

Osteochondral Allo- / Autografts in Valgus Malalignment



Case E.A. *1986: male 30y soccer semiprofessional



X-ray
preop
standing
in 20°
flexion



Long leg standing X-ray
Genu valgum 9.5°
lat. condyle dysplastic



Philosophy > Axis first

The Impact of Osseous Malalignment and Realignment Procedures in Knee Ligament Surgery

A Systematic Review of the Clinical Evidence

Thomas Tischer,^{*†‡} MD, Jochen Paul,^{†§} MD, Dietrich Pape,^{†||} MD, Michael T. Hirschmann,^{†¶} MD, Andreas B. Imhoff,^{†#} MD, Stefan Hinterwimmer,^{†**} MD, and Matthias J. Feucht,^{†††} MD

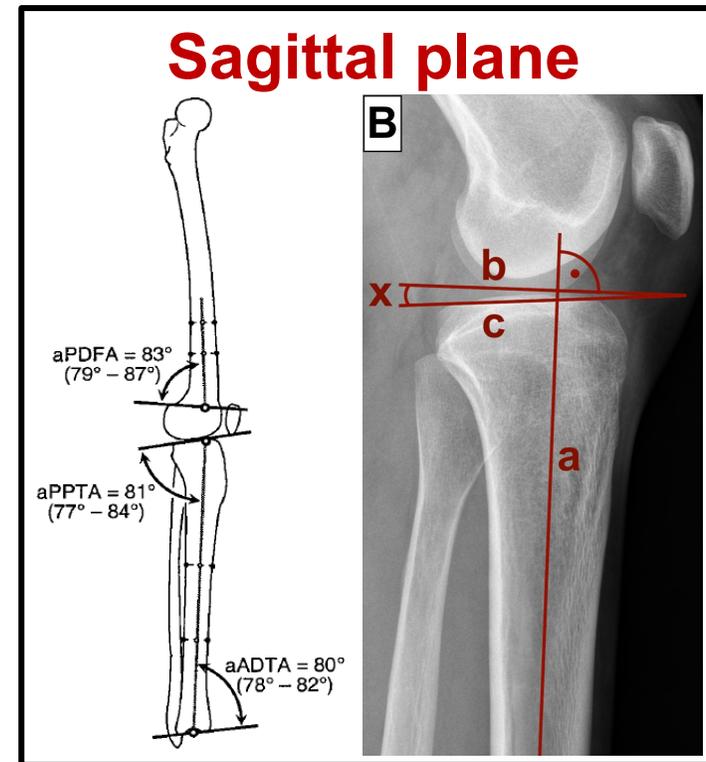
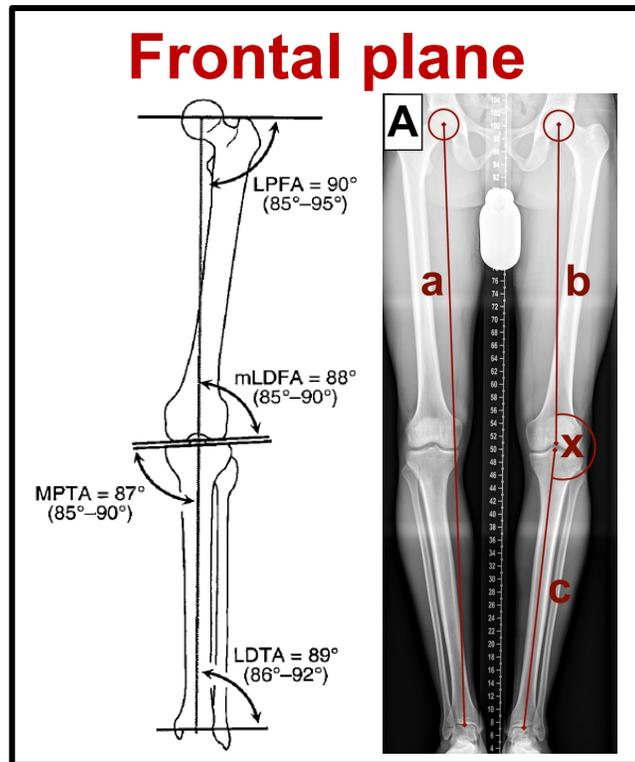
Conclusion: In cases of complex knee instability, the 3-dimensional osseous alignment of the knee should be considered (eg, mechanical weightbearing line and tibial slope). In cases of failed ACL reconstruction, the tibial slope should be considered, and slope-reducing osteotomies are often helpful in the patient revised multiple times. In cases of chronic PCL and/or PLC instability, osseous correction of the varus alignment may reduce the failure rate and is often the first step in treatment. Changes in the mechanical axis should be considered in all cases of instability accompanied by early unicompartmental osteoarthritis.



The Impact of Osseous Malalignment and Realignment Procedures in Knee Ligament Surgery

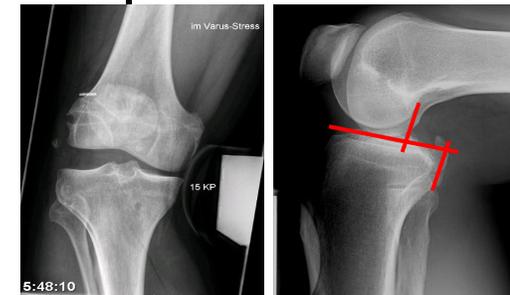
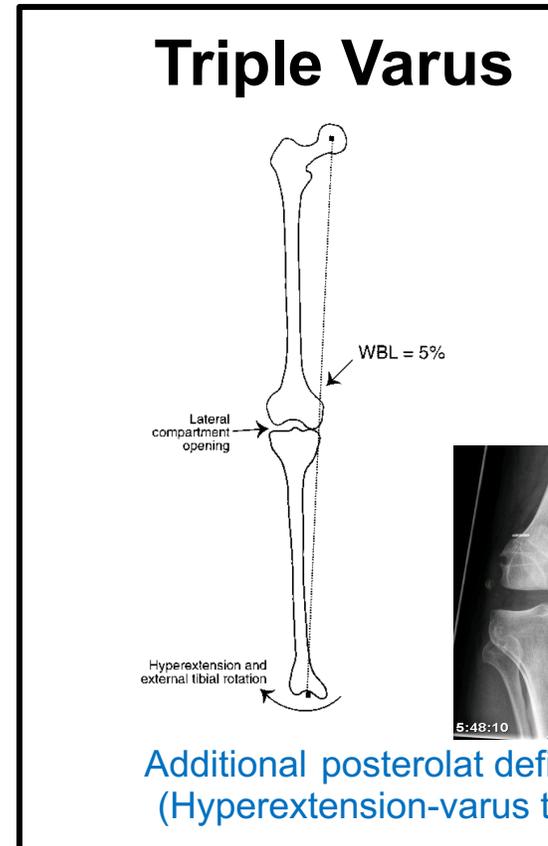
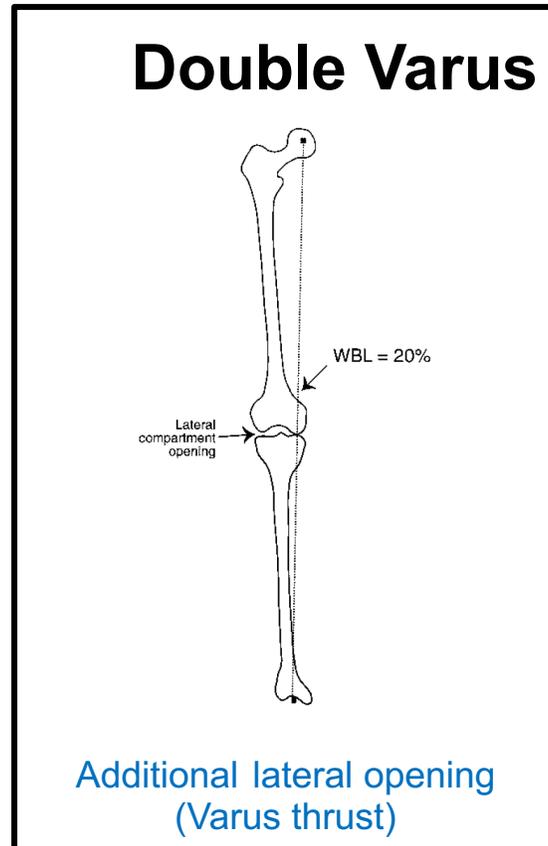
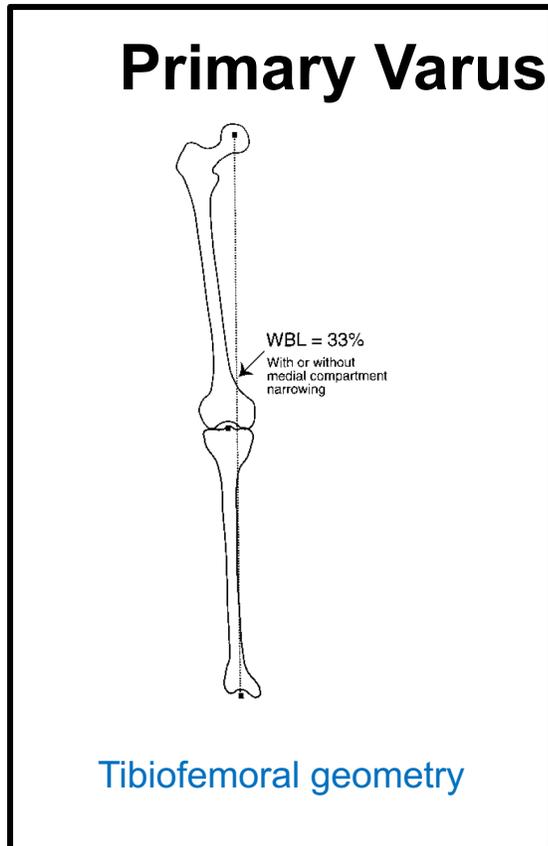
Orthop J Sports Med. 2017

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It is important to analyze the alignment in the frontal plane but also in the sagittal plane, mainly the posterior tibial slope.

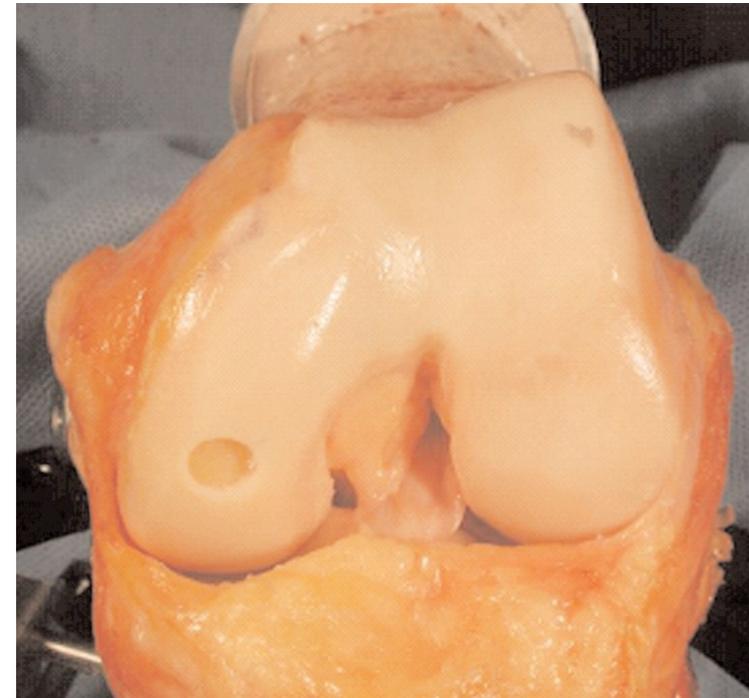
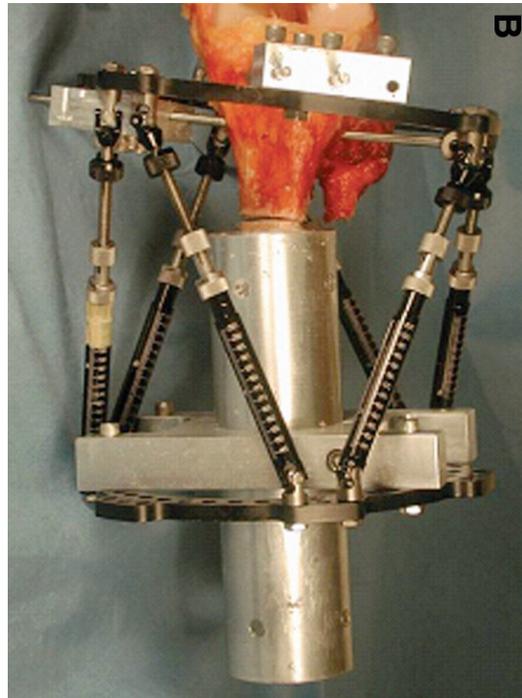
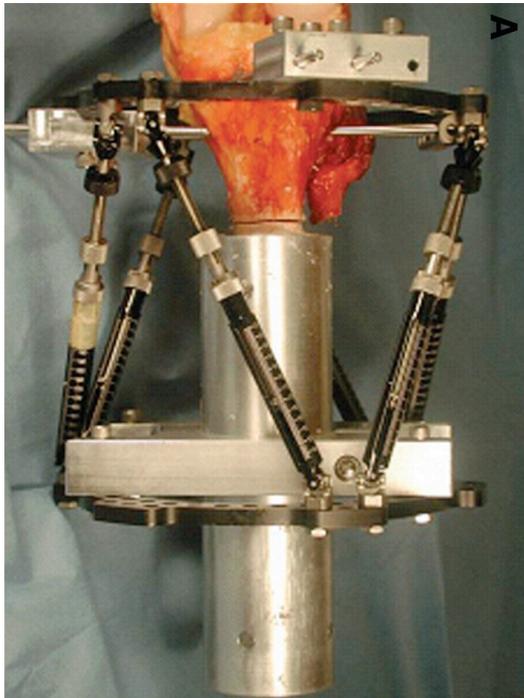
3 types of varus malalignment in chronic knee instability

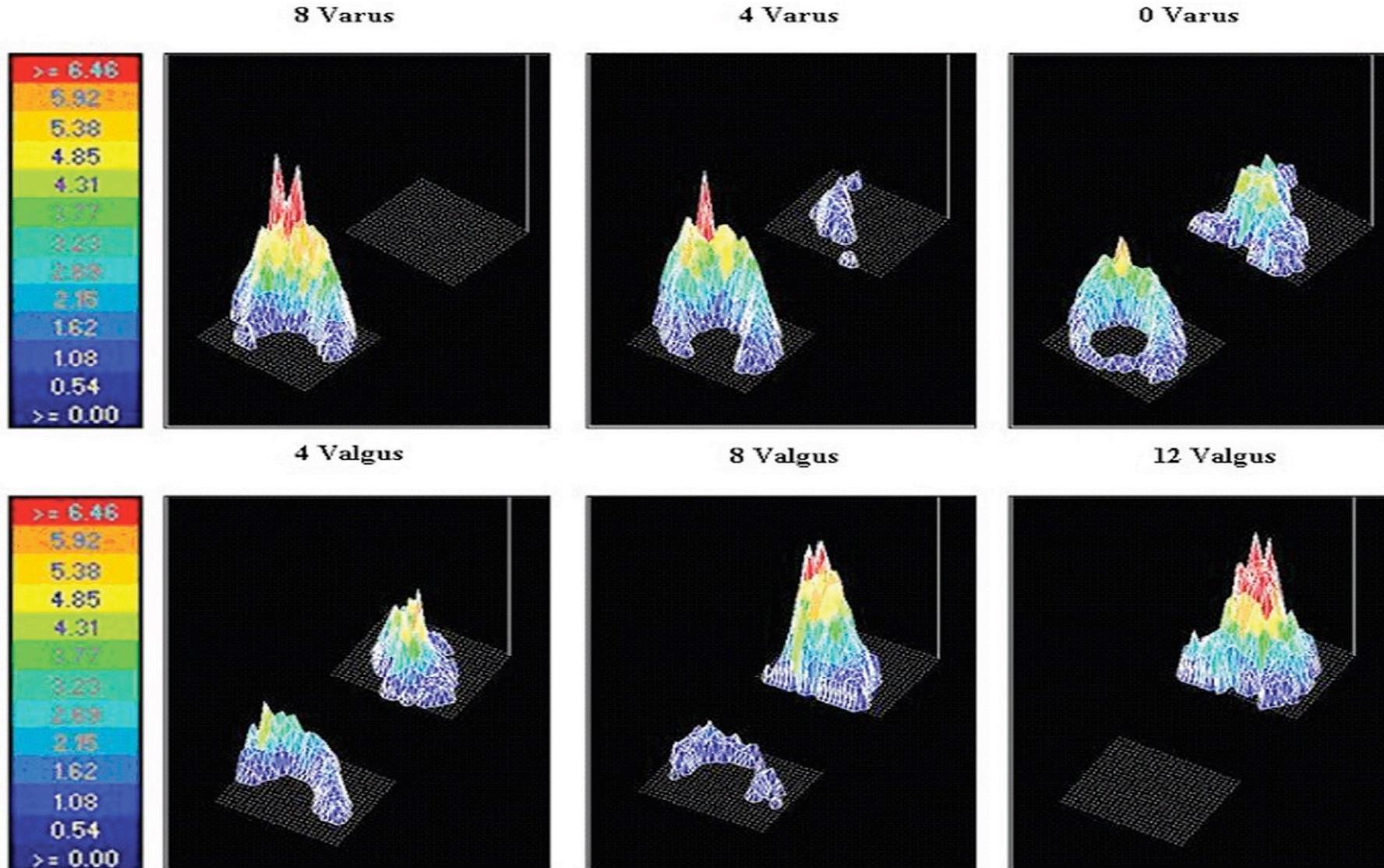


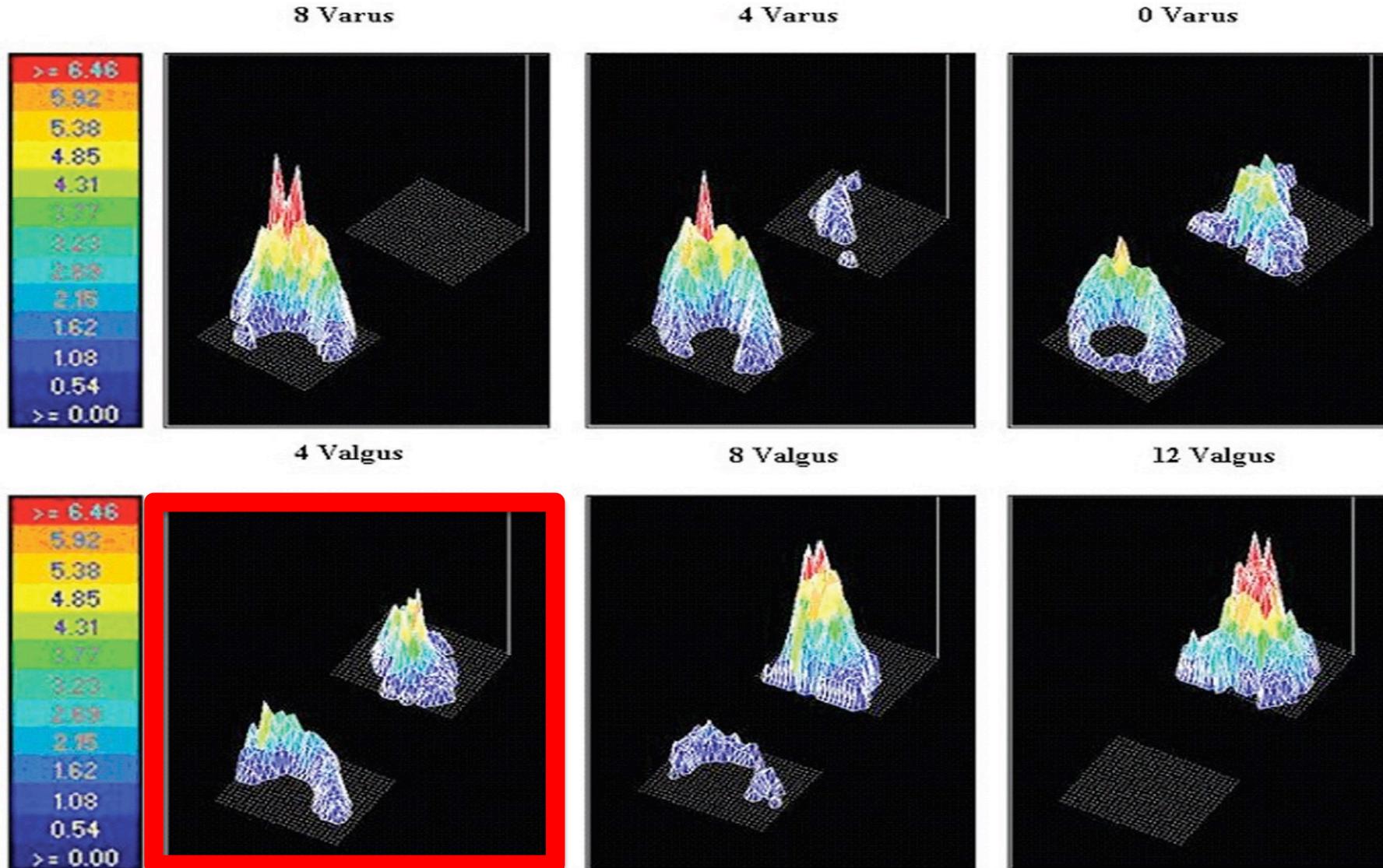
High Tibial Osteotomy for Unloading Osteochondral Defects in the Medial Compartment of the Knee

C. Mina, W.E. Garrett, R. Pietrobon, R. Glisson, L. Higgins

Am J Sports Med 2008; 36: 949-55









History

Proximal tibial osteotomy for osteoarthritis with varus deformity. A ten to thirteen-year follow-up study

P Hernigou, D Medevielle, J Debeyre and D Goutallier

J Bone Joint Surg Am. 1987;69:332-354

n = 93, 60 years old (iliac crest)

FU 11.5 years

Survival rate: 5y: 90% 10y: 45%

20 x perfect	→	3 - 6 ° Valgus
5 x > 6° Valgus	→	lateral OA
68 x < 3° Valgus	→	slow deterioration of OA



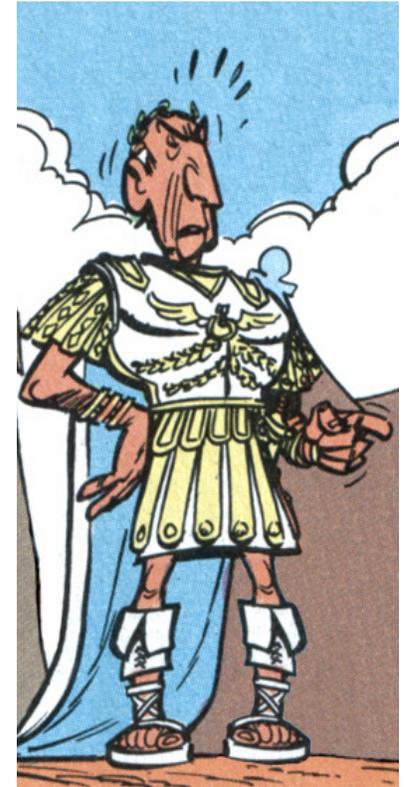
Dresden, 1912

>> the importance of 3-6° valgus

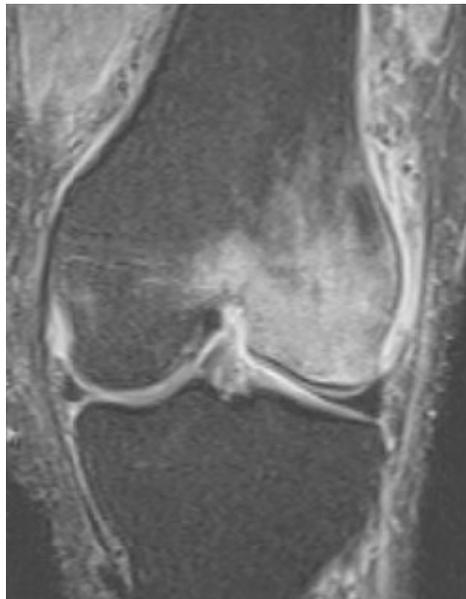
Survival and clinical outcome of isolated high tibial osteotomy and combined biological knee reconstruction

Joshua D. Harris, Ryan McNeilan, Robert A. Siston,
David C. Flanigan

- Systematic review
- 69 studies (4557 subjects)
- 5 year survival of HTO: 92.4%
- 10 year survival of HTO: **84.5%**



Knee malalignment is associated with an increased risk for incident and enlarging bone marrow lesions in the more loaded compartments: the MOST study



Definition of varus/valgus	Compartment	BML score increase
		aRR* (95%CI)
Varus <179°, valgus >181°	More loaded	1.7 (1.4–2.0)
	Neutral	1.0 (ref)
	Less loaded	0.6 (0.5–0.8)
Varus<178°, Valgus>182°	More loaded	1.7 (1.4–2.0)
	Neutral	1.0 (ref)
	Less loaded	0.6 (0.4–0.8)
Varus<177°, valgus>183°	More loaded	1.6 (1.4–1.9)
	Neutral	1.0 (ref)
	Less loaded	0.5 (0.3–0.6)
Varus<176°, valgus>184°	More loaded	1.7 (1.4–2.1)
	Neutral	1.0 (ref)
	Less loaded	0.4 (0.3–0.6)
Varus<175°, valgus>185°	More loaded	2.0 (1.6–2.4)
	Neutral	1.0 (ref)
	Less loaded	0.4 (0.2–0.7)
HKA angle	indicating loading†	1.1 (1.1–1.2)

Malalignment is associated with increased risk of incident + enlarging BMLs in the more loaded comp.

The role of varus and valgus alignment in the initial development of knee cartilage damage by MRI: the MOST study

Alignment	(Row %) knees with incident medial cartilage damage at 30 months (34 knees, 11.6%)	OR (95% CI) adjusted for age, gender, BMI, lateral laxity, medial meniscal tear, medial meniscal extrusion
Non-varus (reference)	14 (7.7%)	Reference
Varus	20 (18.2%)	3.59 (1.59 to 8.10)
Varus (continuous), OR per 1° of greater varus		1.38 (1.19 to 1.59)

Varus was associated with incident cartilage damage in the medial compartment

Same is true for valgus malalignment.....

Valgus Malalignment Is a Risk Factor for Lateral Knee
Osteoarthritis Incidence and Progression

Findings From the Multicenter Osteoarthritis Study
and the Osteoarthritis Initiative

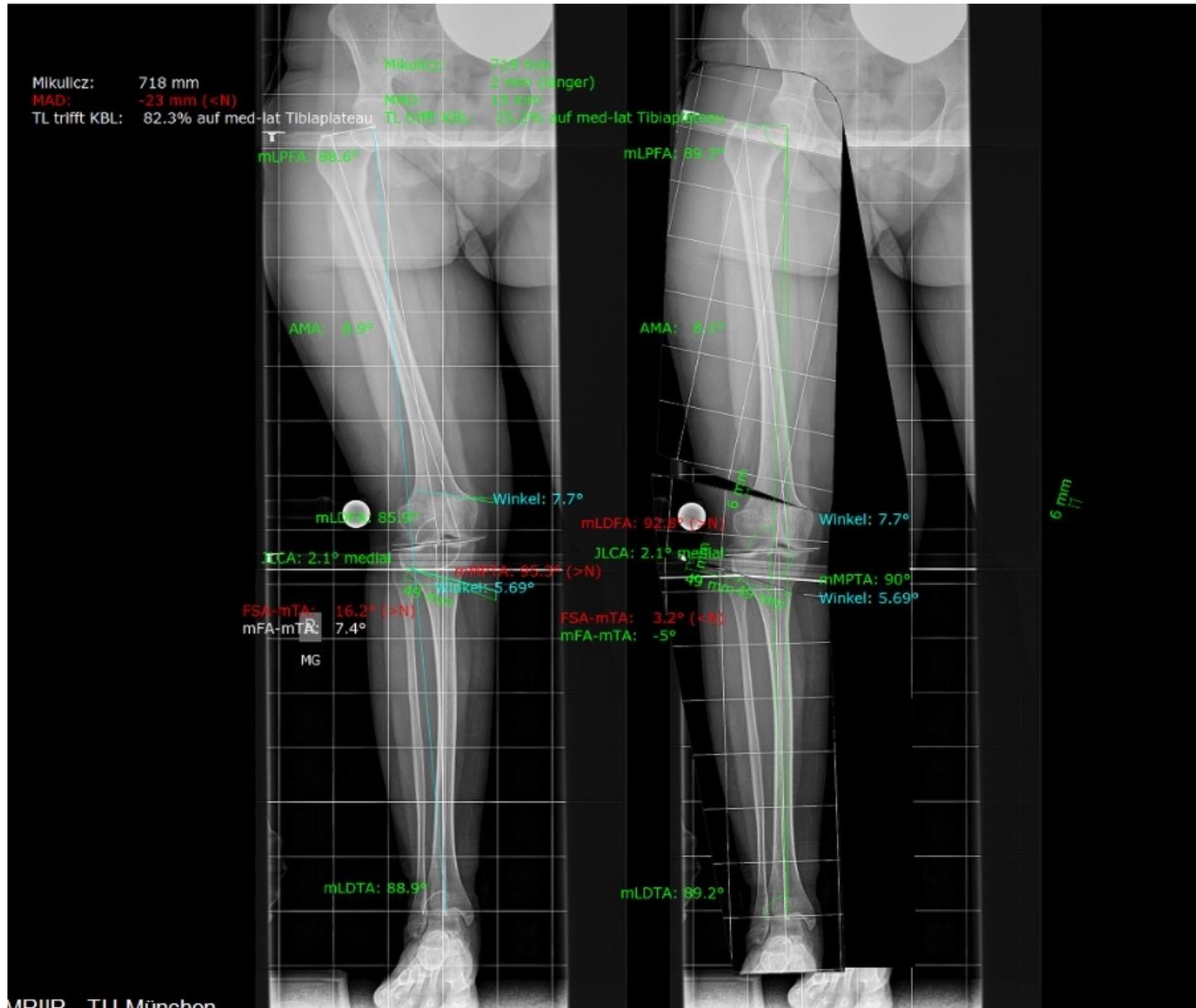
Conclusion:

Valgus malalignment increases the risk of knee OA radiographic progression and incidence as well as the risk of lateral cartilage damage.



Results

Case E.A. *1986: X-ray preop planning



Case E.A. *1986: X-ray postop



Case E.A. *1986: X-ray long leg postop



Surgery
2 level osteotomy

1. DFO ow 4°
biplanar,
bone grafting

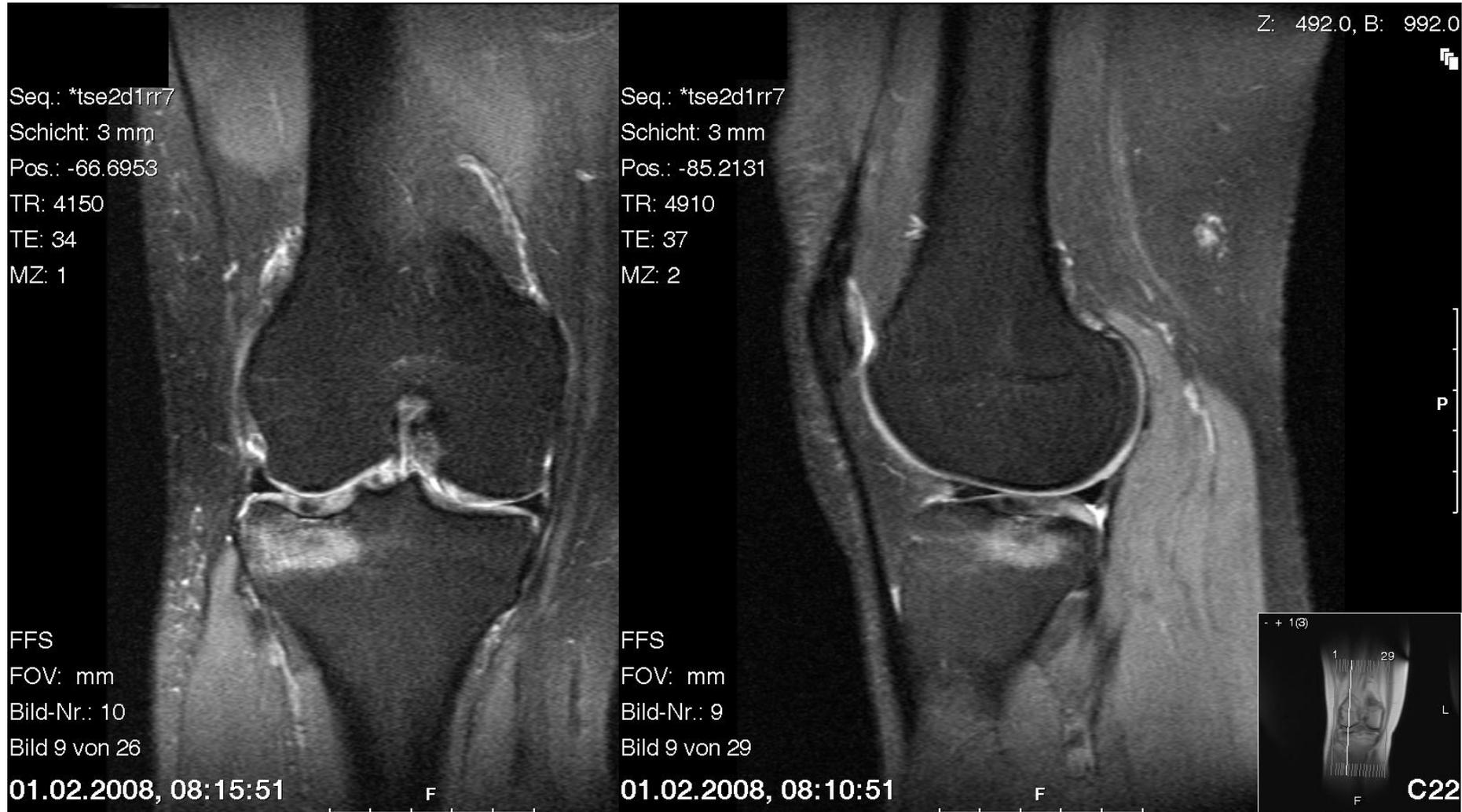
2. HTO cw 5°
Slope reduction 4°
Tuberosity OT distally



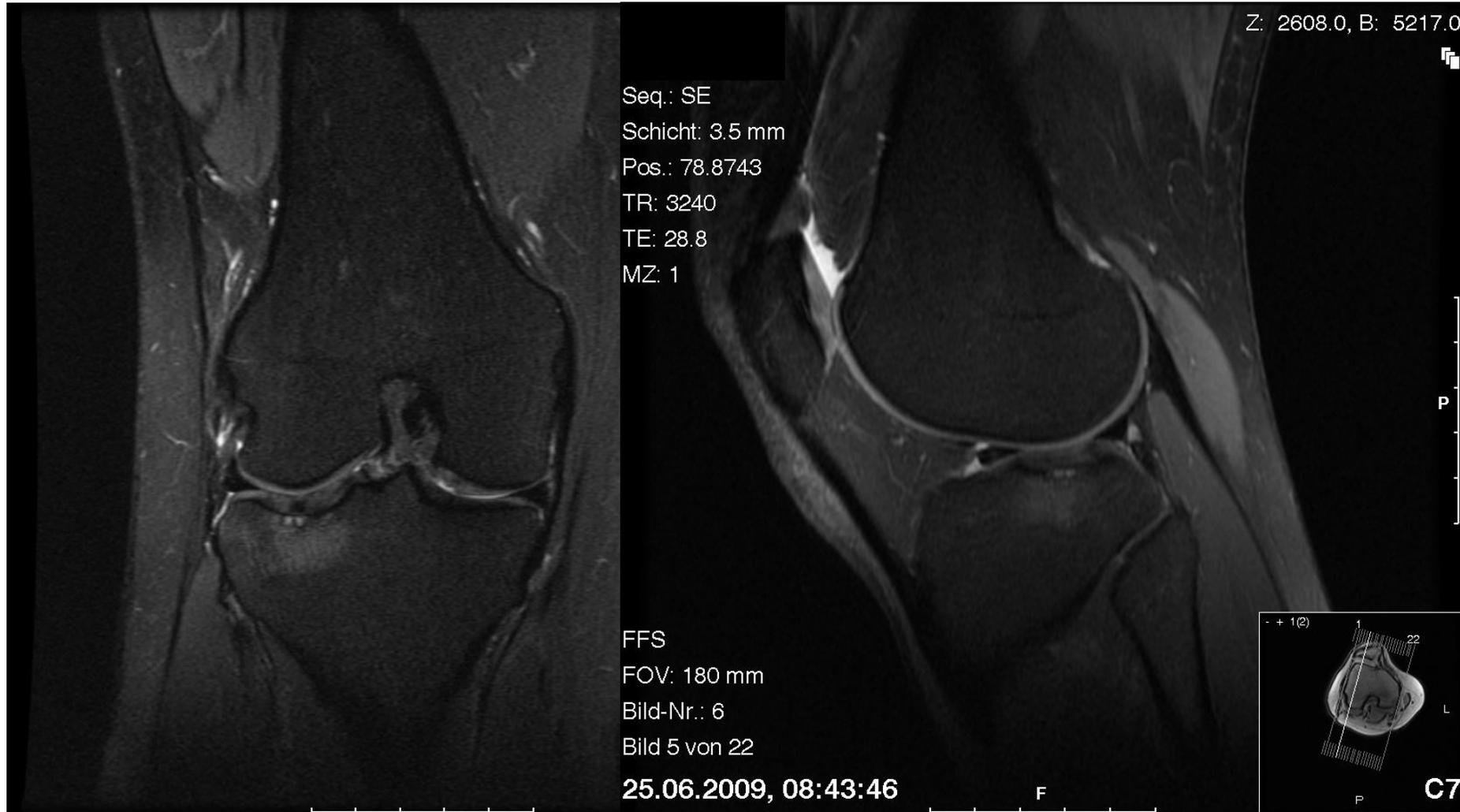
Retro OATS Lateral Tibia

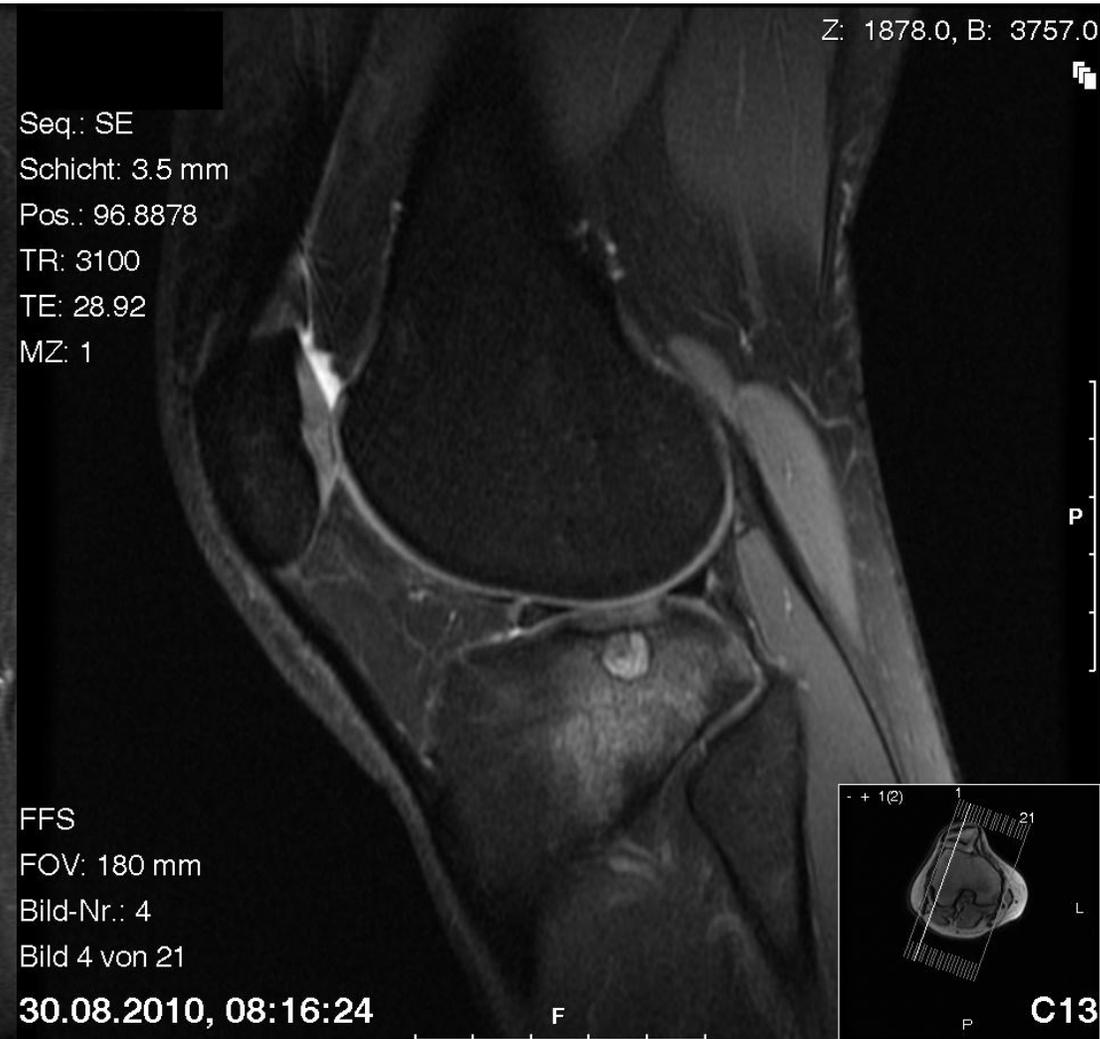
Case: 36y male, Long Distance Runner (marathon)

- No trauma
- Pain lateral compartment
- Conservative tx unsuccessful (insoles, special shoes)
- First consultation 10/2010

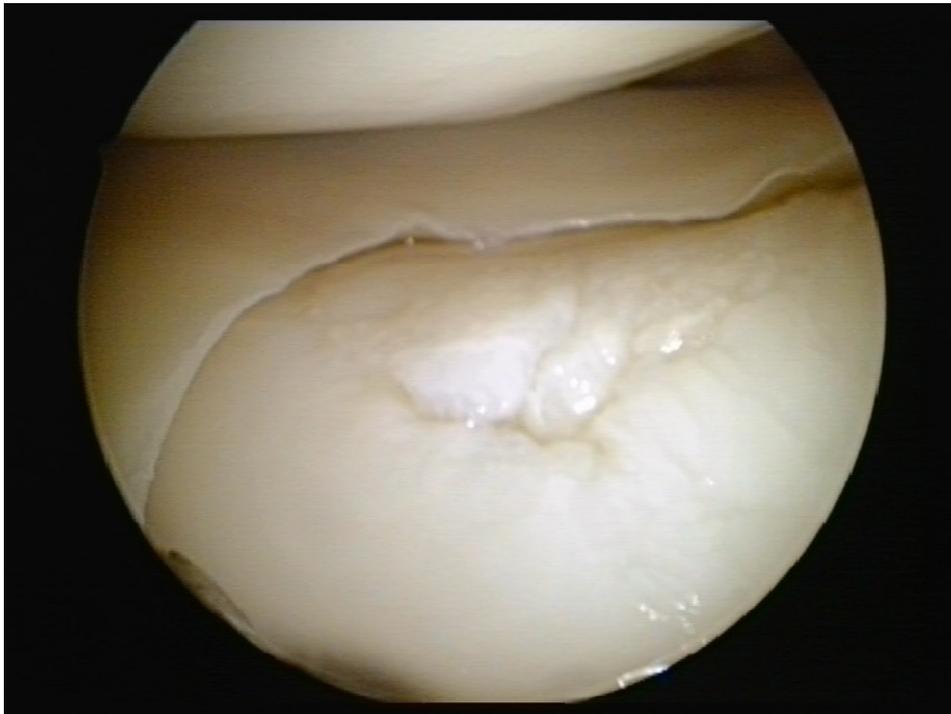


2008



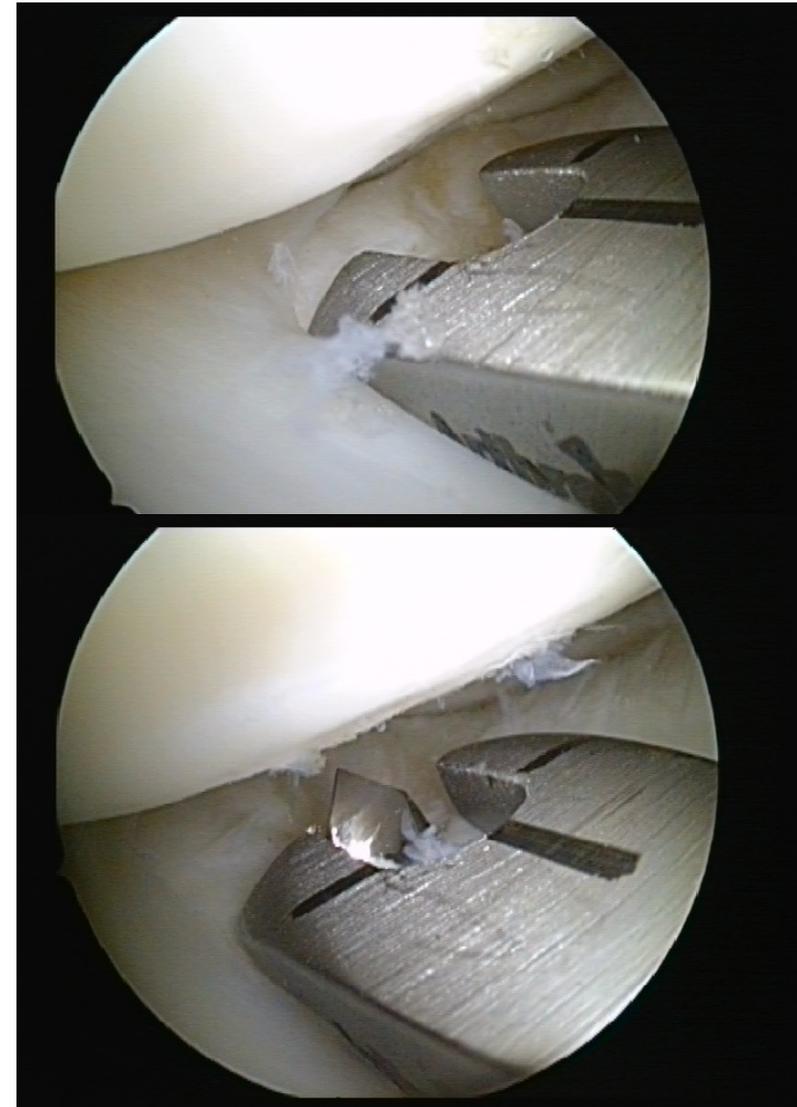




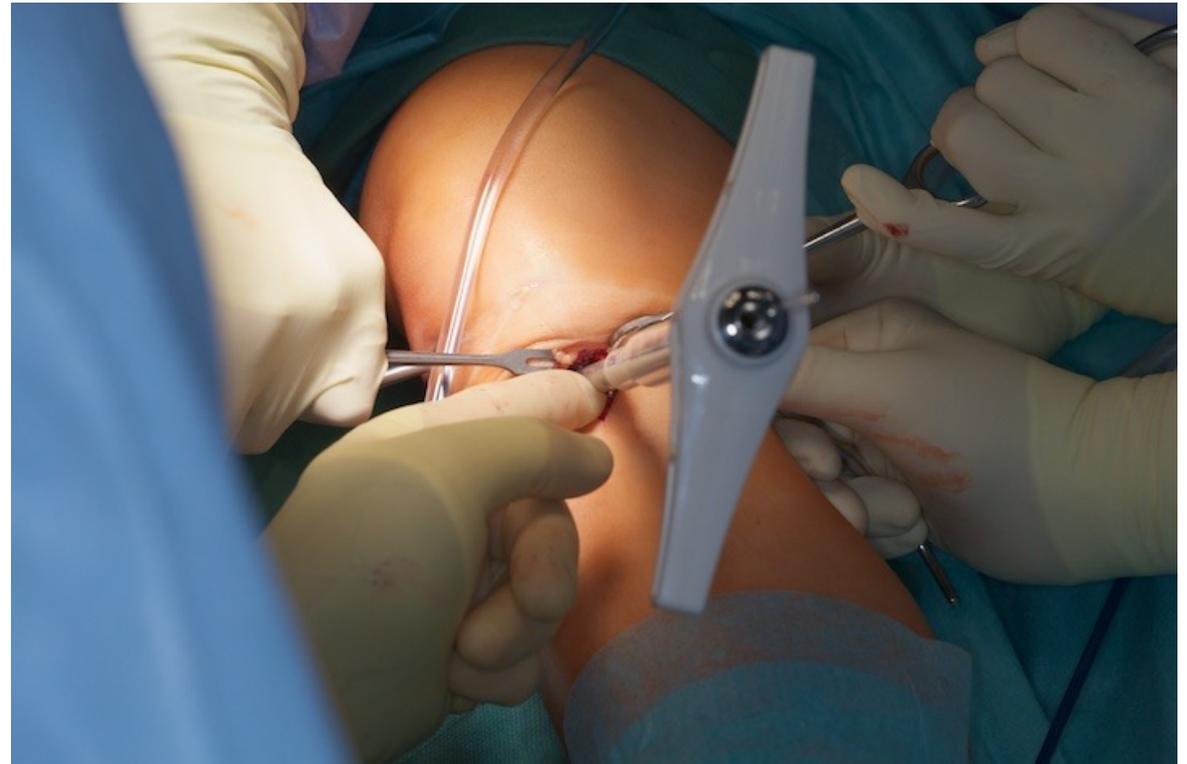


Ueblacker P, Burkart A, Imhoff AB: Retrograde cartilage transplantation on the proximal and distal tibia. Arthroscopy; 2004

Drilling under
x-ray and arthroscopic control
ACL drill guide



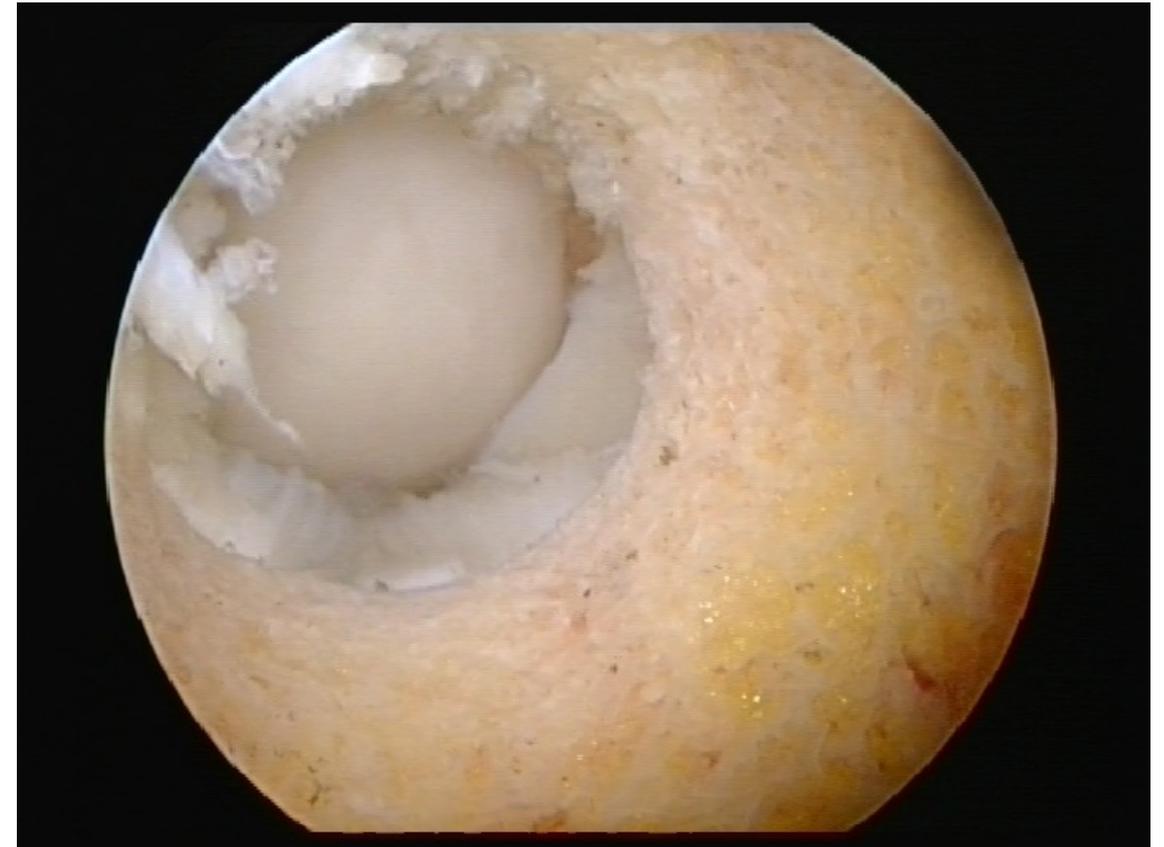
- OATS Recipient side instrumentation
- Cancellous bone cylinder, temporarily



- OATS Donor side instrumentation
- Femoral condyle superolateral
- → CAVE: Radius and curvature



- Implantation retrograde





- Closing with the bony graft
- Final fixation by interference screw retrograde



OCL lateral tibia is very rare

- tibiaplateau proximal – medial+lateral
- tibiaplateau distal



No.	Age	Localization Defect	Side	Operation (Date)	Follow-up
1	39	Posterolateral tibial plateau	Left	Open (6/99)	35 mo
2	34	Lateral tibial plateau (depression fracture)	Left	Open (11/01)	6 mo
3	40	Medial tibial plateau	Left	Arthroscopic + HTO (10/01)	7 mo
4	40	Anterocentral distal tibia	Left	Open-anterior (3/00)	26 mo
5	30	Posteromedial distal tibia	Right	Open-posterior (4/00)	25 mo

Ueblacker P, Burkart A, Imhoff AB: Retrograde cartilage transplantation on the proximal and distal tibia. Arthroscopy; 2004

Imhoff · Feucht Eds.

Surgical Atlas of Sports Orthopaedics and Sports Traumatology



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Matthias Feucht
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