


# How I do an opening wedge osteotomy


**Ph. Lobenhoffer**



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AO Foundation Davos

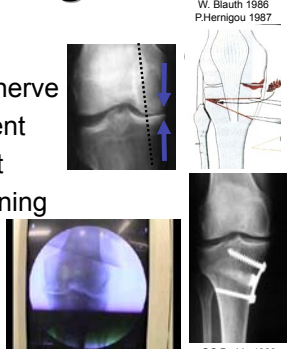
## HTO for varus malalignment

Bony deformity? Age /Activity?



## Open Wedge HTO

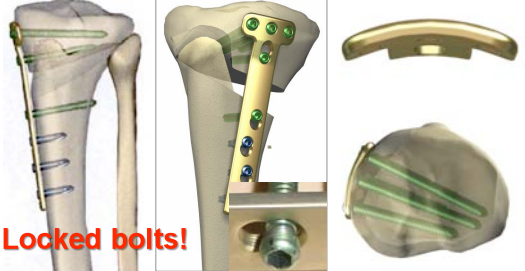
- No fibula osteotomy
- No risk for peroneal nerve
- No muscle detachment
- Only 1 osteotomy cut
- Intraoperative fine-tuning
- No leg shortening



W. Blauth 1986  
P. Herrigou 1987

GC Puddu 1999

## Plate Fixator: Tomofix

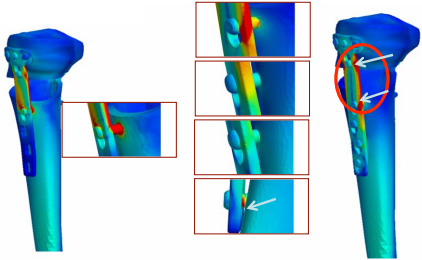


**Locked bolts!**

Staubli, DeSimoni, Mathys - Synthes GmbH and AO-Knee Expert Group  
(Lobenhoffer, Holzach, Gächter, Wymenga, Heerwaarden)

## Optimal stress distribution of TomoFix

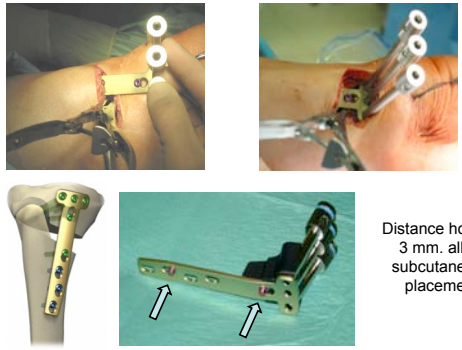
Finite Element Analysis (FEA)



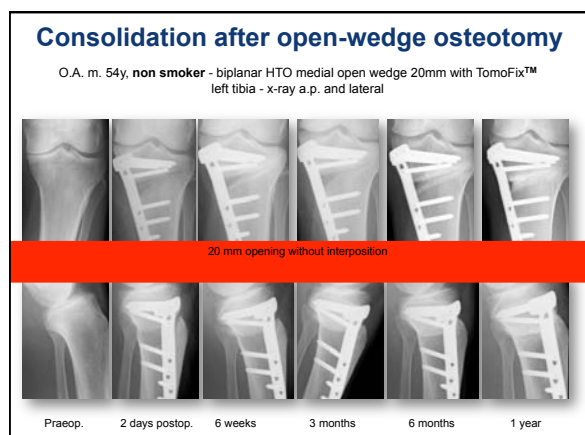
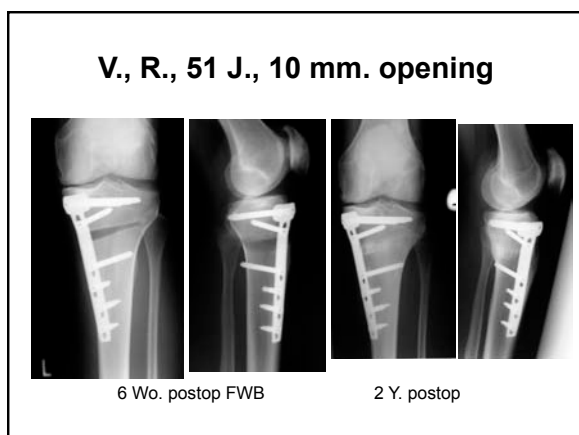
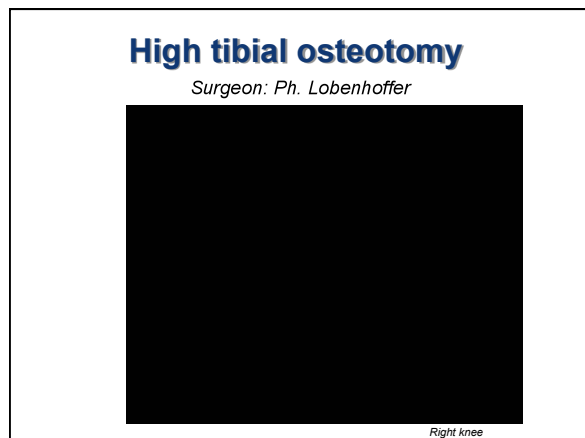
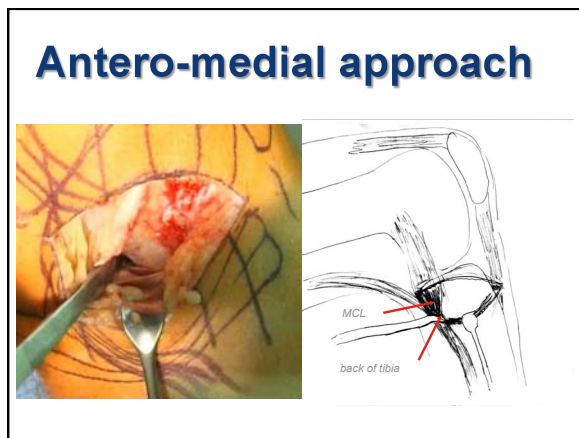
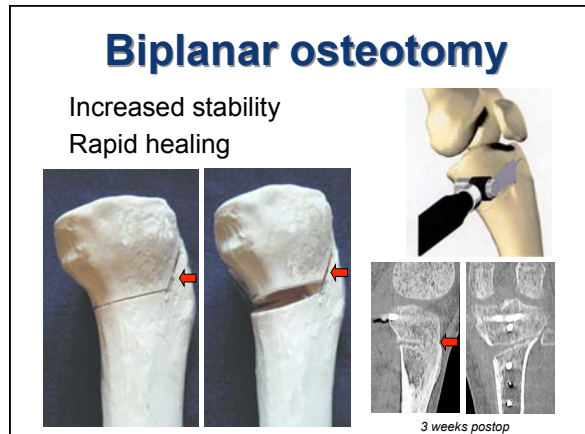
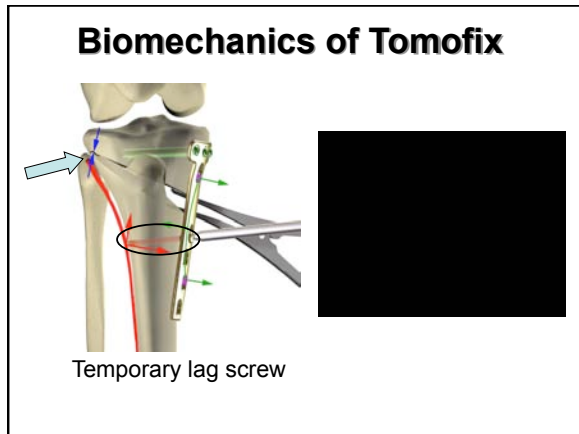
The design and the length of the plate (11.5 cm) is crucial :

Highest stress concentration around the holes at the osteotomy-site

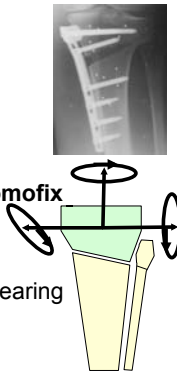
## Percutaneous Plate fixator Tomofix



Distance holders 3 mm. allow subcutaneous placement



### Stability RSA studies




**Heerwaarden 2006:**  
42 cases open wedge Tomofix  
no relevant migration,  
**no difference to closed wedge Tomofix**

**Heerwaarden 2008:**  
14 vs 23 patients  
full weight-bearing /partial weight bearing  
**no differences after one year**

Brinkman, Lobenhoffer, Agneskirchner, Staubli, Wymenga, Heerwaarden JBJS (Br) 12, 2008

### Plate fixator

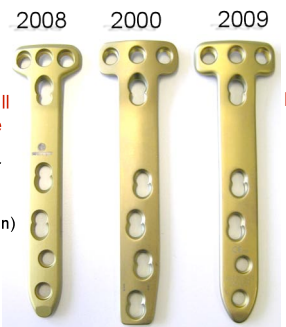


Lobenhoffer, Staubli, Heerwaarden > 1800 cases treated

**>16 mm. opening  
without bone graft  
Early weight-bearing  
(3-4 weeks)**

Lobenhoffer, P. et al Techn in Knee Surgery 1 (2), 2002  
Lobenhoffer, P., Agneskirchner, J., Knee Surg Arthroscopy Sports Med. 11(2), 2003  
Lobenhoffer, P. et al Orthopäde 33 (2), 2004  
Agneskirchner, J.D., Lobenhoffer, P., DeSimoni, C., Staubli, A.E. Acta Clin. Polon. 2004  
Staubli, A.E., DeSimoni, C., Lobenhoffer P. Injury 34 (Suppl 2), 2004  
Galla, M., Lobenhoffer, P., Oper. Orthop. Traumatol. 4/2004  
Galla, M., Lobenhoffer, P. Surg. Tech. Oper. Orthop. 2004  
Agneskirchner, J.D., DeSimoni, C., Staubli, A., Lobenhoffer, P. Arthroscopie 2004 17 (4)  
Brinkman, M., Lobenhoffer, P. et al JBJS (Br) 12, 2008

### Future Perspectives



2008      2000      2009

**TomoFix Small Stature Plate**

**New Generation Medial Tibia Plate**

KNEG together with Dres. Takeuchi and Sawaguchi (Japan)

**Body weight limit 65 kg**

### Statistics

**Unfallchirurgie Henriettenstiftung Hannover (1/1998-12/2006)**

**1012 knee osteotomies**

- 922/1012 open wedge (Osteotomy opening 5-22 mm),

**Open Wedge (n=922)**

- 14 bicortical bone graft
- 101 Spacer plate
- 807 Plate fixator (Tomofix, since 10/2000) (Osteotomy opening Ø 10,6 mm)


### Implantat failure after Open Wedge Osteotomy

- **Spacer-Plate (n=101):**  
6 Implant failures  
(4 healed with Tomofix, 1 Fix., 1 total knee)
- **Tomofix (n=807):**  
no implant failures and no loss of correction


### TomoFix™ retrospective study

**Functional outcome assessment in patients treated with open wedge high tibial osteotomy (HTO) for knee osteoarthritis using Tomofix™.**

**506 patients, 3 centers, op. 4/2004 to 4/2006,**  
75% follow-up rate, BMI 27, 9,8 mm opening



- D. Freiling
- S. Meyer
- S. Friedmann
- P. Lobenhoffer
- A. Staubli
- S. Schröter
- D. Hoentsch





## Literature

		Oxford Knee Score
<b>Tomofix</b>	<b>35 Mo.</b>	<b>41</b>
Oxford Uni cemented	60 Mo.	39
Oxford Uni non- cemented	12 Mo.	39
Total Knee	24 Mo.	37
Total Knee	24 Mo.	39
Total Knee	24 Mo.	40
Total Knee	24 Mo.	35
Total Knee	24 Mo.	35

Pandit et al (JBJS 2009)      Geiger (AOTS 2008)  
 Pandit et al (JBJS 2006)      Karachalios JBJS 2008  
 Spencer (JBJS 2007)        Breugem CORR 2008

AO Foundation Clinical Investigation (AOCID)

## Thank you for your attention

# ASPECTS OF CURRENT MANAGEMENT  
**Osteotomies around the knee:**  
 Indications, planning, technical aspects of execution and results  
 (Oxford Knee Score, AOCID)

JBJS-Br. 12/2008  
 AO Publishing 12/2008, 300 pages,

Davitt, December 13, 2008