

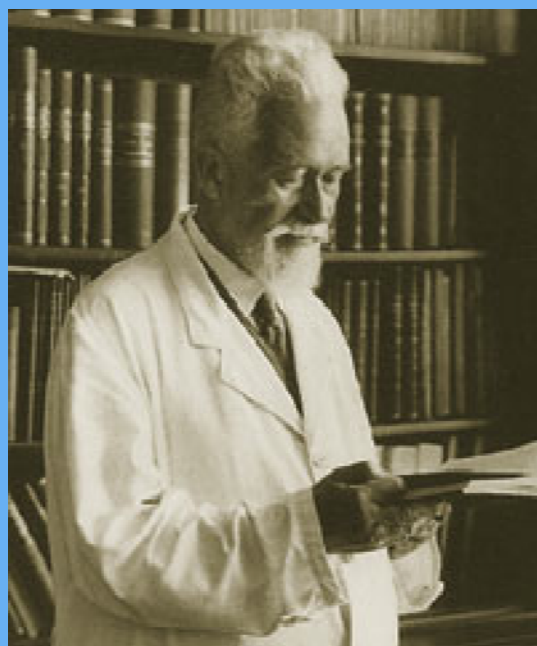


# Bone defects in knee replacement surgery



Klinik für  
Orthopädie und Unfallchirurgie

Medical Director  
Priv.-Doz. Dr. med. M. Clarius



**Prof. Oskar Vulpius**  
1867-1936



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# Bad Rappenau



- ✓ specialized on orthopaedic surgery
- ✓ more than 7000 orthopaedic surgeries per year
- ✓ 1650 total joint replacements in 2011
  - ✓ 844 knee replacements



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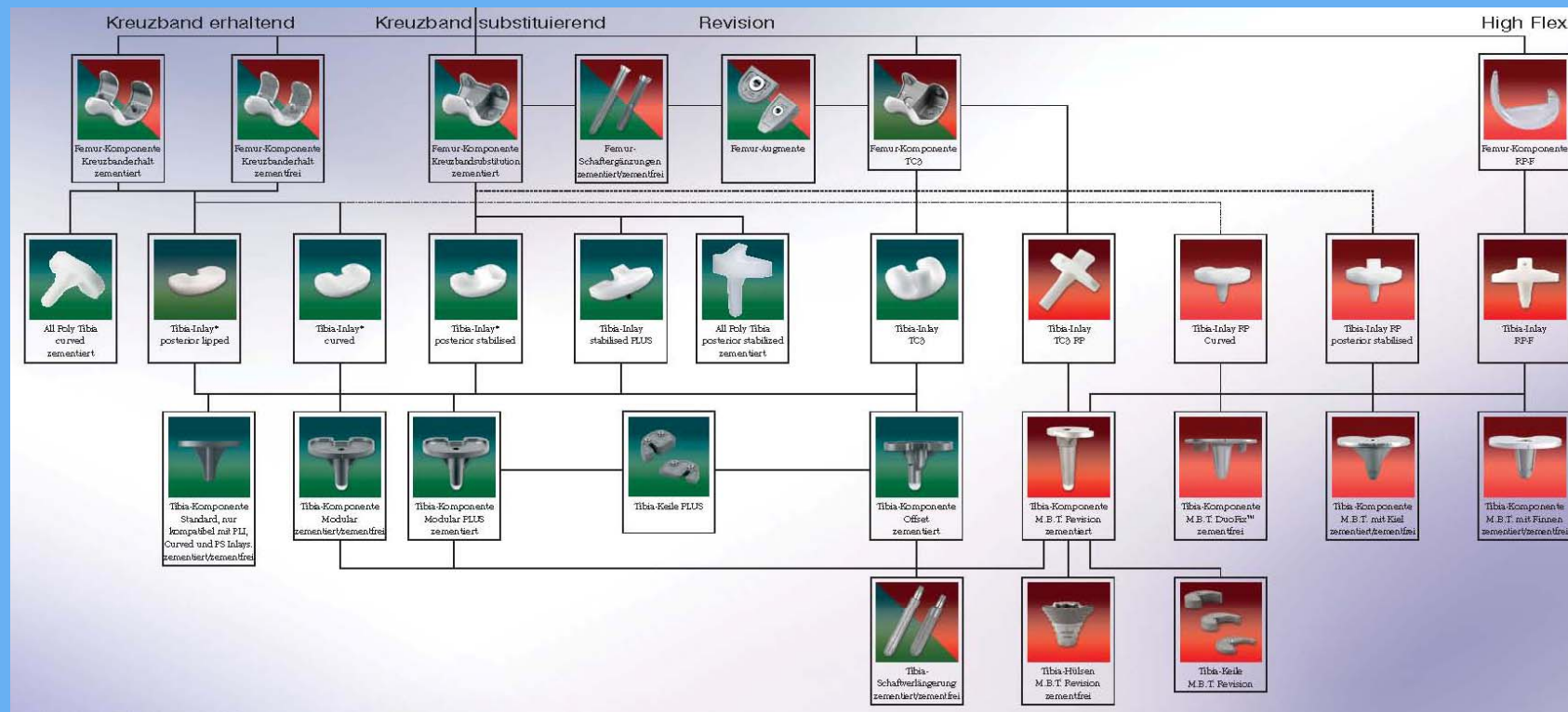
# Total knee Replacement

- ✓ in Germany 150 000 TKR per year



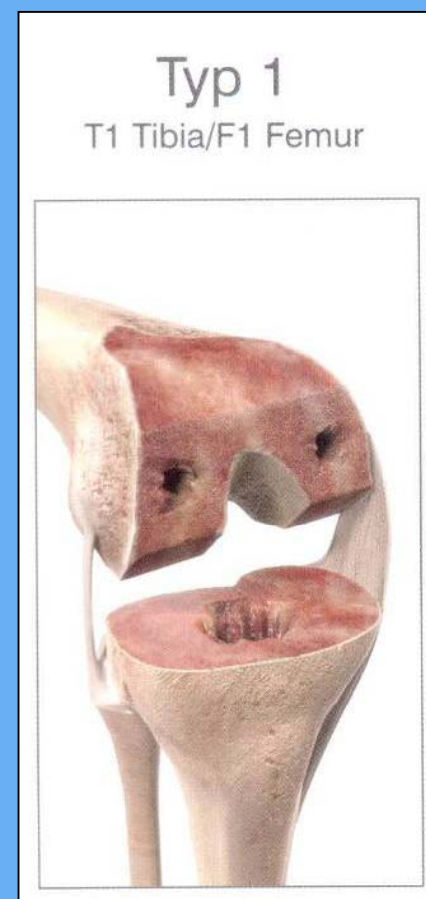
# Options for the surgeons

- CR
- PS
- mobile, fixed bearing
- Unconstrained, semi-constrained, constrained
- Implants for Revision



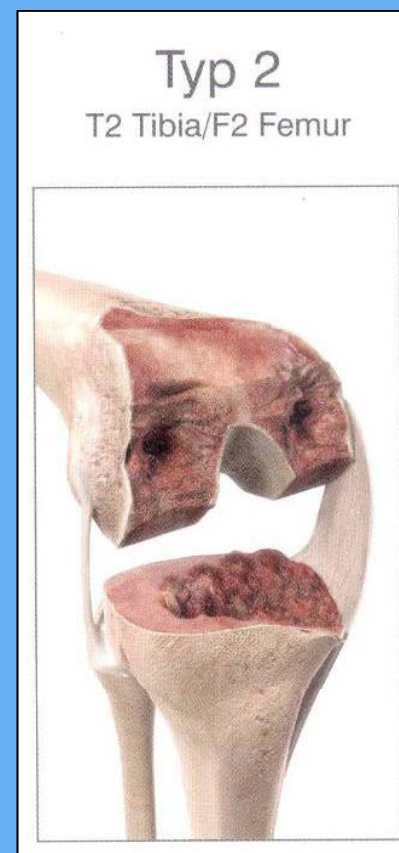
# Bone Loss

- ✓ Type 1:
  - cortical rim intact
  - normal joint line



# Bone Loss

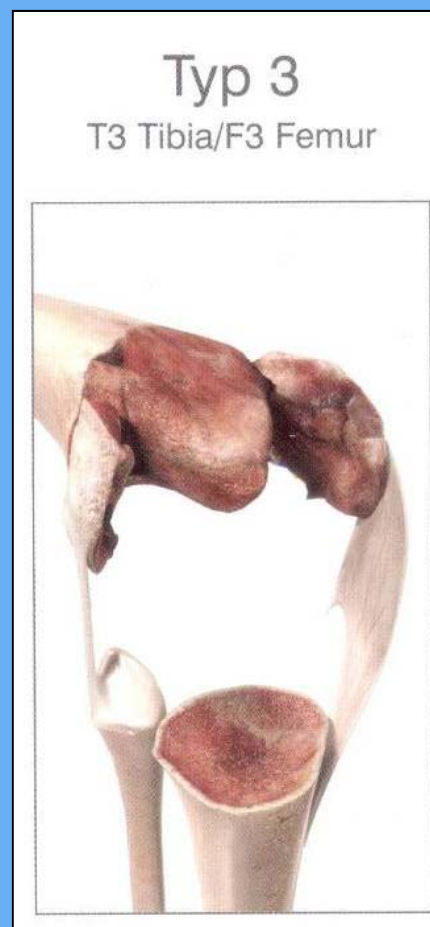
- ✓ Type 2:
  - Cortical rim partially lost
  - Defect in metaphyseal bone





# Bone Loss

- ✓ Type 3:
  - Cortical and metaphyseal bone loss
  - No reference to the joint line



# Choice of Implant

Ligaments / bone substance	stable	PCL	LCL	MCL / all Lig.
Type 1	Oberflächenersatz	PS	PS-plus	constrained
Type 2	PS, semi-constrained with stem	PS, semi-constrained with stem	semi-constrained or constrained	constrained
Type 3		constrained	constrained	constrained

# Knee Replacement

The more malalignment,

the bigger the implant

and the higher the degree of constraint

# Rotating Hinge



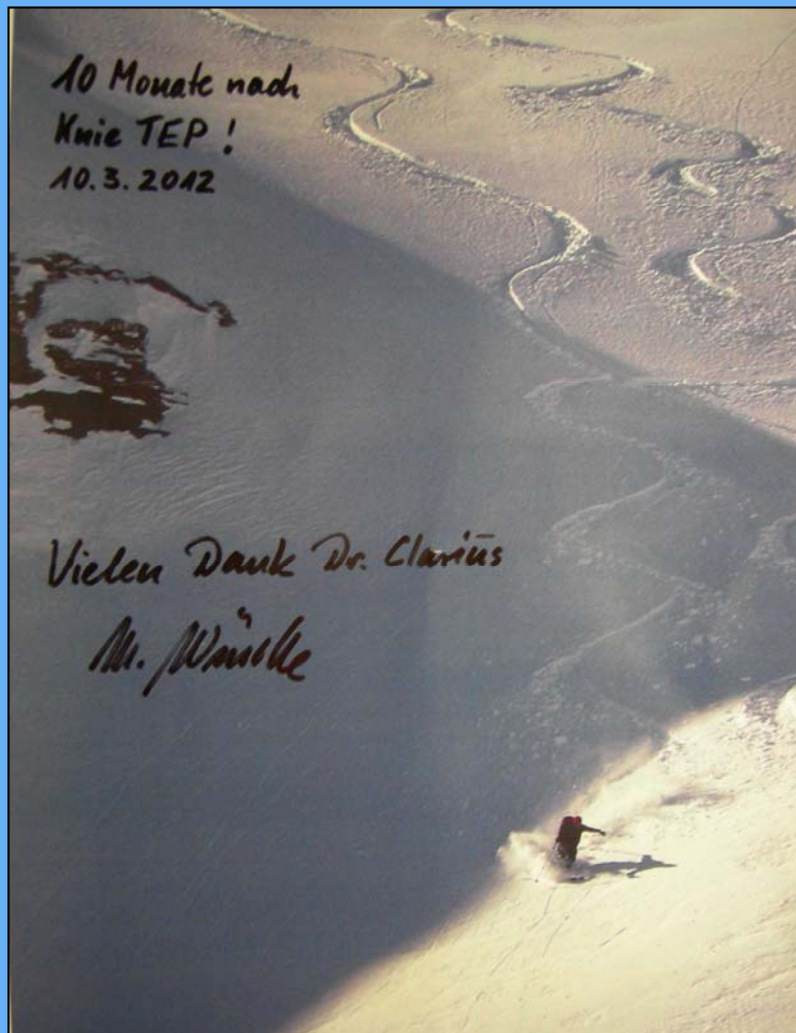
# Knee Replacement

The bigger the implant,  
the worse the functional outcome.

# Functional Demands of our Patients



# Functional Demands of our Patients



# German Print Media





# MIS

Minimal invasive surgery



# Unicompartmental Knee Replacement



- ✓ small incisions
- ✓ preserve ligaments
- ✓ preserve proprioception
- ✓ recovery quicker
- ✓ less blood loss - no transfusions
- ✓ better function and ROM
- ✓ normal gait

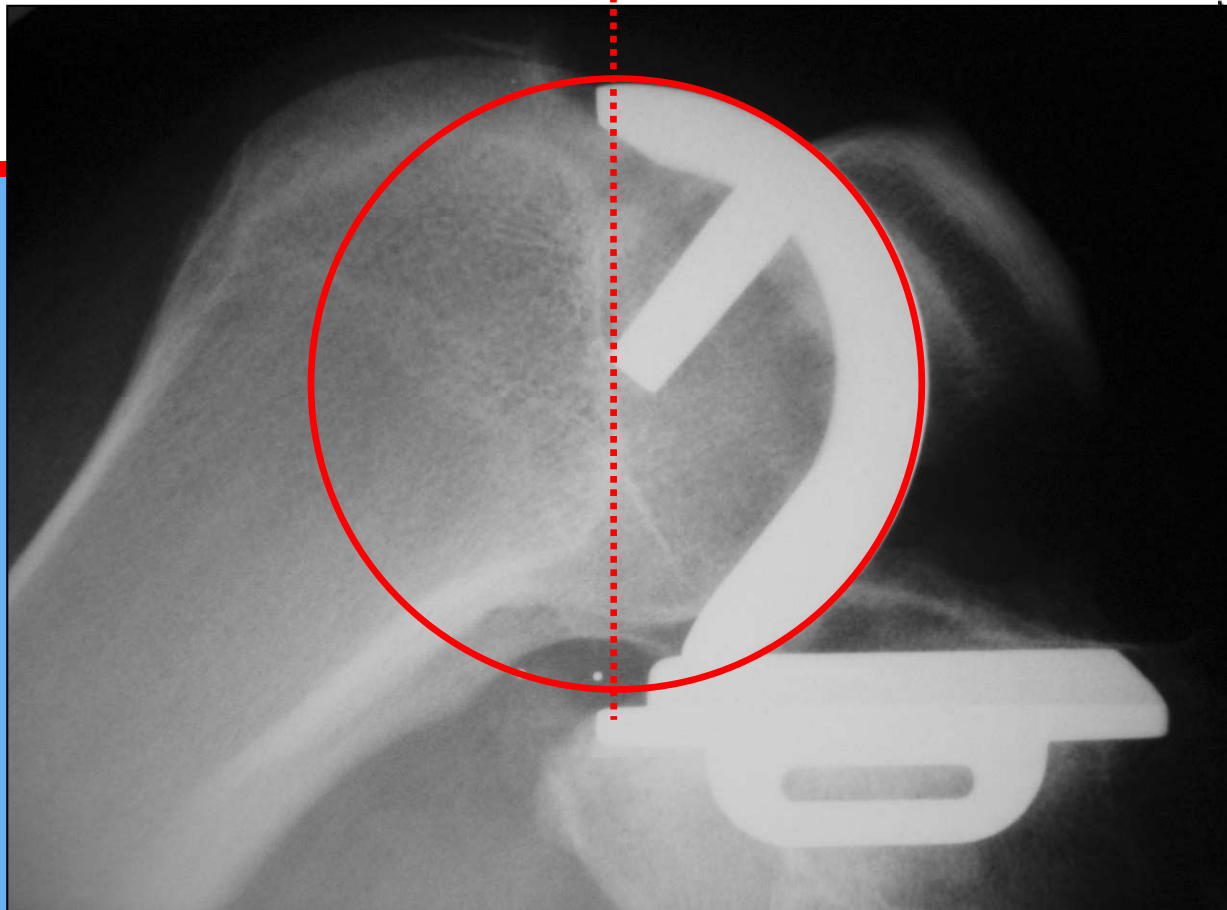
# Unicompartmental knee replacement

The smaller the implant,  
the better the functional outcome



patient of Prof. Choy in Korea



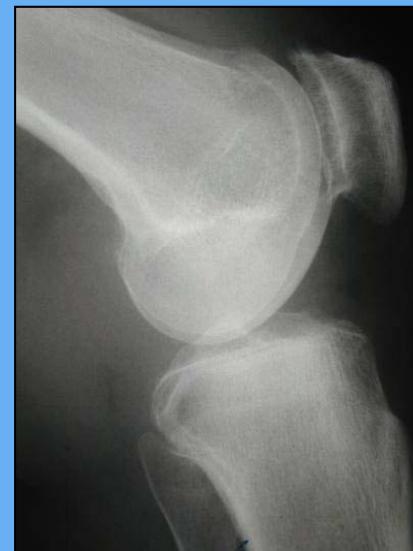


155° Flexion

# Indications



- ✓ Anteromedial OA
- ✓ Correctable Varus Deformity
- ✓ Intact Ligaments
- ✓ minimal involvement of the lateral compartment and PFJ



## contraindications

- ✓ Ligament deficiency
- ✓ Severe Flexion Contracture or Varus deformity
  
- ✓ previous HTO
- ✓ Inflammatory Arthritis

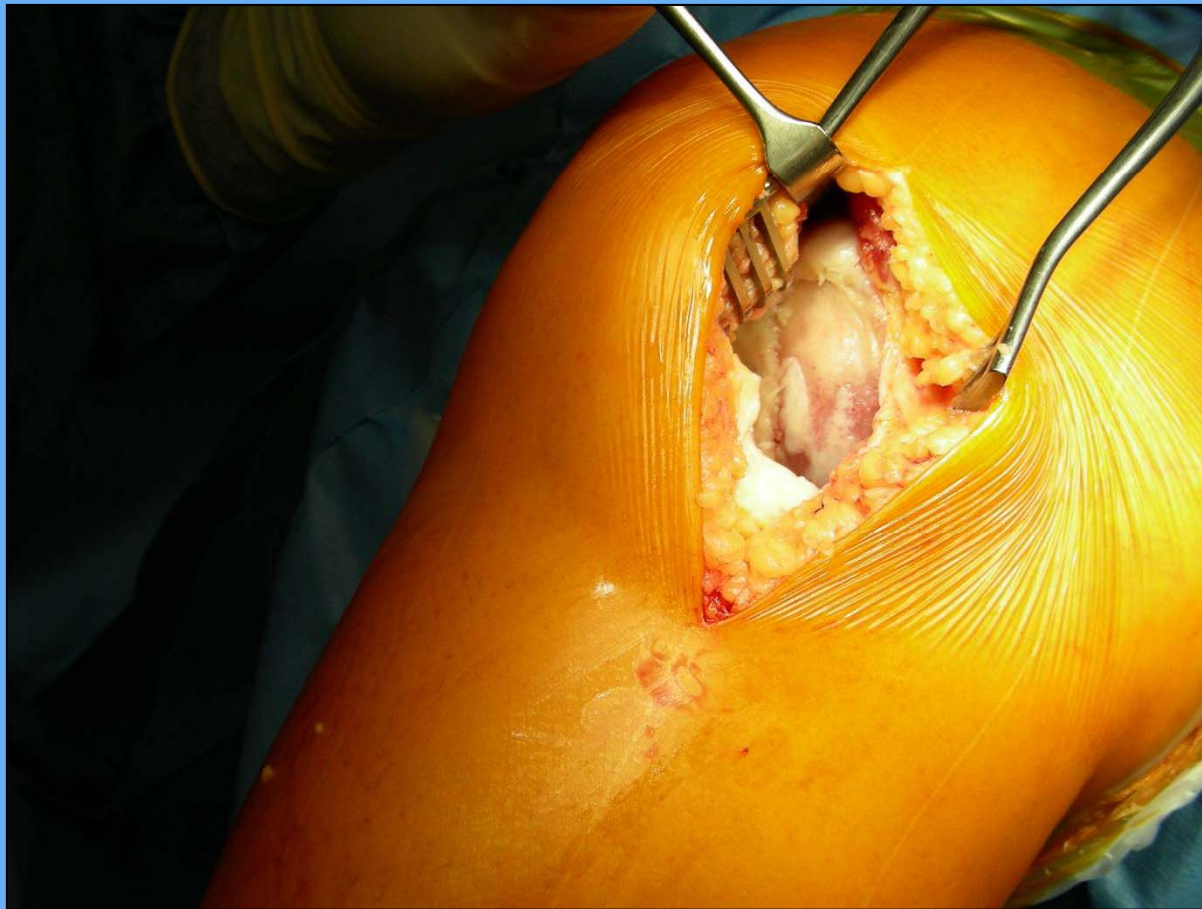
“Accepted” contraindications  
Kozinn & Scott (J Arthroplasty 1989)

- ✓ Patellofemoral Pain
- ✓ Anterior Knee Pain
- ✓ Age (< 60 & old)
- ✓ Sports Activity
- ✓ Obesity
- ✓ Chondrocalcinosis

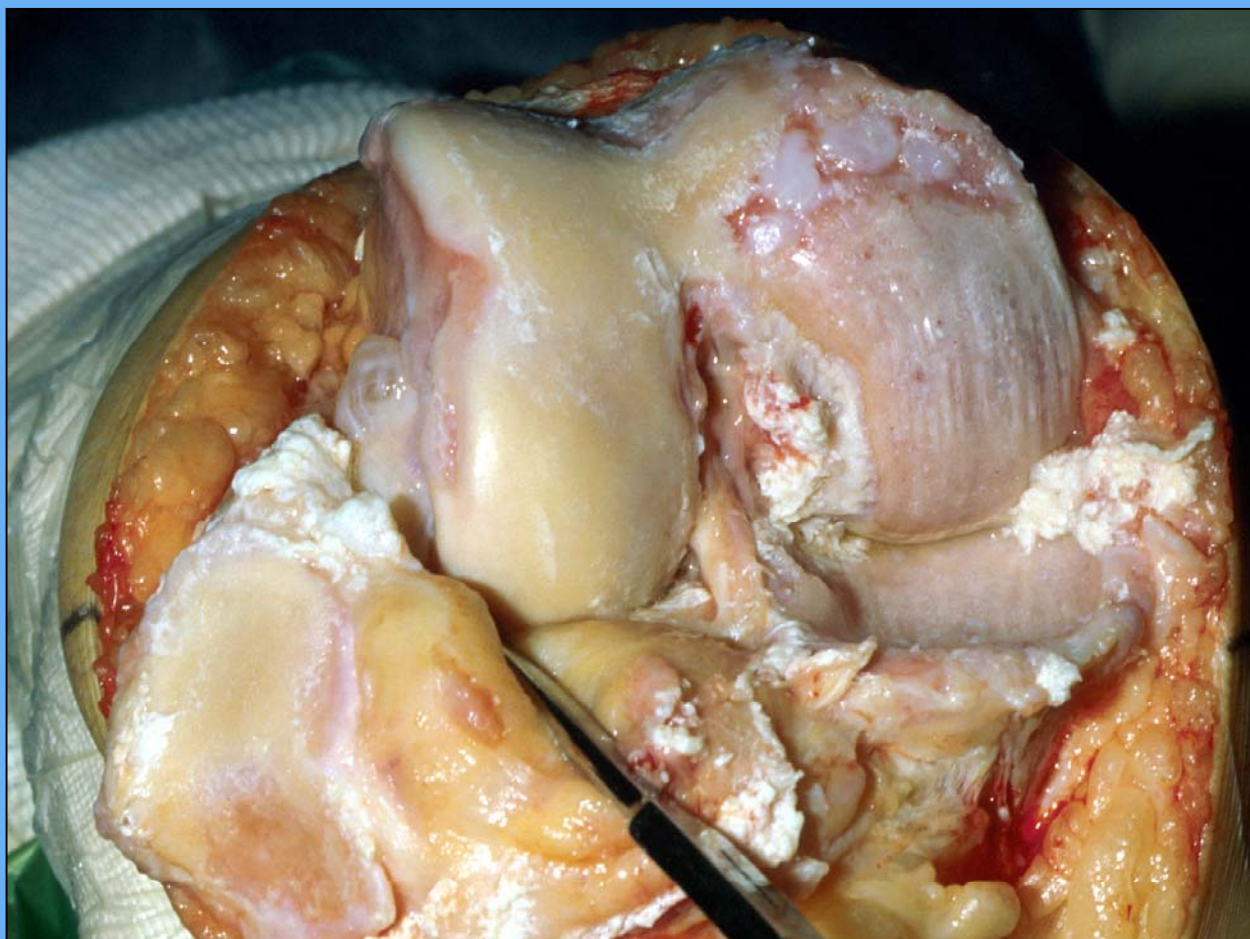
- *not evidence based*
- *therefore no contraindications*



# Anteromedial OA



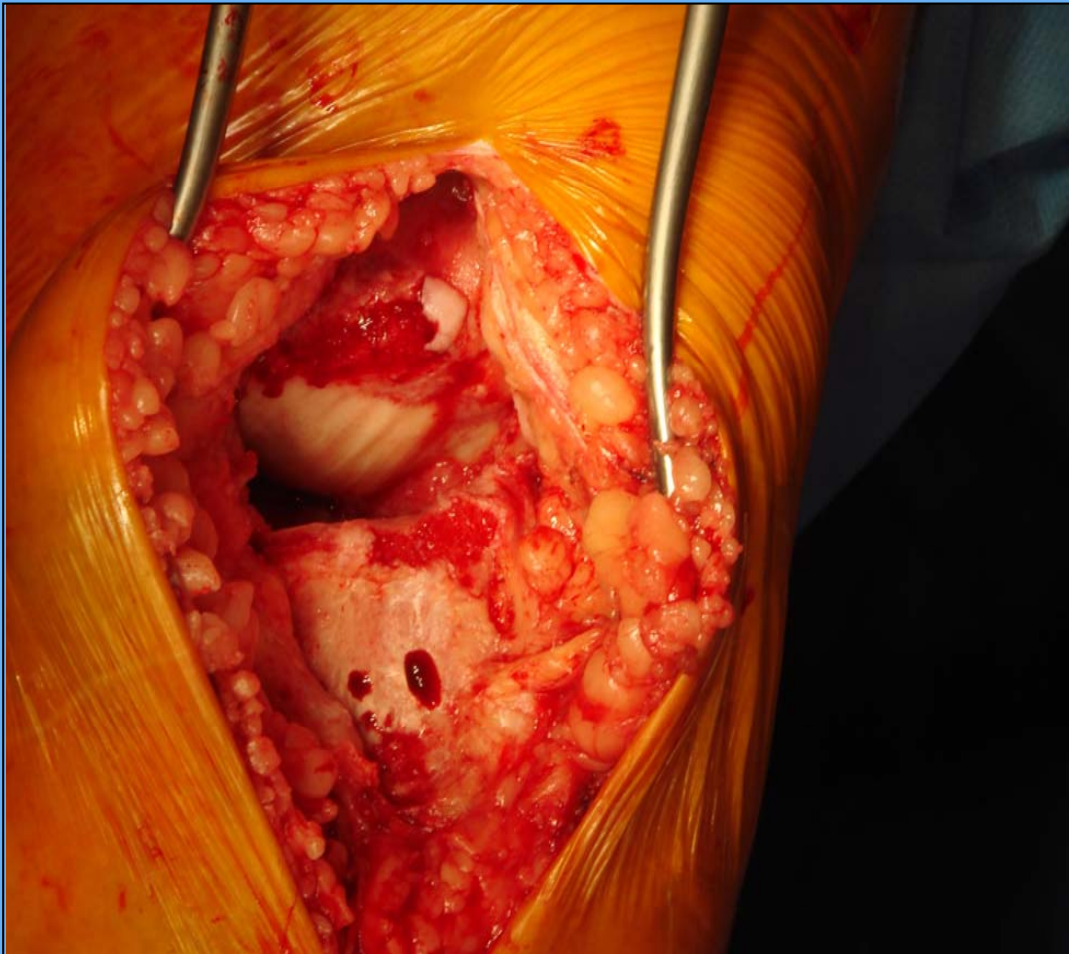
# Anteromedial OA

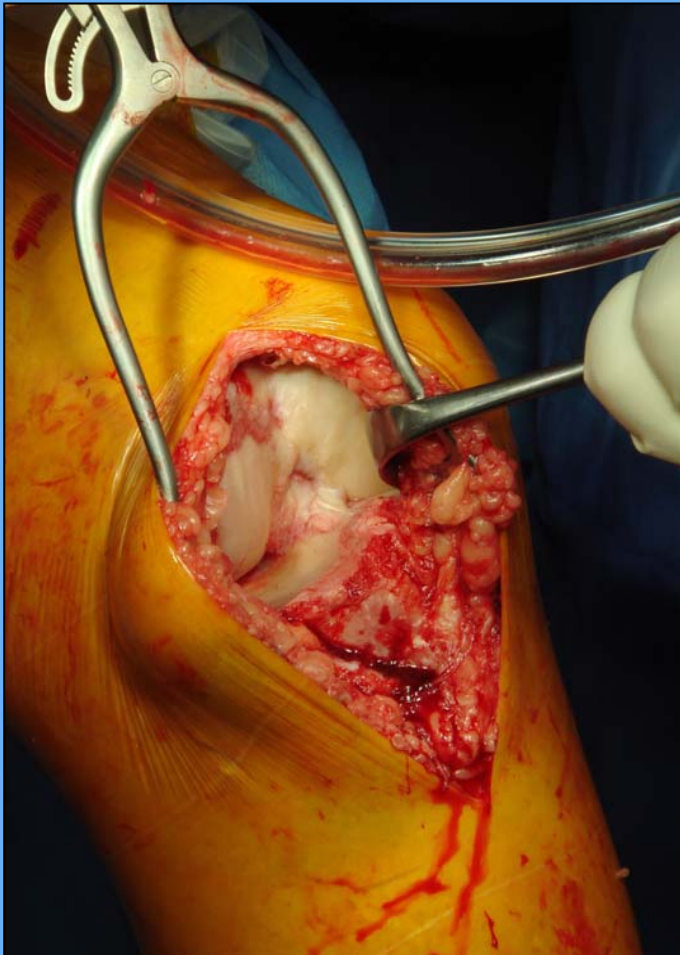


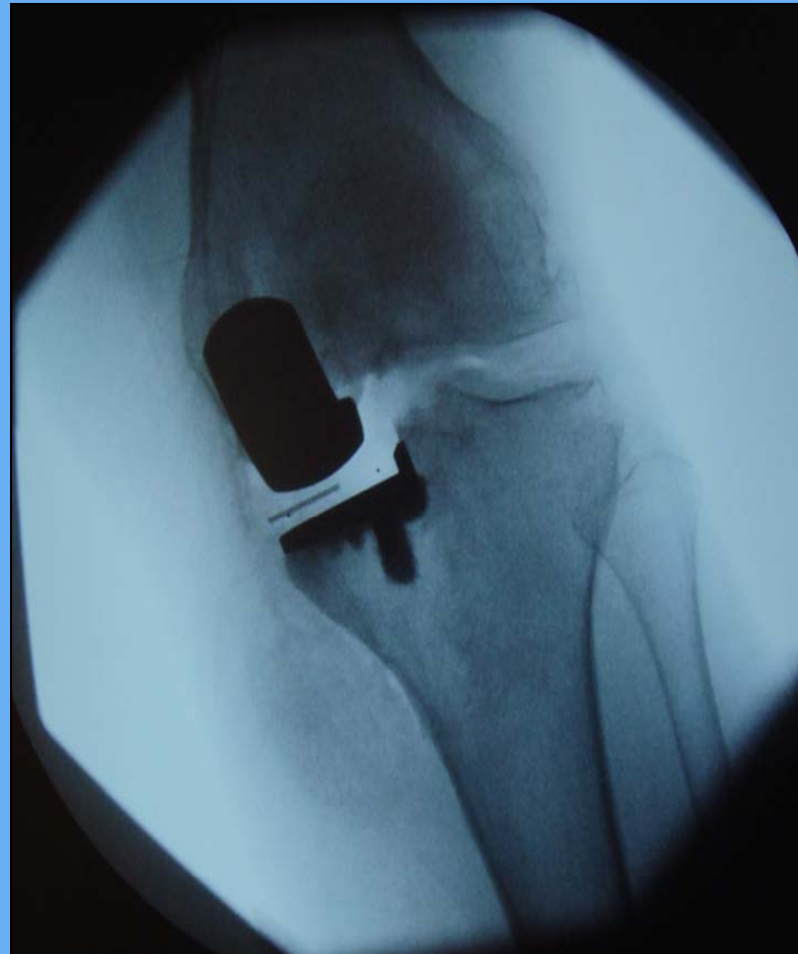






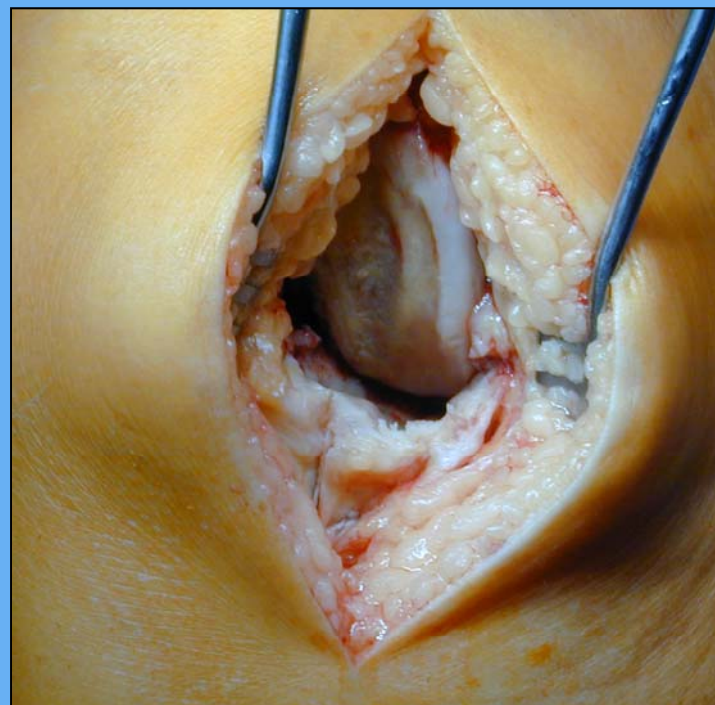








# Avascular Necrosis (AVN)



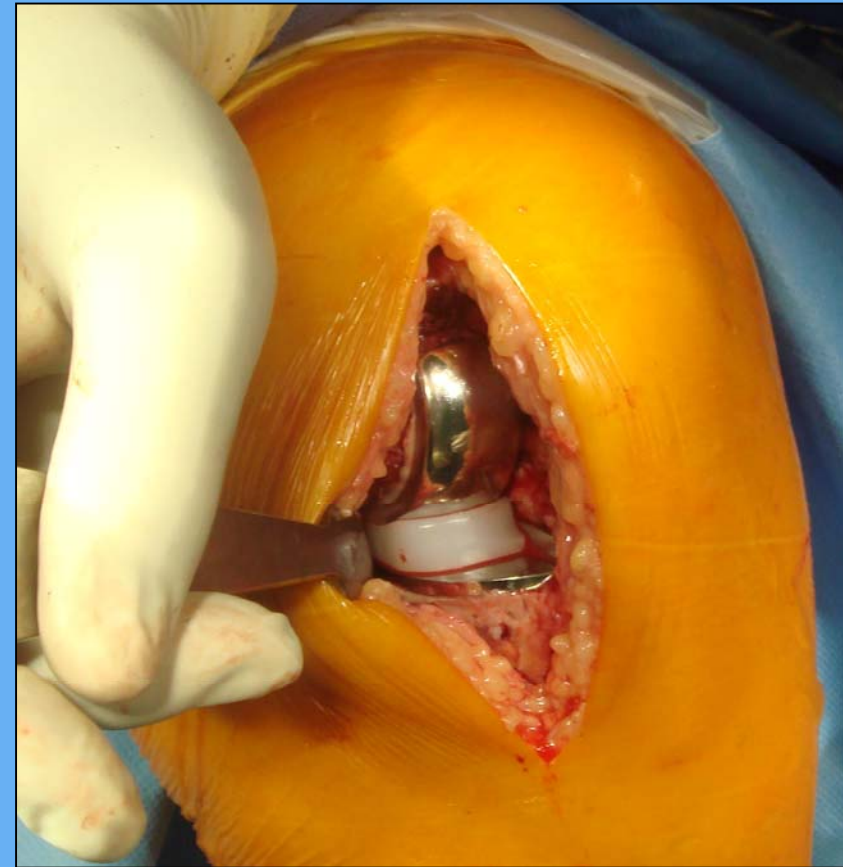
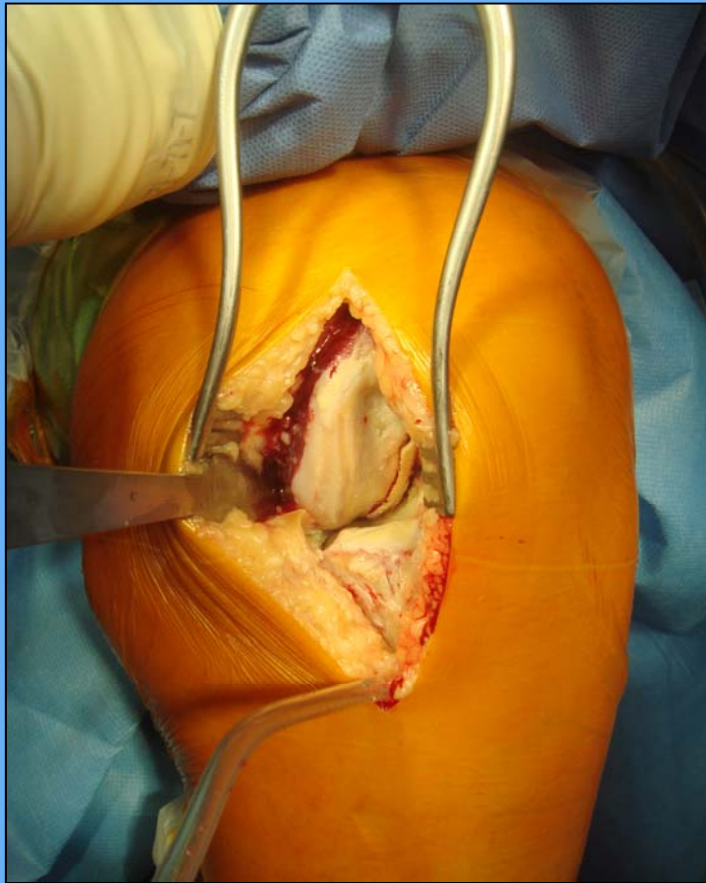
# Posttraumatic medial OA



# Posttraumatic medial OA



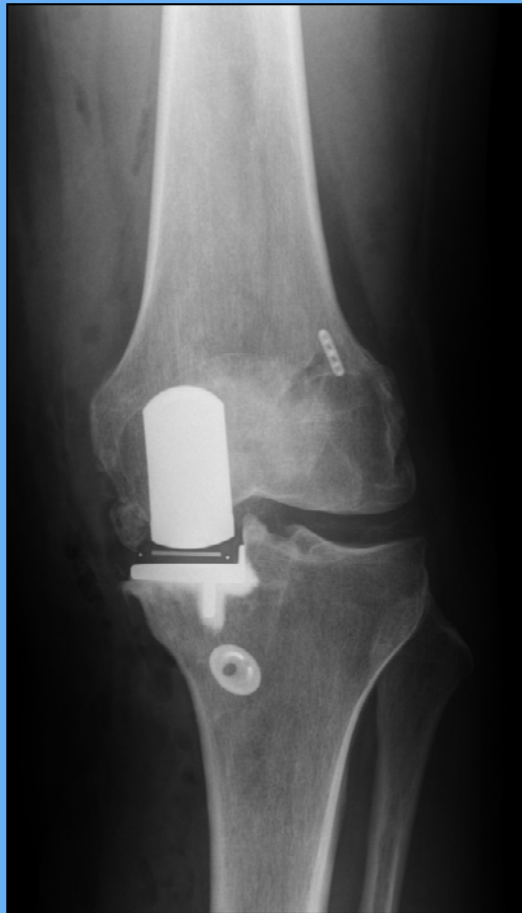
# Posttraumatic medial OA



# Medial OA, ACL-Deficiency



# Combined UNI & ACL-Reconstruction



# Uni versus TKA

1 in 3

# Germany

2010

TKA

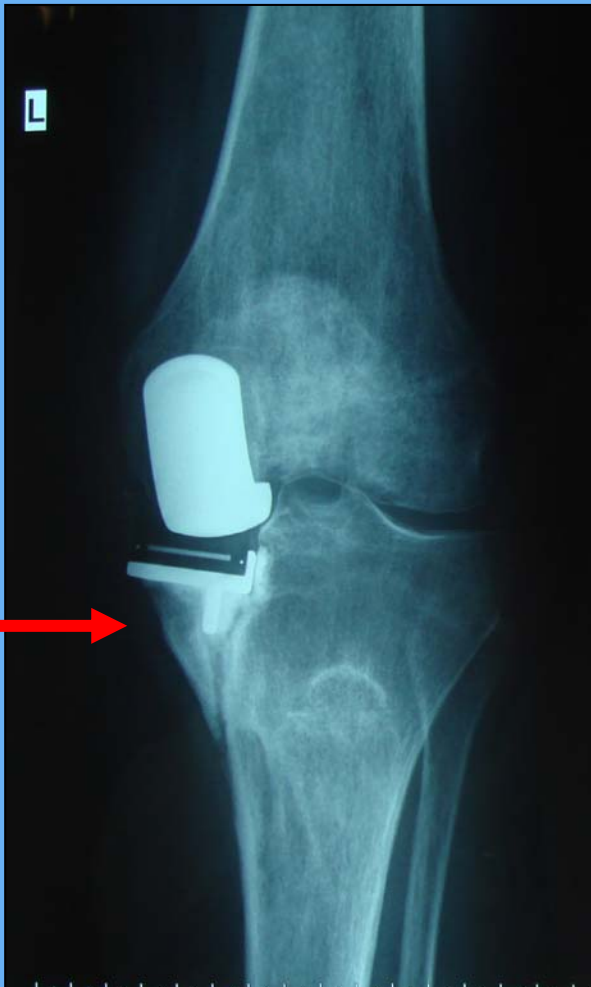
150 000

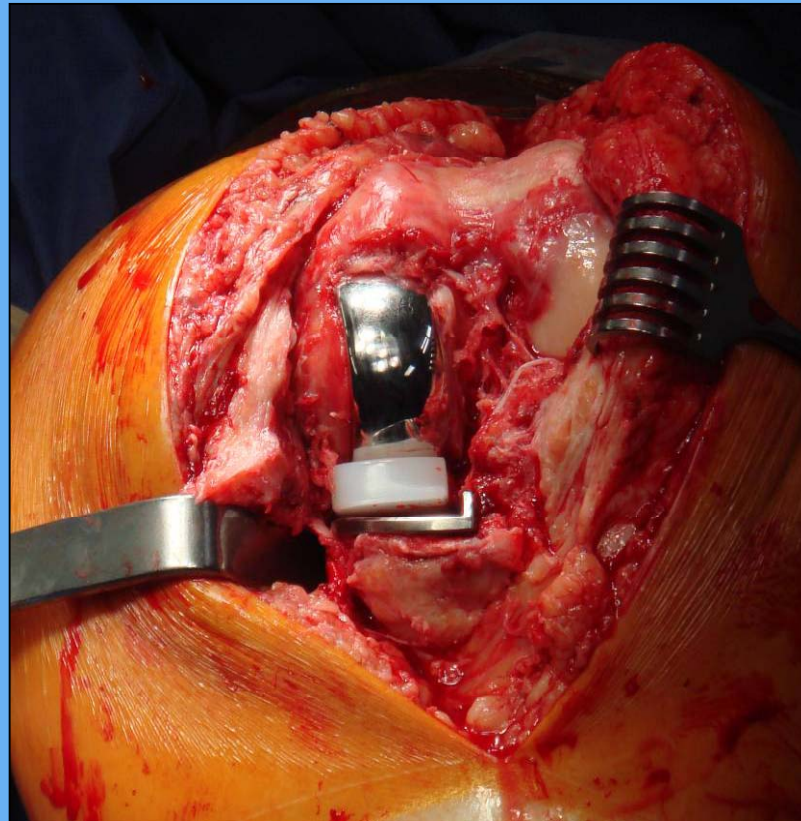
Uni

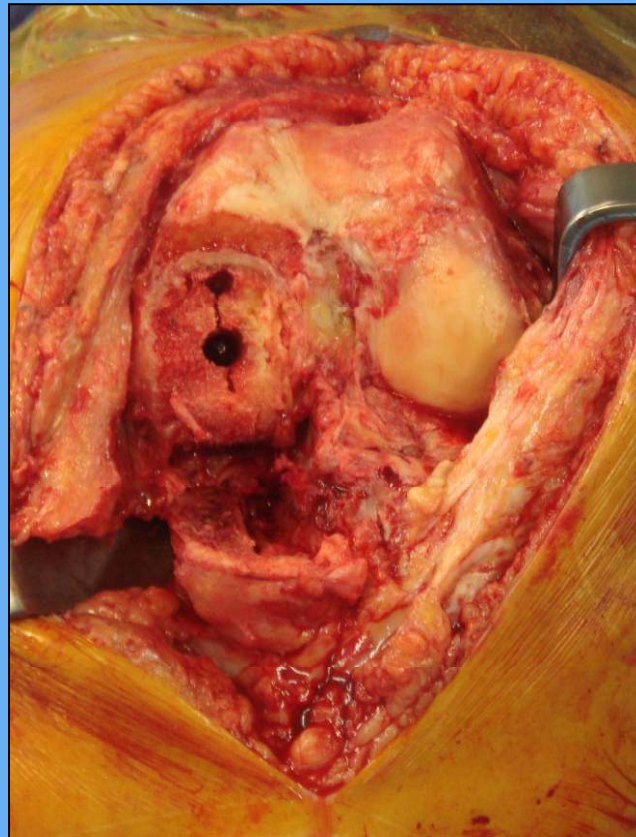
9 000











# Revision

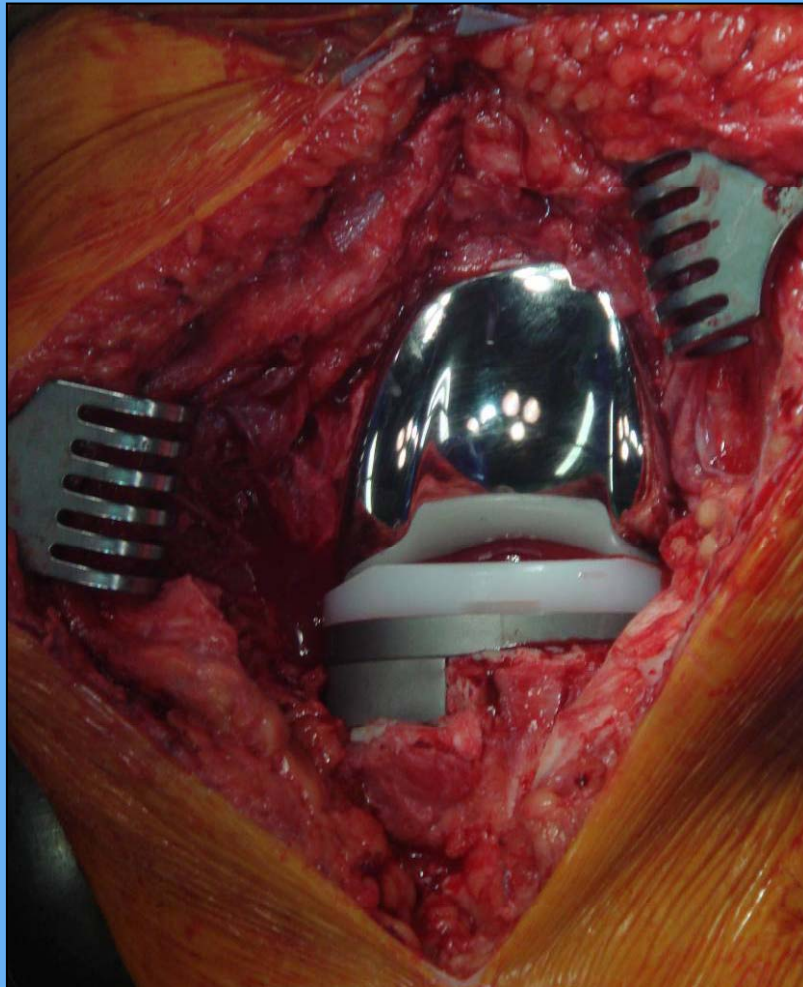


## Tibial bone defect:

### Augmentation with

- Cement
- Bone (cave: Sclerosis)
- Modular metallic Augments





# Knee Replacement

Severe Malalignment:

Ligament Deficiency or /and Bone Defect?

Passive correctable?

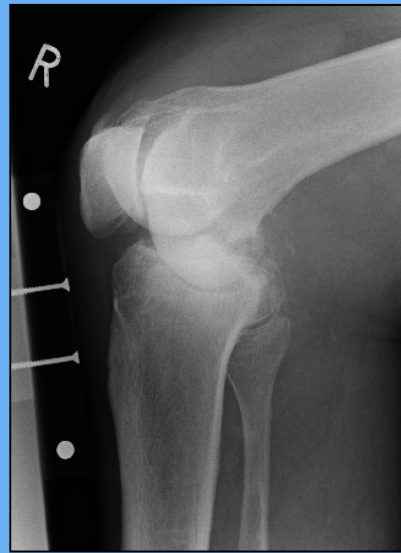
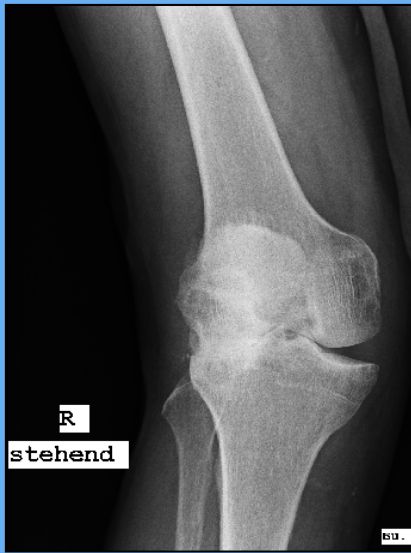


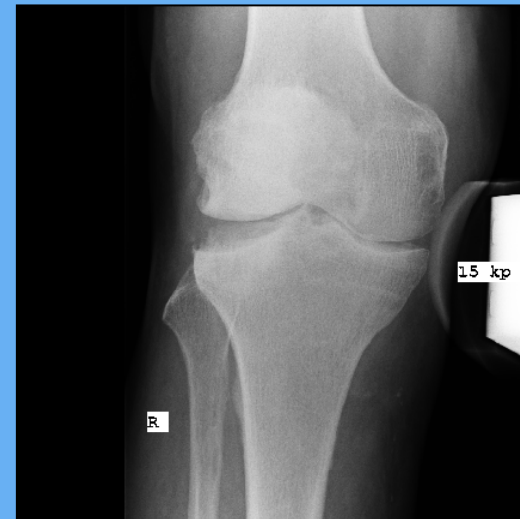
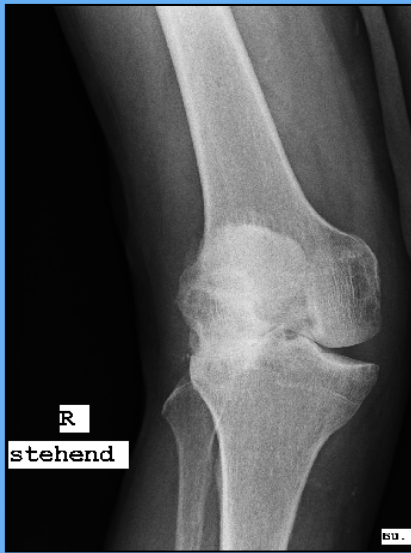
# Severe Valgus Deformity











# Severe Varus Deformity

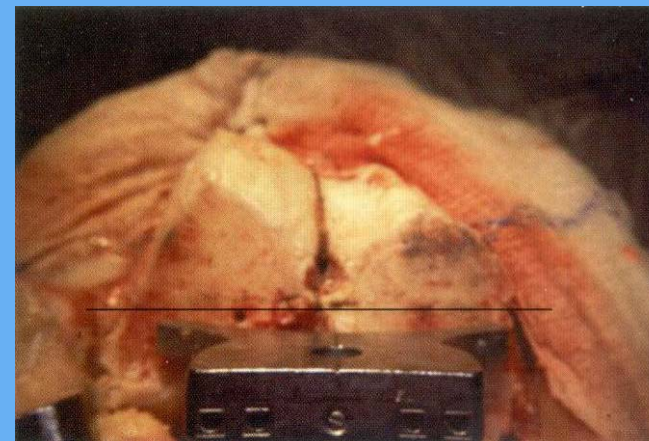
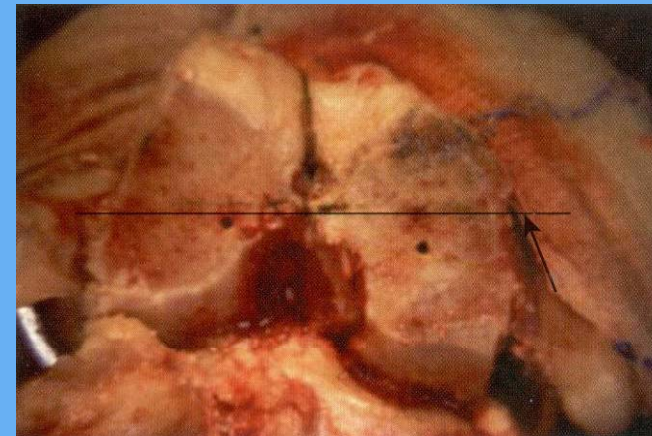
## Pathology:

- Medial FC often hyperplastic
- Subluxation of the lateral tibia
- Often severe tibial bone loss



# Severe Varus Deformity

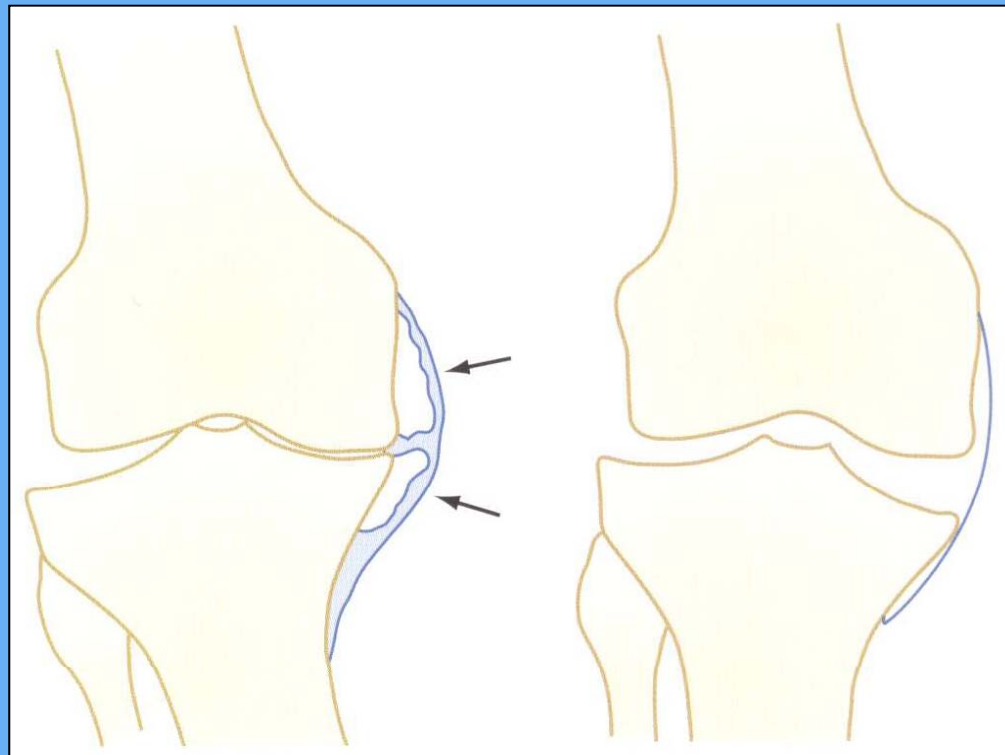
- Femoral Rotation
- Medial FC often hyperplastic:  
3° ERO not sufficient
- Correction



Bilder: Scott, Knieendoprothetik

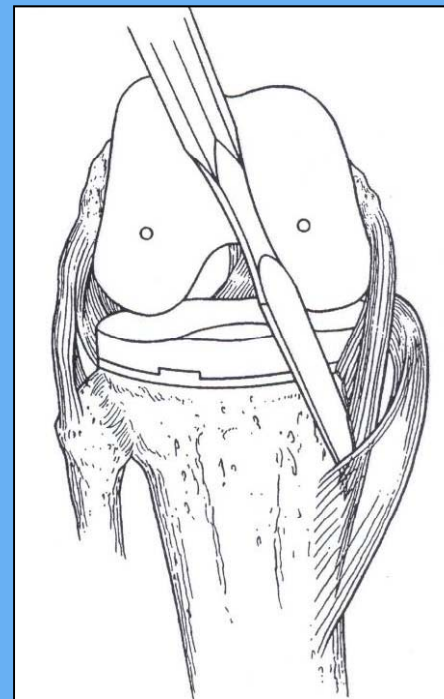
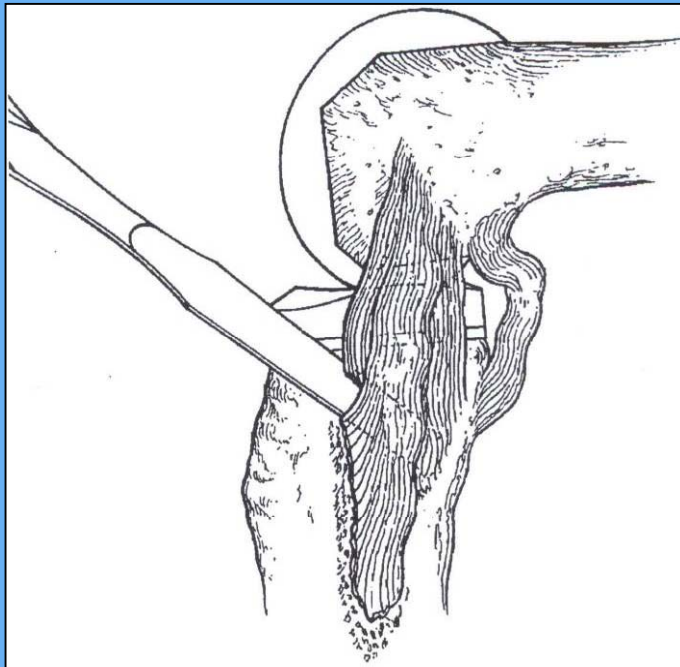
# Severe Varus Deformity

## Removal of medial Osteophyts





# Severe Varus Deformity



Bilder: Whiteside, Ligament balancing

# Severe Varus Deformity

If correction is not achieved:

- Medial tibial downsizing



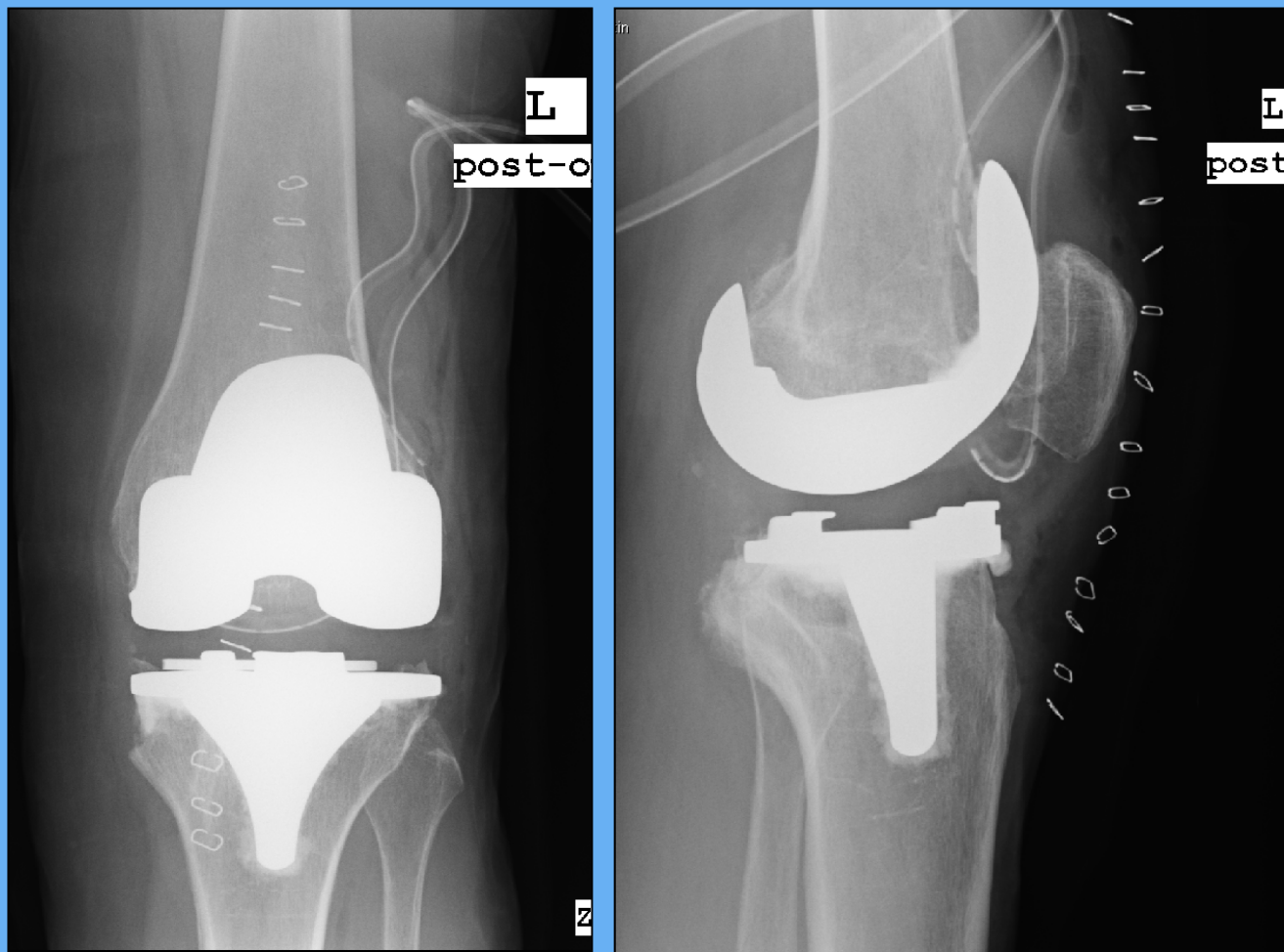
Bilder: Scott, Knieendoprothetik



# Severe Varus Deformity



# Medial tibial Downsizing



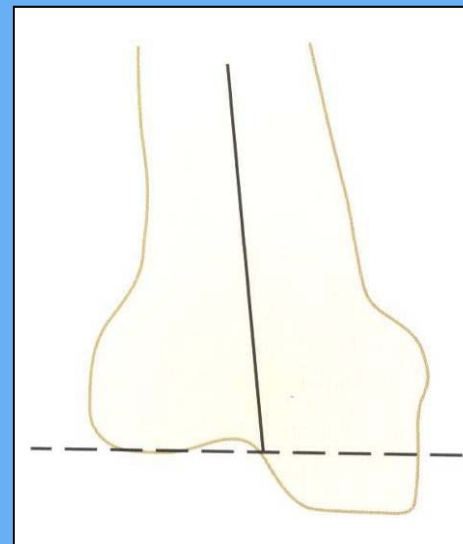
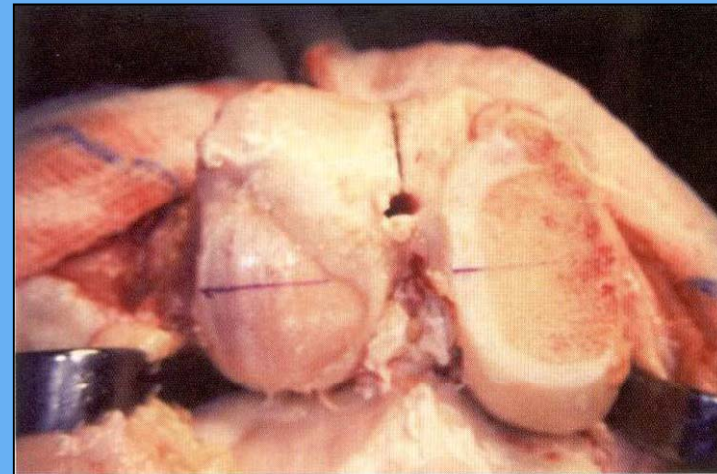
# Severe Valgus Deformity



# Severe Valgus Deformity

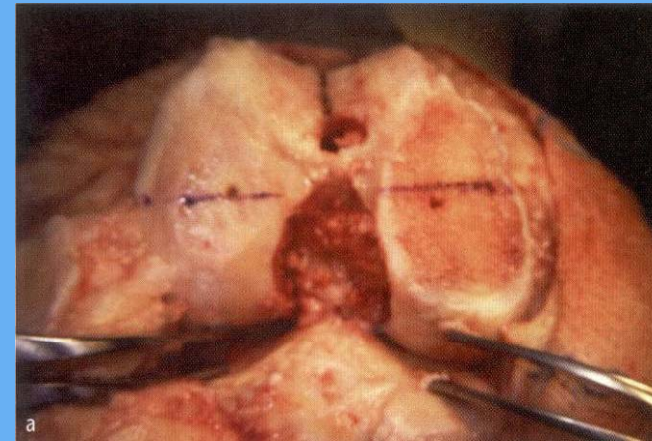
## Pathology

- Hypoplastic lateral FC distal dorsal
- MCL stretched and weak
- Lateral Contracture
- Patellofemoral involvement



# Severe Valgus Deformity

- Lateral FC often hypoplastic:  
3° ERO not sufficient
- Femoral Rotation:
  - Whiteside Linie
  - transepikondylar Axis
  - Parallel to Tibiaresection in  
90° Flexion



Bilder: Scott, Knieendoprothetik



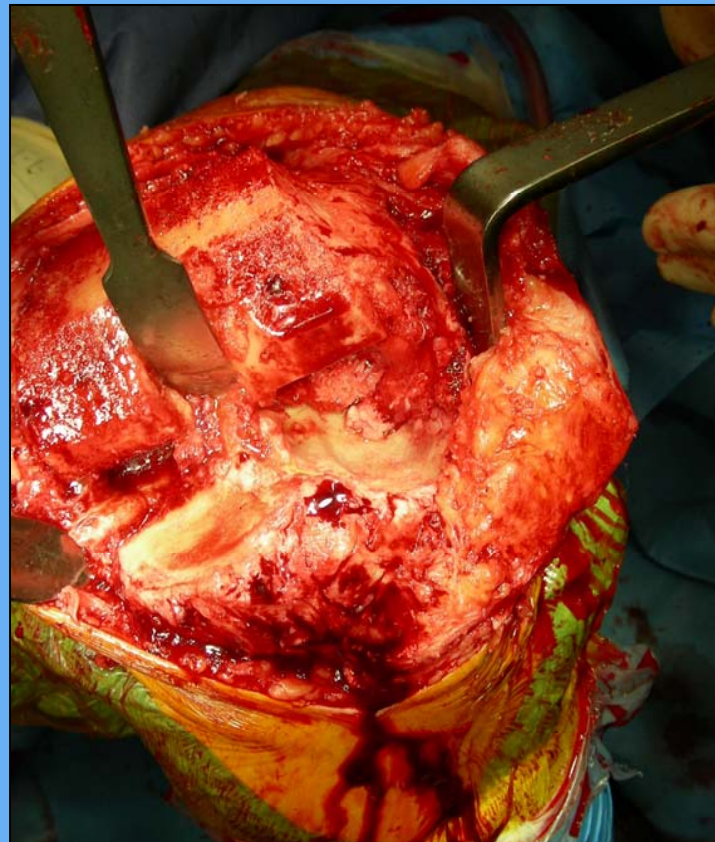
# Severe Valgus Deformity

- Deep tibial bone defect lateral



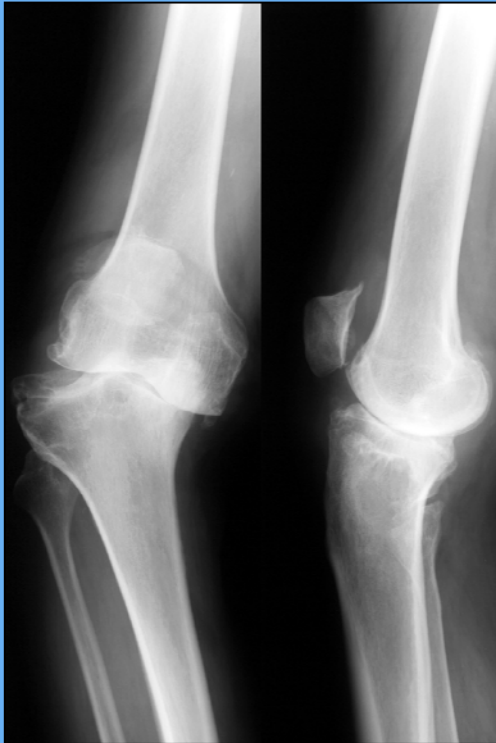
# Severe Valgus Deformity

- Deep tibial bone defect lateral

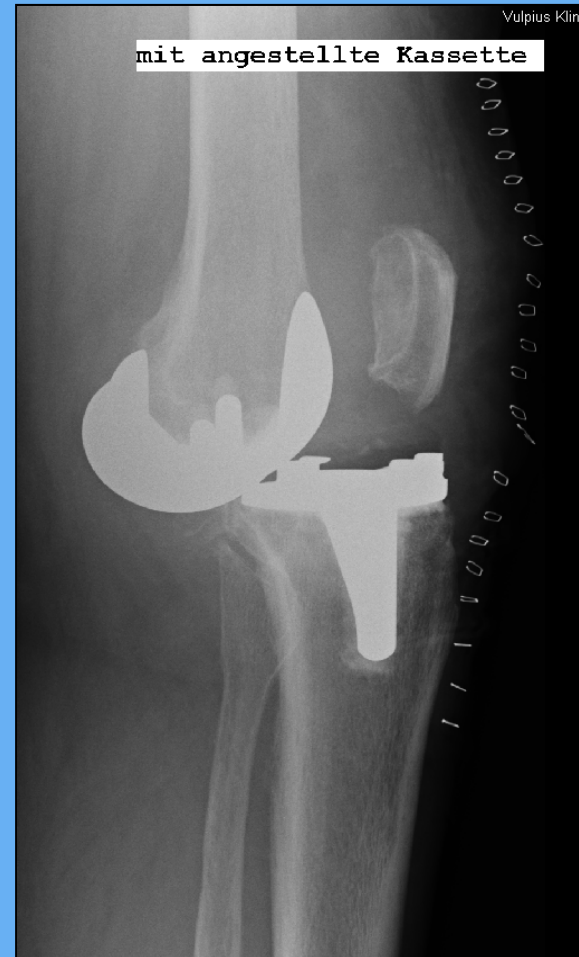


# Severe Valgus Deformity

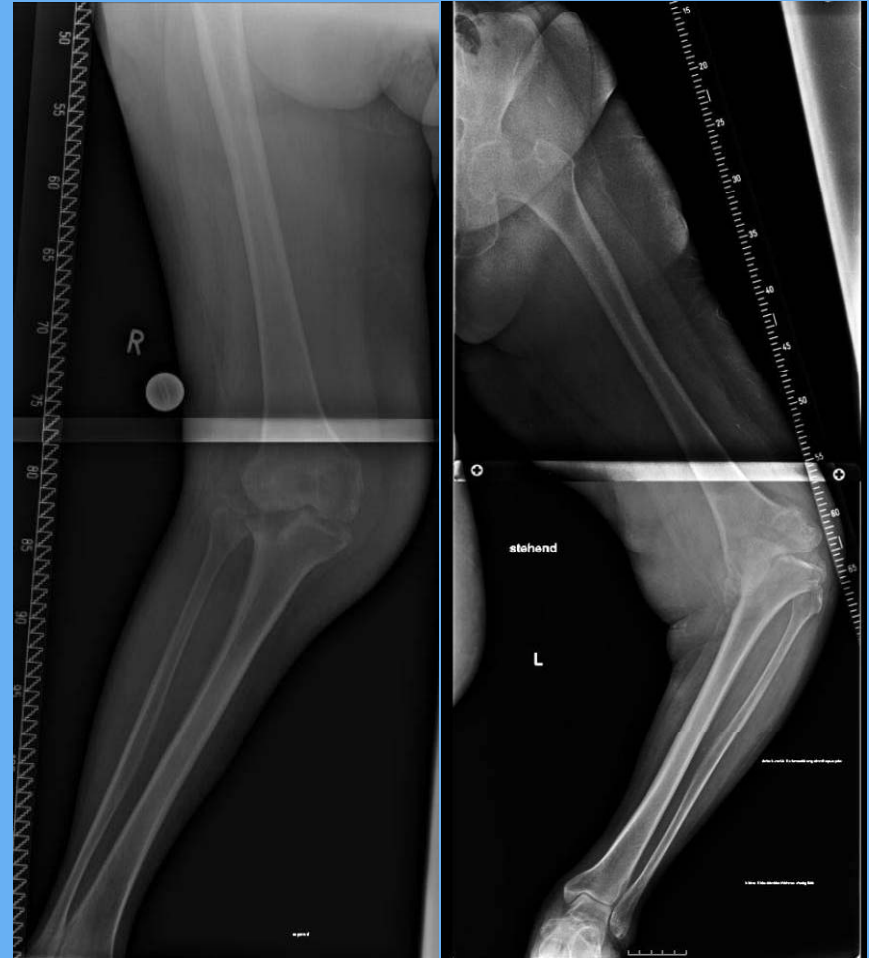




# Ligament Deficiency













Thank you