



**Centre of Orthopaedics and Traumatology**  
Hospital Brandenburg  
Medical School "Theodor Fontane"



# The femoropatella compartment in TKA

**Roland Becker**



# KEYPOINTS



**Patella subluxation**

**Patella instability**

**Patella baja and alta**

**Retropatella wear**





## Failure after TKA

1814 cases

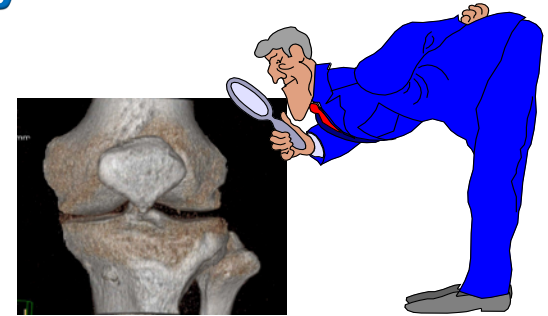
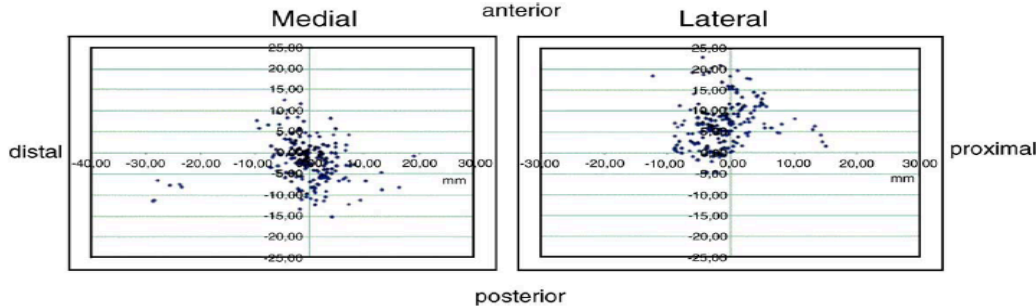
Aseptic loosening	36.2%
Patella and extensions mechanism problems	<b>18.5%</b>
Instability	12%
PE wear	<b>8%</b>
Malalignment	3.6%
Stiffness	3.3%

Cummulative risk of 2nd revision:

- 16.1% after 5 years
- 26% after 10 years
- 34% after 15 years



## Reliability of the transepicondylar line



- Variation of 15mm in the antero-posterior dimension
- Variation of 19mm in the proximal-distal dimension

**ROTATION**

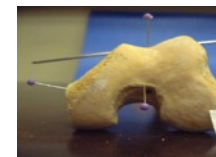
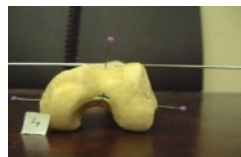
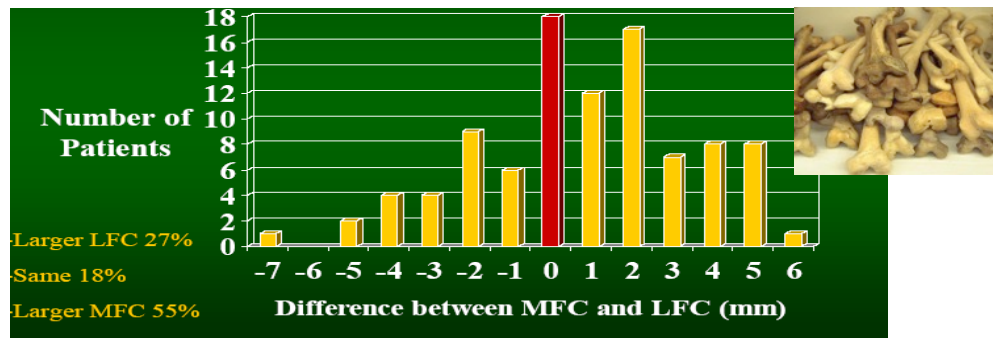
**LEG ALIGNMENT**



# Anatomy

Femoral component position of 3° of IR up to 7° of ER after lig. balancing knee arthroplasty

## Variation in anatomy of the knee

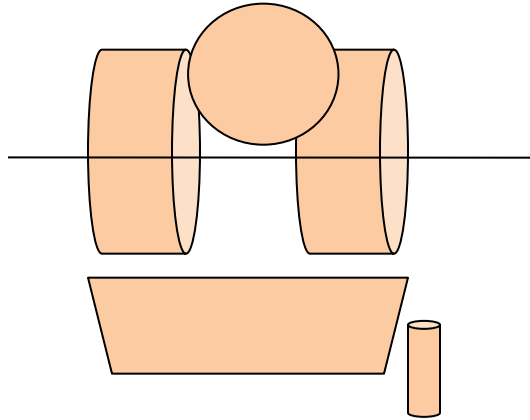




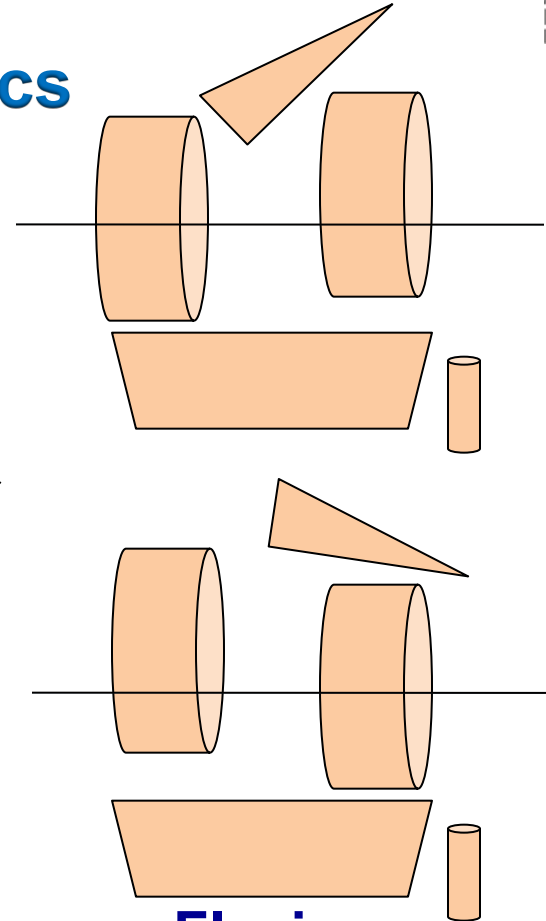


## Kinematics

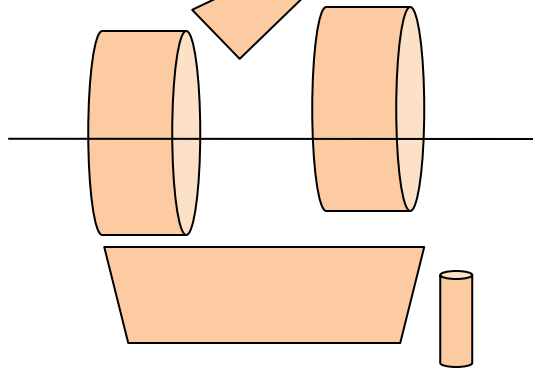
medial



**Extension**



**Flexion**



## Internal rotation

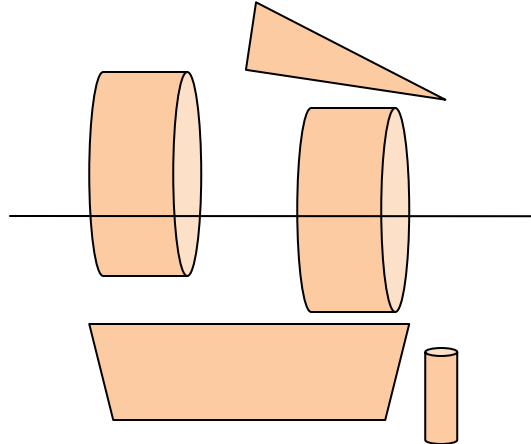
VALGUSALIGNMENT in flexion

1-4° lateral patella tracking and tilting

5-8° patella subluxation

7-17° patella dislocation

Berger Clin Orthop 1993



## External rotation

VARUSALIGNMENT in flexion

overloading of the lateral compartment

lift off medially

Instability in flexion

Hanada COOR 2007

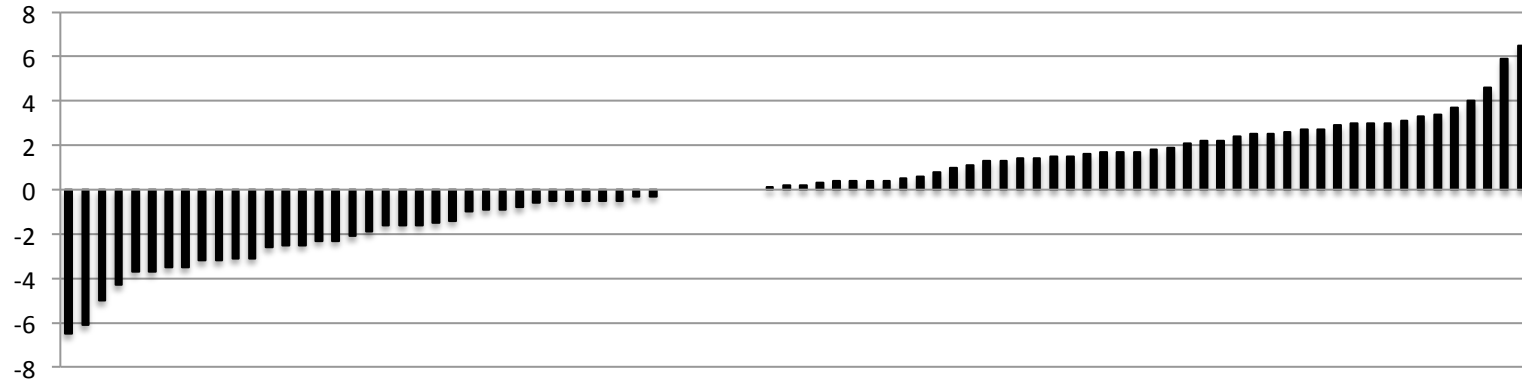
**Flexion**



## Femoral component rotation

Mean femoral component rotation:  $0,1^\circ \pm 2,5^\circ$ ; (max. internal and external rotation  $6,5^\circ$ )

femoral rotation ( $^\circ$ )



Patients





- **Difficulty in identifying the surgical epidondylar line**

- 42% of the patients presented more than 2° of external or internal rotation
- 23% more than 3° of external and internal rotation



Siston et al: only 17% of all cases were within a range of 5° of internal and external rotation  
Hesterbeek et al: Variance of 4° external rotation to 13° internal rotation

- **Most reliable reference posterior condylar line**

Victor et al: PCL close to the PCL (variability of less than 1°)

- Risk of error: 1. dysplastic lateral femoral condyle  
2. Remnants of cartilage at the posterior aspect of the lateral condyle

} Internal rotation  
of the  
femoral component



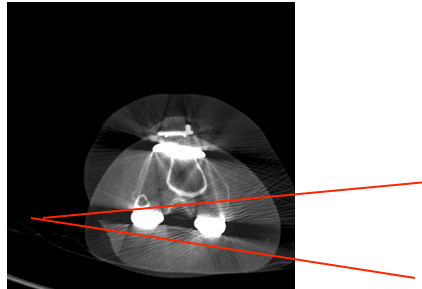
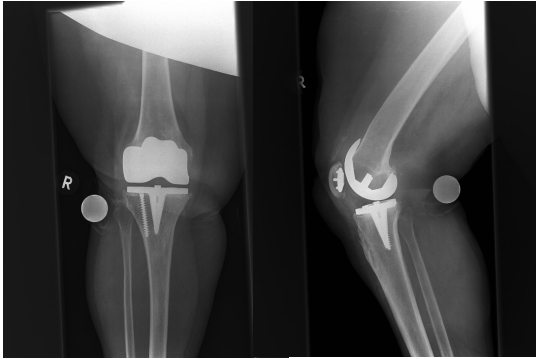
## Epicondylar axis versus femoral flexion axis



**Difference between the transepicondylar axis and femoral flexion axis of  $4.6^\circ$**



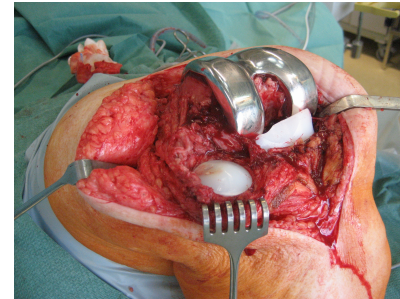
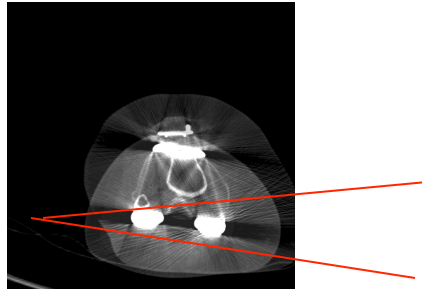
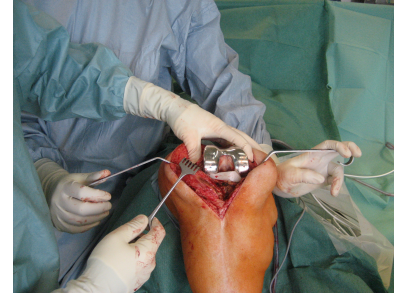
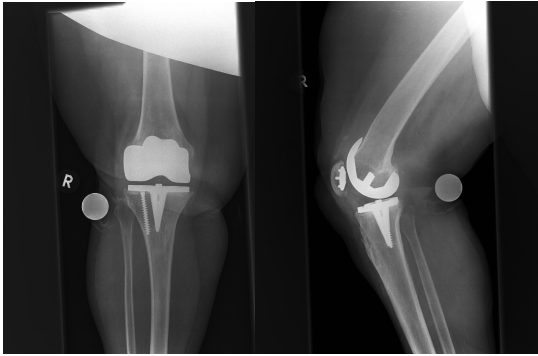
RM, 73 Jahre







RM, 73 Jahre





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**Patella subluxation**

**Patella instability**

**Patella baja and alta**

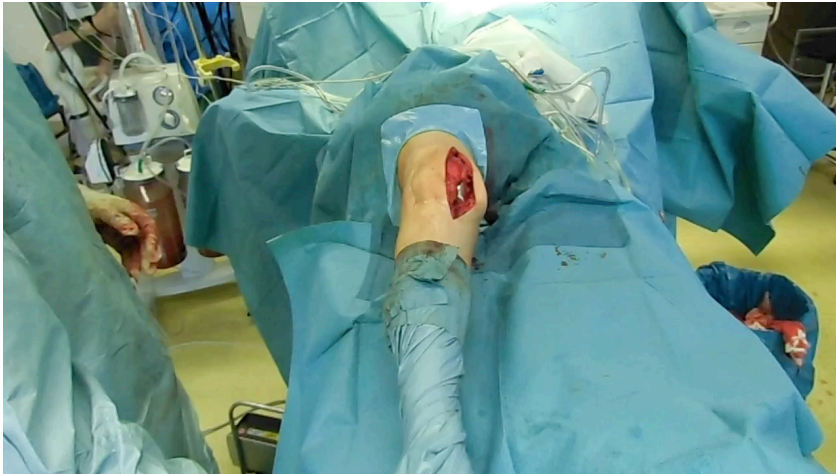
**Retropatella wear**







## Patellamobility



**1.** Check patella tracking before wound closure



**2.** Check patella mobility before skin closure  
25%-50% mediolateral mobility



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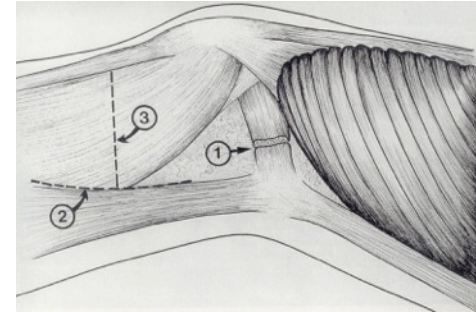


## Patellainstability





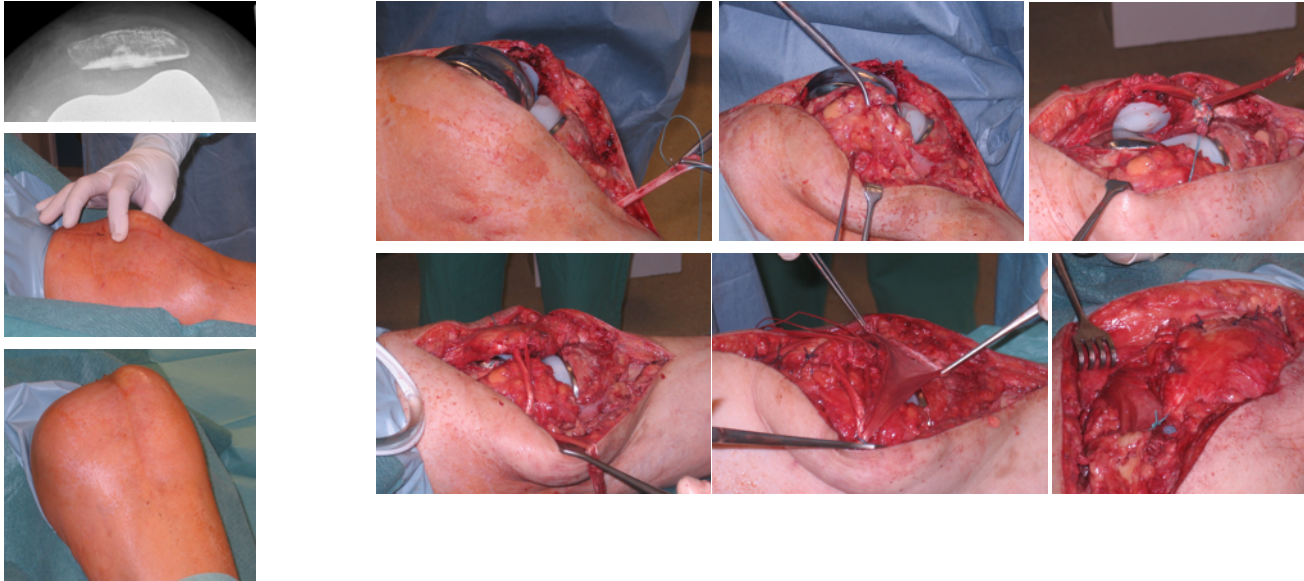
## Rupture of the medial capsule



**52% of the medial passive stabiliser**

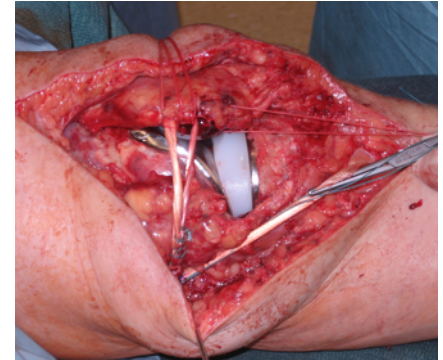
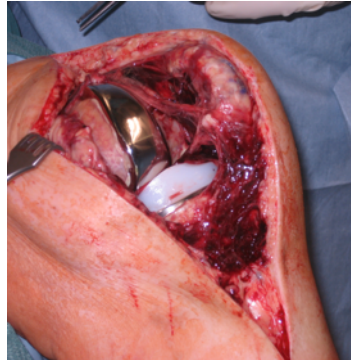


## Rupture of the medial capsule





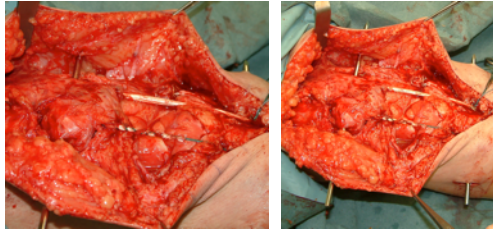
## Rupture of the medial capsule







## Patella ligament rupture



**usage of semitendinosus and gracilis tendon**

**+**

**temporary external fixation**







# KEYPOINTS



**Patella subluxation**

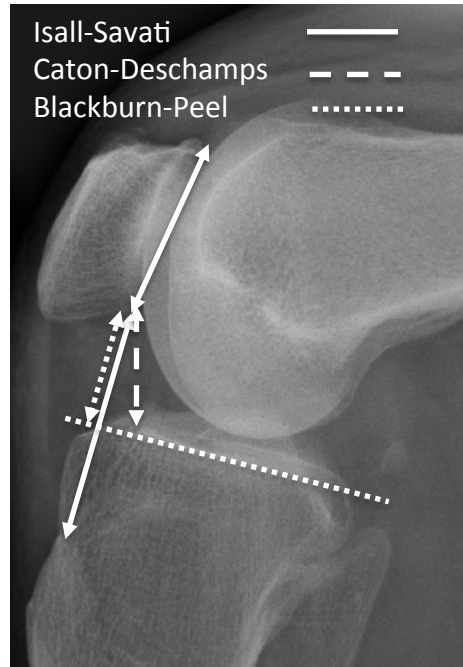
**Patella instability**

**Patella baja and alta**

**Retropatella wear**



## Radiographic Measurement



<b>INTER - observer agreement</b>	<b>Preoperative ICC</b>	<b>Postoperative ICC</b>
Isall-Savati-Index	0.89	0.91
Caton-Deschamps ratios:	0.89	0.91
Blackburn-Peel		

<b>INTRA - observer agreement</b>	<b>Preoperative ICC</b>	<b>Postoperative ICC</b>
Isall-Savati-Index	0.6	0.74
Caton-Deschamps ratios:	0.74	0.91
Blackburn-Peel	0.74	0.91



**Incidence of patella baja **prior** to surgery: 9.4%**

**Incidence of pseudopatella baja **after** to surgery: 26,4%**



**Do we need to adjust the joint line according to the patella position ??**



## Patella baja

### PSEUDO PATELLA BAJA

**Contraction of patella ligament**  
**Rupture of the quadriceps tendon**



### TRUE PATELLA BAJA

**Joint line elevation**

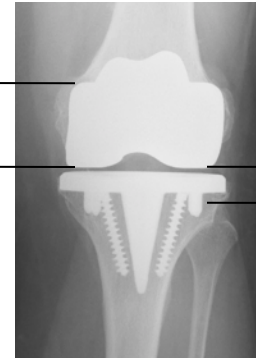




## Joint line preservation

50% of revision cases malpositioned  
joint line proximally (Laskin RS CORR 2002)

52 mm



11 mm

76% joint line elevation in revision

(Partington PF CORR 1999)

Significant inferior results when joint line +/- 4mm

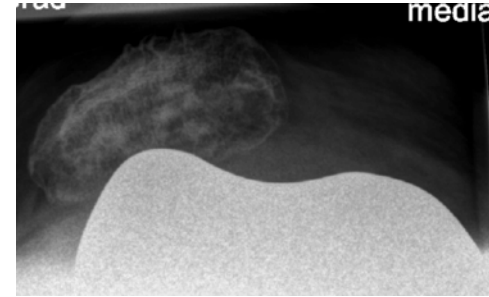
In KSS, ROM and flexion / extension deficits

(Hofmann AA, J Arthropalsty 2006)



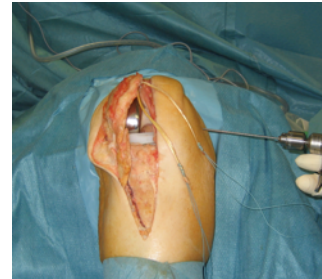
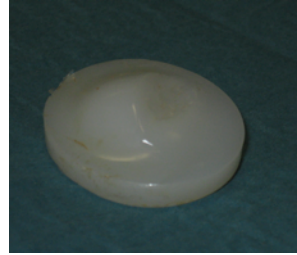
Fall 3

## Patella baja





## Patella baja





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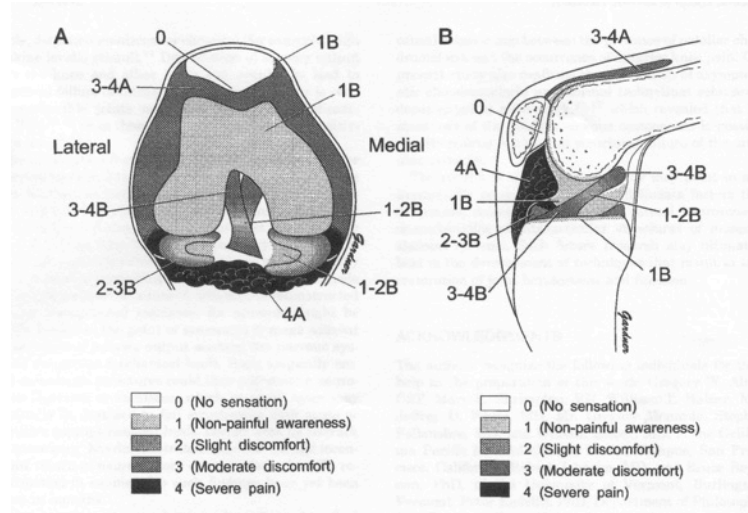
**Retropatella wear**





## Clinical outcome

Abraham W; CORR 1988	Klinische Auswertung, Bewegung
Bourne RB; COOR 1995	Klinische Auswertung, Bewegung
Feller JA; JBJS-B, 1996	HSS-Score, Patellascore
Barrack RL ; J of AAOS 1998	KSS, Patellascore
Pollo FE; AmJ Knee 2000	Gehen, Aufstehen, Treppensteigen
Ogon, M; AOTS 2002	KSS, Röntgenauswertung
AbraÖztürk A; Acta Orthop Traum 2006	KSS, Patellascore
Burnett RS; COOR 2007	Level 1 klinische Studie, Bevorzugen + Ersatz
Wood DJ; JBJS-A, 2008	
Garneti N; J of Knee Surg. 2008	KSS, Gehfähigkeit, Kniestabilität, <b>mehr ANP</b>
Epinette JA; J of Knee Surg 2008	Knieschmerz, Gehfähigkeit, Bewegung, Treppe
Helmy N; COOR 2008	<b>mehr ANP</b>





## Meta-Analysis patella resurfacing versus non-resurfacing

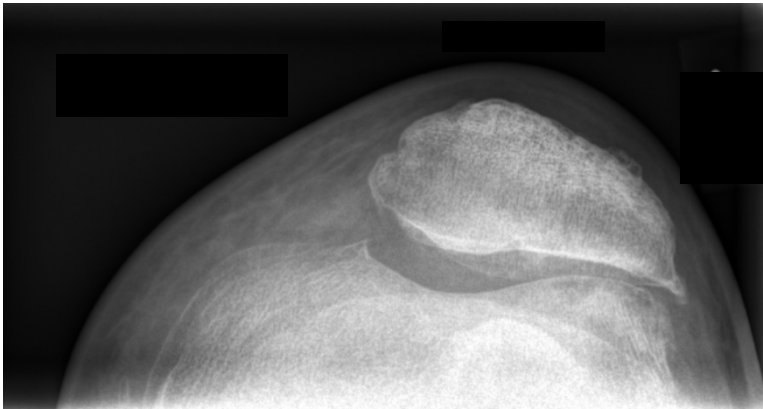
	Patella resurfacing	Patella non-resurfacing
Revision rate <sup>(1)</sup>	1%	6.9%
Anterior knee pain <sup>(2)</sup>	12.9%	24.1%

Complications after patella resurfacing:

- Avascular necrosis
- Patellafractur
- Aseptic loosening
- Patella ligament damage
- Polyethylene wear



## Indication for patella resurfacing in TKA



Patella resurfacing:

Dysplastic patellofemoral compartment  
Concave lateral patella facet



# Summary

- **Patella maltracking may be caused due to femoral component malrotation, joint line alteration or instability - Identify the cause!!**
- **Distinguish between true and pseudo patella baja**
- **Joint line preservation is very important in TKA**
- **Patella resurfacing causes less revision surgery and better clinical outcome in TKA**





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Thank you



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