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Hip, knee and foot

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Orthopedic clinic





Hip joint – congenital femoral defects

MUDr. Maroš Hrubina, Ph.D.

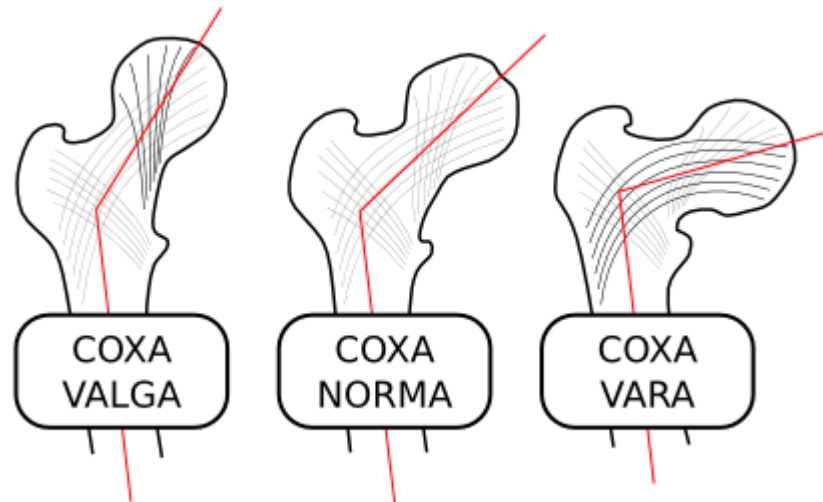
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Coxa vara



- Coxa vara congenita
- Idiopathic deformity of the proximal femur – shortness of the neck of femur, reduced CCD angle below 125° , high position of the greater trochanter, shortness of the limb (with unilateral involvement) (Dungl et al., 2005)



Coxa vara

- X-ray findings of a 42-year-old patient with bilateral coxa vara (archive of OC UHM)



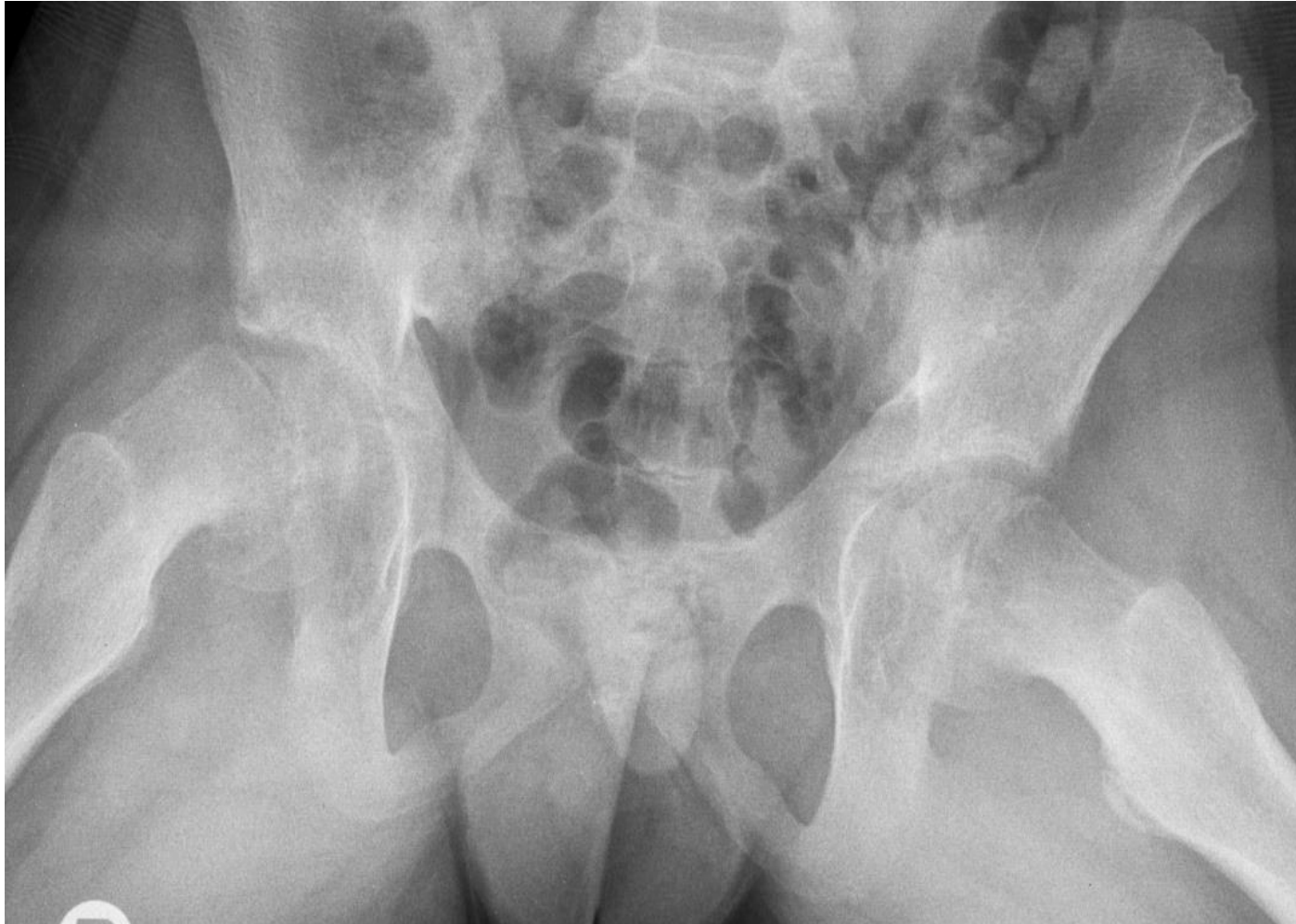
Coxa vara

- Coxa vara adolescentium (CVA, epiphyseolysis capitis femoris)
- Serious disease of the hip joint in puberty!
- Hormonal changes (adiposogenital syndrom)
- Primarily non-traumatic condition
- „slip“ of the femoral head dorsally and medially
- CVA is not equal to acute traumatic epiphysiolysis of proximal femur! (Hrubina, 2022)



Coxa vara adolescentium

- X-ray findings of a 13-year-old boy with bilateral CVA, more advanced finding on the right hip (archive OC UHM)



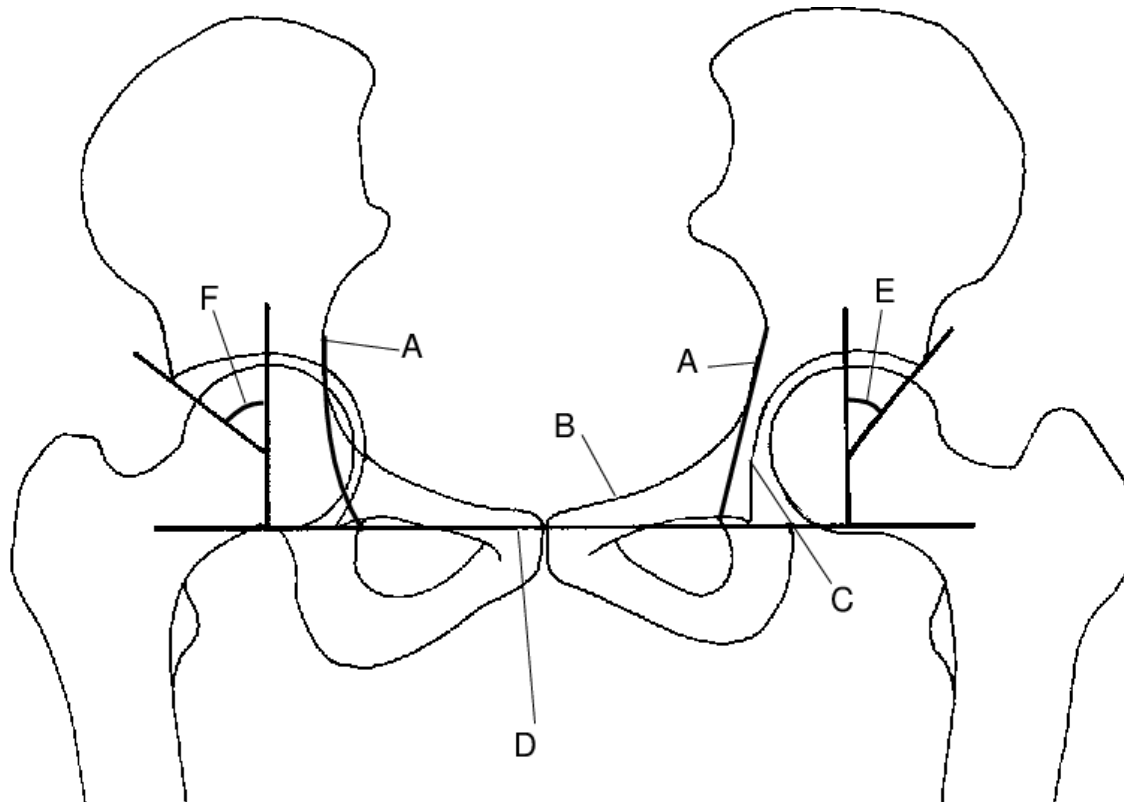
Coxa valga

- Coxa valga
- Is a condition of the proximal femur associated with a CCD angle higher than 145° , possible connection with other congenital changes of the proximal femur (increased anteversion of the femoral neck...)
- Part of hip changes in congenital hip dysplasia



Protrusio acetabuli

- Protrusio acetabuli
- The femoral head protrudes medially into the pelvis, where the medial edge of the femoral head lies medial to the ilioischial line (Van De Velde et al., 2006)



Coxa profunda



- Coxa profunda
- „deeper“ acetabulum, where the fossa acetabuli is medial to the ilioischial line but the medial edge of the femoral head is not medial to the ilioischial line (Anderson et al., 2012)
- Association with femoroacetabular impingement



Coxa saltans

- Coxa saltans
- Audible and palpable skipping (phenomen) on the lateral side of the hip joint during movement
- „skipping“ of the iliotibial tractus over the greater trochanter during hip movement (Dungl et al., 2005)
- Negative x-ray finding



Developmental dysplasia of the hip

- Developmental dysplasia of the hip (**DDH**)
- A wide spectrum of morphological deviations and the resulting functional disorders, which have different characteristics of different phases of individual growth and can vary from normal finding to the most serious pathology – instability associated with capsule laxity, subluxation, luxation.
- **Dysplasia** = developmental disorder of all parts of the joint (proximal femur, acetabulum, joint capsule) (Dunlop et al., 2005)



Developmental hip dysplasia - treatment



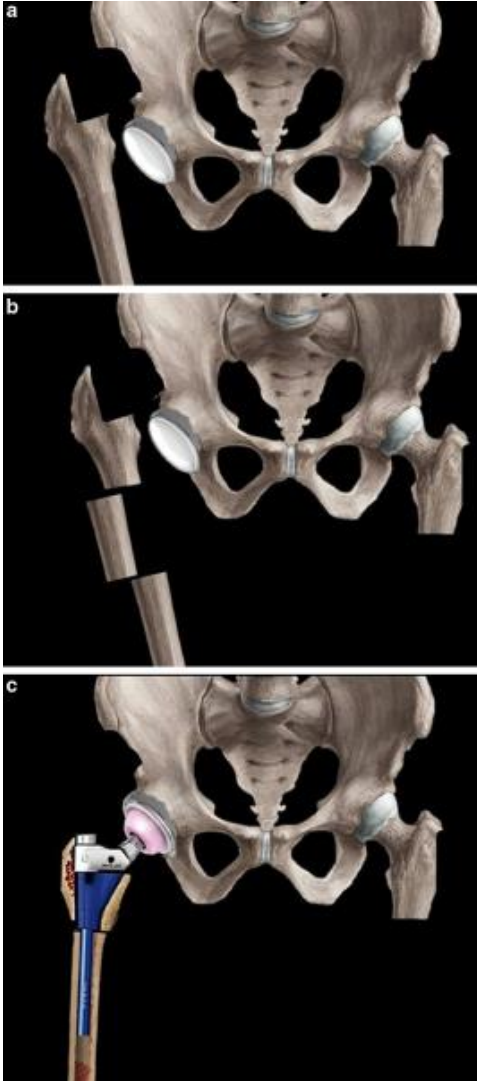
DDH – late results

- X-ray finding of a 39-year-old woman with a high dislocation of the hip joint on the right after „untreated“ dysplasia (archive OC UHM)



SSOT – subtrochanteric shortening osteotomy of the femur + THR

- Preoperative planning and X-ray after SSOT (archive OC UHM)





Cementless hip arthroplasty and transverse shortening femoral osteotomy with the S-ROM stem for Crowe type IV developmental dysplasia

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Abstract

Introduction The aim of this study has been to present outcomes after cementless arthroplasty for developmental dysplasia Crowe type IV of the hip, with transverse subtrochanteric shortening osteotomy and using the S-ROM stem.

Methods We evaluated radiographs, functional scores and complications in a consecutive series of 23 patients (28 hips) with high dislocation of the hip. The average age of patients at surgery was 49.9 (range 22–68) years. The operations were performed between 2007 and 2013. Patients were assessed retrospectively—clinically and radiographically during the year 2018.

Results The mean follow-up period was 94 (range 60–134) months. The average Harris hip score improved from 39.9 to 84.0. The mean leg length discrepancy decreased from 5 cm preoperatively to 1.4 cm at the final follow-up. All acetabular components were implanted into the true acetabulum, and all prostheses were stable at the latest examination. No neurovascular damage was recorded. We have identified specific complications in seven hips (25%) in total: Intraoperative femoral fracture required fixation in four hips; three hips (10.7%) needed revision: Recurrent dislocation, with the need for cup reorientation, occurred in two hips (in one of them, this was followed by the subsequent need for resection of heterotopic ossification); there was one aseptic stem loosening with the need of one-stage revision. All the osteotomies healed within 8 months.

Conclusion Hip arthroplasty with transverse shortening femoral osteotomy, using S-ROM stem, is an acceptable, but not complication-free treatment method in patients with Crowe type IV developmental hip dysplasia, in the midterm.

Keywords Hip dysplasia · Shortening femoral osteotomy · S-ROM stem

Introduction

Total hip arthroplasty (THA) in patients with Crowe type IV developmental dysplasia of the hip (DDH) is a technically more demanding procedure and has a higher complication rate than surgery in primary coxarthrosis [1]. Anatomical abnormalities typically associated with high hip dislocation are: a deformed femoral head, a short femoral neck with excessive anteversion, a narrow femoral medullary canal, a hypoplastic true acetabulum with reduced depth and deficient superior bone stock, a posteriorly located greater trochanter and muscular contractures [2, 3]. The optimal surgical treatment for such patients remains controversial. Most studies recommend that the center of rotation should be at the level of the true acetabulum because of the reduced contact stress and a lower failure rate of cups [4–7]. The femur should be shortened in order to reduce the hip more easily and to avoid excessive limb lengthening with possible

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Avascular necrosis of the femoral head

- Avascular necrosis of the femoral head (AVN)
- Disease with impaired intraosseous circulation, primarily affects men between 30-40 years of age
- Multifactorial etiology (use of corticosteroids, radiation, hemodialysis, trauma, alcoholism...) (Dunlop et al., 2005).
- Clinical finding – severe pain in the groin with antalgic walking, reduction of range of motion, inability of weight bear
- Possible even destruction of the femoral head – result in THR



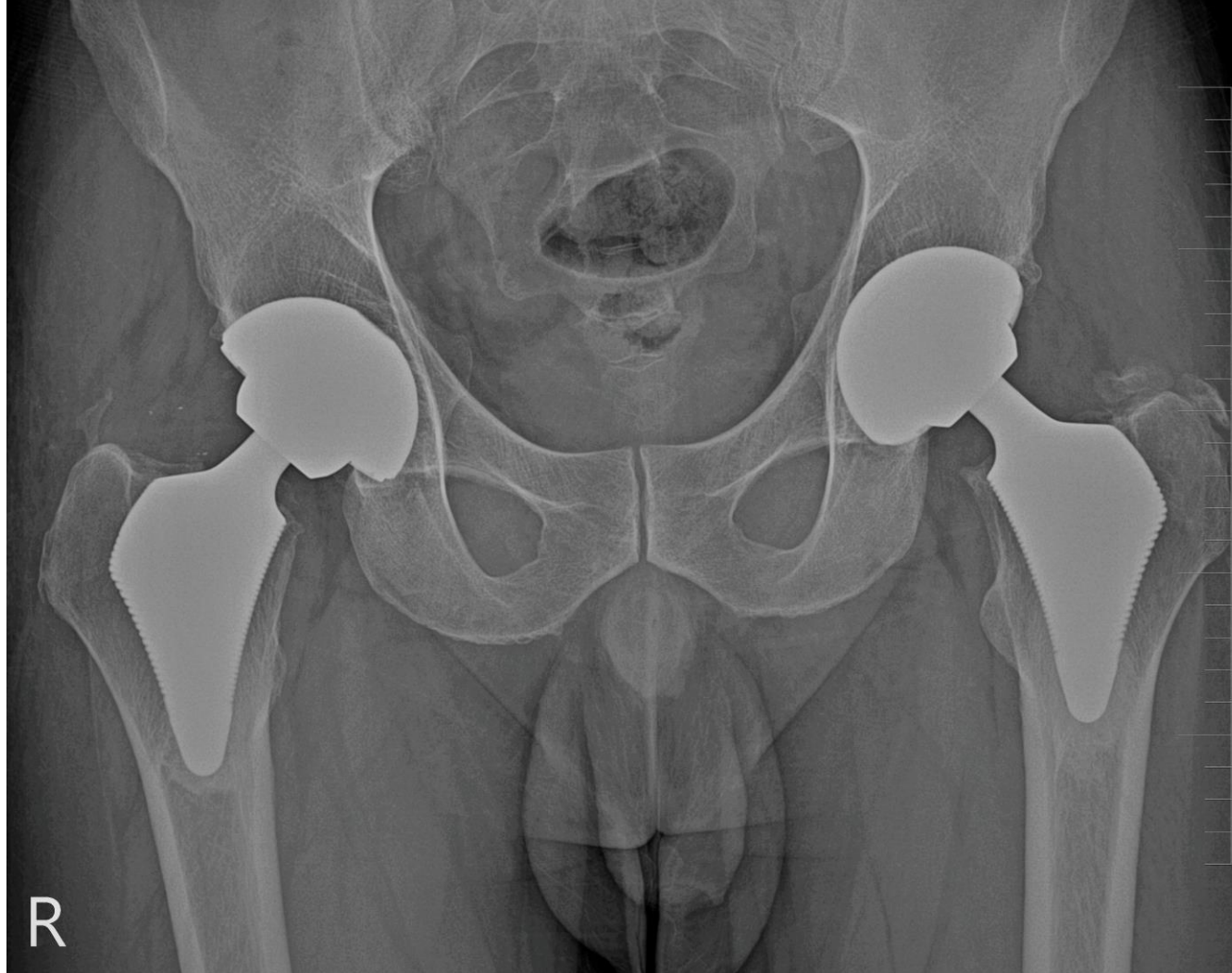
Avascular necrosis of the femoral head

- X-ray findings of a 27-year-old patient with bilateral AVN after radiotherapy (archive OC UHM)



Avascular necrosis of the femoral head

- X-ray findings of the previous patient 11 years after bilateral THR –
Proxima short cementless stem (archive OC UHM)



Total hip arthroplasty with ultra-short uncemented stem in patients with osteonecrosis of the femoral head: mid-term results

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Juraj Cabala², Zoltan Cibula^{1,2} and Matej Daniel³

Abstract

Background: Mid-term results (clinical and radiographic) of ultra-short anatomical cementless stem total hip arthroplasty (THA) in patients with osteonecrosis of the femoral head (ONFH) has not often been presented. The aim of this study is to evaluate THA using the Proxima stem in patients with ONFH in the mid-term.

Methods: The study consists of 73 patients (97 THAs) with a Proxima stem implanted between 2006 and 2015. The mean age of patients was 47.4 years, with a mean follow-up 105.2 months. The clinical results include preoperative and postoperative Harris Hip Scores (HHSs). Radiological follow-up reports on stem migration, bony trabecular development and radiolucent lines. The complications and revisions were registered. Kaplan-Meier survival analysis was performed to determine the implant survival.

Results: The average HHS improved significantly from 40.3 preoperatively to 98.0 at the final evaluation ($p < 0.0001$). Stem migration (subsidence and "varisation") was observed in 11 hips (in 9 of them up to 6th postoperative month without any further progression, in 2 with progressive migration and radiological loosening). Bony trabecular development was detected in modified Gruen zones (1,2,4,6,7 for Proxima stem): in zone 1 (0%), 2 (67.0%), 4 (64.9%), 6 (64.9%), 7 (0%). Radiolucent lines were observed in 1 cup and 6 stems (2 were loose, 4 with fibrous stable fixation). Complications were found in 5 hips (5.1%): squeezing hip once, repeated dislocation in 1, 1 early deep infection, and 2 loose stems. 2 hips (2.1%) were revised (dislocation, infection). The implant survival was 98.9% and 97.9% clinically and radiologically, respectively.

Conclusions: Observations in the mid-term show that the clinical and radiological results of the Proxima stem in patients with ONFH are promising. The stem design preserves the proximal femoral bone stock. The bony trabecular appearance confirms physiological proximal femoral load transmission.

Keywords

Bony trabecular development, osteonecrosis of the femoral head, total hip arthroplasty, ultra-short anatomical cementless stem

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Introduction

Osteonecrosis of the femoral head (ONFH) is a complex clinical, radiographic and pathological syndrome, which leads to hip joint destruction secondary to an impairment of blood supply.^{1,2} ONFH usually affects patients <60 years, in men 5 times more often than women.³ The risk factors associated with ONFH are: corticosteroids; chemotherapy and radiotherapy (immunosuppressant agents); and excessive alcohol consumption.^{4,5} When the loss of the femoral head sphericity occurs, total hip arthroplasty (THA) for the

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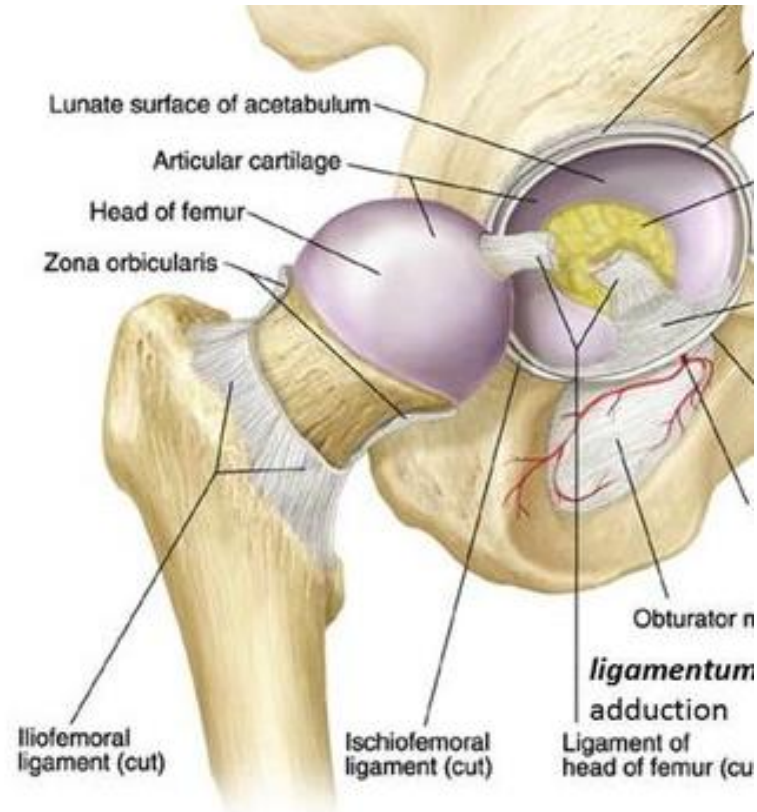
Diseases of the hip joint in adults

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Anatomy of hip joint

- Spherical shape of the joint (ball and socket)
- Static stabilizers : labrum + ligaments (iliofemoral, ischiofemoral, pubofemoral a lig. capitis femoris)
- Dynamic stabilizers: muscles



Hip osteoarthritis



- One of the most common chronic diseases, one of the most common reasons for long-term inability for work – significant health care costs
- Primary non-inflammatory degenerative disease of the hip joint manifested by destruction of articular cartilage, the formation of osteophytes and the destruction of the femur and acetabulum
- Cartilage is characterized by a reduction in the volume of water and proteoglycans, degradation of collagen, reduction of elasticity, reduced resistance to load, a reaction of subchondral bone and an inflammatory reaction of soft tissues is present



Etiology of hip osteoarthritis

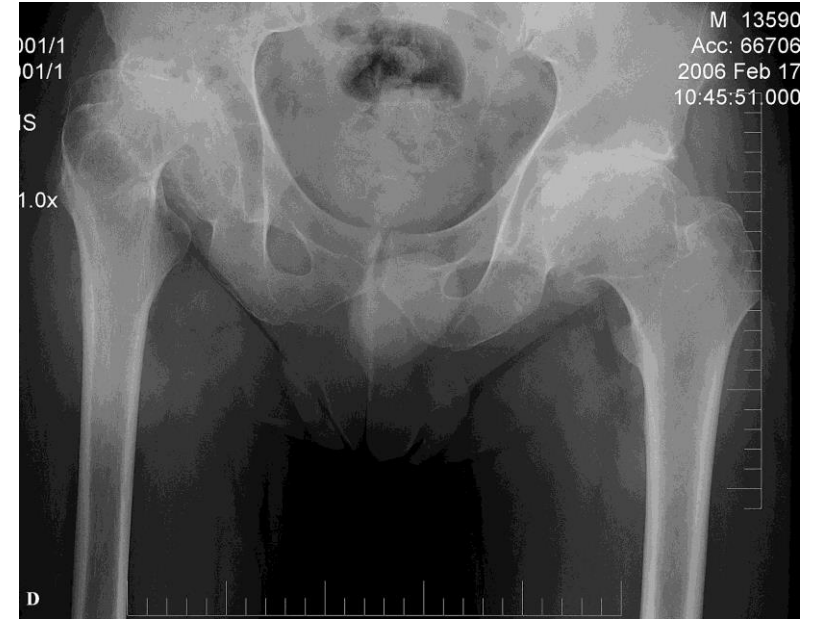
Hip osteoarthritis = degenerative hip joint disease

1. Primary osteoarthritis – idiopathic, genetic factors

- Chondrocyte metabolism disorder

2. Secondary osteoarthritis – known cause

- Hip diseases in childhood – condition after hip dysplasia(DDH), m. Perthes, CVA
- posttraumatic osteoarthritis – previous fracture of the acetabulum, fracture of femoral head
- Avascular necrosis of the femoral head – use of corticoids, chemotherapy, radiotherapy
- Inflammatory diseases – reumatoid arthritis



Risk factors of hip osteoarthritis



- Age over 60 years
- Women > Men
- Obesity
- Previous trauma of the joint
- Other intra-articular disease, e.g. inflammatory ethiology



Clinical picture

Subjective symptoms :

Pain – initially starting, during load, later at rest and at night

Objective symptoms:

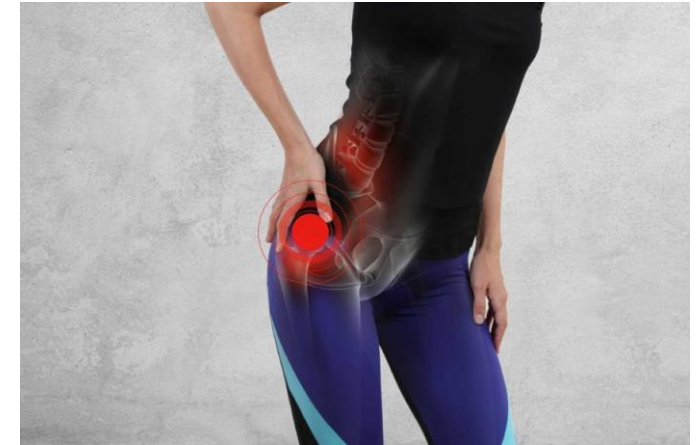
Reduction of range of motion – initial rotations

Shortening of the limb – difference in cm compared with healthy side (DUM a DSM)

Limping – antalgic walking pattern

Trendelenburg sign – gluteal muscle insufficiency

Flexion contracture of the hip joint



Diagnostics



- X-ray : AP+ axial view:

Reduction of the joint space, formation of osteophytes and subchondral sclerosis, cysts of femoral head and acetabulum and deformation and possible collapse

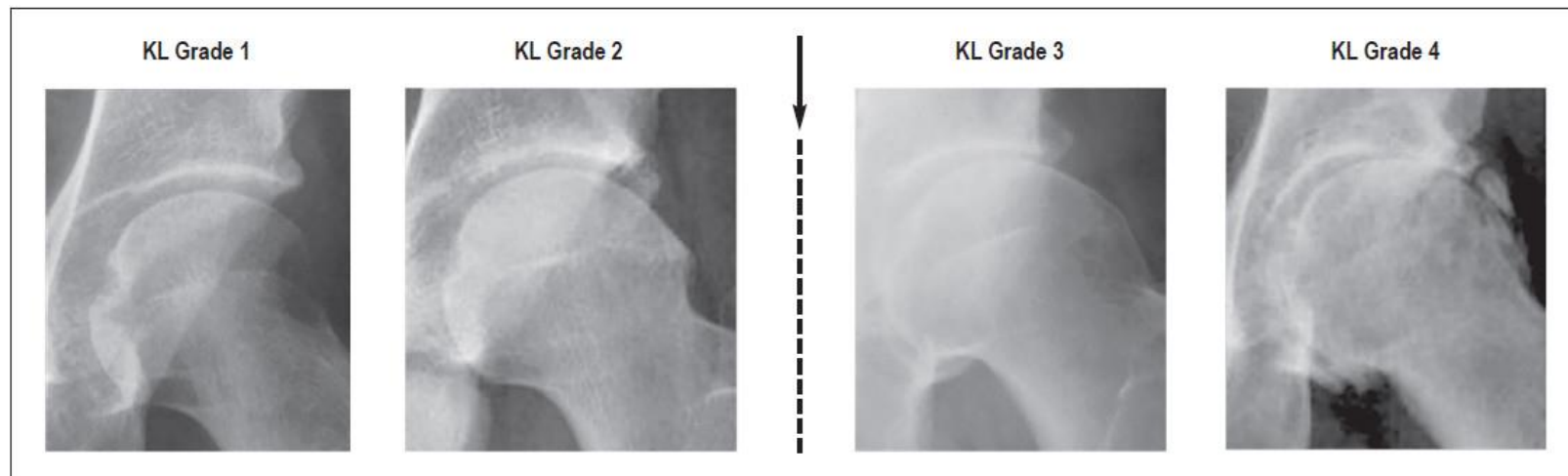


Figure: Radiological stages of osteoarthritis of the hip according to the Kellgren-Lawrence score (KL). As a rule, THR surgery should only be performed for advanced hip osteoarthritis (grade 3 or 4).

- CT indicated rarely in dysplastic and post-traumatic indications to assess the volume of acetabular bone mass



Hip osteoarthritis : Therapy



- 1. conservative

medicament therapy - NSAAs, analgetics, SYSADOA, hyaluronic acid
physiotherapy and physical therapy

- 2. surgical

varotization and valgotization **osteotomy** of proximal femur – rare indication (DDH)

Hip arthroscopy – rare indication for femoroacetabula impingement

THR – total hip replacement – most often

Hip arthrodesis – historical surgery, better functional results with Girdlestone

arthroplasty – after infectious complications of revision endoprosthetic surgeries

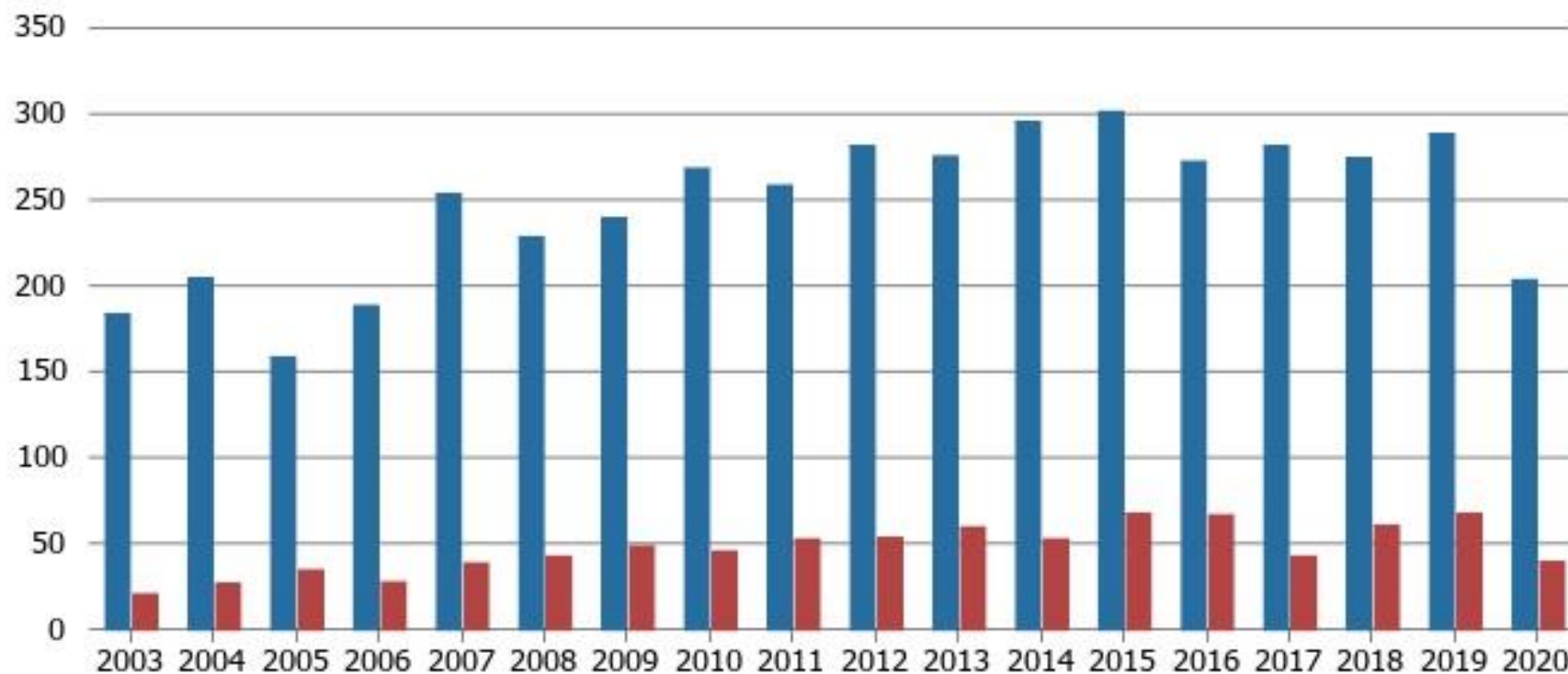


Total hip replacement - THR

- The number of primary implantations is constantly increasing
- 2-3 milion primary hip replacements performed annually in the world
- More and more younger patients are operated on
- The number of revision surgeries is also increasing



Primary and revision hip arthroplasty SVK



Slovak Arthroplasty Register



THR – type of fixation

1. **Cementless THR** (patients under 70 years old)
both components fixed without bone cement
2. **Cemented THR** (elderly patients over 80 years old)
both components fixed with bone cement
3. **Hybrid THR** (between 70 and 80 years)
one component fixed with bone cement, the other without)



Acetabular component

- The cementless press-fit socket is currently gold standard in most patients
- Cemented fixation only for elderly patient over 80 years old
- Articulation pairing: ceramic - ceramic
ceramic – crosslinked polyethylen
- Head diameter 36 ev 32 mm

New:

- trabecular titanium and tantalum with imitation of 3D structure of bone (for DDH and revisions)



Conventional femoral components

- Titanium alloy with a special roughened surface responsible for osseointegration
- Introduced into clinical practice in late 1980s of last century
- Until recently the gold standard in young patients
- excellent long-term survival results in studies and national endoprosthetic registries
- Corail stem 98,3% survival after 10 years and 14 years postop.



Conventional femoral components - negatives

- Transmission of forces distally with cortical bone hypertrophy in the area of the diaphysis and thigh pain
- Bone resorption of the femoral calcar region and greater trochanter
- Difficult revision surgeries for challenging extraction of well-fixed femoral component

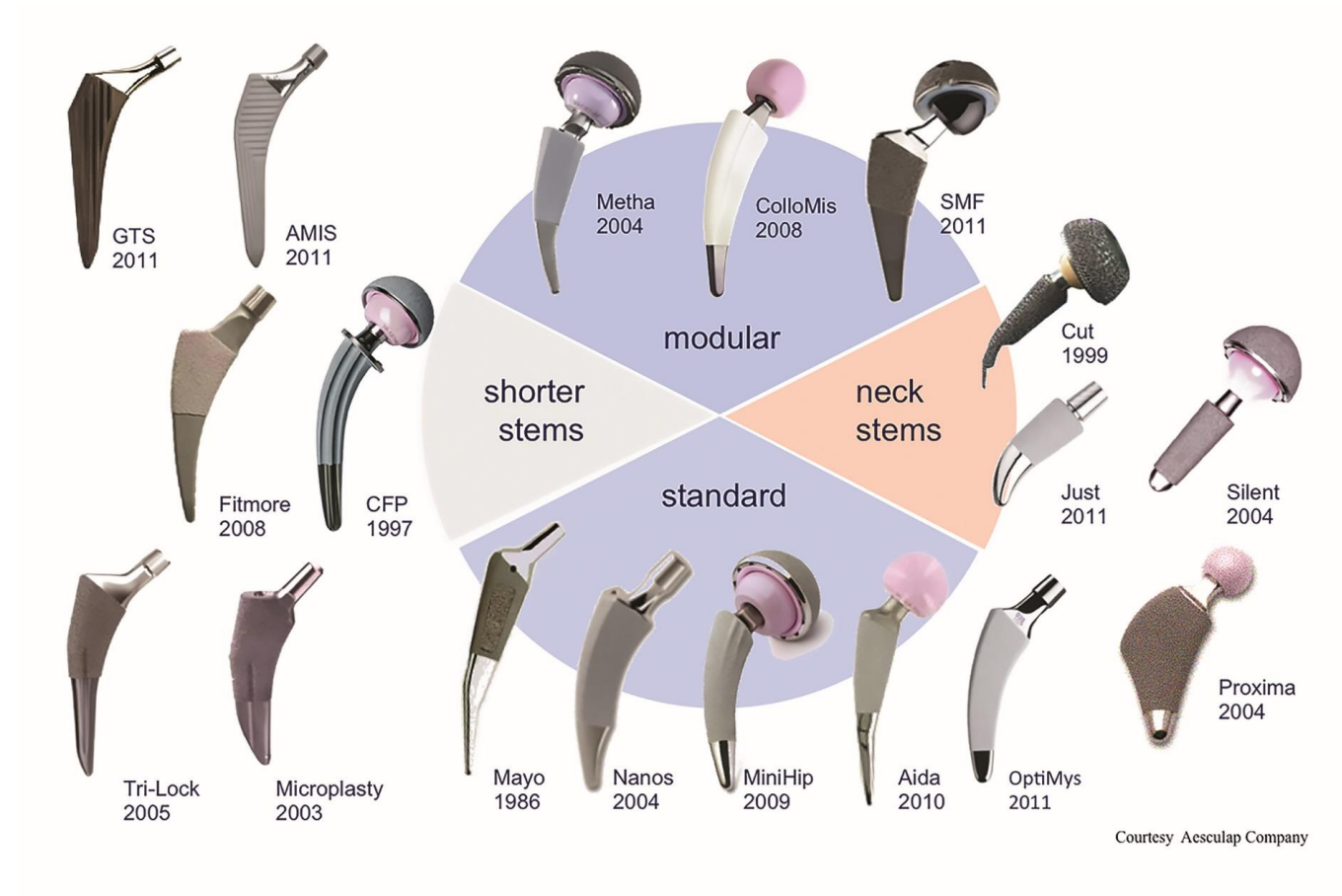


new conservative stems with these characteristics:

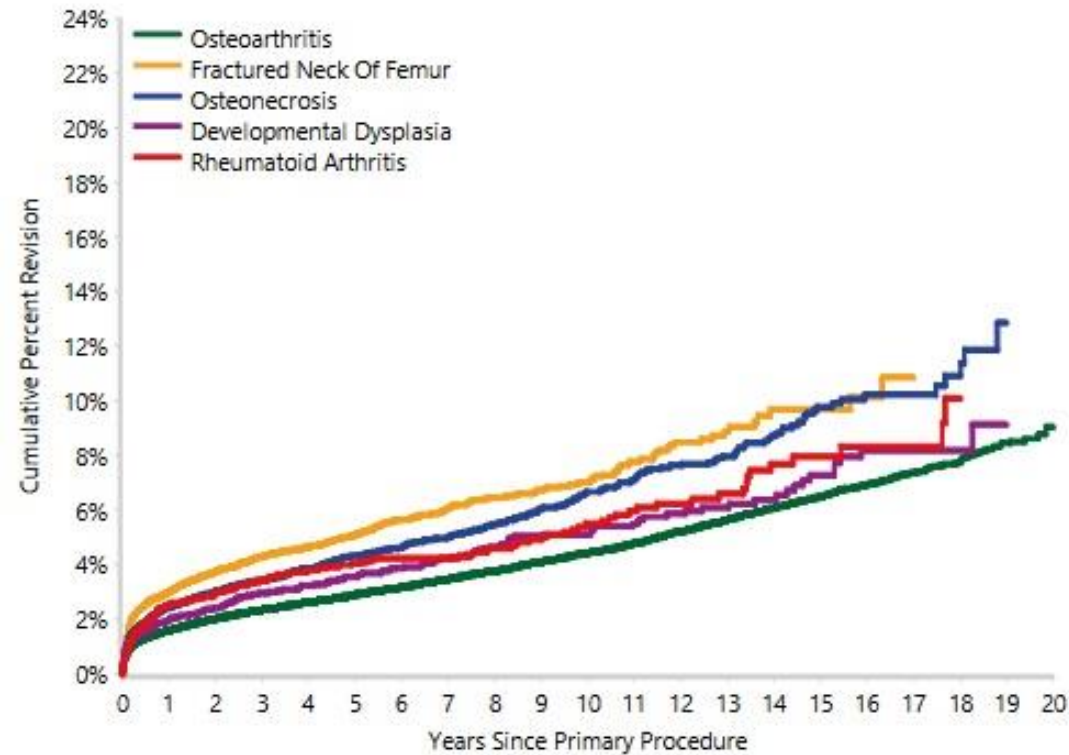
- Reduces invasion in the area of the diaphysis
- Physiological transfer of forces to the area of the proximal femur
- Reduced invasion to the region of the greater trochanter
- Easier revision surgeries



Conservative femoral components



Surviving of total hip replacement



Australian national joint register Annual report 2021



Femoroacetabular impingement (FAI)



- Pathological contact between the head and the edge of the acetabulum, which causes damage of the labrum with the development of osteoarthritis at the young age

Types:

1. Cam – deformity of the femoral head (oval shape)
2. Pincer - abnormal shape of the acetabulum

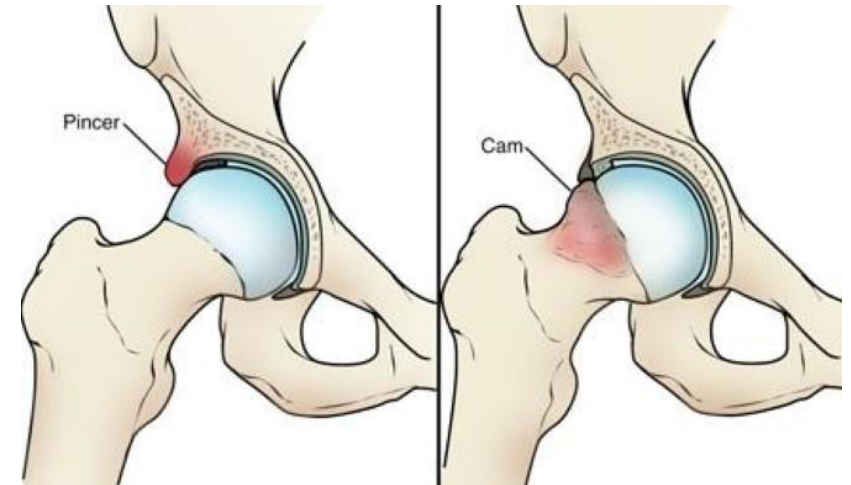
Symptoms:

- Pain in edge positions during abduction and rotation, stiffness
- Impingement clinical test (Flexion+Adduction+IR)

Diagnostic : x-ray AP + axial view

Therapy:

- In case of resistance to conservative treatment arthroscopic resection of bone prominence with labrum reconstruction



Strednedobé výsledky ultra-krátkeho anatomického drieku Proxima: analýza 130 prípadov

Mid-Term Results of Proxima Ultra-Short Anatomical Stem: Analysis of 130 Cases

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ABSTRACT

PURPOSE OF THE STUDY

The aim of this study is to assess the mid-term results of this specific ultra-short, cementless stem in patients younger than 60 years with regard to clinical and radiographic outcomes, survivorship, complication rate and revisions.

MATERIAL AND METHODS

A consecutive series of one hundred and twenty-one patients (130 hips) younger than 60 years at the time of surgery was enrolled in the study. Primary arthritis (33.8%) and dysplastic hips (30%) were the most common diagnoses. The patients used crutches for 6 weeks to protect femoral components against subsidence and rotational stress. The mean follow-up was 118 months (range 96-156 months).

RESULTS

At the final evaluation, the mean Harris Hip Score was 98.8. A perioperative periprosthetic fracture occurred in two hips and a perioperative ceramic insert breakage was observed in one hip. One hip had ceramic insert fracture 3.5 years post-operatively. In one hip a dislocation occurred. These two hips (1.5%) were revised due to reasons not associated with the stem. One hip has aseptic asymptomatic polyethylene inlay wear. In two hips squeezing was reported. There were two cases of loosening and migration of stems (1.5%) with osteolysis all around the stems. These patients have moderate thigh pain. The radiological survival is 98.5% and the clinical survival is 100% after 10 years on average.

DISCUSSION

Although improved clinical results were reported in younger patients with standard cementless stems, some problems still prevail: thigh pain, proximal stress shielding, difficult removal of the stem. In an effort to reduce these problems, Proxima ultra-short anatomical cementless stem was developed. Several studies show that this stem design provides good short- and mid-term results, but only in a limited number of patients and relatively short follow-up. Furthermore, the initial fears of early aseptic loosening due to the absence of diaphyseal fixation were not confirmed.

CONCLUSIONS

Proxima ultra-short anatomical cementless stem provided excellent mid-term clinical and radiographic results in patients younger than 60 years.

Key words: total hip arthroplasty, ultra-short cementless anatomical stem.

ÚVOD

Publikované výsledky konvenčných necementovaných driekov totálnej náhrady bedrového kĺbu (TEP) sú väčšinou veľmi dobré (16, 18, 22). Tieto endoprotézy majú niekoľko málo nevýhod, ako sú: bolesti v stehne; fenomén periprotetickej kostnej resorpcie („stress shielding“); strata kosti proximálneho femuru pri implantácii či problematická extrakcia dobre integrovaného štandardného necementovaného drieku pri reoperáciách (13, 14). Vzhľadom k tomu, že necementovaná femorálna komponenta TEP je implantovaná obvykle mladším a aktívnym pacientom s dobrou kvalitou kosti, je dôležité minimalizovať kostnú stratu pri primárnej implantácii s ohľadom na pravdepodobnú revíziu operáciu v budúcnosti. Z týchto dôvodov boli postupne vyvíjané a zavedené krátke (do 12 cm) až ultra-krátke drieky (6).

Necementovaný driek TEP bedrového kĺbu Proxima (De-Puy, Leeds, Veľká Británia) patrí medzi ultra-krátke

anatomické drieky bez diafyzárnej fixácie (typ III podľa Feyena a kol.), ktorý vychádza filozoficky aj konštrukčne z individuálne vyrobeného krátkeho drieku Francesca Saveria Santoriho (6, 25).

Proxima má klinovitý tvar s laterálnym výbežkom („lateral flare“), ktorý tomuto drieku poskytuje vertikálnu stabilitu. Je vyrobený z titánovej zliatiny (Ti-6Al-4V) s hydroxyapatitovou vrstvou Duofix™, zodpovednou za sekundárnu osteointegráciu. Povrch komponenty má unikátnu schodovitú štruktúru, čo zväčšuje povrchovú plochu implantátu pre osteointegráciu a minimalizuje strižné sily pri zaťažení. Metafyzárna fixácia a zachovanie krčku femuru pri implantácii pomáha redukovať distálnu migráciu komponenty a poskytuje jej torznú stabilitu (17). Implantát má 9 veľkostí („standart“ a „high-offset“ v pravo- a ľavostrannom prevedení). Táto endoprotéza bola zavedená do klinickej praxe na Slovensku





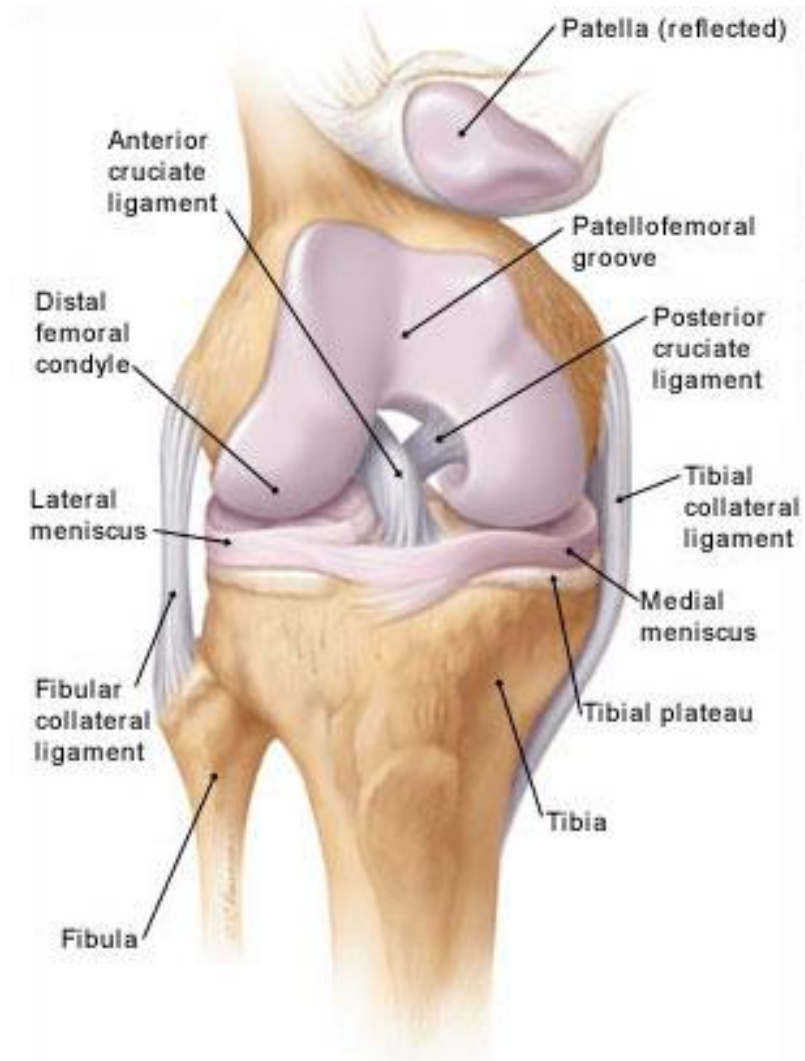
Diseases of the knee joint

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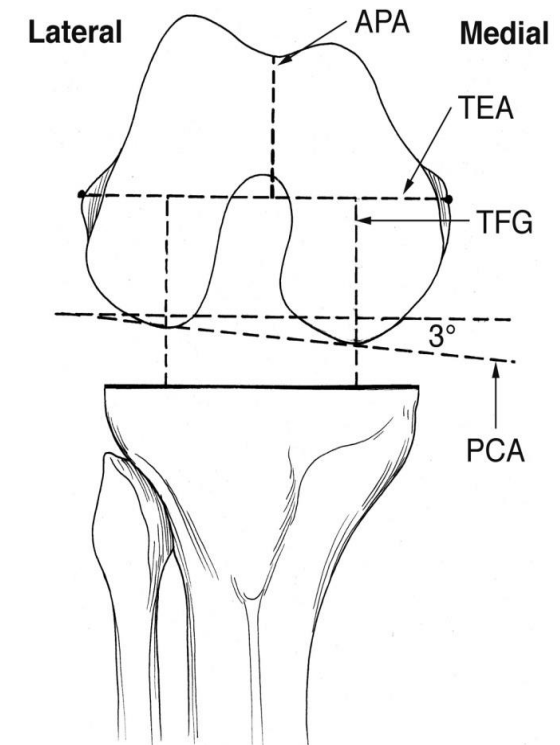
Anatomy of knee joint

- Complicated, locked hinge joint
- 2 joint spaces:
 1. Tibio – femoral joint
 2. Patelo - femoral joint
- Stabilizers:
 1. Static stabilizers: ligaments, meniscus
 2. Dynamic stabilizers: muscles, tendons



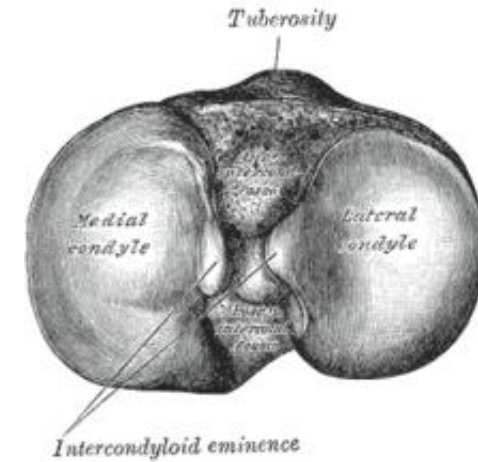
Bone anatomy - femur

- *Lateral condyl*
smaller radius – spherical shape
smaller in all dimensions
- *Medial condyl*
Bigger radius – ellipse shape
- *Interkondylar sulcus*



Bone anatomy - tibia

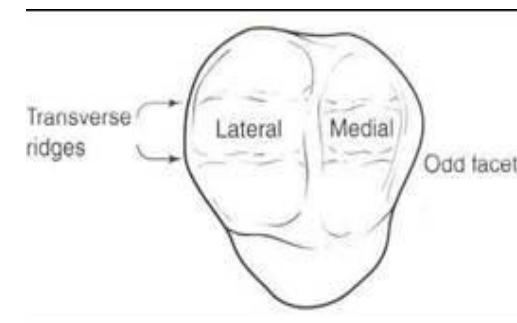
- *Medial condyle*
bigger surface
circular shape
concave surface
- *Intercondylar eminence*
- *Lateral condyle*
smaller surface
oval shape
convex surface
- posterior slope 10 $\pm$ 4 deg.



Bone anatomy- patela



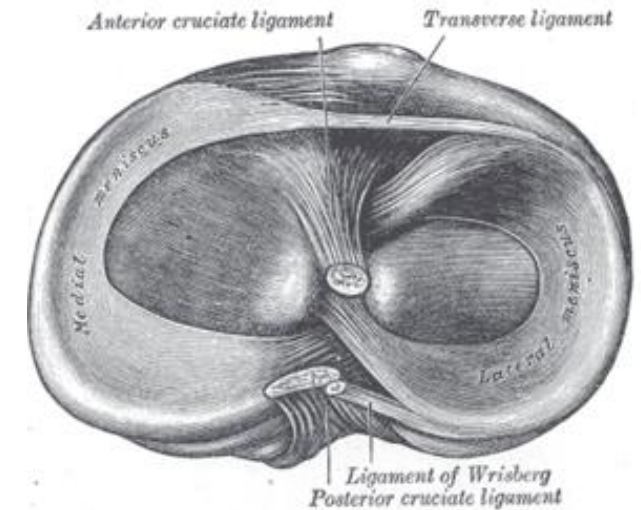
- Biggest sesame bone in quadriceps muscle, divided by a central ridge
- Consisting of 7 facets
- Medial and lateral facet divided into 3 parts
- Medial half usually smaller
- Strong hyaline cartilage (5,5 mm)



Anatomy - menisci



- **Medial meniscus:** shape C, secondarily takes over the function of anterior stability in case of insufficient ACL
- **Lateral meniscus:** shape O, anchored by anterior (Humphrey) and posterior (Wrisberg) menisco-femoral ligament to the medial femoral condyl
- **Function:** load transfer
Extension - 50% of load, Flexion 85% of load
Resection of 15-34% increase pressure by 350%
- Average excursion of the menisci during flexion
5,2 mm medial
11 mm lateral – smaller anchorage, popliteal window



Kinematics of knee joint

- basic range of motion
 - flexion/extension 0-140
 - varus /valgus 6-8 deg. in extension
 - intra/extrarotation 25-30 deg. In flexion
- Normal walking on the plane 0-70 deg.

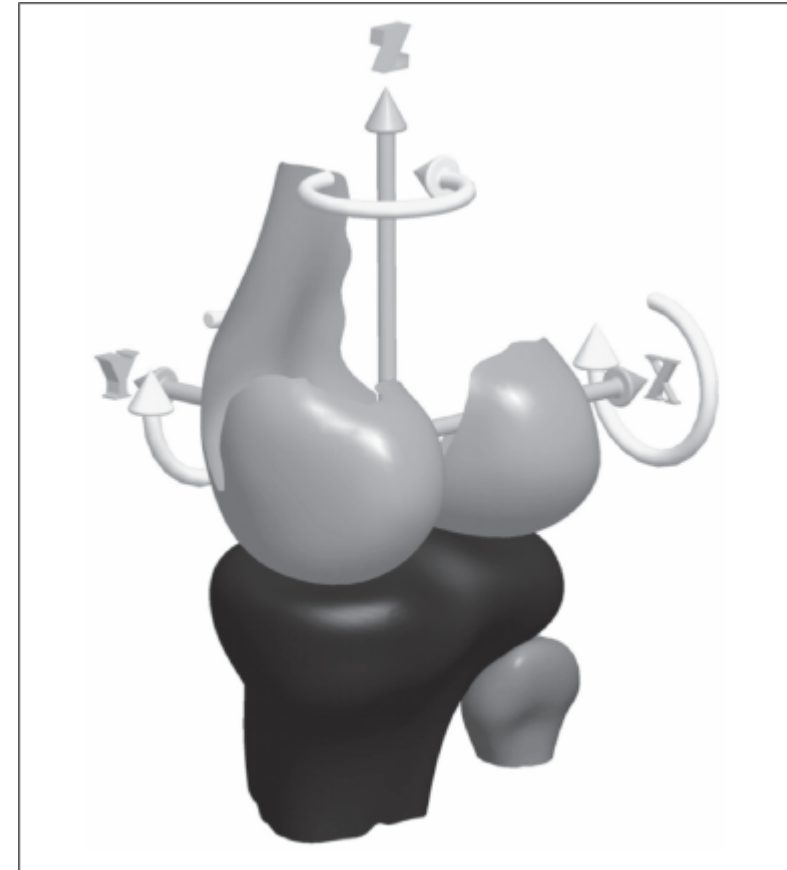
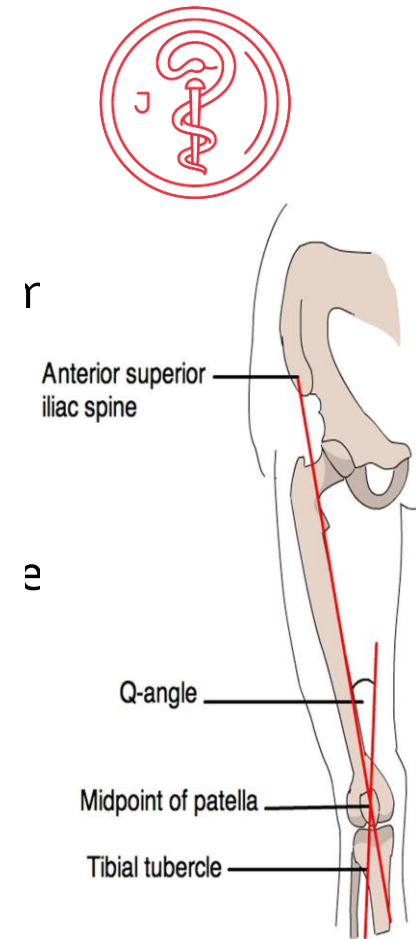


Figure 1 – Knee movements.



Frontal axis

- **Mechanical axis** (centre of femoral head and the center of ankle joint)
anatomic axis
- allows an even load of medial and lateral compartment
- **Q-angle** – line between Spina iliaca anterior superior/middle of patella
middle of patella/ tuberositas tibiae - important for stability of patella
 - In extension: men 13 deg., women 18 deg.
 - in 90 deg. of flexion: 8 deg.
- Valgus/Varus deviation increases the load on one compartment



Genu varum

- Axial deviation in the frontal plane
- More common, forefoot deviated medially
- Physiological genu varum : 10-15 degrees up to 2 years of age

Etiology:

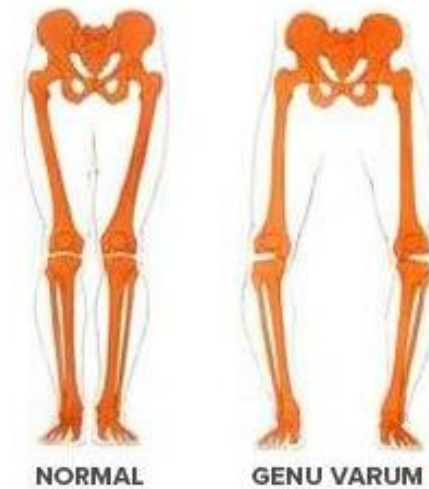
children - m.Blount, skeletal dysplasias, metabolic bone diseases

adults - osteoarthritis, post-traumatic deformity, rheumatoid arthritis

Diagnostics: long X-ray image of lower extremity – we evaluate the anatomical axis of the tibia and the mechanical axis of the femur

Therapy: conservative – orthoses

operative: corrective osteotomy – open wedge proximal tibia, endoproshtesis (unicompartmental, total)



Morbus Blount (infantile tibia vara)



- osteochondroncrosis of the medial part of proximal tibial metaphysis possibly and teh medial part of the growth plate and epiphysis
- localized circulatory disorder of unknown etiology
- Often present medial instability of the knee

Forms: 1. **Infantile** up to 3 years, more severe, often bilateral

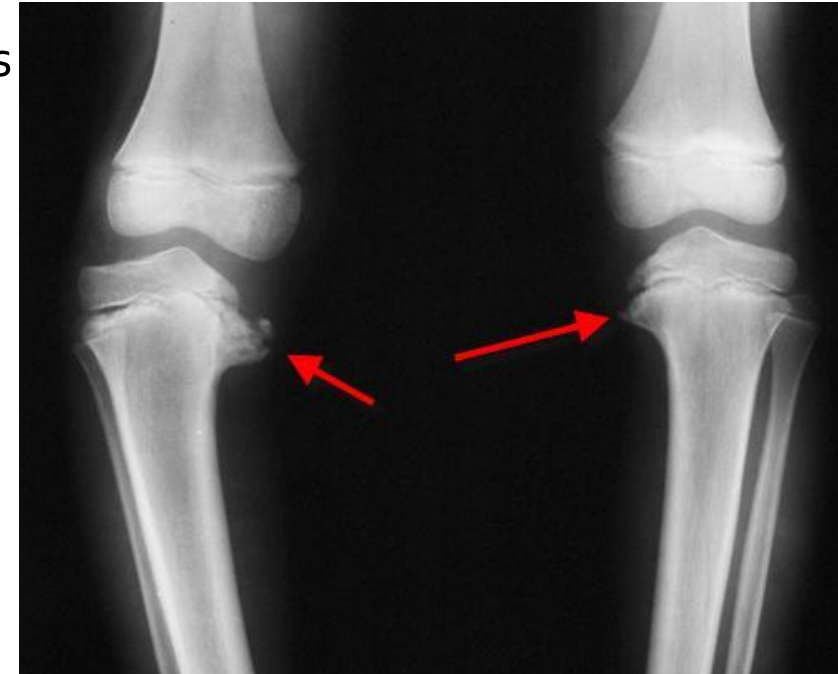
2. **Adolescent** over 8 years, mostly unilater

Diagnostics:

X-ray – beak-like protrusion of the methaphysis, narrowing of the medial part of the epiphysis časti epifýzy, metadiaphyseal angle more than 16 degrees

Therapy: **conservative** – splinting

operative – corrective osteotomy in the metaphysis up to 4 years



Crus varum

Congenital forefoot pseudoarthrosis

- varosity and antecurvation of forefoot with x-ray finding of pseudoarthrosis of tibia and possibly also fibula

Therapy

- Resection of the pseudorathrosis with osteosynthesis with intramedular nail or external fixation after the 3rd year



Genu valgum



- Axial deviation in the frontal plane
- Less common, deviation of the forefoot laterally
- Physiological valgus between 2-6 years up to 8 degrees

Etiology:

- osteoarthritis with dominantly affected lateral compartment
- Posttraumatic deformity, rheumatoid arthritis

Diagnostics:

Long x-ray of lower extremity, we evaluate the degree of deviation
Of anatomical axis of the tibia and the mechanical axis of the femur

Therapy: **conservative:** orthoses

operative: corrective osteotomy – closed wedge of the distal femur
medial epiphysodesis of the distal femur, endoprosthesis (uniEP, TEP)



Genu recurvatum

- Hyperextension in the knee joint of varying degrees

1. Physiological

- patients with generalized hypermobility

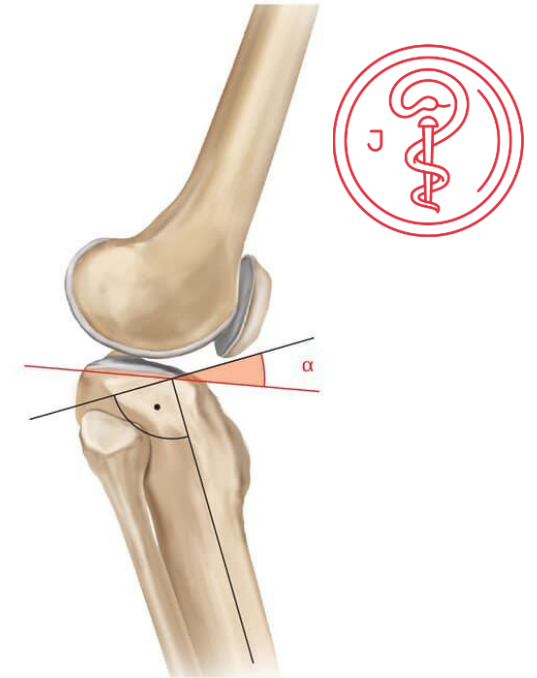
2. Pathological

- Children: congenital dislocation of the knee joint
- Adults: systemic diseases, disorders of collagen synthesis (Marfan's syndrome), post-traumatic instability (LCP), consequences of poliomyelitis disease

Diagnostics: lateral x-ray of the knee in standing position

Therapy:

- According to the ethiology of the deformity



Congenital knee dislocation

Ethiology: associated with systemic disease
(arthrogryposis, Larson syndrome, myelodysplasia)

Clinical picture:

- Knee joint in hyperextension, shortened quadriceps muscle
- Palpable condyles in the popliteal fossa by dislocation

Forms: **Type 1** – knee in hyperextension, flexion possible up to 90 degrees

Type 2 – tibia subluxated in front of the femur, reponible

Type 3 – irreponible dislocation, flexion impossible

Therapy: conservative – pasive excercise, cast, splints

operative – between 3 and 6 months – open reduction – release and elongation

Of the quadriceps muscle, release of anterior capsule and collateral ligament, LCA transposition

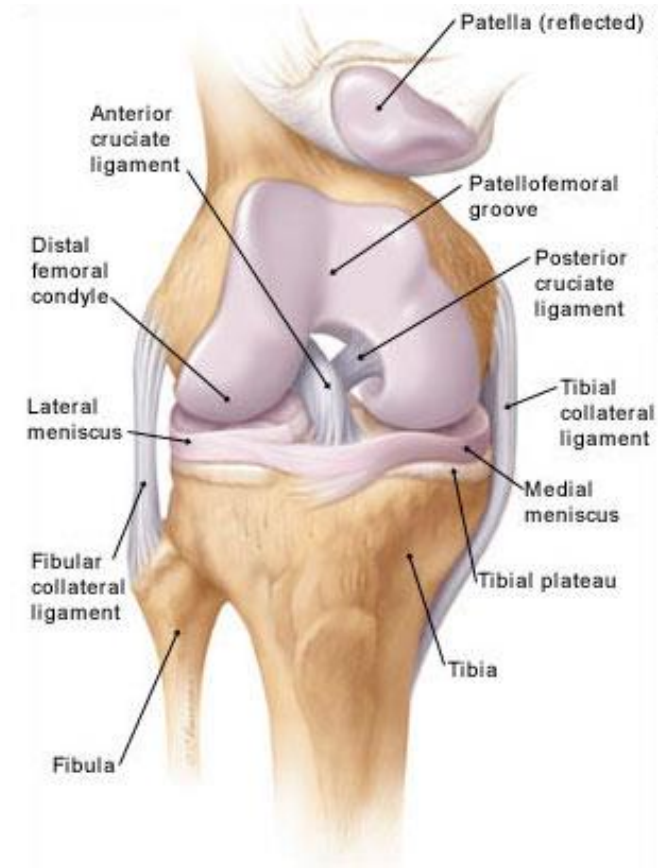


Soft knee injuries

- **Etiology:**
- - Direct or indirect mechanism (more frequent)
- - abduction or adduction of forefoot with its rotation
- - Sports injury (70%) – football, skiing

Type of injury:

- A. Meniscus lesions
- B. Ligaments lesions
- C. Lesions of cartilage – chondral and osteochondral fractures

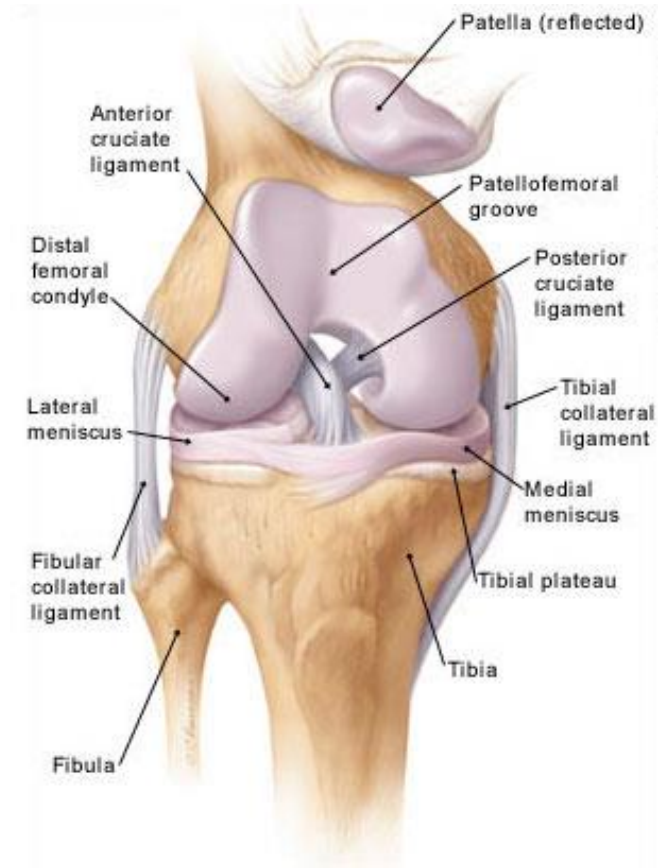


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A. Meniscus lesions

Etiology:

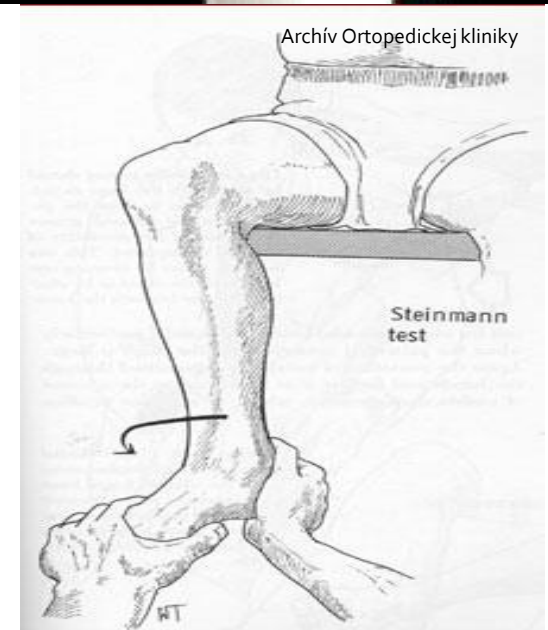
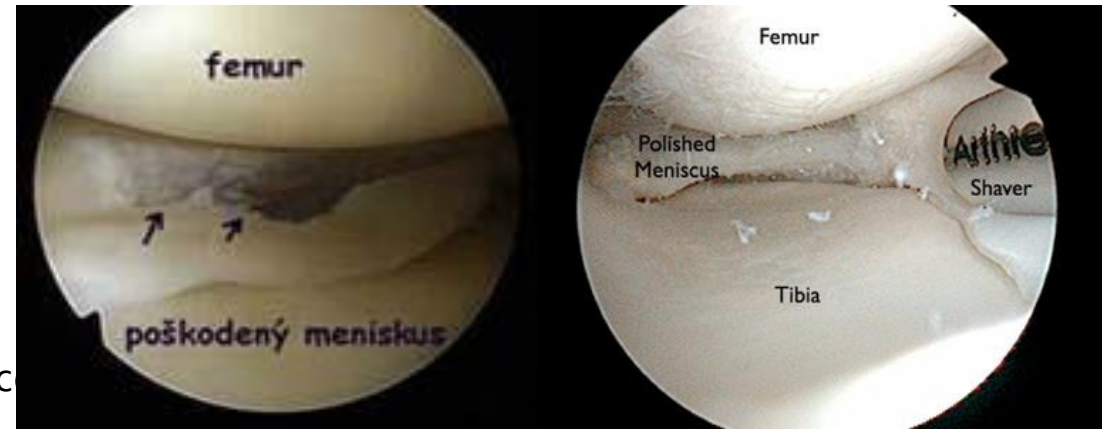
- trauma - (compression, rotation, valgus stress)
- degenerative (gonarthrosis)

Diagnosis:

- Subj: anamnesis, pain, movement restriction
- Obj: block, swelling, effusion, painful palpation of the joint space (McMurray)
- MRI examination – unclear clinical picture

Therapy:

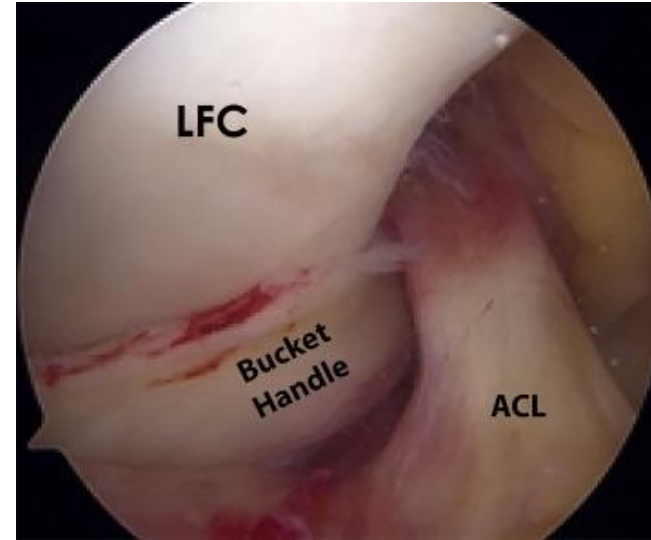
- conservative – bandage, rehabilitation
- surgical – arthroscopy
 - suture: fresh bucket handle lesions in red-red zone (10% of lesions)
 - menisectomy: removal of the damaged part of meniscus partial or subtotal
- Indication for acute arthroscopy: block of knee, hemarthrosis with fat drops



Meniscus suture

- only 10% of all lesion suitable for suture
- localized in red-red zone – to 4mm
- Ideal to 8 weeks from injury
- Technique:
 1. inside – out – all part of meniscus
 2. outside-in – middle and anterior part
 3. all-inside with implant – dominant technique
Rapidlock, Truespan

Imobilisation for 6W and knee relief after suture



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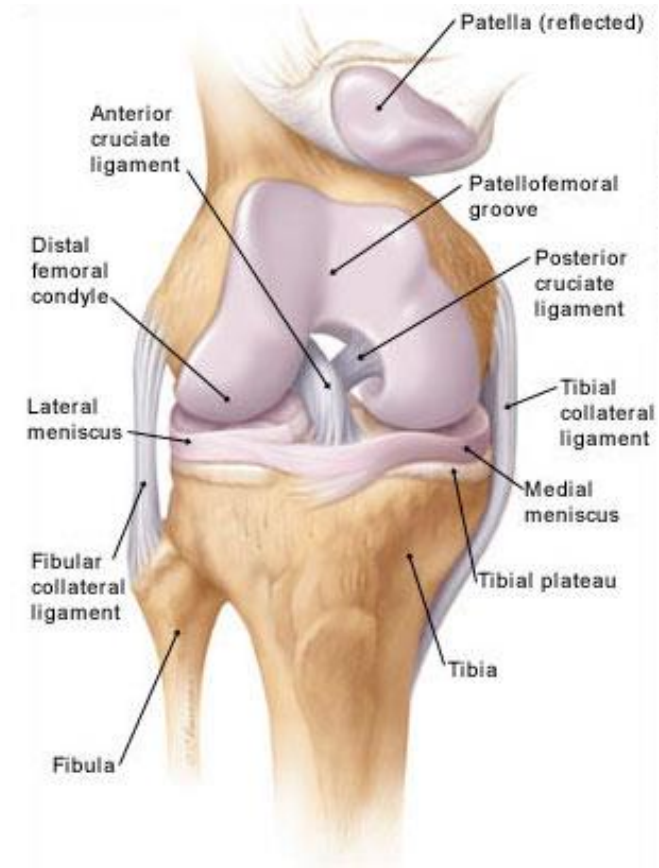


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- I. Instability with primary lesion of capsular stabilizers

1. Medial instability (90%) – abduction and ER of forefoot
lesions of: MCL, menisci, possibly cruciate ligaments

2. Lateral instability (uncommon) – adduction and forefoot rotation
lesions of: LCL, menisci, cruciate ligaments, posterolateral complex

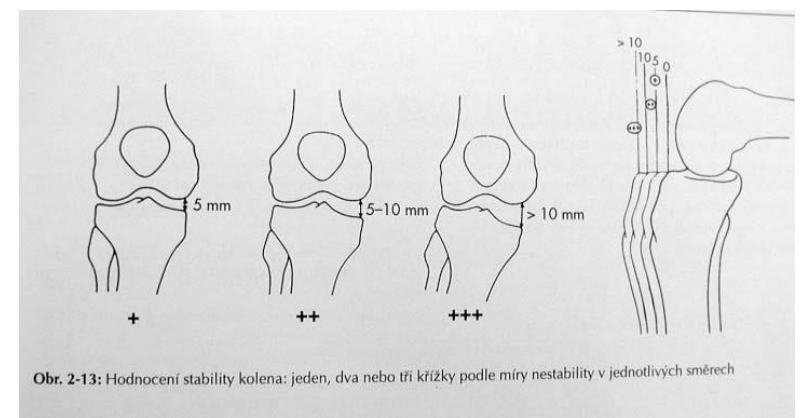
3. Hyperextension instability – rare - violent hyperextension lesions: posterior capsule, one or both cruciate ligaments

- II. Isolated lesion of cruciate ligament

1. Lesion of ACL – violent external rotation of forefoot
2. Lesion of PCL – direct force on the front of the knee in flexion (dash board injury)



Degrees of ligament injuries



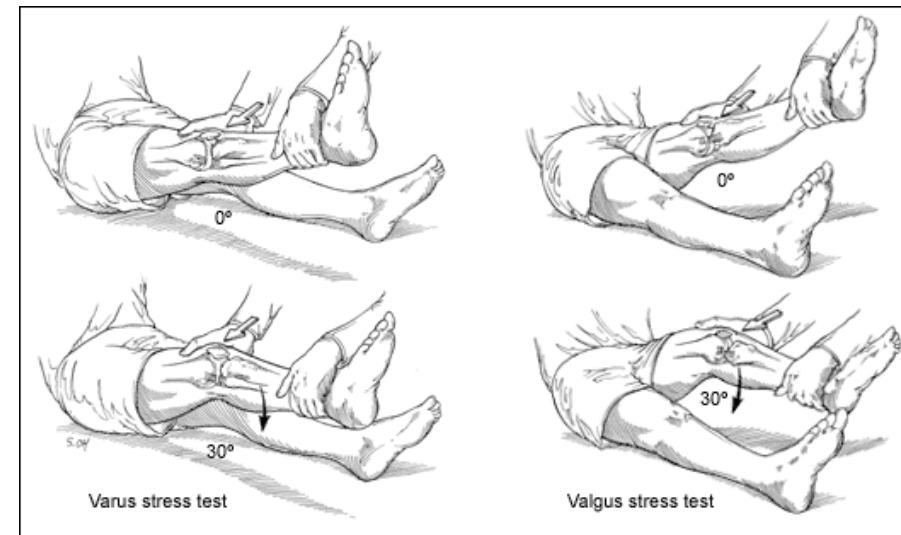
- **I. stretch** – local pain, mild swelling, no signs of instability, healing after 2-4 weeks
- **II. partial lesion** – local pain, swelling, signs of light or middle instability, healing after 4-6 weeks
- **III. complete lesion** – moderate pain, swelling, instability, healing after 6-8 weeks

Diagnosis:

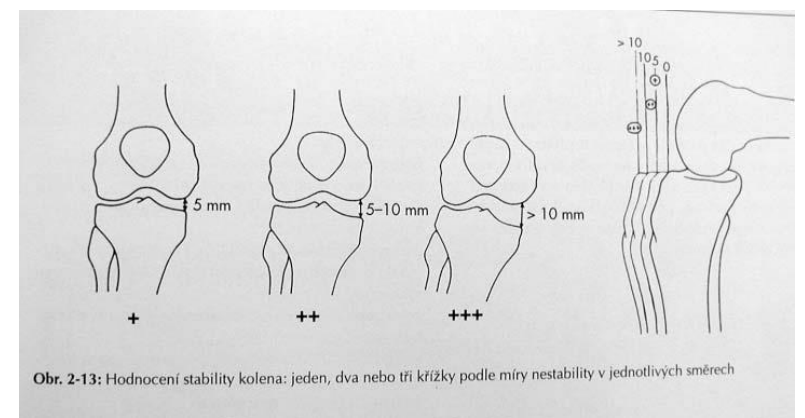
- subj: anamnesis, pain, instability
- obj: restriction of movement, swelling, hemarthrosis

Clinical signs: collateral ligaments: stress tests,

- ACL : anterior drawer test, Lachman test
- PCL : posterior drawer test



Degrees of ligament injuries



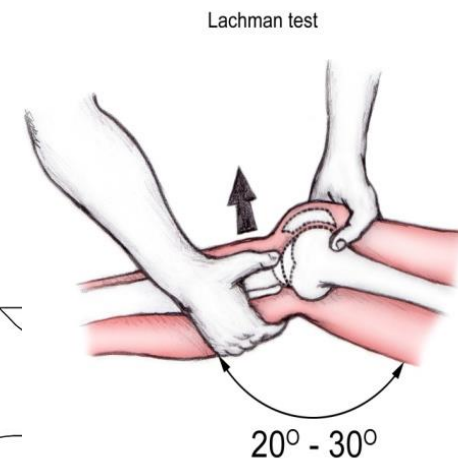
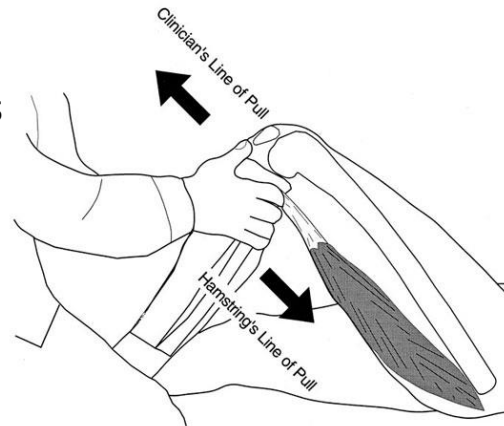
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Clinical signs: collateral ligaments: stress tests,

- ACL : anterior drawer test, Lachman test
- PCL : posterior drawer test



Cruciate ligament lesions



Etiology:

ACL – indirect, violent abduction and extrarotation (skiing, football)

PCL – typically dashboard injury, hyperextension

ACL 10x more frequent than PCL

Diagnosis:

Clinical tests: ACL (anterior drawer, Lachmann), PCL – (posterior drawer)

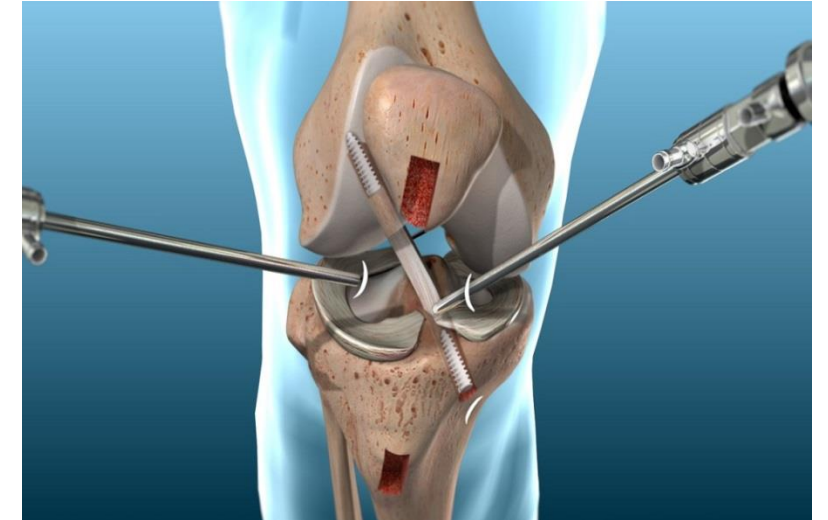
MRI

Therapy:

conservative: rhb – drilling of thigh muscles, quadriceps (swimming, cycling)

Operative: arthroscopy - persistence of instability after rhb in young patients

1. BTB graft – tendon of lig. proprium patellae - gold standard
 2. STG graft – tendon of m.semitendinosus and m.gracilis
- fixation of graft in bone tunnels with interference screws, pins.



Colateral ligament lesions



Mechanism:

MCL – direct abduction and extrarotation, force from lateral side - contact sports

LCL – hyperextension and external rotation, often a combined injury

MCL 15x more frequent than LCL

Diagnosis:

Clinical examination : stress tests

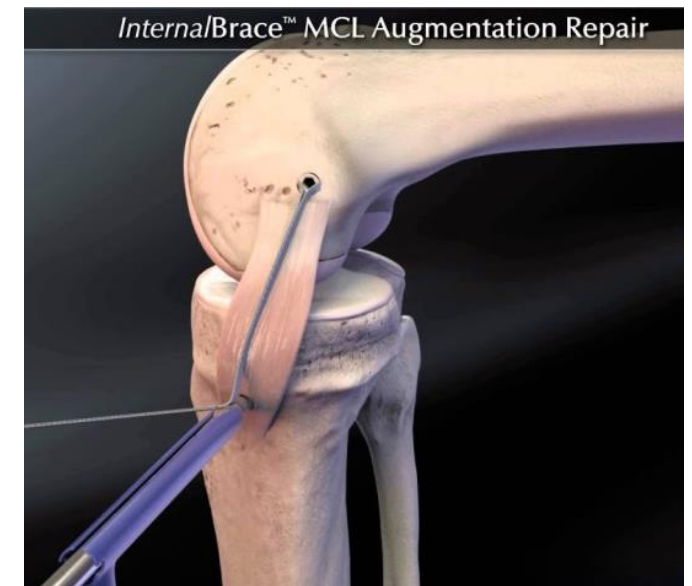
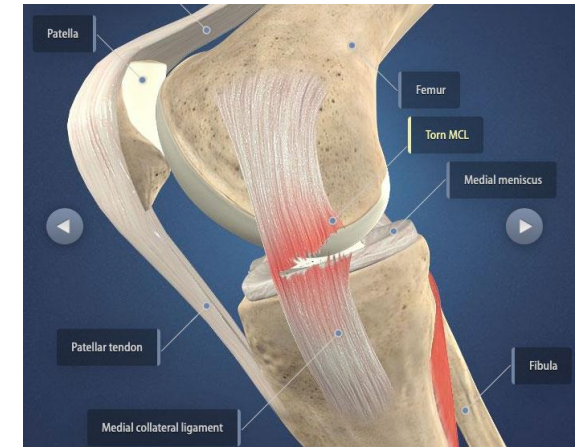
MRI examination

Therapy: conservative – orthosis, plaster splint – spring or partial lesions

operative – absolute indication – total lesion of lateral complex

relative indication – total lesion of MCL

suture, possibly augmentation with internal brace



Extensor apparatus injury

Etiology : direct or indirect

Localisation: 1. rpt. of lig. quadriceps femoris
2. rpt. of lig. proprium patellae

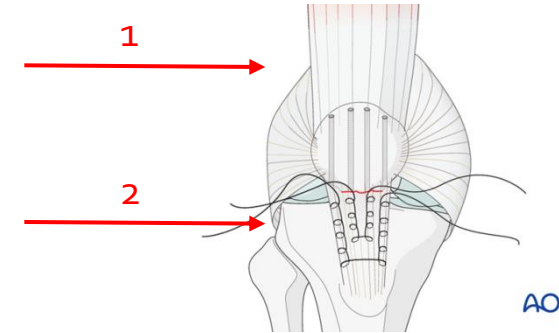
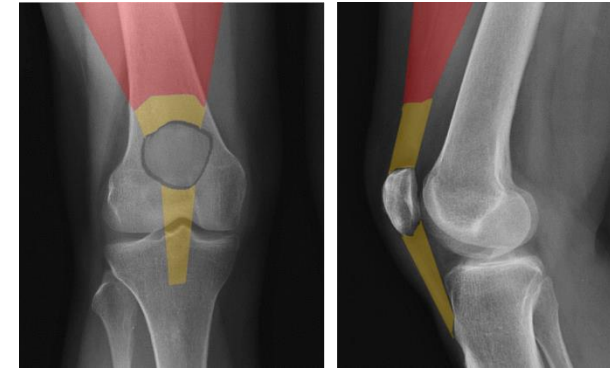
Diagnosis: clinical picture : - palpable defect of tendon
- absence of active extension

sonography

MRI

Therapy:

Krackow stitch with transosseal fixation through bone tunnels

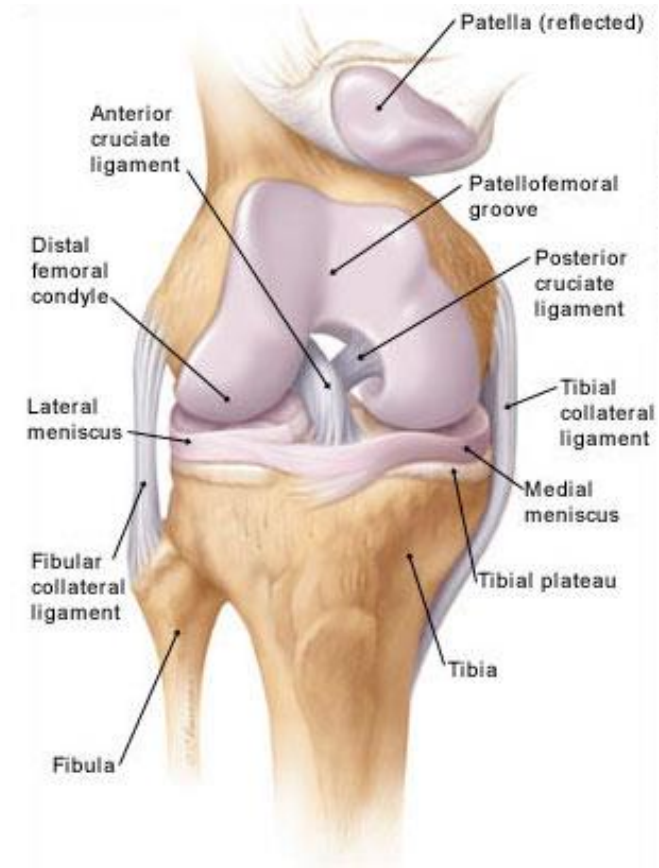


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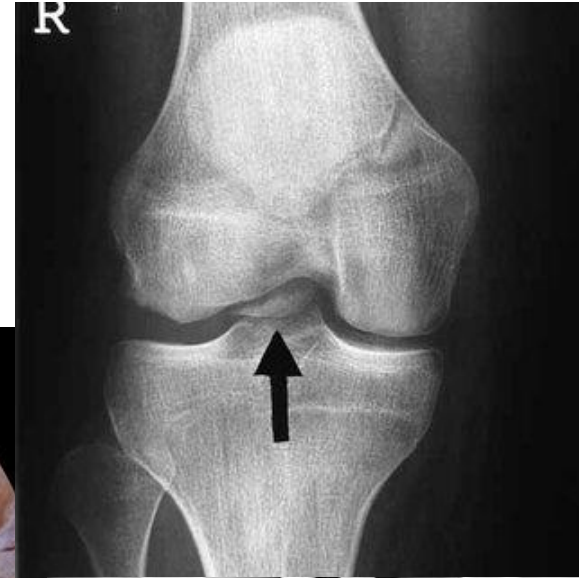
Osteochondral fractures

Clinical picture:

- - hemarthrosis with fatty drops

Diagnosis:

- - puncture
- - x-ray
- - CT possibly MRI



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Therapy:

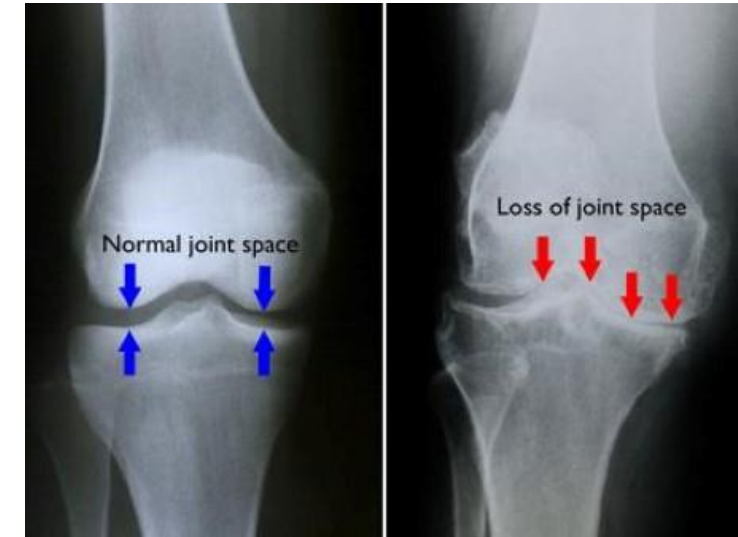
- arthroscopy possibly open fixation of fragment (arthrotomy) with resorbable pins or screws



Gonarthrosis (Knee Osteoarthritis)



- **Definition:** non-inflammatory disease characterized by excessive wear of articular cartilage, subchondral sclerosis, osteophyte formation and soft tissue changes - synovial membrane, joint capsule ligaments and muscles
- **Etiology:**
 1. **primary :** excessive cartilage wear of unclear ethiology
 2. **secondary:** known pathological proces of the knee
 - congenital and developmental defect
 - arthritis (pyogenic, chronic specific and non-specific)
 - aseptic necrosis (necrosis of medial femoral condyl - m.Ahlbäck)
 - postraumatic (intraart. fractures, meniscus lesions, instability)
 - extraarticular axial deformities



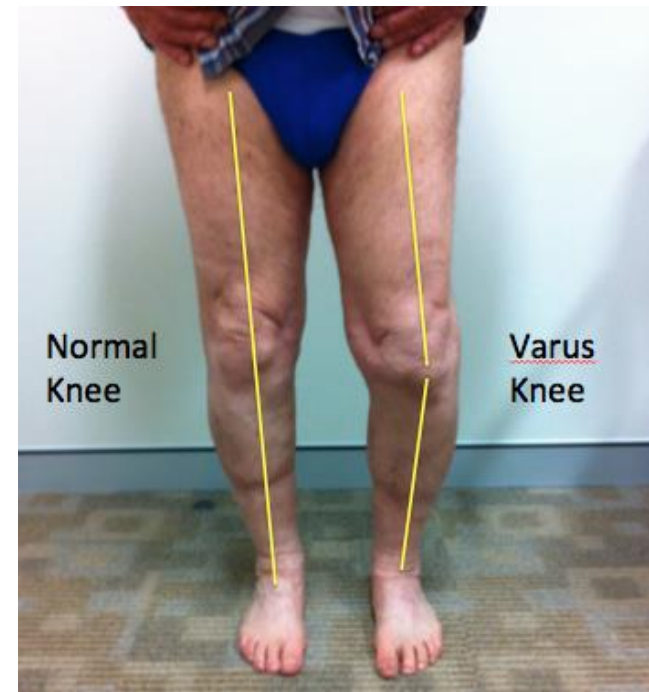
Clinical picture

Subjective signs:

- **Pain:** first during load, later rest and night pain
- **Stiffness:** typically after a period of rest
- **Crepitus** during movement

Objectiv signs:

- Restriction of the range of **movement**
 - first flexion, later extension
- **Axial deviation** of the knee



Clinical examination

- **Palpation** – pain of affected compartment, joint thickening
- Swelling and **effusion** – positiv balotement sign of patela
- Restricted **range of motion** – active and passive
- Axial **deformity** – varus or valgus
- Flexion contracture
- **Colateral ligaments:**
laxicity on convexity a shortenig on concavity

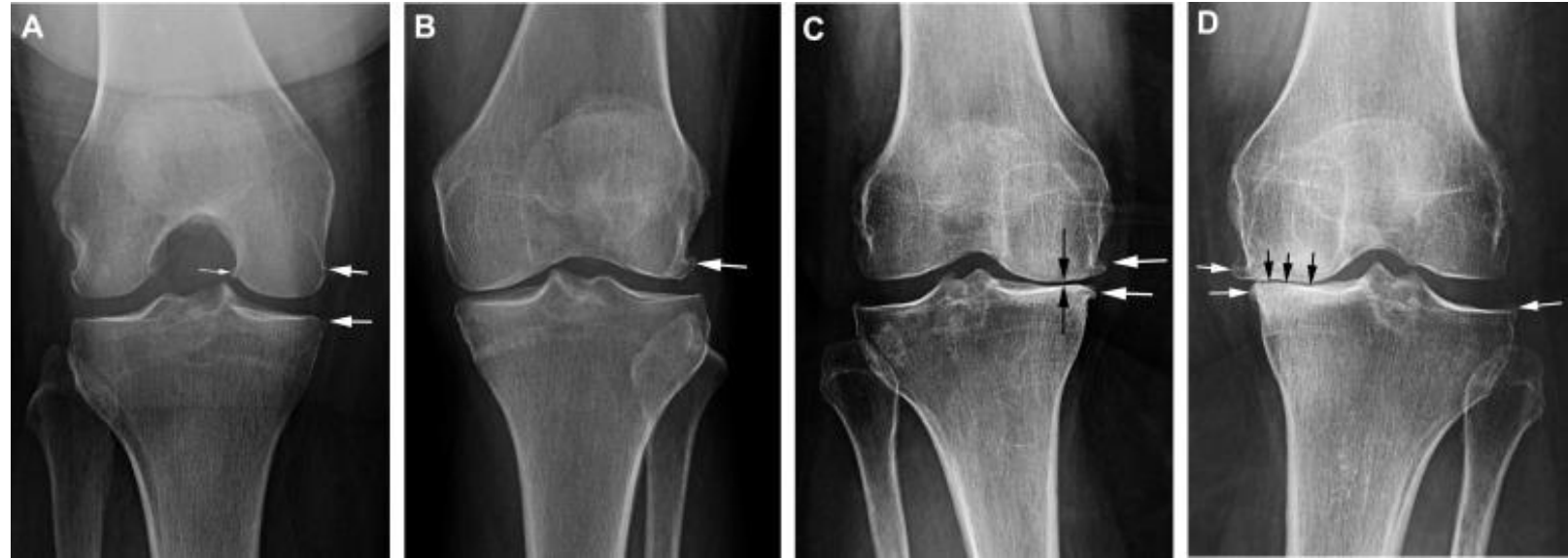


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X-ray examination

- Kellgren – Lawrence classification



1.dg. - subchondral sclerosis, sharpening of intercondylar eminence, small osteophytes

2.dg. - reduction of joint space, marginal osteophytes

3.dg. - marked reduction of joint space, marked osteophytes, formation of pseudocysts, deformity

4.dg. – disappearance of joint space, local necrosis, severe deformities

CT and MRI – usually not necessary to determine treatment



Therapy of knee osteoarthritis



- Conservative

1. medicamentous
2. physiotherapy and physical therapy – hydrotherapy, ultrasound, x-ray therapy
3. orthopedic devices – crutches, corrective orthoses...

- Operative

1. Joint preservation

- arthroscopy
- synovectomy
- corrective osteotomy

2. Joint endoprotheses – unicompartmental or total endoprosthesis

3. Arthrodesis – verry rare



Medicament therapy



- **Analgesics** – **metamizol** (Novalgin pill, inj)

- **Nonsteroidal antirheumatics** (NSA)

COX - 1 inhibitors – nonselective – **ibuprofen, diclofenac, piroxicam**

COX – 2 inhibitors - selective - **nimesulid, meloxicam** – reduction of side effects

patients with gastrointestinal pat., coagulopathy, chron. corticotherapy and anticoagulant therapy

- **Chondroprotectives - SYSADOA** – symptomatic slow acting drugs in osteoarthritis

- affect the metabolism of the chondrocyte, composition of the extracellular matrix, improve the viscoelasticity of synovial fluid and stimulate it's synthesis

1. oral administration : **glucosamínsulfát** (DONA), **chondroitínsulfát** (Condrosulf)

2. intraarticular injection: **hyaluronic acid** (Sinovial, Hyalgan, Monovisc)

- **corticoids** – intraarticular administration in acute synovitis



Arthroscopy, synovectomy

- Arthroscopy:

lavage – removal of loose fragments of cartilage from the joint

shaving – treatment of cartilage defects, removal of unstable parts, that could be loosened

meniscectomy – treatment of degenerative lesion of meniscus

partial synovectomy

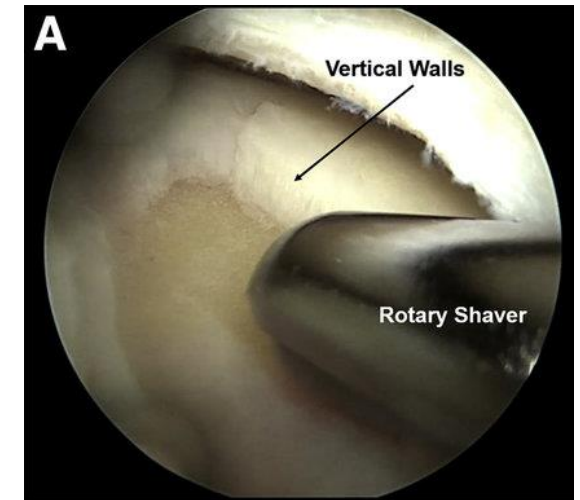
- Synovectomy:

surgical removal of hyperthrophic, inflammatory altered synovia

1. arthroscopy

2. open procedure – arthrotomy

indication: relief of pain and chronic effusion in primary inflammatory diseases (RA, seronegative RA)



Corrective osteotomy

- **Goal of surgery:**
 - Knee axis correction with relief of overloaded knee compartment
- **Indication:**
 - **Starting stages** osteoarthritis – stage I,II
 - good **range of motion** (flexion 90 dg., contracture to 10 dg.)
 - good **stability** of knee (colateral ligaments)
 - young, active patient (to 65 years)

- **Diagnosis:**

X-ray of the whole lower limb standing

- Localisation OT – varus knee – proximal tibia – open wedge
 - valgus knee – distal femur – closed wedge

Important to maintain the horizontal course of joint space postOP!!!



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Hemiarthroplasty

Indication:

- Only one compartment is affected
- More frequent medial compartment (genu varum)
- Good function of collateral ligaments and LCA!
- Correctable axial deformity
- Oxford (Zimmer) uni knee:
8% of all knee replacements in Australia *
revision rate 13% after 10 years

Benefits:

- Quicker recovery, bigger range of motion
- Possibility conversion to TKR in the future

* Australian national register report 2018



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Total knee replacement (TKR)

- Replacement of both support compartments possibly patella
- In Slovakia more than 5000 TKRs per year (SAR)
- Reliable long-term survival results

Indication: gonarthrosis III,IV. with diffuse involvement of all knee compartments

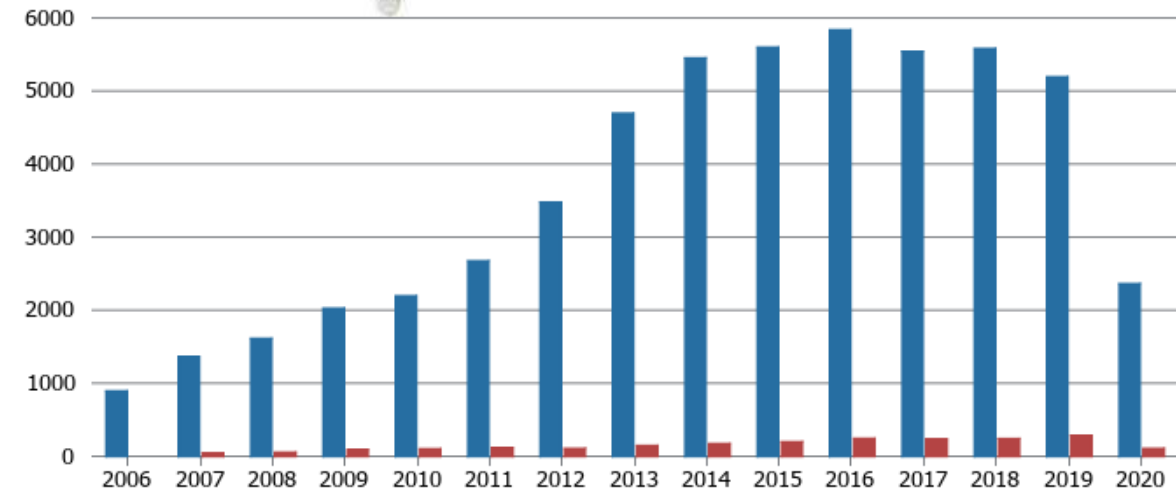
Goal of surgery: stable joint with good range of motion

Components:

- metal femoral a tibial component
- polyethylen insert
- fixation with bone cement

Surgical technique:

- Protection of PCL, MCL, lateral stabilizers
- Measuring the tension of collateral ligaments in extension and flexion in order to create an identical space between components at the same ligament tension



Slovak arthroplasty register



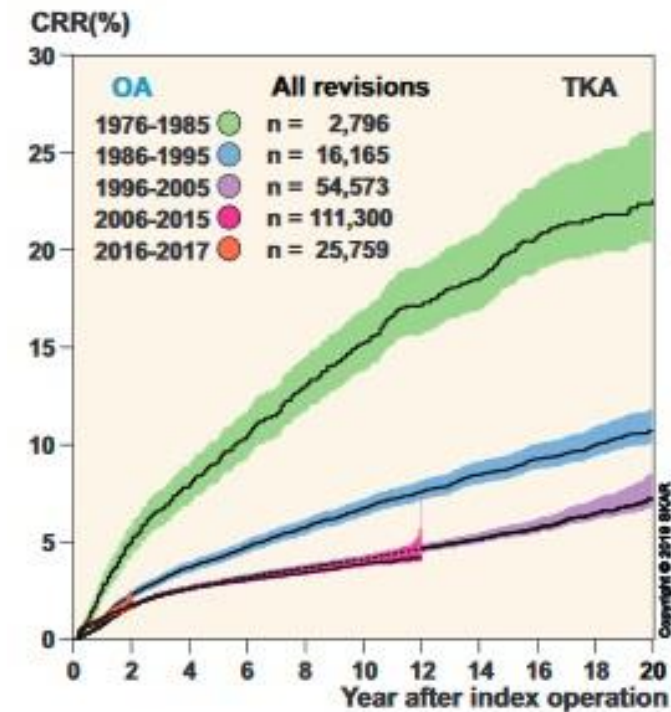
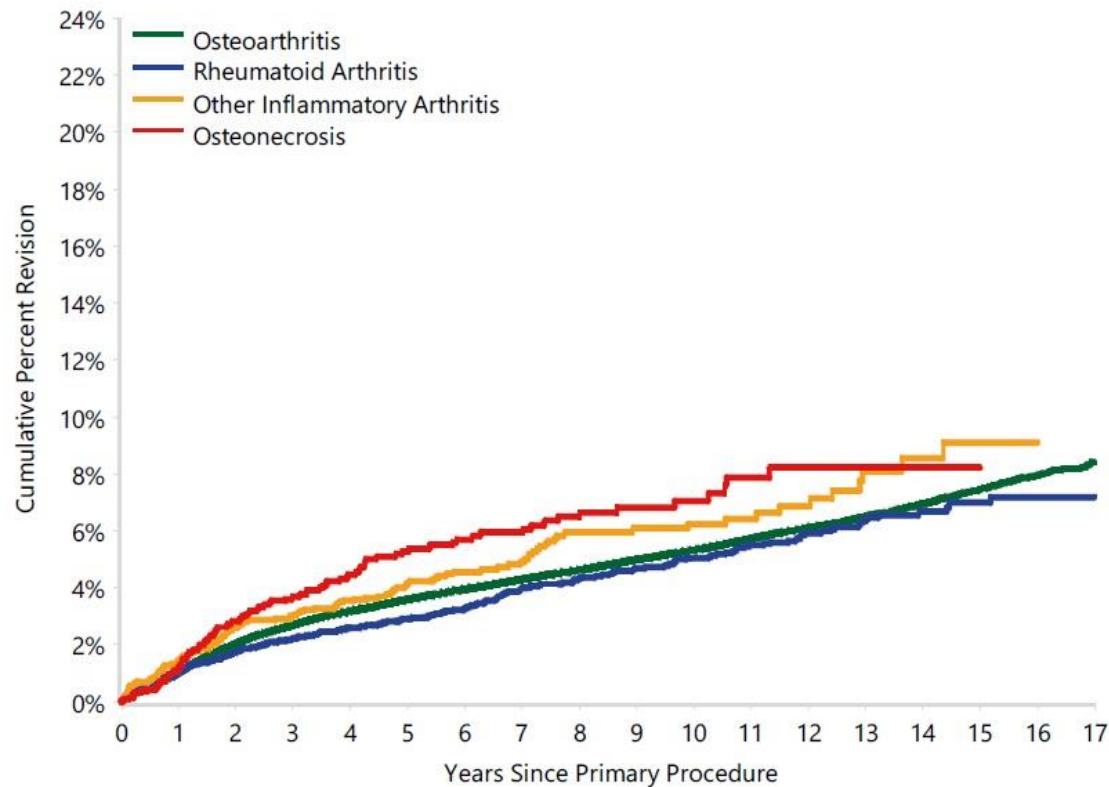
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Survival rate of TKR



- Reliable long-term survival results from national joint registries



M. Osgood - Schlatter

- Involvement of the proximal apophysis of the tibia
- Boys between 10-15 years

Etiology:

traction tendinitis with subsequent partial avulsion of the apophysis during repeated loading

Clinical picture:

Subjectiv: pain in the tuberosity area lasting 12-45 months

Objectiv: swelling in the area, painful palpation

X-ray: possible fragmentation of the apophysis

Therapy:

conservative : restriction of movement activities, local cold and NSA, orthosis - tape

operative: extirpation of the demarcated symptomatic fragment in adult age



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M. Sinding - Larsen

- osteochondrosis of the lower edge of the patella by traction tendinitis due to repeated overloading of the extensor apparatus
- between 10-14 years of age

Clinical picture:

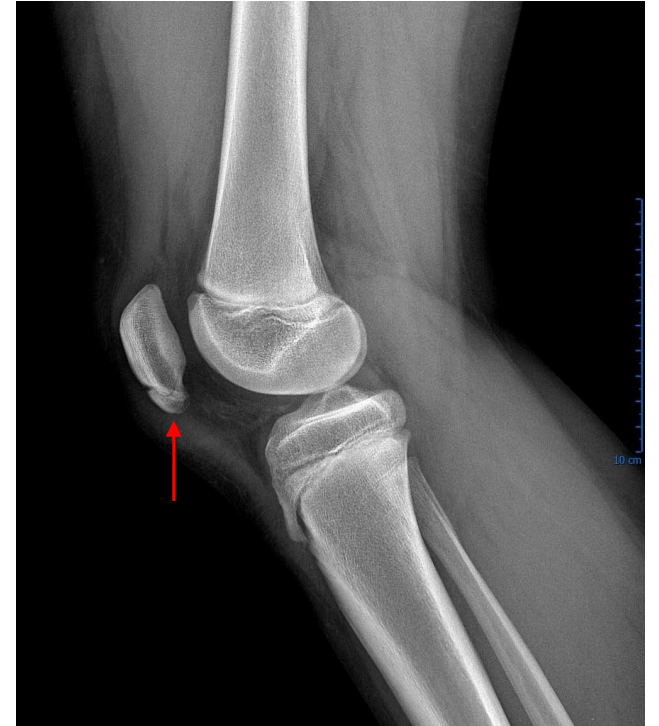
- pain and pressure sensitivity at the lower pole of the patella

X-ray:

- Fragmenttation or elongation of the lower pole of the patella

Therapy:

- conservative : identical to m.osgood Schlatter



Jumper's knee – tendopathy of lig. patellae



- Tendinopathy of the proximal attachment of lig. patellae

Etiology:

- Athletes with increased load on the extensor apparatus

Clinical picture:

- Pain at the lower pole of the patella

Diagnostics:

X-ray – calcification in the attachment area +

MRI – dystrophic changes

Therapy:

Conservative – load reduction, NSA, physical therapy, patellar tapes

Operative – resistant cases – tendon revision, drilling of the distal pole of the patella



Osteochondritis dissecans

- Local aseptic subchondral necrosis in adolescents
- 2-3 times more often boys

Etiology: unclear

- theory exogenous and endogenous trauma, possible ischemia and genetic factors

Location of the defect: medial femoral condyle (80%), lateral femoral condyle (15%)

Forms:

1. **Juvenile** : up to 15 years, good results of the conservative treatment
2. **Adult** : over 15 years, conservative results unsatisfactory

Clinical picture:

Pain during load, and feeling of hitch, hydrops and later movement blocks



Osteochondritis dissecans II

Diagnostics:

X-ray: classic and tunnel image

– subchondral clearing → sclerotic border of lesion → free fragment

CT and MRI : more accurate localization and size of the defect

Therapy:

conservative: restriction of activity, relief of load, temporary fixation

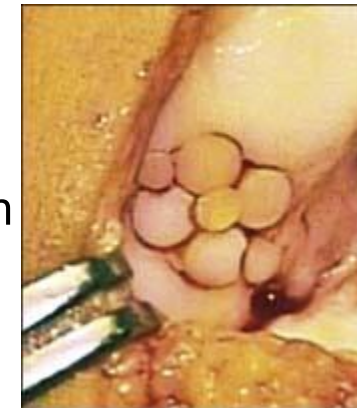
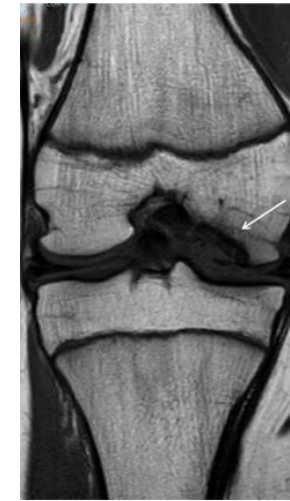
operative: intact cartilage – retrograde drilling

free fragment – AS or open stabilization of the fragment

with screws or pins, extirpation in the non-load zone

defects – autologous osteochondral grafts (mosaic plastic)

- transplantation of the autologous chondrocytes



Plica syndrom

Location:

1. Suprapatellar
 2. Infrapatellar
 3. Mediopatellar – duplication of the synovial lining
- asymptomatic remnants of the embryonic septum

Clinical picture:

- Pain over the medial condyle of the femur
- Palpate skipping of the fibrous band between the medial condyle and the medial border of the patella

Diagnostic: symptomatic cases will be confirmed by arthroscopy

Therapy: arthroscopic resection of the plica



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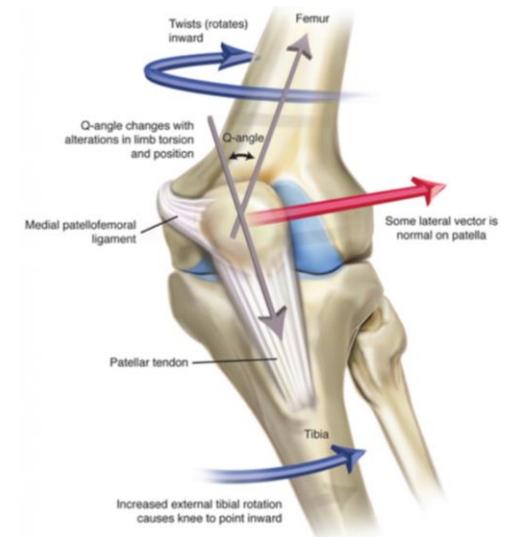
Patellar instability



- Is the condition characterized by episodes of subluxation or dislocation of the patella due to injury, ligamentous laxicity or higher Q angle of the knee
- mechanism of dislocation:
valgus + full extension + femur intrarotation + fixed foot

Risk factors:

- trochlear dysplasia – reduced depth , flat to convex shape
- patella alta
- Precous dislocation – inhury of stabilizers : medial retinaculum, ligaments (medial patelofemoral ligamnent (MPFL), patelomeniscal ligament (MPML), patelotibial ligament (MPTL)
- Malformations (anteversion of the proximal femur,tibial extrarotation,genu recurvatum)



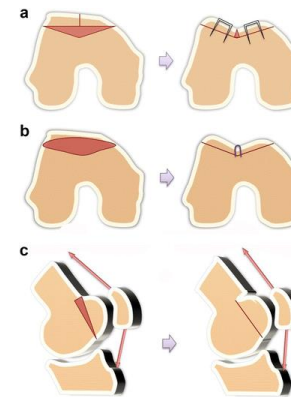
Diagnostics

- **symptoms:**
 - Feeling of instability
 - anterior knee pain
- **clinical examination:**
 - medial instability – apprehension test positive
 - increased Q angle
- **Imaging methods:**
 - X ray – AP, lateral view, defile
 - CT scan- TT-TG distance
 - MRI - osteochondral lesion, rupture of MPFL



Therapy

- conservative:
 - reduction
 - therapeutic arthrocentesis
 - fixation – 20° flexion – 3-6 weeks
 - rehabilitation
- surgical:
 - fixation/removal of osteochondral fragment
 - MPFL plastic
 - trochleolastic
 - Osteotomy of tibial tuberosity
 - lateral release of retinaculum



Bilaterálna implantácia TEP kolenného kĺbu – krátkodobé funkčné výsledky

Bilateral Total Knee Arthroplasty. Short-Term Results

S. KŘIVÁNEK, M. HRUBINA, M. CHMÚRNÝ, M. ROVNÁK, M. MELIŠÍK, L. NEČAS

Ortopedická klinika Univerzitnej nemocnice a Jesseniovej lekárskej fakulty v Martine Univerzity Komenského v Bratislave

ABSTRACT

PURPOSE OF THE STUDY

Evaluation of short-term functional results in patients undergoing one-stage surgery involving sequential bilateral total knee arthroplasty (TKA) and comparison with the results of patients after unilateral TKA.

MATERIAL AND METHODS

The group with bilateral TKA consisted of 171 patients with 342 total knee replacements treated between 2009 and 2013. The control group included 50 patients with 50 TKAs operated on in the years 2010 to 2012.

The indications to bilateral knee replacement included bilateral gonarthrosis, grade III or more in patients who were in good health and had a stable knee joint with axis deviation up to 20 degrees. A cemented TKA was used and the posterior cruciate ligament was preserved. Assessment of functional results was based on the Womac score, Knee Society Score (KSS 1, 2) range of motion and presence of specific complications in both groups. The follow-up lasted three years.

RESULTS

The average results in the bilateral vs the control group were as follows: the **Womac** score, 39.4/42.2 pre-operatively, 87.2/71.0 at 3 years; **KSS 1**, 48.5 / 44.8 pre-operatively, 87.4 / 79.9 at 3 years; **KSS 2**, 44.1 / 50.6 pre-operatively, 86.1 / 72.8 at 3 years; **motion-flexion**, 105.2° / 105.7° preoperatively, 114.0° / 100.2° at 3 years. In the bilateral group, infection was recorded in one patient.

DISCUSSION

Bilateral total knee replacement is a controversial issue. A higher risk of non-specific complications has been reported. Functional outcomes are good. The key problem is to set the correct indication to this procedure after an individual assessment of the patient's general health condition and the state of his/her knee joints.

CONCLUSIONS

The patients undergoing bilateral TKA at one-stage surgery showed functional results comparable (range of motion was even better) with the results of the unilateral TKA group. The number of specific complications was low. Every patient should be carefully assessed.

Key words: total knee arthroplasty, bilateral implantation, functional results.

ÚVOD

Totálna endoprotéza (TEP) je osvedčená metóda definitívneho riešenia pokročilých štádií artrózy kolenného kĺbu (4, 7, 8, 25). Výsledky a komplikácie jednotlivých endoprotéz sú v literatúre dostatočne analyzované, väčšinou so zameraním sa na jednostrannú implantáciu (7, 9, 10, 25, 27). V klinickej praxi sa však stretávame so skupinou pacientov, ktorí majú obojstranný nález pokročilých artrotických zmien na kolenných kĺboch. Časť z týchto pacientov je indikovaná k bilaterálnej jednodobej sekvenčnej implantácii TEP, ktorú na našom pracovisku

vykonávame od roku 2008. V literatúre je obojstranná implantácia TEP kolenných kĺbov v jednej dobe (sekvenčne či simultánne) diskutovanou témou (1, 6, 14, 18, 19, 26, 28, 29). Cieľom našej práce je zhodnotiť krátkodobé funkčné výsledky (bez ohľadu na typ použitej endoprotézy) v súbore pacientov, ktorí podstúpili implantáciu TEP kolenných kĺbov obojstranne v jednej dobe na našom pracovisku, a porovnať tieto výsledky s menšou kontrolnou skupinou pacientov po jednostrannej implantácii TEP.



Comparison of short-time functional outcomes after TKA between Multigen Plus CR and Physica KR prostheses

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Abstract

Background Aim of this study was to compare functional results within 36 months following primary total knee arthroplasty (TKA) using a conventional prosthesis Multigen Plus CR and a new Physica KR implant. Our hypothesis was that the use of the Kinematics-Retaining design of an TKA implant leads to a significantly greater improvement in the active range of motion and better functional results (KSS 1, KSS 2 and WOMAC score) than the conventional CR implant at short-term follow-up.

Materials and methods We retrospectively analysed data of 234 patients who underwent primary TKA at our hospital from April 2010 to August 2015 with the CR type of implant and from July 2014 to August 2015 with the KR implant due to advanced knee arthrosis of IIIrd and IVth grade of Kellgren-Lawrence classification, with no major ligamentous instability. Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) questionnaire, Knee Society Scores 1 (KSS 1) and 2 (KSS 2) and flexion (AROM) were recorded preoperatively and at 6, 12 and 36 months after surgery.

Results Our study showed a statistically significant difference in functional results at three years with better KSS 1 score, a tendency to higher values in the KSS 2 score, as well as a statistically significant overall improvement in AROM in favour of the new KR design over the conventional CR implant with a post-hoc power analysis of 83.8%. We found that there was no statistically significant difference between groups when comparing WOMAC score and complications at short-term follow-up.

Conclusions Our study provided more favourable clinical results for using Kinematics-Retaining implant in primary TKA. Further studies should focus on radiological and functional outcomes from mid- to long-term follow-up.

Keywords Total knee arthroplasty · Physica KR · Multigen plus CR · Functional outcomes · Kinematics-retaining

Introduction

Despite the positive long-time survivorship of conventional total knee arthroplasty (TKA), a significant percentage of patients remain dissatisfied after surgery, with authors reporting patients being unsatisfied from 15 to 20% [1, 2], and from 30 to 50% [3, 4]. This is most often due to residual pain as well as to reduced mobility relating to serious limitations in activities of daily living [2, 5–7]. According to the Slovak Arthroplasty Registry, the overall revision rate after primary TKA is 4.33% [8]. Nonetheless, this information

does not provide us any indication regarding the level of patient satisfaction. It has been known for a long time that the satisfaction rate after the primary TKA is significantly lower than after the primary total hip replacement [9]. Nowadays, because life expectancy has been increasing, the number and age spectrum of patients undergoing TKA has increased significantly. It is therefore necessary to adapt implants and their use to specific individual patient requirements, although some limitations may remain unchanged.

It has been proved that endoprosthesis design has a direct impact on postoperative outcome and patient satisfaction [10], affecting directly the kinematics of the knee joint, and thus stability during movement [11]. In this study, we compared two designs of primary TKA, Multigen Plus CR (LimaCorporate, Italy) and Physica KR (LimaCorporate, Italy). Multigen Plus CR has been using since 1997, thus for more than 20 years, and it can be considered as a conventional and reliable endoprosthesis. It is a cemented TKA that retains the posterior cruciate ligament and provides five

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Congenital and acquired deformities of the foot

MUDr. Maroš Hrubina, Ph.D.

Ortopedic clinic



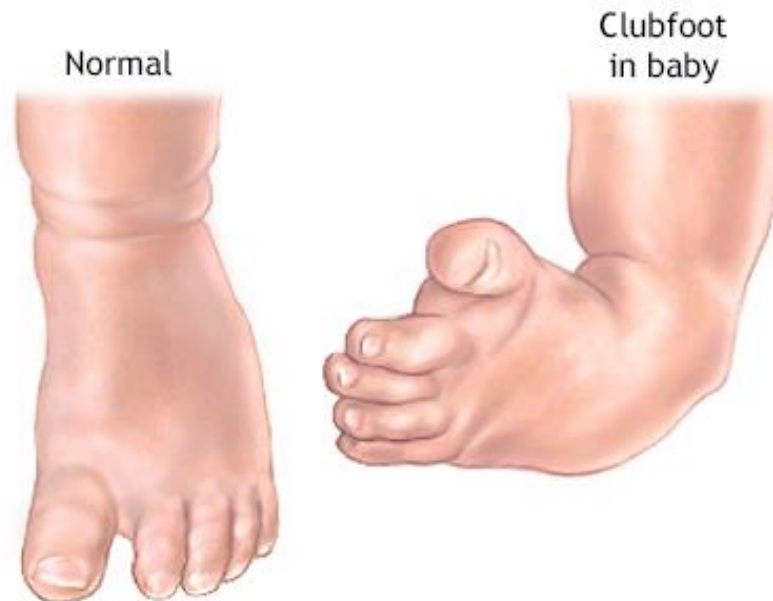
Congenital deformities of the foot

- Pes equinovarus congenitus (PEC)
- Pes calcaneovalgus
- Talus verticalis



Pes equinovarus congenitus (PEC)

- PEC – complex foot deformity
- - equinosity in TC joint
- - varosity of the foot by supination of the calcaneus
- - excavation of the middle part of foot
- - forefoot adduction (Dungl et al., 2005)



Pes equinovarus congenitus - classification

- 1. – position type, passively correctable
- 2. – rigid type, right
- 3. – resistant rigid type + other defects present



PEC - Therapy

- It depends on the type of deformity and age of the child
- Rehabilitation – passive exercises, splinting
- Plastering – Ponseti method
- Surgical procedures – Achilles tendon tenotomy, pantalar release (Mac Key...) – reposition in the talonavicular joint
- Corrective osteotomies or arthrodeses in older age



Pes calcaneovalgus

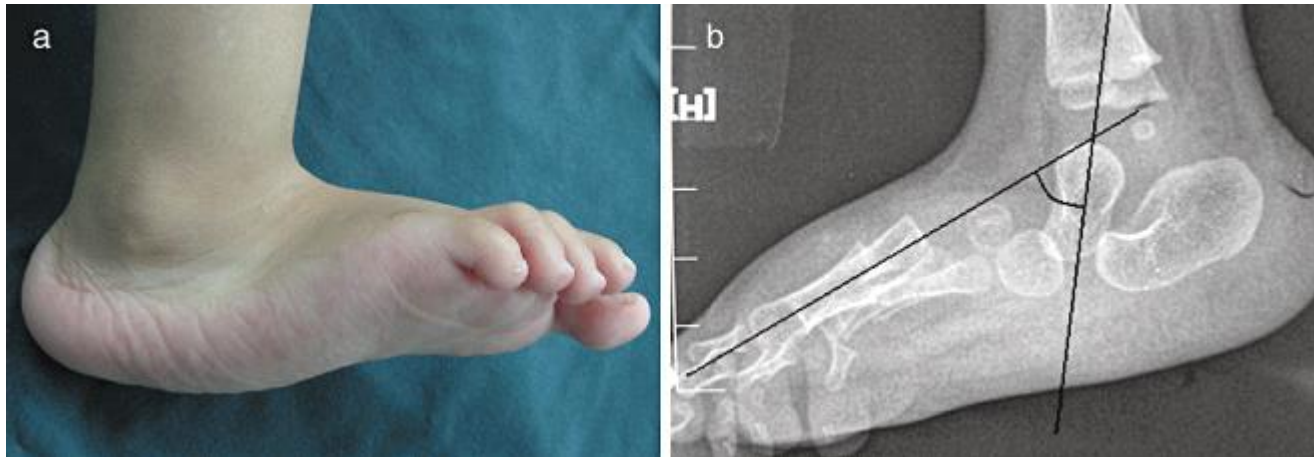
- The most common congenital defect of the foot
- Position of the foot in dorsiflexion (contact between the bottom of the foot and front part of the lower leg , eversion position of the foot (Dungl et al., 2005)
- Treatment – early started rehabilitation



Talus verticalis

- Congenital steep talus
- Dorsal dislocation of the navicular bone in the talonavicular joint
- Rigid defect (Dungl et al., 2005)

Treatment : surgical - revision with release and reduction, K-wire fixation



Acquired leg and foot deformities

- Hallux valgus
- Hammer-like fingers
- Morton's neuralgia
- Os tibiale externum
- Calcaneal exostoses
- Diseases of the Achilles tendon
- Pes planus



Hallux valgus

- Complex deformity of the foot
- varosity of I. MTT – medial deviation
- valgosity of thumb – lateral deviation
- The presence of other pathological findings :
Hammertoes, metatarsalgia, flat feet, calcaneal spurs
(Popelka et al., 2014)
- A common reason for visiting an orthopedic clinic



Hallux valgus

- X-ray findings of a 50-year old woman, complex foot deformity



Archive of orthopedic clinic UHM



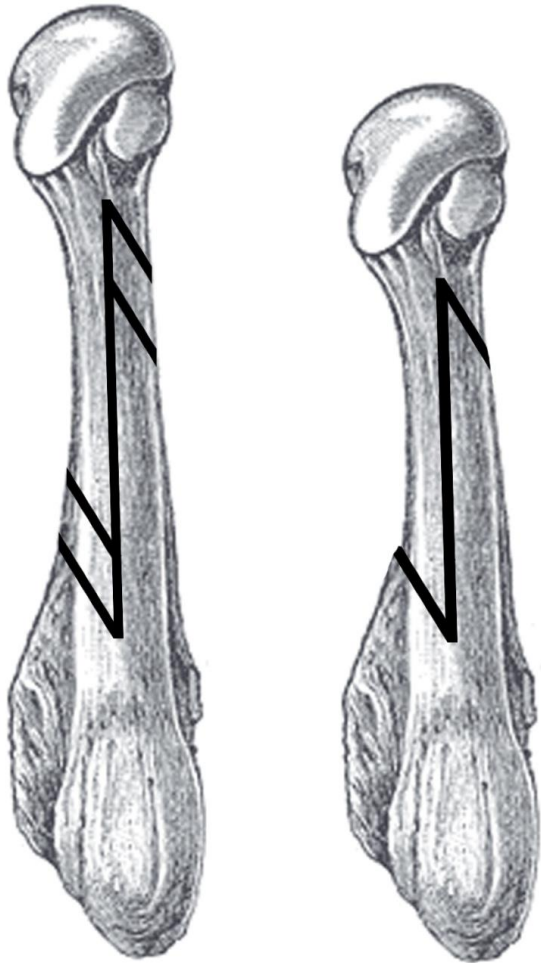
Hallux valgus – surgical treatment

- More than 100 surgical procedures are described
- Soft tissues release
- Bone procedures – osteotomies of 1.MTT (distal, diaphyseal, and proximal osteotomies, arthrodeses MTP, TMT joint...)
- Usually combination of soft tissue and bone procedure



Hallux valgus - surgical treatment

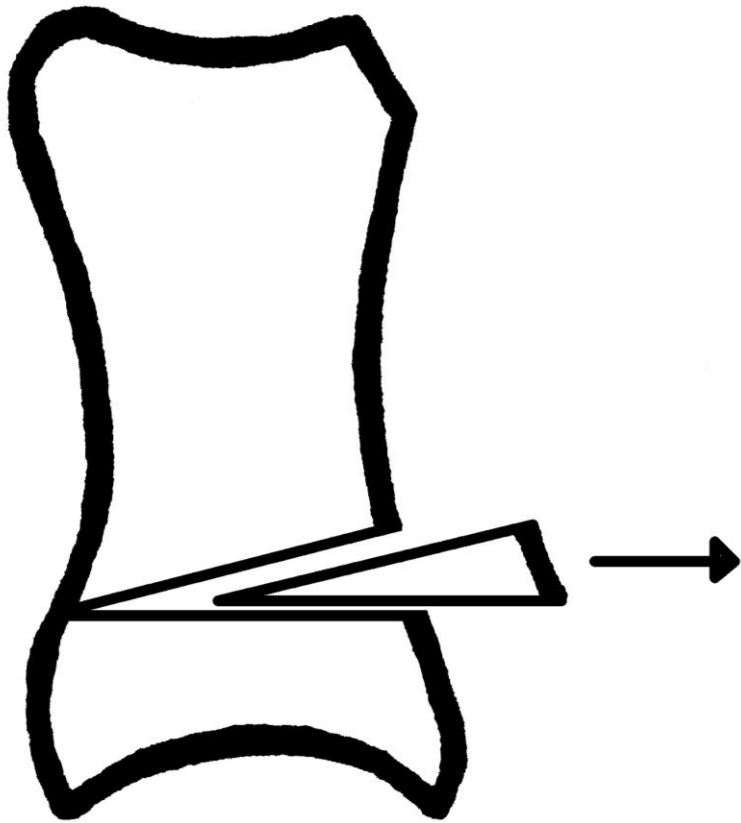
- Scarf osteotomy - scheme + X-ray of the patient after scarf osteotomy of 1.MTT and corrective surgery of II.hammertoe (author's archive)



Hallux valgus – surgical treatment

- Scheme and X-ray findings of Akin osteotomy of the base joint of the thumb in the treatment of hallux valgus + scarf osteotomy of I. MTT

(author's archive)



Hallux valgus juvenilis

- Hallux valgus deformity in adolescents (growth zones still present) – we prefer conservative treatment
- X-ray finding of a 14-year-old girl on the right with hallux valgus juvenilis - visible physes (author's archive)



Surgical treatment of complex foot deformity

- X-ray finding of a severe deformity of the foot (hallux valgus, flat feet...) and the condition after surgery – arthrodesis of I. tarsometatarsal joint ac. to Lapidus and arthrodesis of I. MTP joint (archive OC UHM).



Hammer – like fingers

- Deformity caused by flexion position in the PIP joint and extension position in the MTP joint with bruises above the PIP joint and below the head of the affected metatarsal (Popelka and all., 2014).
- Clinical finding of a combined foot defect on both sides (hallux valgus, hammer toes II., III., flat feet.. (author's archive).



Hammer toes – metatarsalgia, surgical treatment

- X-ray findings of the foot after hammer-toe II finger, scarf osteotomy of I. MTT a Weil osteotomy of II.-III. MTT (autor's archive)



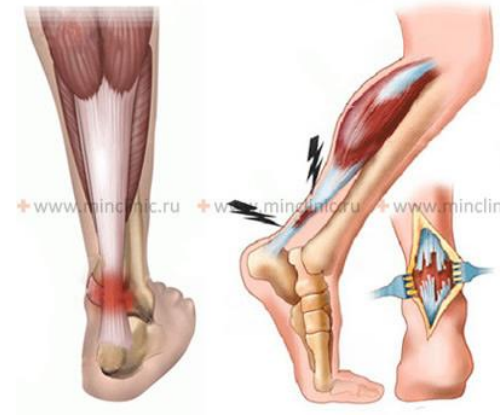
Calcaneal exostoses (calcar calcanei plantaris)

- Plantar spur – medial protrusion of the calcaneus bump – traction osteophyte (muscle attachments: m. flexor digitorum brevis, m. quadratus plantae, m. abductor hallucis) (Dung. et al. 2005)
 - It is related to plantar fasciitis
 - Heel pain plantar and medial (or dorsal), overload, inappropriate footwear
- Treatment** – rehabilitation, local corticoid, radiotherapy, surgical.



Diseases of the Achilles tendon

- Achillodynia – pain in the region of Achilles tendon
- Pain from various causes (peritendinitis, calcar calcanei dorsalis, parainfectious inflammations...)
- Acute or chronic condition



Clinical signs:

- Swelling, soreness, crepiatation, spindle - shaped swelling of the Achilles tendon aproxim. 3-4cm above the tuber calcanei
- Treatment – rest mode, heels, rehabilitation, NSA, laser, shock wave...
- Operative treatment – rare – revision with peritendinectomy



Os tibiale externum

- „additional“ bone located on the medial edge of the navicular bone
- Occurrence 14-26% of the population (Dungl. et al. 2005)
- Prominence on the medial edge of the foot – insertion of m. tibialis posterior tendon

Treatment

- resection sec. Kidner + reinsertion of the tendon



Morton's neuralgia

- Interdigital neuralgia - compression of the interdigital nerve under the transverse metatarsal ligament with the formation of a neuroma
- Most often in the 3. space between fingers (Popelka et al., 2014)

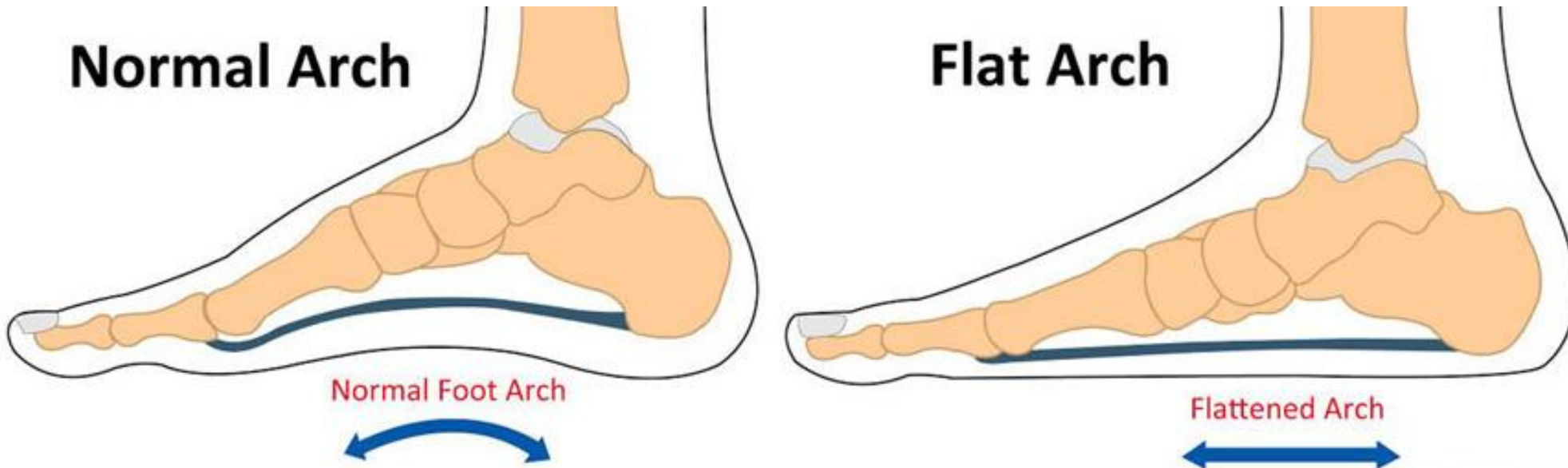
Treatment - RHB, surgical release of the transverse intermetatarsal ligament



Flatfoot

- Pes planus (planovalgus, transversoplanus...)
- Static deformity of the foot after the end of growth, medial pain
- Multifactorial etiology (children's flat foot, long term overload...)
- Fall of the arch + other pathologies (hallux valgus) (Dungl et al. 2005)

Treatment – insoles for shoes, RHB, surgical – osteotomies...



Other acquired foot deformities

- Hallux rigidus (rigidovarus, rigidovalgus)
- Bunionette deformity
- Rheumatic foot
- Ankle osteoarthritis
- Impairment of the back foot



Hallux rigidus

- Arthritis of the 1. MTP joint
 - Joint deformity, posterior osteofytes formation, limitation of range of motion
- Combination with other foot deformities
- Hallux rigidovarus, rigidovalgus



Treatment – revision, removal of osteofytes (cheilectomy) – efekt?
arthrodesis of I. MTP klbu
TJR of I. MTP klbu – high rate of complications



Hallux rigidovarus

- X-ray finding of bilateral hallux rigidovarus deformity (AP view) , hammer-like toes, pes planus in a 59-year-old woman (autor's archive)



Hallux rigidus

- X-ray findings – lateral projection with longitudinal flatfoot and plantar calcaneal exostoses (author's archive).



Hallux rigidus

- Clinical findings of the above-mentioned patient (author's archive).



Hallux rigidovarus - treatment

- X-ray findings of the above-mentioned patient after splinting of the 1.MTP joint of the foot (autor's archive)



Bunionette deformity

- Similar like „hallux valgus“ on the V. ray of the foot

Treatment – shortening scarf osteotomy of V.MTT



X-ray of a 36-year-old patient with bunionette deformity and condition after shortening scarf osteotomy (autor's archive)





Bunionette deformity corrected with “shortening” scarf osteotomy of the fifth metatarsal: mid-term results of a 34-cases

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ABSTRACT

Background: The aim of this study was to evaluate the clinical and radiological outcomes (in mid-term) after “shortening” scarf osteotomy of the fifth metatarsal for the treatment of bunionette deformity.

Methods: We retrospectively reviewed the functional score – American Orthopaedic Foot and Ankle Society (AOFAS) Lesser Toe Metatarsophalangeal-Interphalangeal Scale, radiographic results – 4th/5th intermetatarsal angle, varus angle of the 5th metatarsophalangeal joint and complications in a consecutive series of 34 feet (27 patients) with bunionette. Nine males and 18 females (mean age: 45 years) were included in the study. Three males and four females were operated bilaterally. The patients were operated on between 2004 and 2015, and evaluated during 2017.

Results: The average AOFAS score improved from 59.4 to 93 at a mean follow-up of 7.2 years. The 4th/5th intermetatarsal angle and varus angle of the 5th metatarsophalangeal joint decreased from 13.9°/19.5° preoperatively to 6°/5.9° at final follow-up. No neurovascular damage was recorded. Complications arose in five feet (14.7%): delayed union ($n=1$), early infection ($n=1$), distal screw migration ($n=1$), asymptomatic non-union ($n=1$), transverse metatarsalgia ($n=1$). The osteotomy healed within less than three months except two (delayed union, non-union). Three feet needed additional surgery: screw removal ($n=2$), Weil osteotomy of 2nd–4th metatarsals ($n=1$).

Conclusions: “Shortening” scarf osteotomy is an acceptable, but not complication-free, treatment option for the bunionette deformity and offers promising results in the mid-term.

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1. Introduction

Bunionette deformity (Tailor's Bunion, or Digitus Quintus Varus) is a painful osseous prominence on the lateral aspect of the fifth metatarsal head [1]. It is caused by a widening 4th/5th intermetatarsal angle (M4M5) with associated varus inclination at the 5th metatarsophalangeal joint (M5P1). The following play roles in the aetiology of this deformity: structural bony abnormalities (enlarged fifth metatarsal head, lateral bowing of the fifth metatarsal); soft-tissue conditions (medial deviation of toe and rotation of the metatarsal, adhesion of the adductor tendon); extrinsic causes (wearing of tight narrow shoes) [2,3].

Du Vries and Coughlin distinguished three types of this deformity based on bony appearance [4,5]. Type I deformity is characterized by a prominent lateral condyle of the fifth metatarsal (MT V.) head, type II deformity is characterized by a lateral bowing of the diaphysis of the MT V. shaft and type III deformity shows divergence of the fourth and fifth metatarsal. Combinations of these deformities are often observed.

The treatment of bunionette deformity is largely conservative. For severe, or refractory cases, surgery is indicated. Various techniques (open, minimally invasive) and sites of osteotomies (distal, shaft, basal) have been published in the literature [6–13].

Barouk, as first, described the scarf osteotomy of the fifth metatarsal [8]. “Shortening” scarf osteotomy is based on standard scarf metatarsal osteotomy with a small modification (shortening of the MT V.), which helps to correct bunionette deformity [9].

The aim of this study was to evaluate the validity of this technique by reviewing the clinical and radiological outcomes, and identifying the complications that occurred in this series.

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„Rheumatic“ foot

- Complex involvement of the foot in rheumatoid arthritis
- destruction of bones (osteoporosis, joints destruction..) and also soft tissues : ligaments (instability) and tendons



X-ray findings of a 72-year-old patient with RA with complex foot deformity (archive OC UHM)



Surgical treatment of the „front“ foot



Indikations for foot surgery:

- Pain in the region of front foot
- Problems in shoes
- Cosmetic aspect
- Exhaustion of conservative treatment
- The patient's own decision after education about possible complications !



Contraindications for planned foot surgeries !

- Ischemic changes /diabetic foot/!!!
- Smokers, angiopathy
- Open (infected) skin defects, panaritium...
- Open physes
- Severe osteoporosis – age over 70-75 years?
- Psychiatric patient!
- Presumed non-cooperation of the patient – non-compliance



Surgeries on the „back“ foot

Indications:

- Ankle osteoarthritis (TT a TC kĺbu)
- Post-traumatic deformities
- Ankle and hinfot instability (axial deviations)
- Congenital diseases /eqiunovarus/
- Charcot arthropathy
- Condition after previous surgeries – TC arthrodesis



Hindfoot Arthrodesis Nail (HAN)

- Permanent immobilisation of the the tibiotalar and talocalcaneal joint
- Clinical results very good !



Indication HAN arthrodesis

- X-ray findings of advanced ankle arthritis and instability indicated to pantalar arthrodesis with HAN (archive OC UHM)



HAN arthrodesis (archive OC UHM)



Thank you for your attention

