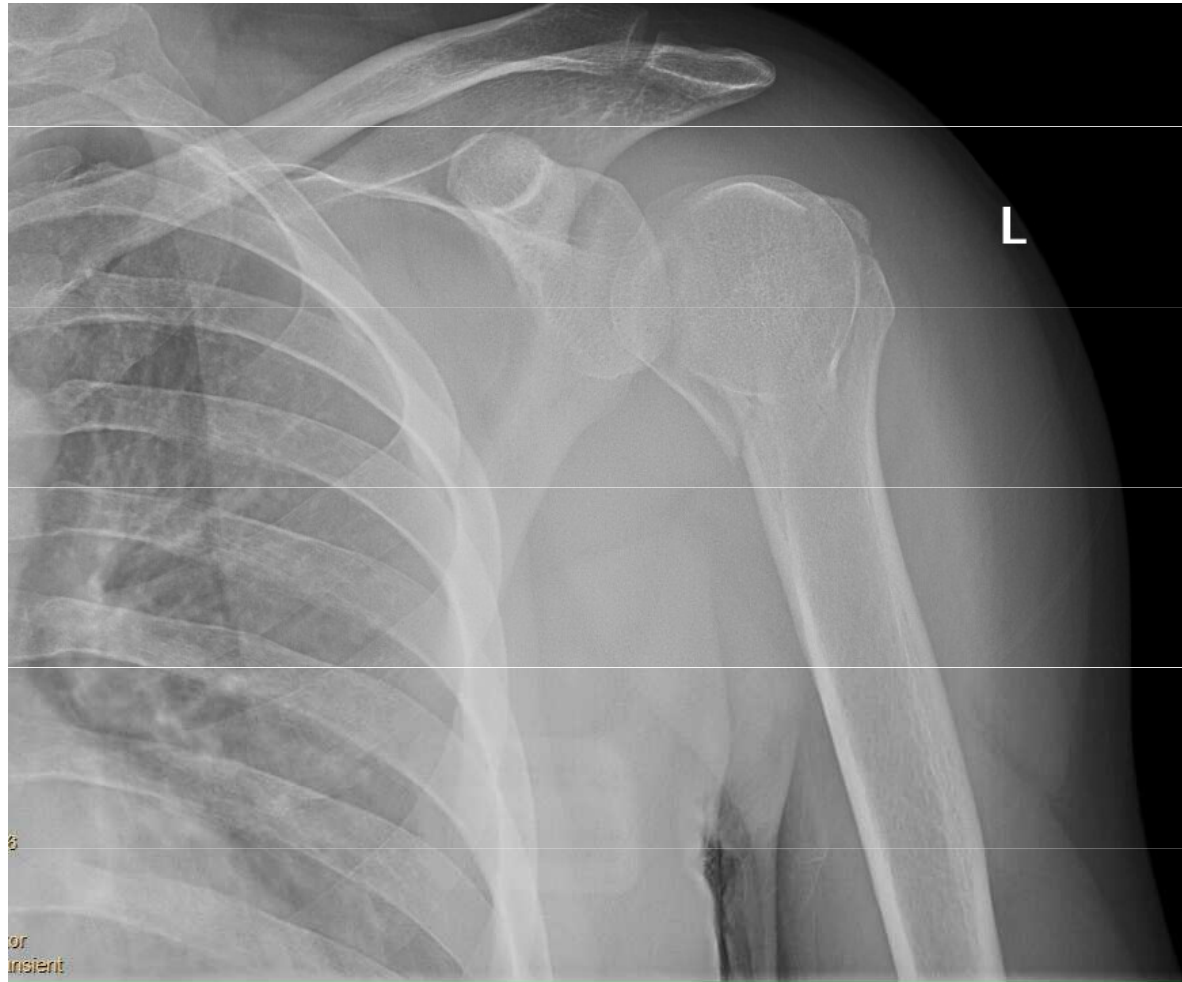
CT Computer tomography

- Radiation
- Examination of **bone structures**
- used in polytrauma –
CT – spiral
3D reconstruction



Imaging methods

My own experience 😊



CT 3D reconstruction

Comminuted dislocated fracture of the proximal humerus

ORIF Phillos Plate, healed up nicely with full ROM



MRI

– Soft tissues / periarticular, bone marrow



– Clinical examination + X ray + **MRI** + neurology –
SPONDYLOSURGERY

– **KI** – cardiostimulator, defibrillator, magnetic implants,
6 weeks post op, claustrophobia, gravidity,..

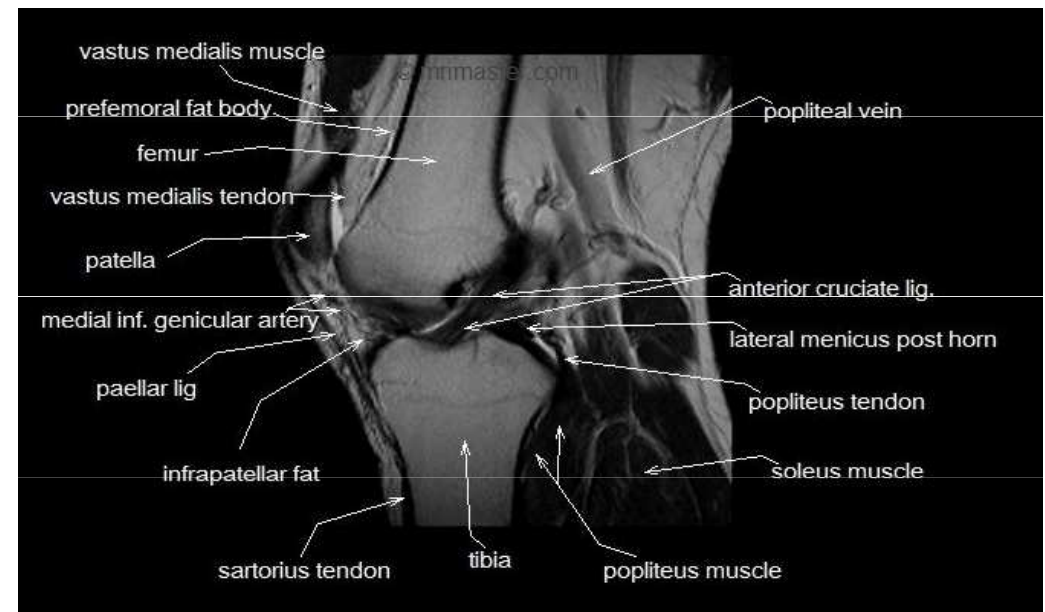
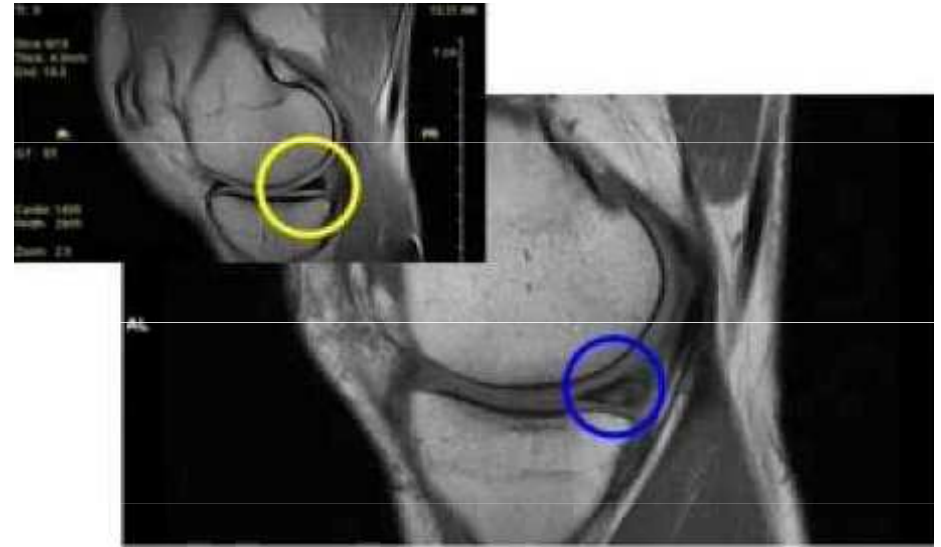


MRI

– Joint examination

soft tissues around and inside the joint:

- **intraarticular /periarticular**
- **menisci, ACL, PCL**
- **collateral ligaments**
- **cartilage and subchondral bone**



Case report

patient DOB 1941, no injury

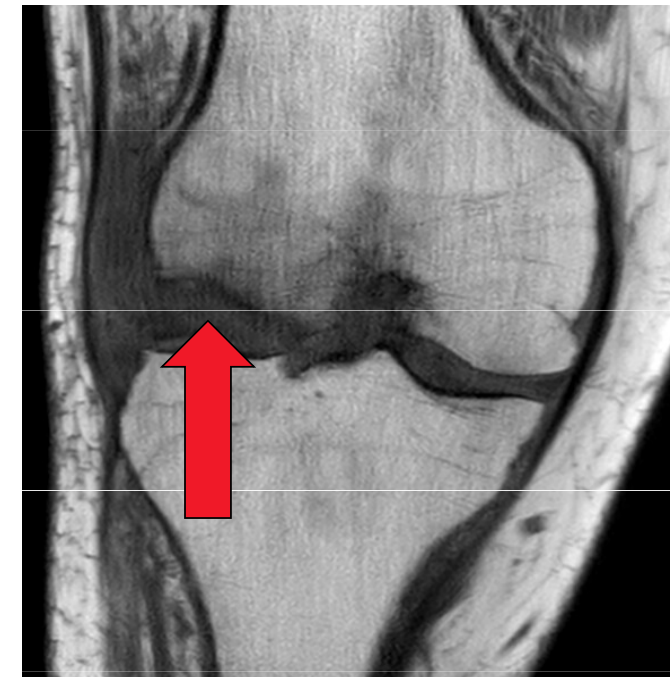
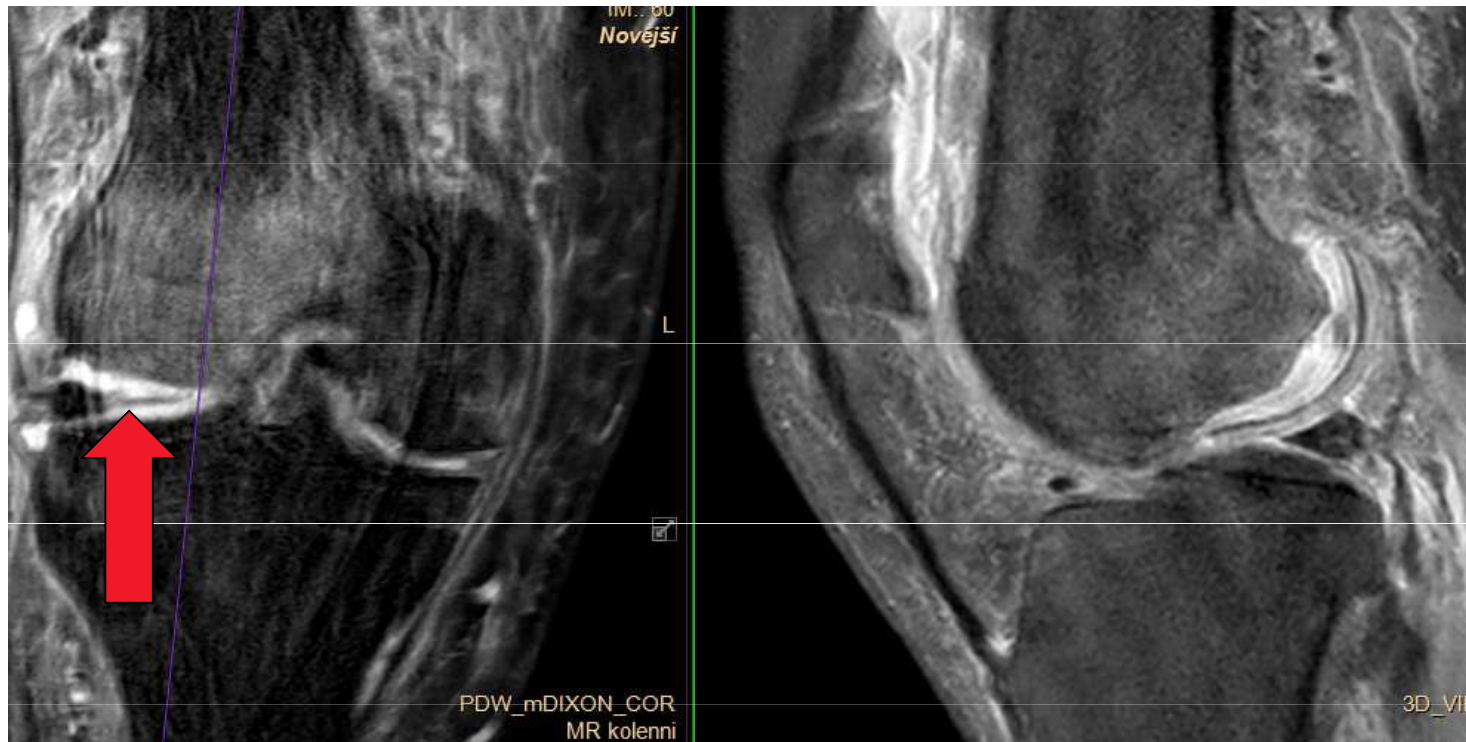
reccurent serosanguinolent exsudate

pain over the lateral joint space

X ray – arthrosis gr. II

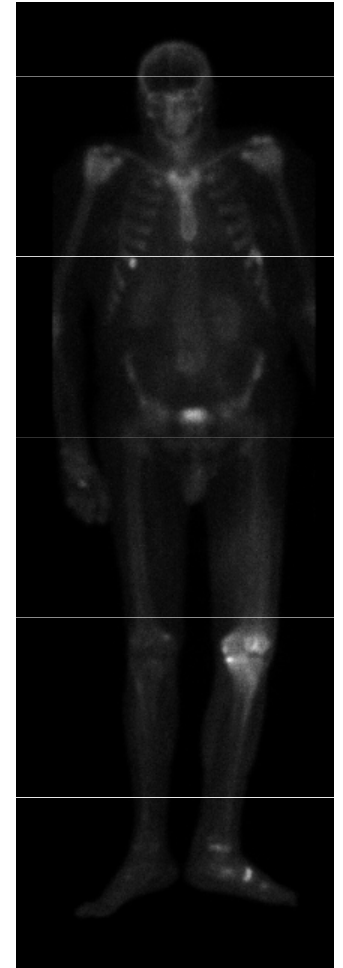
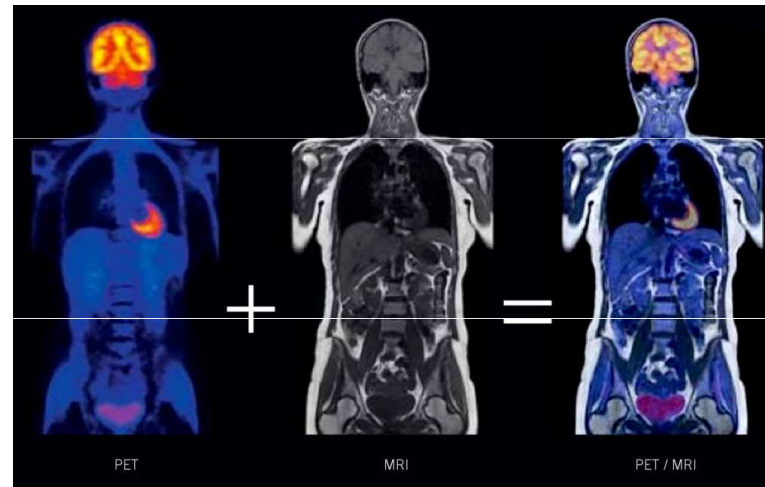
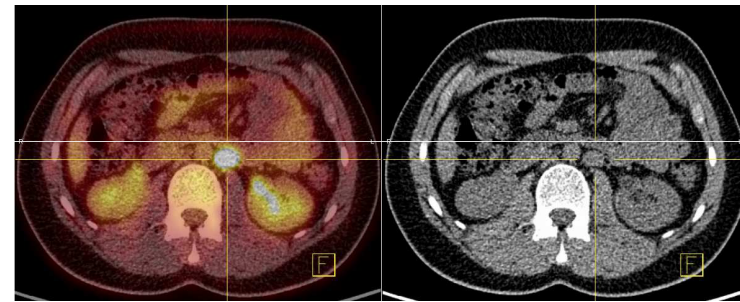


MRI – necrosis of the lateral femoral condyle – gr IV
indication of TKR



Scintigraphy, PET, PET-CT, PET-MRI

- Metabolism of tissues and bones
- Radionuclides i.a., i.v.
- High sensitivity!! X low specificity
- Dg. Tumours, infection, non-union, malunions, fractures



Laboratory

– Pre op examination – exclusion of infection

urine bacteriology, FBC, CRP, FW, procalcitonin

– Metabolic diseases – Uric acid - gout

– Autoimmune diseases – RF, HLAB 27, anti DNA/RNA Ab



– **Microbiology, PCR** – cultivation of pathogens

sensitivity for ATBs



– **Tumour** – ALP, LDH - OSA, Bence-Jones protein – MM

catecholamines metabolits /Vanilmandelic acid/ Ewing SA,..

– **Specific tests**- Beta2-tranferin / cerebrospinal fluid,

synovasure / periop infection,..



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Histology

– Pathological examination of the bioptic sample

– Needle biopsy 1-2mm

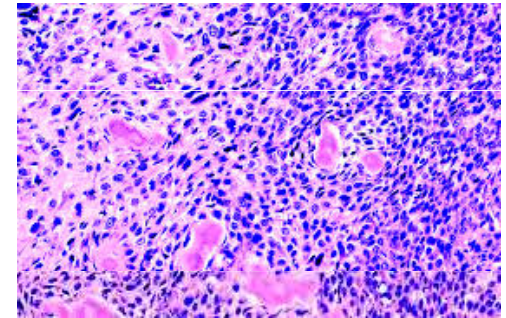
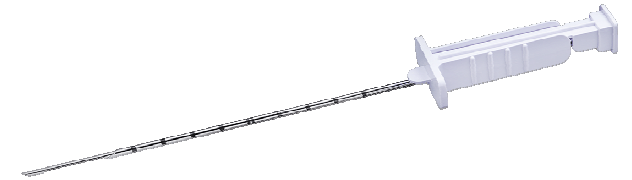
Trocar biopsy 3-5mm

Excision of the tissue sample $> 1 \times 1 \text{ cm}$, diagnostic / curative

– Histologic verification of the pathology / **tumourous tissue**


- type

- origin



Orthopaedic - Take home message

- **Surgical branch** of medicine treating pathology of musculoskeletal system
- / spondylosurgery, TJRs, Arthroscopy,../

- **Anamnesis and clinical examination are essential**
- +
– **Imaging methods** – X ray, US, CT, MRI, scintigraphy, PET
-  **diagnosis decision and treatment algorithm determination**

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Thank you for the attention

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