

Basic Principles Primary



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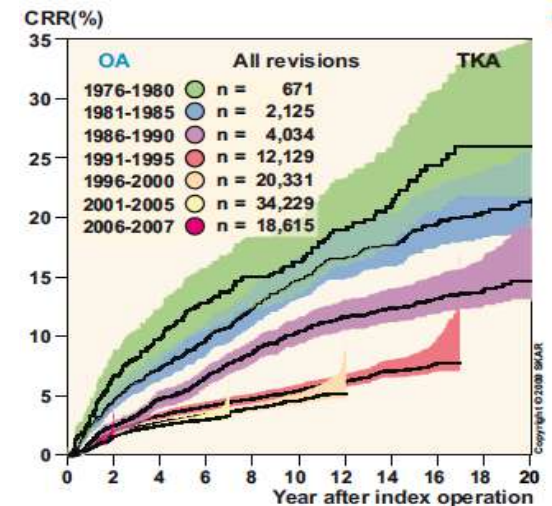
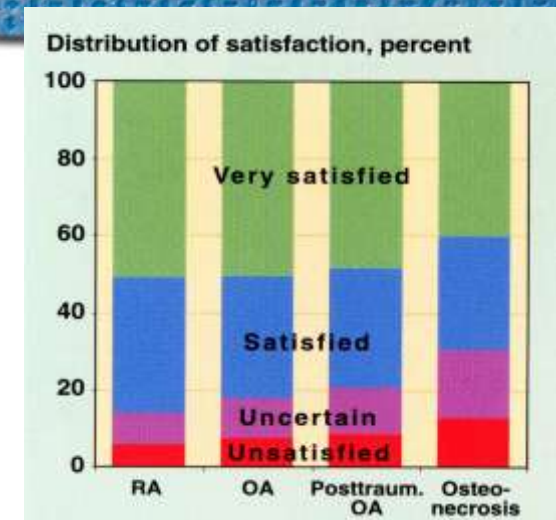
Key Points

- Challenge of TKA
- 10 basic principles
- Planning & Deformity analysis
- Conventional navigation
- Extension gap first technique



Challenge of TKA

- Achieve perfect implant
 - Alignment
 - Positioning
 - Balancing
 - Fixation
- Only 80 % patients satisfied
- 3 % early revision rate
 - ⇒ 10 basic principles



10 Basic Principals Primary TKA

- Patient selection
- Planning
- Implant Selection
- Approach
- Proper Bone Cuts



Mod after J. Insall, 1978

10 Basic Principals Primary TKA

- Rotational positioning
- Balancing
- Jointline
- Patella management
- Fixation

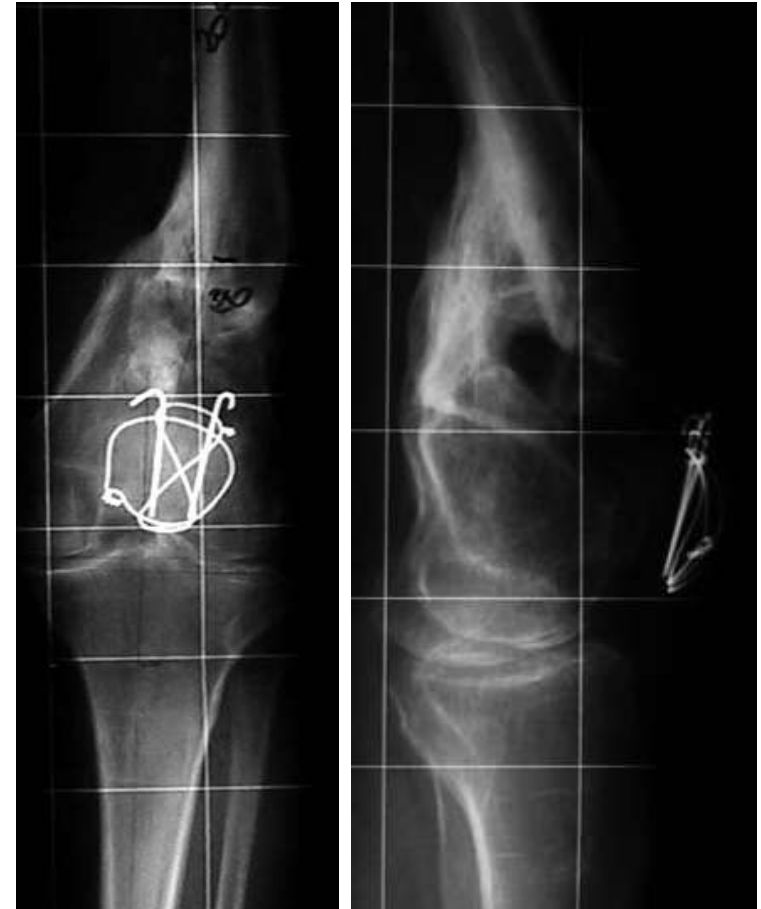


Mod after J. Insall, 1978

1. Patients Selection

- Ideal candidate
 - lost quality of live
 - conservative failed
 - mobile & informed
- Type of deformity
- Identify risk factors
 - ⇒ should be addressed before surgery

Malunion of femur #

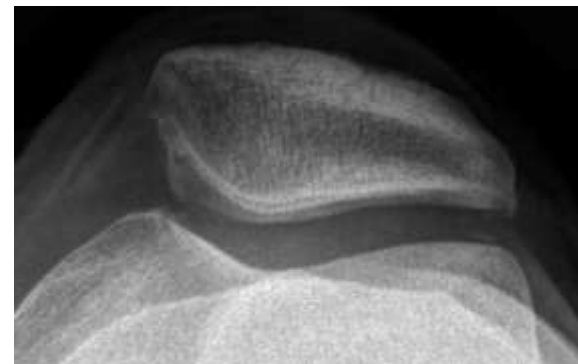


2. Planning - Radiographs

- Long weight bearing x-rays
 - deformity analysis
 - Knee joint
 - lateral (a-p)
 - Patella sun rise
 - Option special imaging
- ⇒ Without planning or Navigation 20% outliers

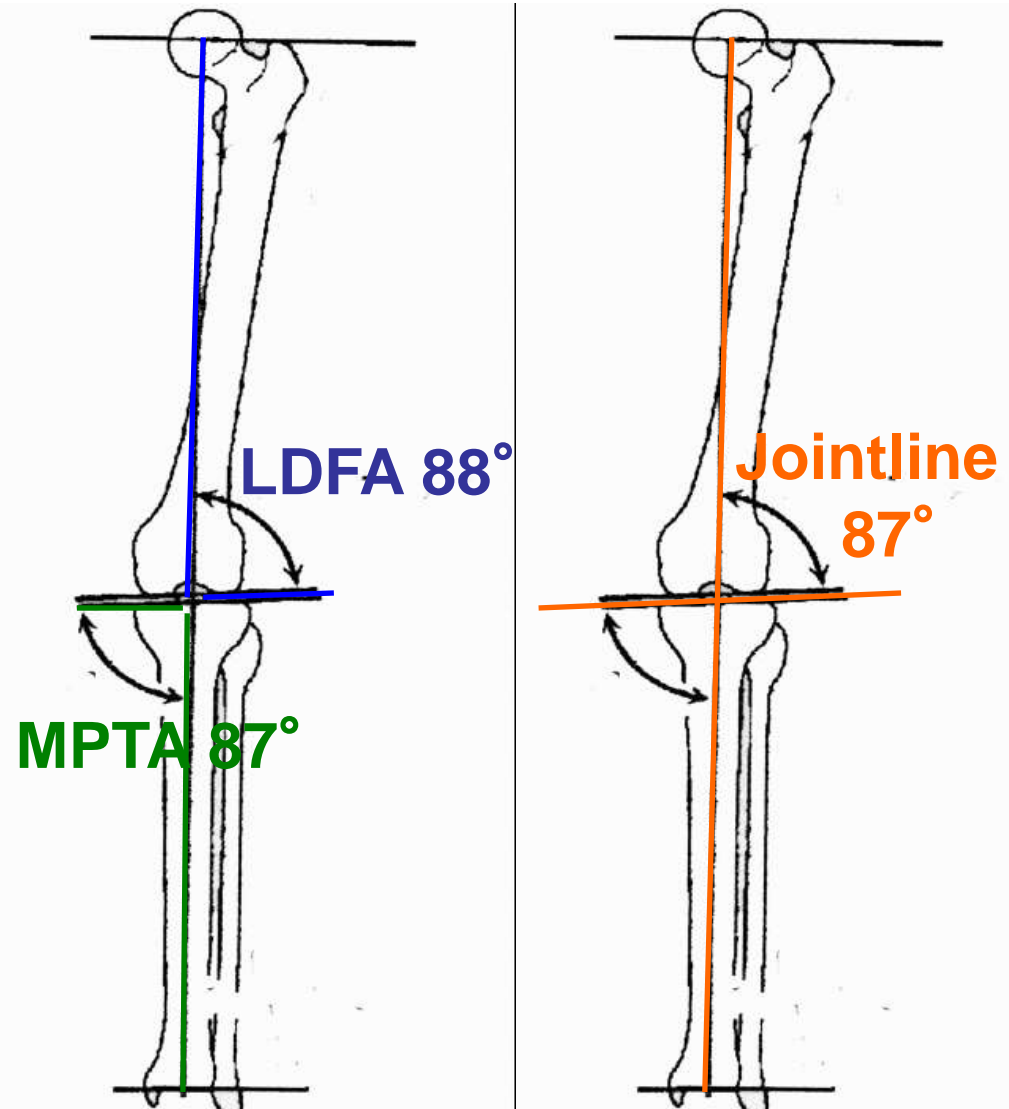


3 Standard x-rays



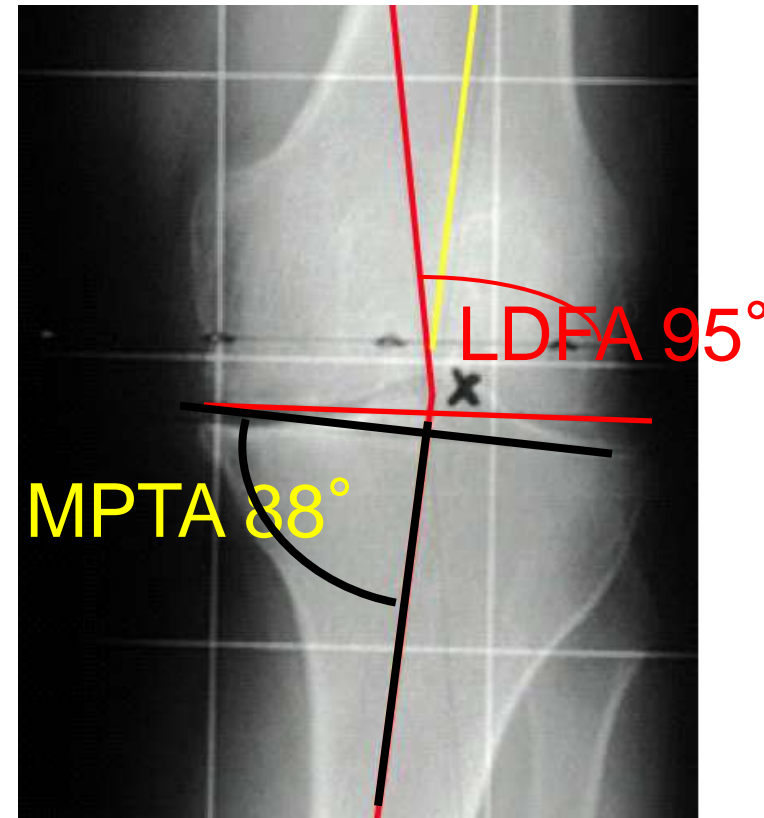
Deformity Analysis

- Normal knee
 - LDFA $88 \pm 3^\circ$
 - MPTA $87 \pm 3^\circ$
 - Jointline $87 \pm 3^\circ$
- ⇒ We don't operate on normal knees



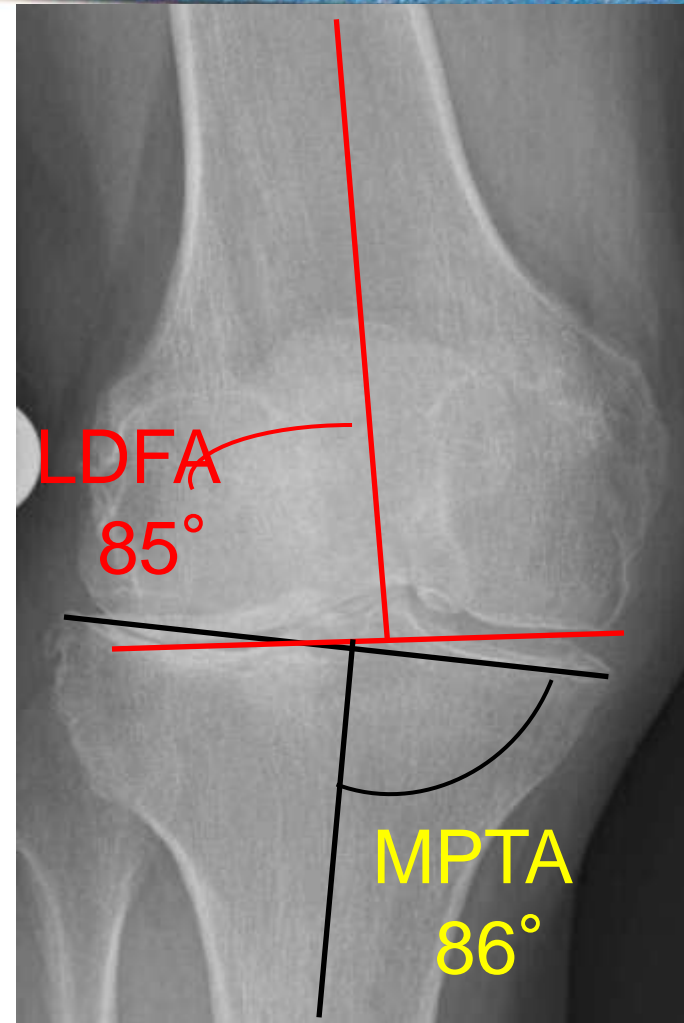
Varus Case Planning

- Varus 12°
- LDFA 95°
- MPTA 88°
- IM 11°



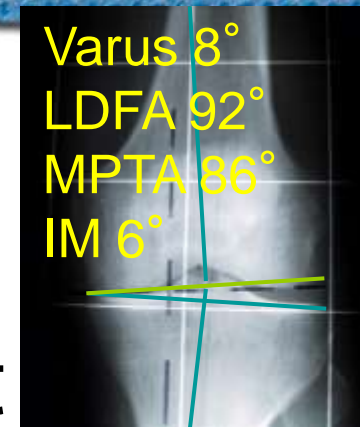
Valgus Case Planning

- Valgus 9°
- LDFA 85°
- MPTA 86°
- IM 3°



Conventional Navigation

- Preop planning
 - ⇒ long standing x-ray
- Double checking before cut
 - ⇒ cutting jig & EM control
- Cut verification
 - ⇒ bone cuts & caliber
- Results comparable to computer navigation

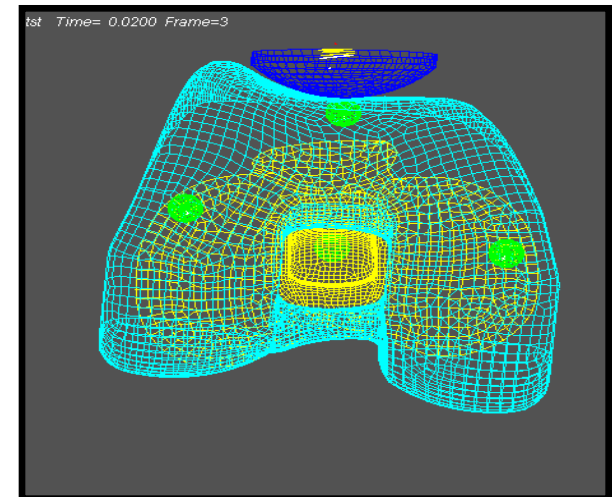


3. Implant Selection

- 80 % of success remains
⇒ surgeon & instruments
- Specific implant philosophies
⇒ advantages & disadvantages
- New biomechanical designs
medial/lateral pivoting
single radius
ACL & PCL substituting



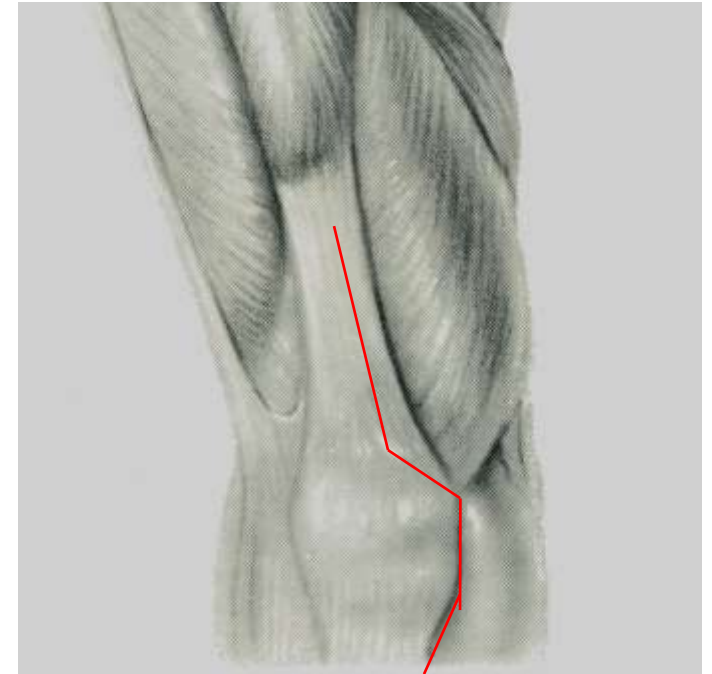
Mobile or fix ?



BCS Journey®

4. Approach

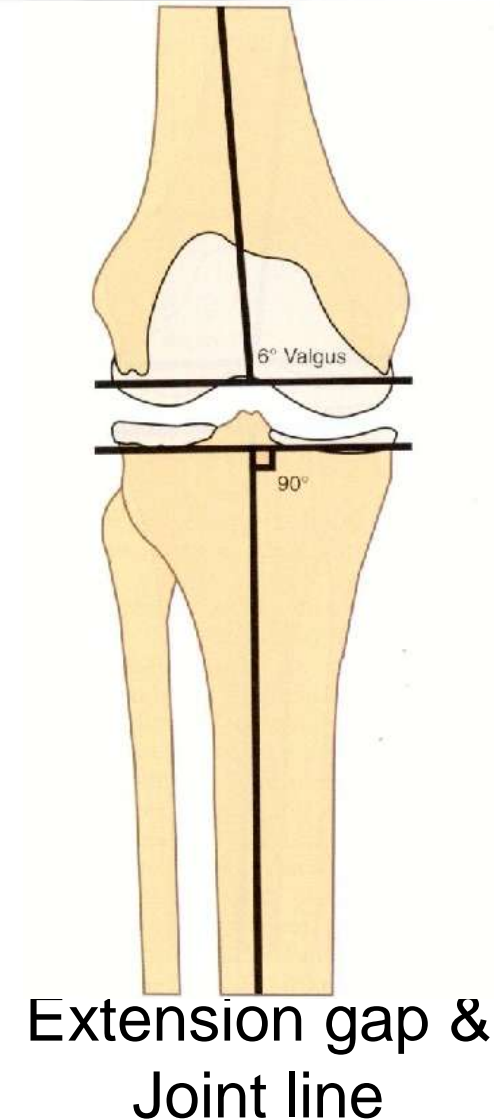
- Rules for scars
- Varus - medial
 - ⇒ parapatellar / straight
- Valgus - lateral
 - ⇒ Hoffa plastic
- Valgus like Varus
- Approach extensions
 - ⇒ only necessary



Classical Medial
Arthrotomy

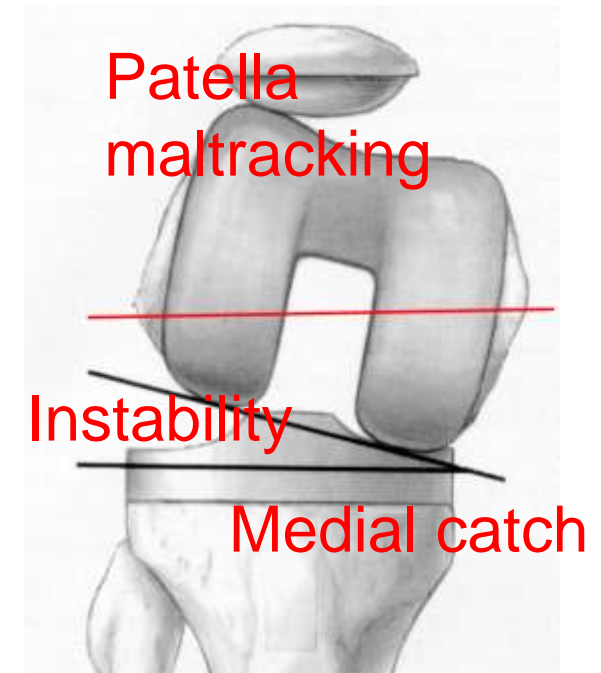
5. Bone Cuts & Alignment

- Frontal plane
 - mechanical axis 0-3° ?
 - extension gap
 - Femurcut = joint line
- Sagittal plane
 - Femur
 - ⇒ extension / flexion
 - Tibia Slope
 - ⇒ flexion gap



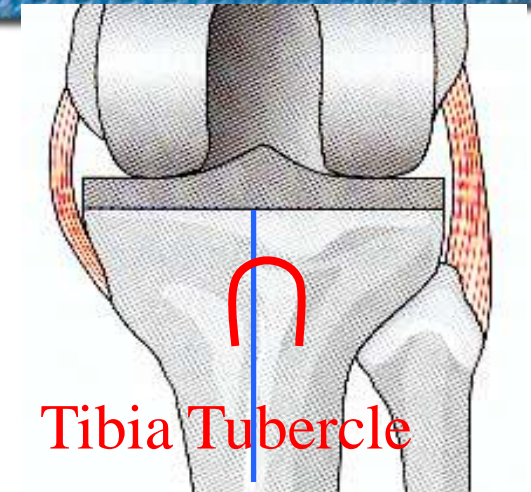
6. Rotational Positioning

- Most difficult bone cuts
- Tibia & Femur
 - ⇒ Patella maltracking
- Femur
 - ⇒ Asymmetric flexion gap
 - ⇒ Type A (Flexion $>90^\circ$)
 - ⇒ Type B (Flexion $<90^\circ$)



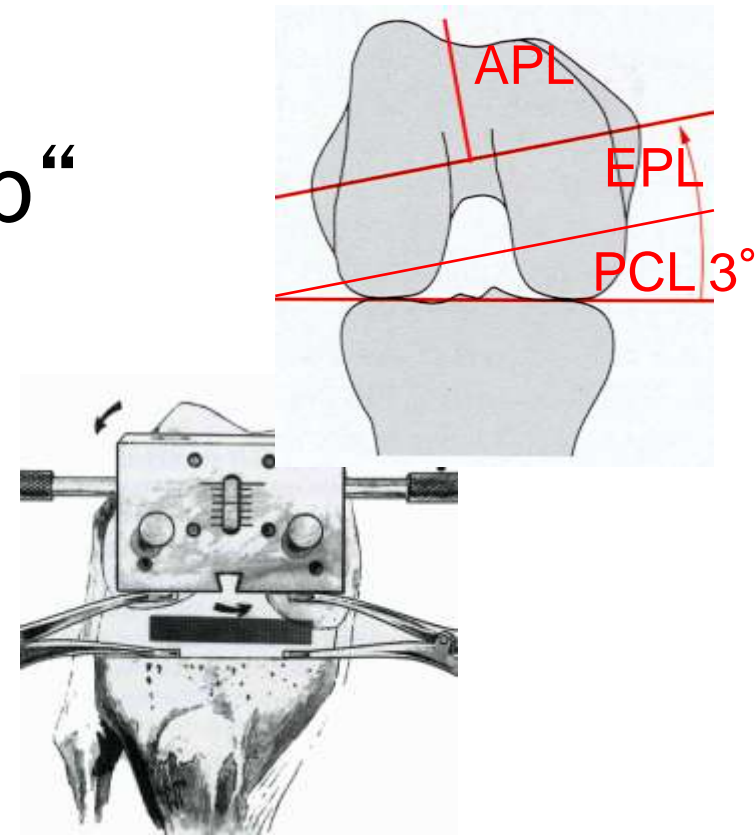
Rotational Positioning Tibia

- Prepare TT & anterior crest
- Torsional deformity ?
- Functional landmark
 - ⇒ TT & posterior lateral
- Anatomical landmark
 - ⇒ curve on curve
- Best coverage but no overhang



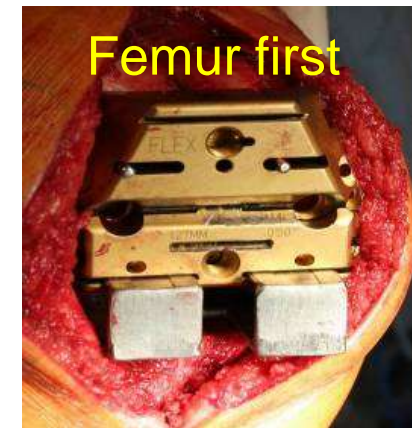
Rotational Positioning Femur

- „Femur first“ or „measured resection“
 - ⇒ bony landmarks
- „Tibia first“ or „balanced gap“
 - ⇒ balanced soft tissues
- Both have limitations
- “Extension gap first”
 - ⇒ solid compromise



“Extension gap first” technique

- Distal femur and tibia cut
- Balance extension gap
- Femur Rotation controlled
 - ⇒ 3 bony landmarks
 - ⇒ balanced soft tissues
- Combines both philosophies



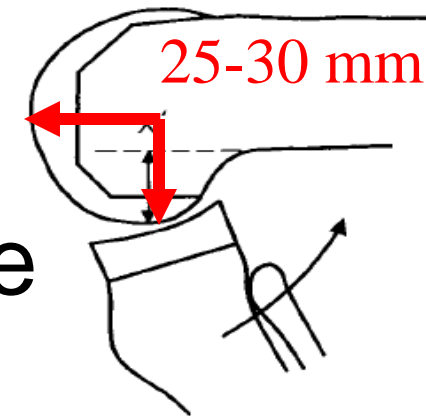
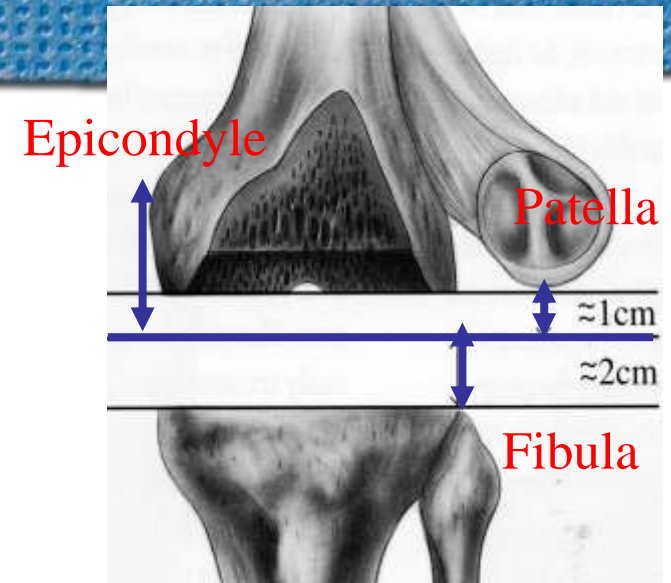
7. Balancing

- Important factor for success
- Tight $< 2\text{mm}$
 - ⇒ pain & limited ROM
- Loose $>4\text{mm}$
 - ⇒ pain & instability
- Correction deformities requires soft tissue releases
- Different techniques available



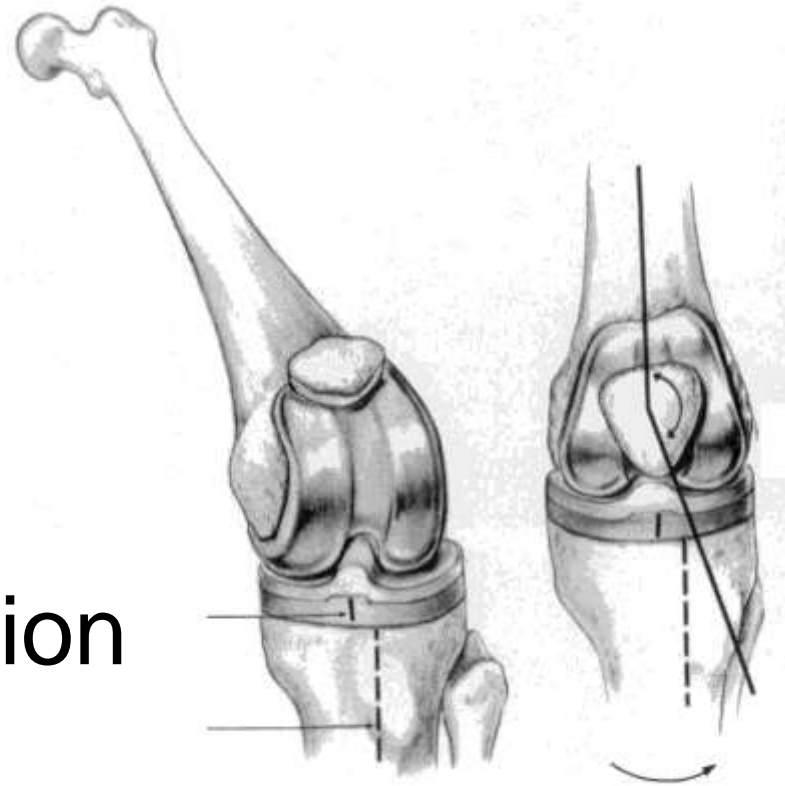
8. Joint line

- Important for tibiofemoral & Patella kinematics
 - ⇒ too high – instability
 - ⇒ too low - contracture
- Landmarks jointline
 - ⇒ 2 cm prox Fibula
 - ⇒ 25-30mm med Epicondyle
 - ⇒ Patella relative



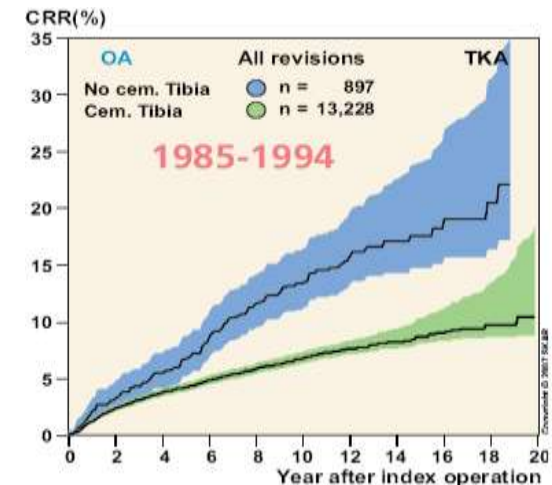
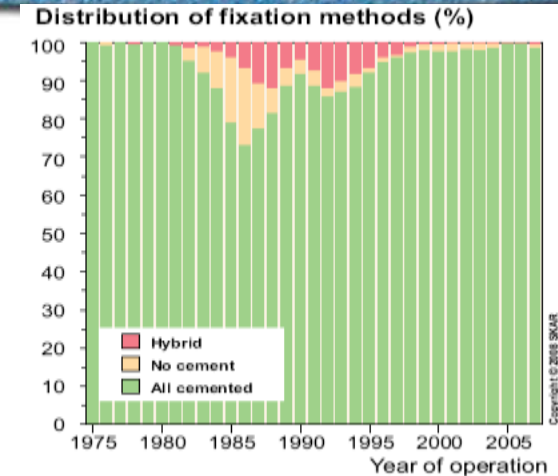
9. Patella

- Patella replacement or not
 - ⇒ no difference
- Proper tracking
- Advantages & Disadvantages
- Key factors
 - ⇒ Femur & tibia rotation
 - ⇒ Femur design
 - ⇒ Joint line & balancing



10. Fixation

- Cementing
 - proper technique
 - save & cheaper
 - AB loaded cement
- Cementless
 - good bone quality
 - no interface or third body
 - results comparable
 - new designs promising



Take Home Message

- TKA difficult & demanding procedure
- Following 10 basic principles
 - ⇒ less implantation failures
 - ⇒ 90% satisfied patients
- Conventional navigation
 - ⇒ proper planning
- Extension gap first
 - ⇒ proper rotational positioning



smallest patient