



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



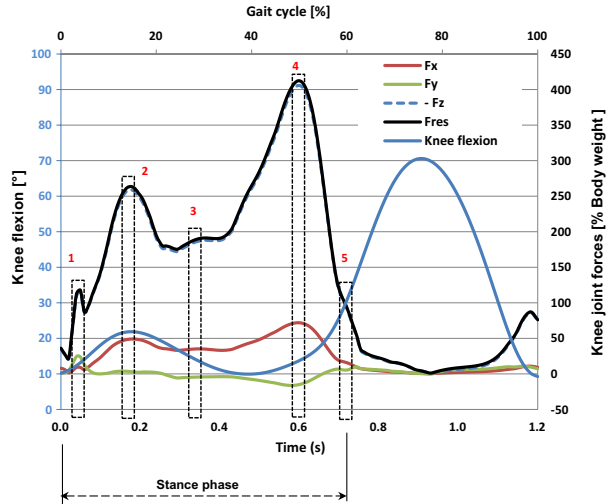
MHB
MEDIZINISCHE
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Postoperative course related to fixation
Rehabilitation after osteotomy

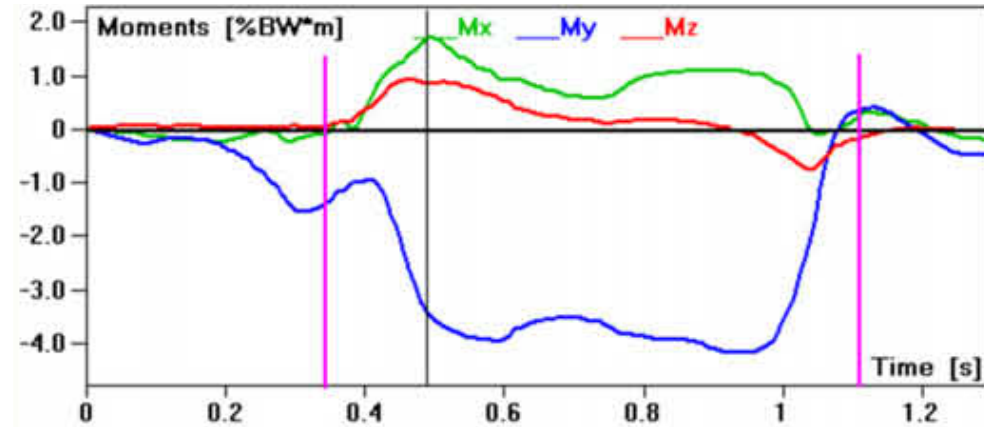
Roland Becker



Loading of the knee



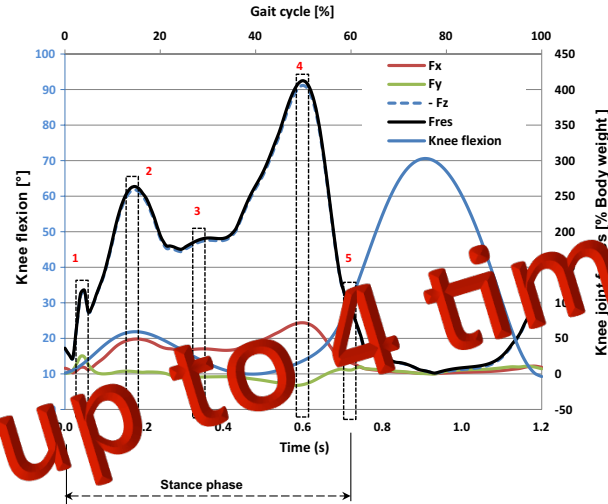
Computer model



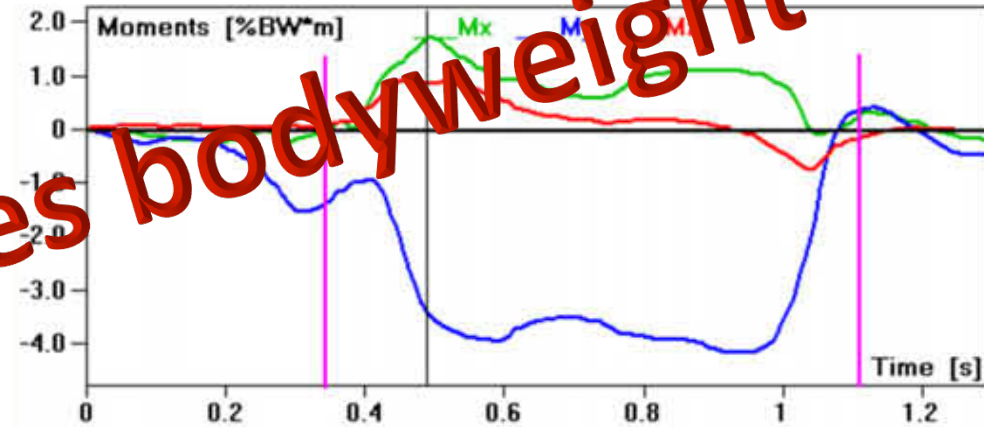
In vivo measurements



Loading of the knee



Computer model

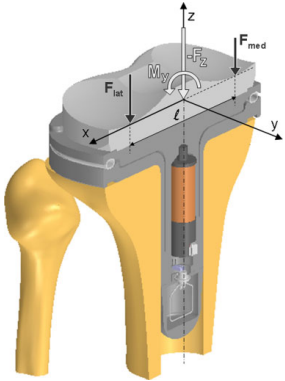


In vivo measurements



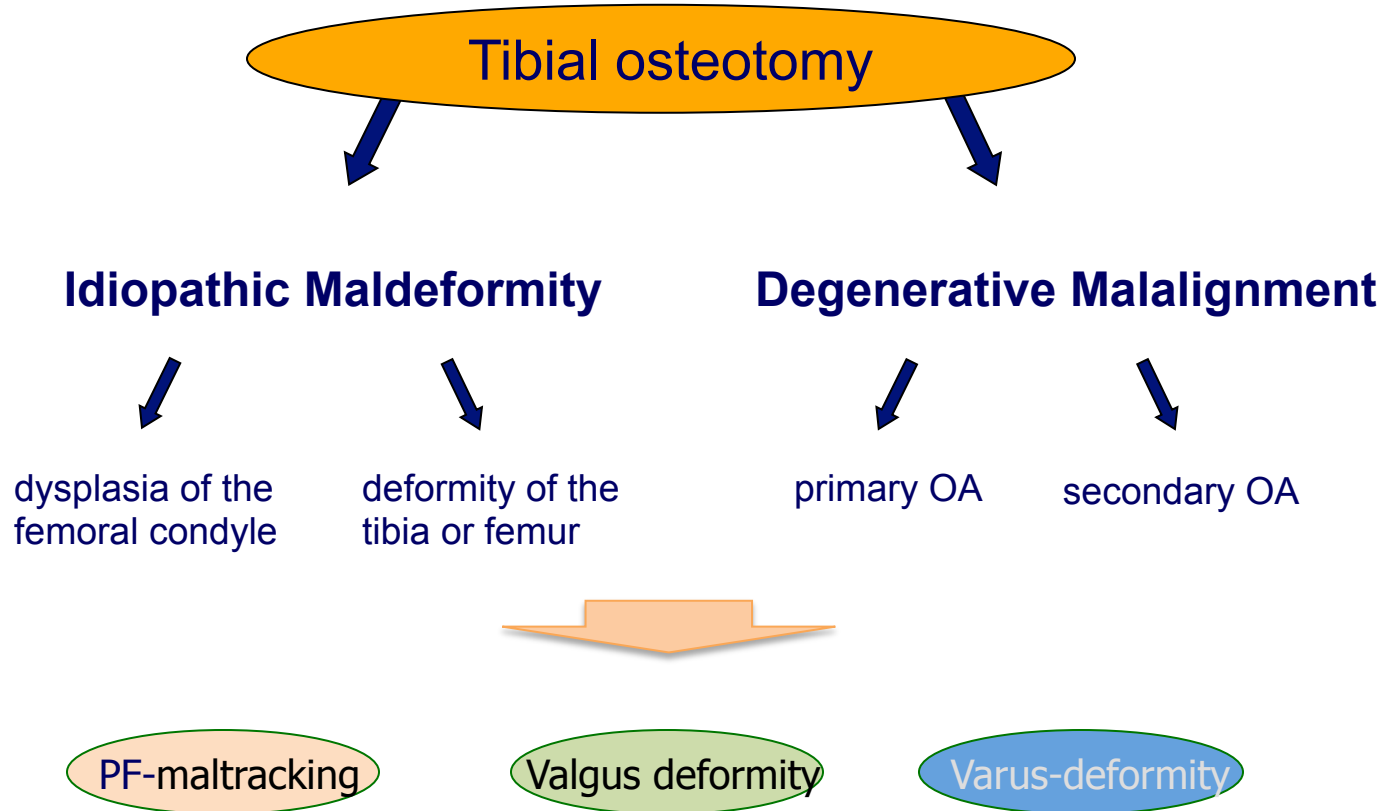
Lateral wedged shoe loading

Medial femorotibial loading



Tibia plateau with
load cell

	5mm wedge	5mm insole	10 wedge
1 st peak	-2 (2/-6)	-1 (3/-5)	-2 (2/-8)
2 nd peak	-3 (2/-6)	-3 (1/-9)	-4 (2/-11)





Tibial osteotomy

Open Wedge Osteotomy

- ✓ precise correction
- ✓ biplanar correction
- ✓ ligament balancing
- ✓ cancellous bone for the open wedge

Closed Wedge Osteotomy

- ✓ unprecise correction
- ✓ uniplanar correction
- ✓ laterale ligament laxity
- ✓ risk of peroneal nerve damage
- ✓ no cancellous bone required

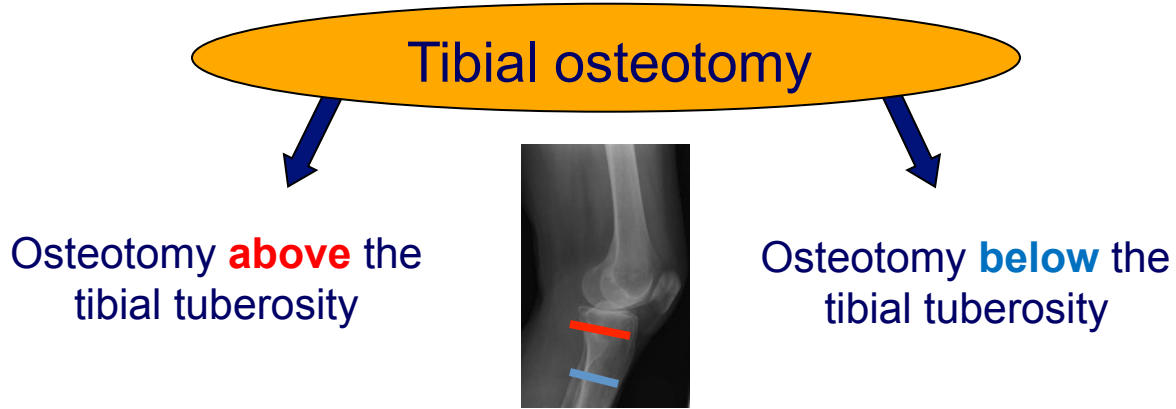


Osteotomy **above** the tibial tuberosity

- ✓ better bony healing
- ✓ ligament balancing
- ✓ CAVE patella infera
- ✓ demanding in case of conversion to TKA

Osteotomy **below** the tibial tuberosity

- ✓ proximal part longer
- ✓ no influence on the patello-femoral tracking
- ✓ delayed bony healing



- proximale open wedge osteotomy → increase in patellofemoral pressure
- distal open wedge osteotomy → no increase of pressure



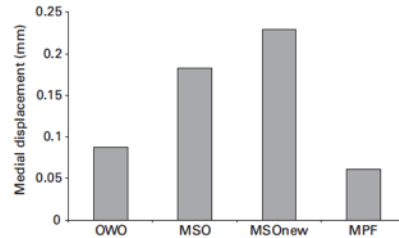
CAUTION in patients with patellofemoral OA



Mechanical properties of the Implants



Puddu-Platte



Tomofix®-Platte



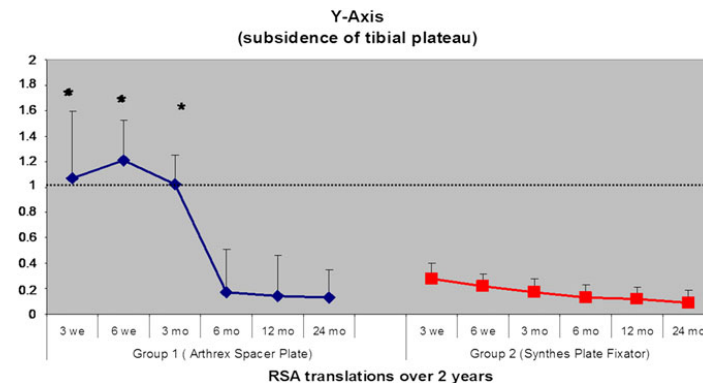
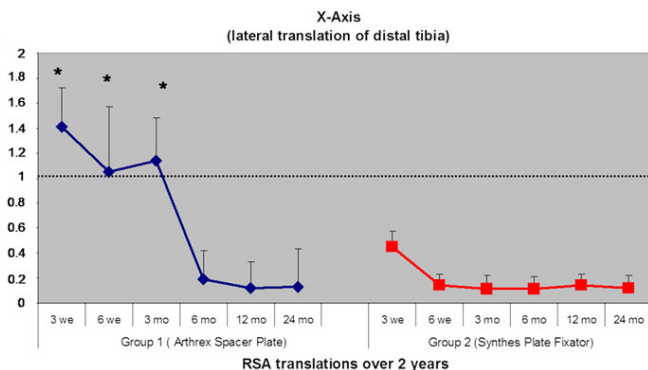
Mechanical properties of the Implants

	Maximal loading (kN)	Vertical Stiffness (N/mm)	Lateral Stiffness (N/mm)	No of cycles prior to failure
TomoFix®	1.5 ± 0.2	1950±577	2233±252	> 86000
PEEK Power®	1.4 ± 0.2	2245±468	2297±184	> 73000
iBalance®	1.8 ± 0.1	3375±479	3113±490	>12500
TomoFix® small	1.4 ± 0.3	1983±184	1933±330	> 80000
ContourLock®	2.2 ± 0.4	2367±250	3133±900	> 173000



Fixation stability and loading

Tomofix® versus Puddu-plate®





Return to work after HTO

	Type of osteotomy	Return to work
Schröter, KSSTA 2013	OWHTO	87 (14-450) days
Hoell, AOTS 2005	OWHTO	90 weeks
	CWHTO	88 weeks



REFA classification:

Grade 0: Work without physical strain (desk work)

Grade 1: Work with small physical strain (standing, walking)

Grade 2: Work with moderate physical strain (stairs, carrying load up to 15 kg)

Grade 3: Work with heavily physical strain (carrying load up to 30 kg)

Grade 4: Work with most heavily physical strain (carrying load more than 50 kg)



Comparison of OW- and CW-HTO

Meta-analysis of 9 clinical trials (324 OW vs. 324 CW)

No difference in Clinical outcome
Infection
DVT
Nerve palsy
Non-union

BUT

Greater tibial slope and mean angle of correction after OW-HTO

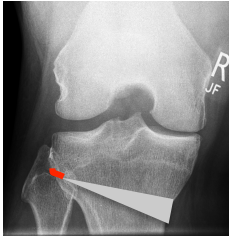


Factors associated with the poor outcome

	OR	Confidence interval
History of pain of > 2 years	13.1	3.8 - 45.1
Preoperative KOOS of > 50 points	12.7	2.7 - 58.9
Obesity	3.2	1.2 - 8.5
Smoking	5.3	1.8 - 14.9
Medial tibial osteophytes	18.7	5.7 - 61.7
Medial joint space width < 5mm	5.8	2.1 - 16.3
OA of Grade IV	3.0	1.9 - 9.2

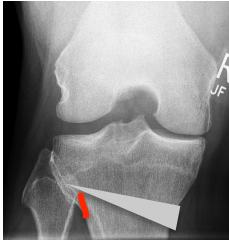


Hinge fracture classification



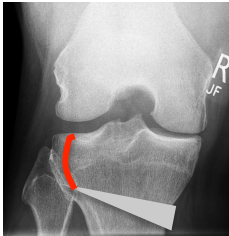
Type I

Fracture in line with the osteotomy



Type II

Fracture distally to the osteotomy



Type III

Fracture proximally to the osteotomy and into the tibial plateau



Impact of hinge fracture on early mobilisation



Type I fracture



Compression force at the hinge site



Impact on knee loading after HTO

Type of osteotomy

- OWO or CWO
- uniplanar or biplanar

Site of the osteotomy

- femur or tibia
- above or below the TT

Implant design



Concomitant procedures

- ACL reconstruction
- Meniscal repair
- Meniscus transplantation
- Cartilage procedures
 - Microfracture
 - Chondrocyte transplantation

Function of the hinge

- intact versus fracture



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HOSPITAL BRANDENBURG
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Questions

1. What is your postoperative protocol (length of stay, physiotherapy) ?



Questions

- 1. What is your postoperative protocol ?**
- 2. Does the implant or patients weight influences the onset of weightbearing ?**



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- 3. Do you fill the gap with cancellous bone or bone substitutes ?**



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- 2. Does the implant determine the onset of weightbearing ?**
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- 4. Does the amount of correction has an impact on your mobilisation?**



Questions

- 1. What is your postoperative protocol ?**
- 2. Does the implant determine the onset of weightbearing ?**
- 3. Do you fill the gap with cancellous bone or bone substitutes ?**
- 4. Does the amount of correction has an impact on your mobilisation?**
- 5. Does a hinge fracture affect your rehabilitation protocol ?**



ZENTRUM FÜR ORTHOPÄDIE UND UNFALLCHIRURGIE
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Thank you