ESSKA

Universitat Autònoma de Barcelona

Osteotomies Around The Knee
Complications of HTO

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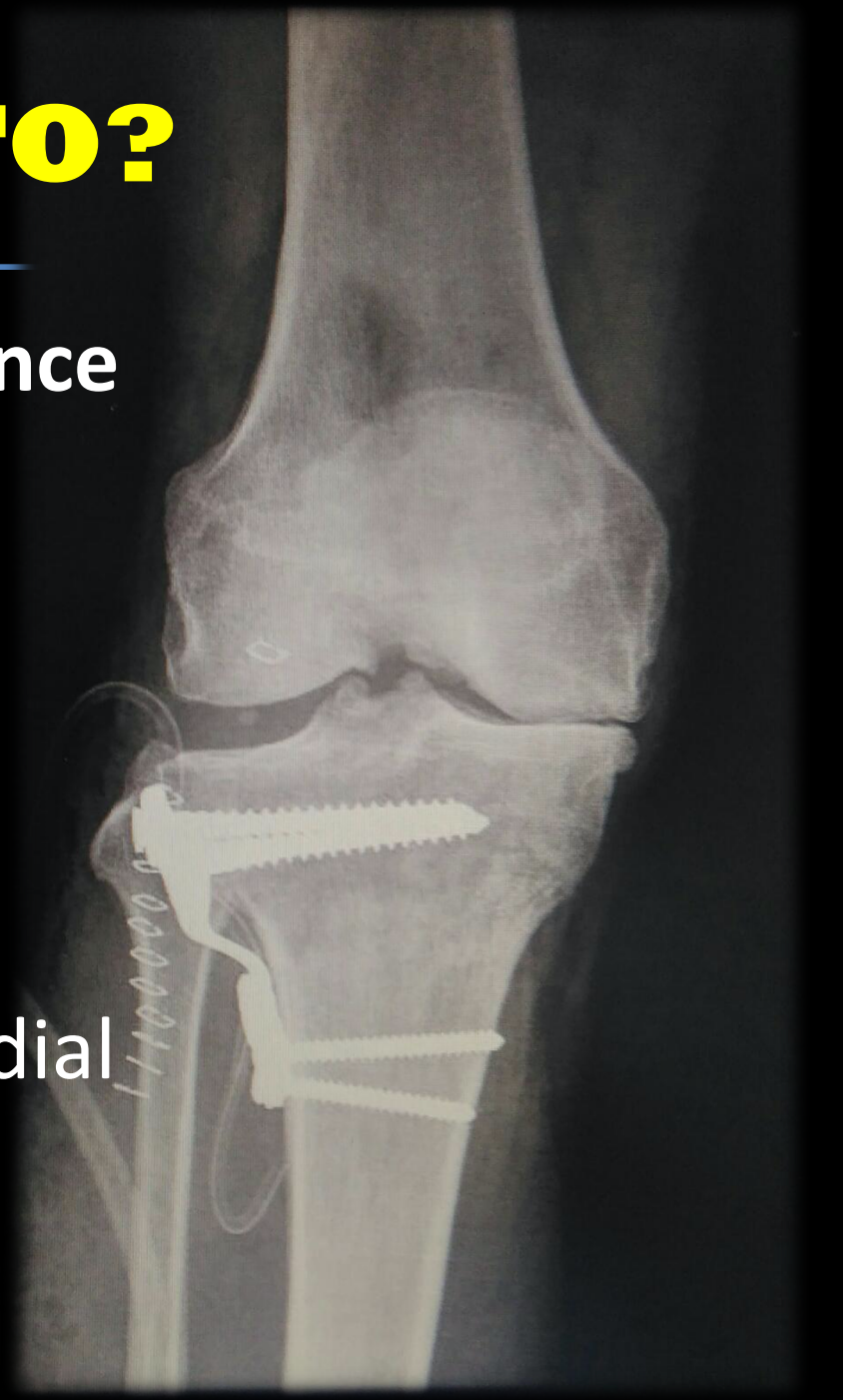
Barcelona
Spain


DISCLOSURE
DISCLOSURE
DISCLOSURE
NOTHING
TO DECLARE

WHY HTO?

Correcting the frontal imbalance

- ➔ Relieves pain
- ➔ Improves function
- ➔ Limits the evolution of medial tibiofemoral OA

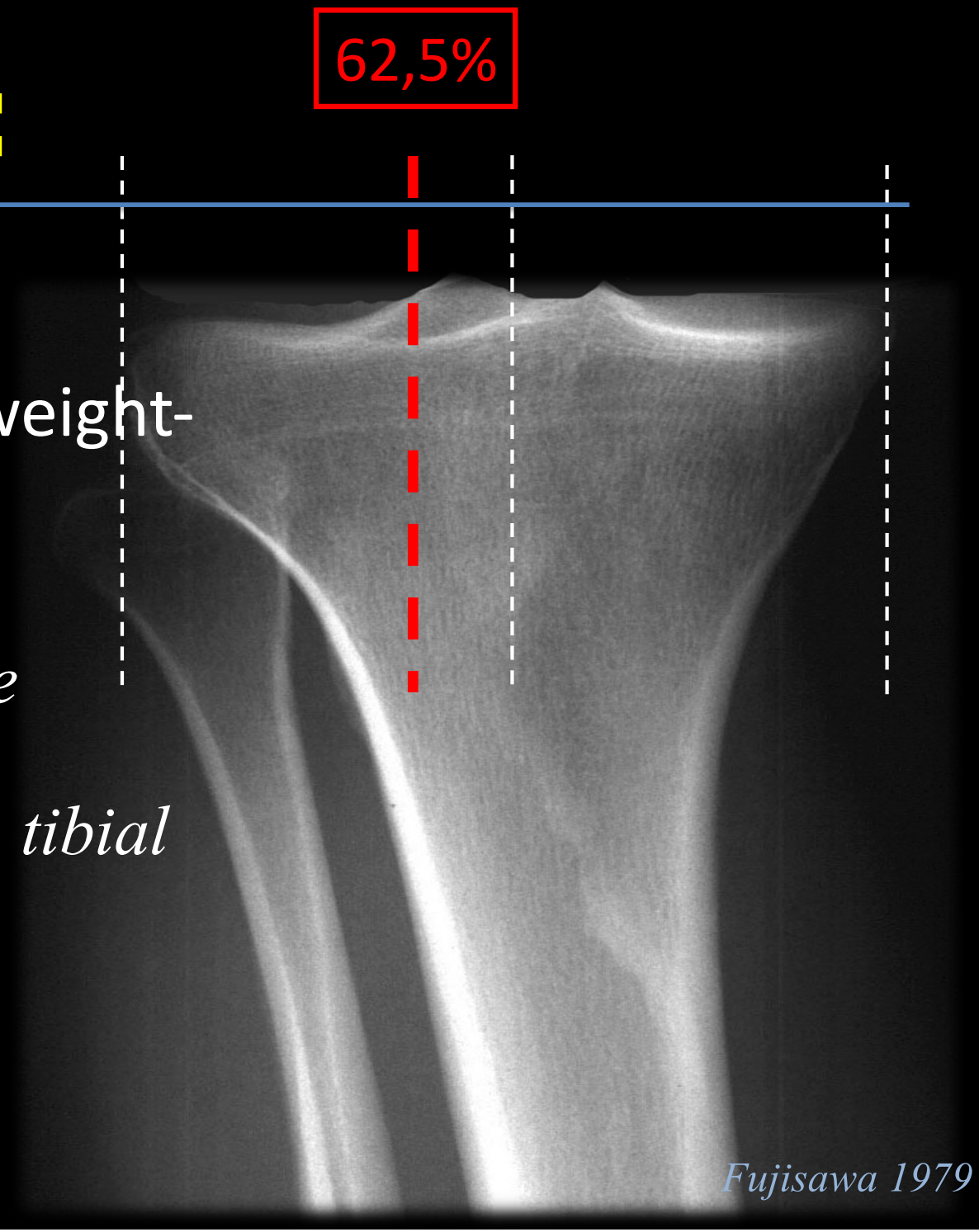


Jackson 1958, Coventry 1973, Maquet 1985, Goutallier 1986, Akamatsu 1997

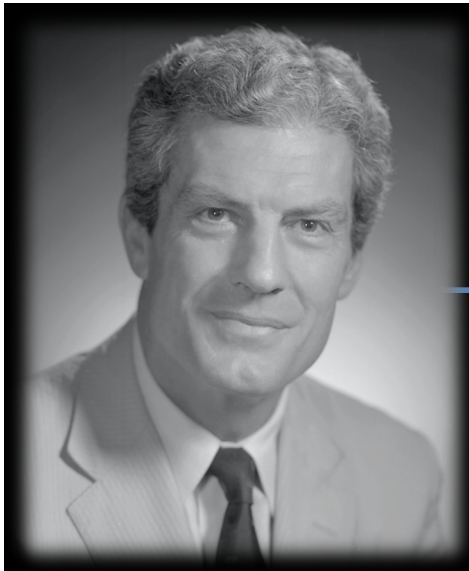
OBJECTIVE

- redistribution of weight-bearing forces

"...transference of the weight-bearing to the opposite (uninvolved) tibial condyle..."



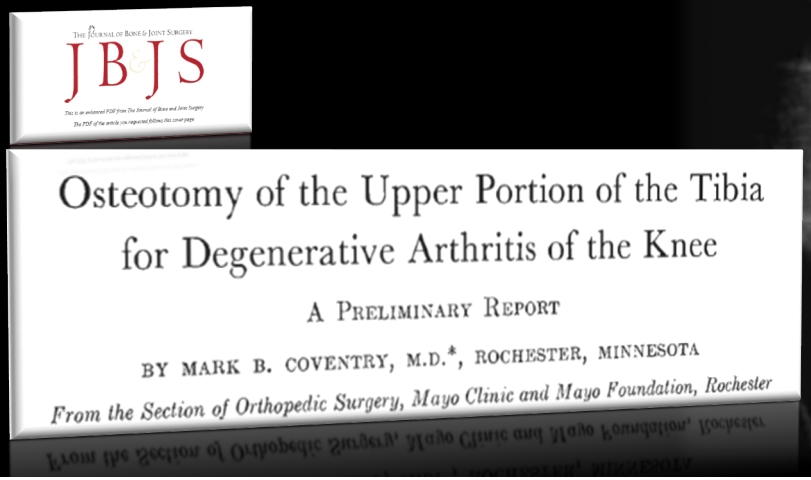
Fujisawa 1979

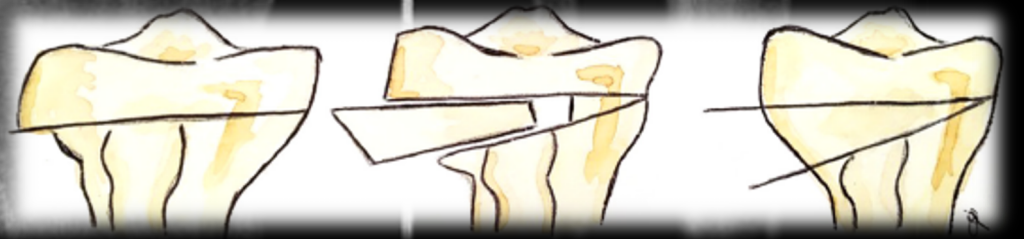


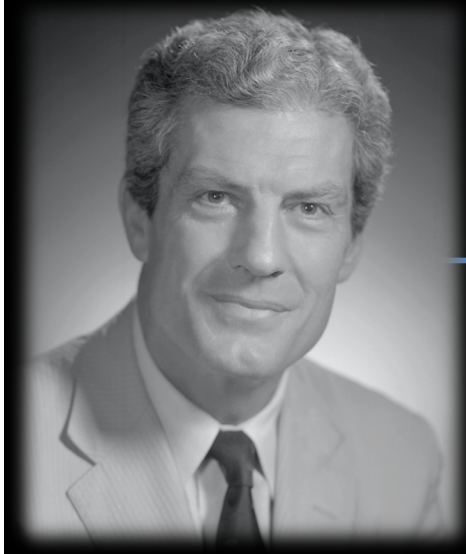
HTO Closed-Wedge

'60 – '70

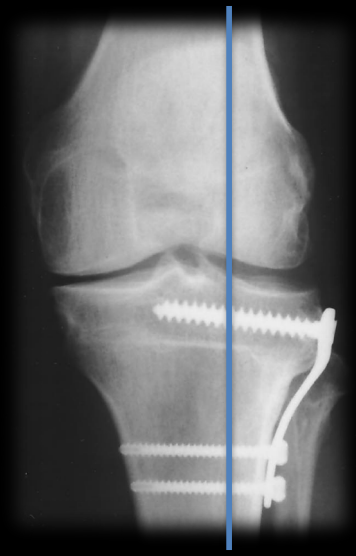
OA







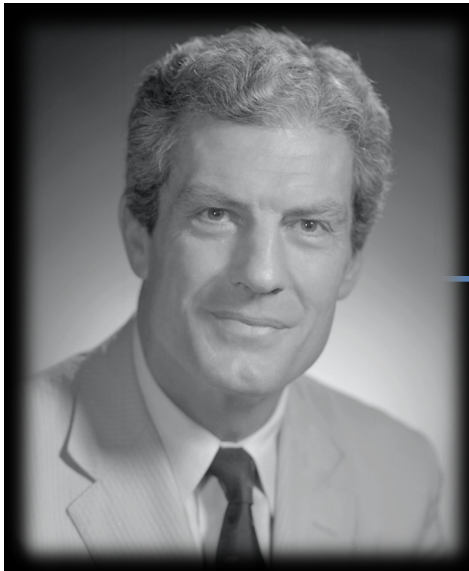
HTO Closed-Wedge



ADVANTAGES

- Stable → allows compression
  - Early weigth-bearing

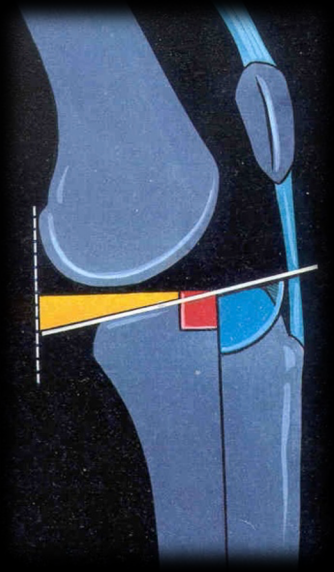
"Osteotomy of the Upper Portion of the Tibia for Degenerative Arthritis of the Knee. A Preliminary Report"
Coventry 1965

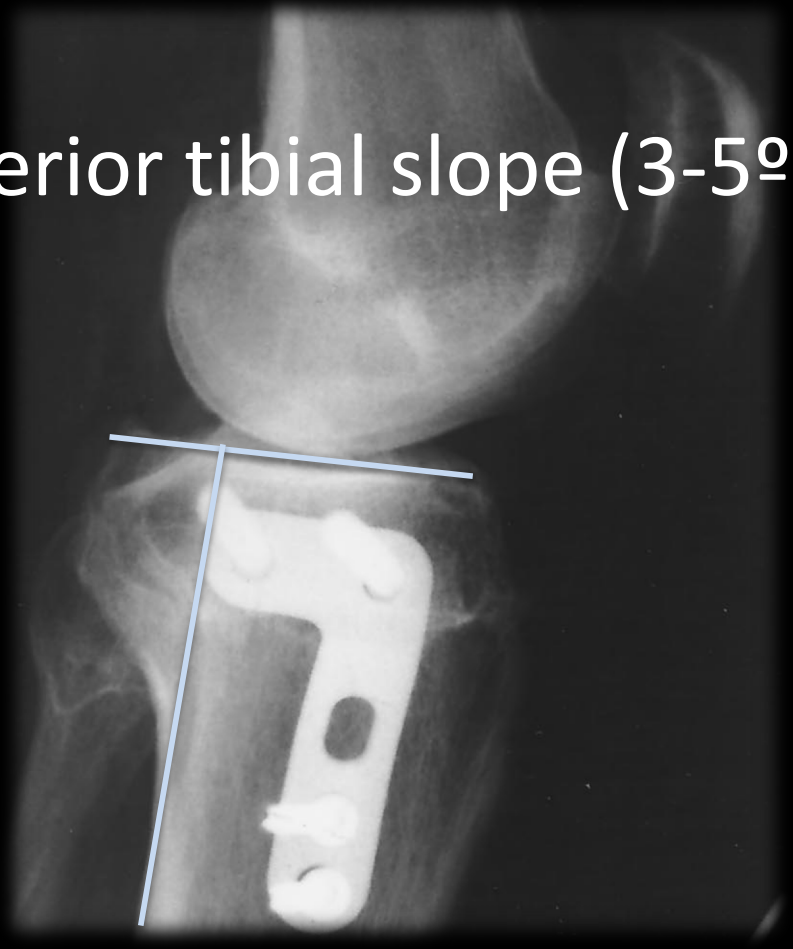


HTO Closed-Wedge

BUT

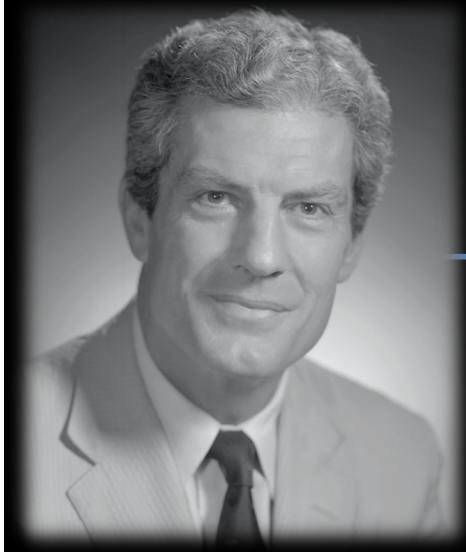
- Decrease posterior tibial slope (3-5º)





**Diminishing ACL stress*

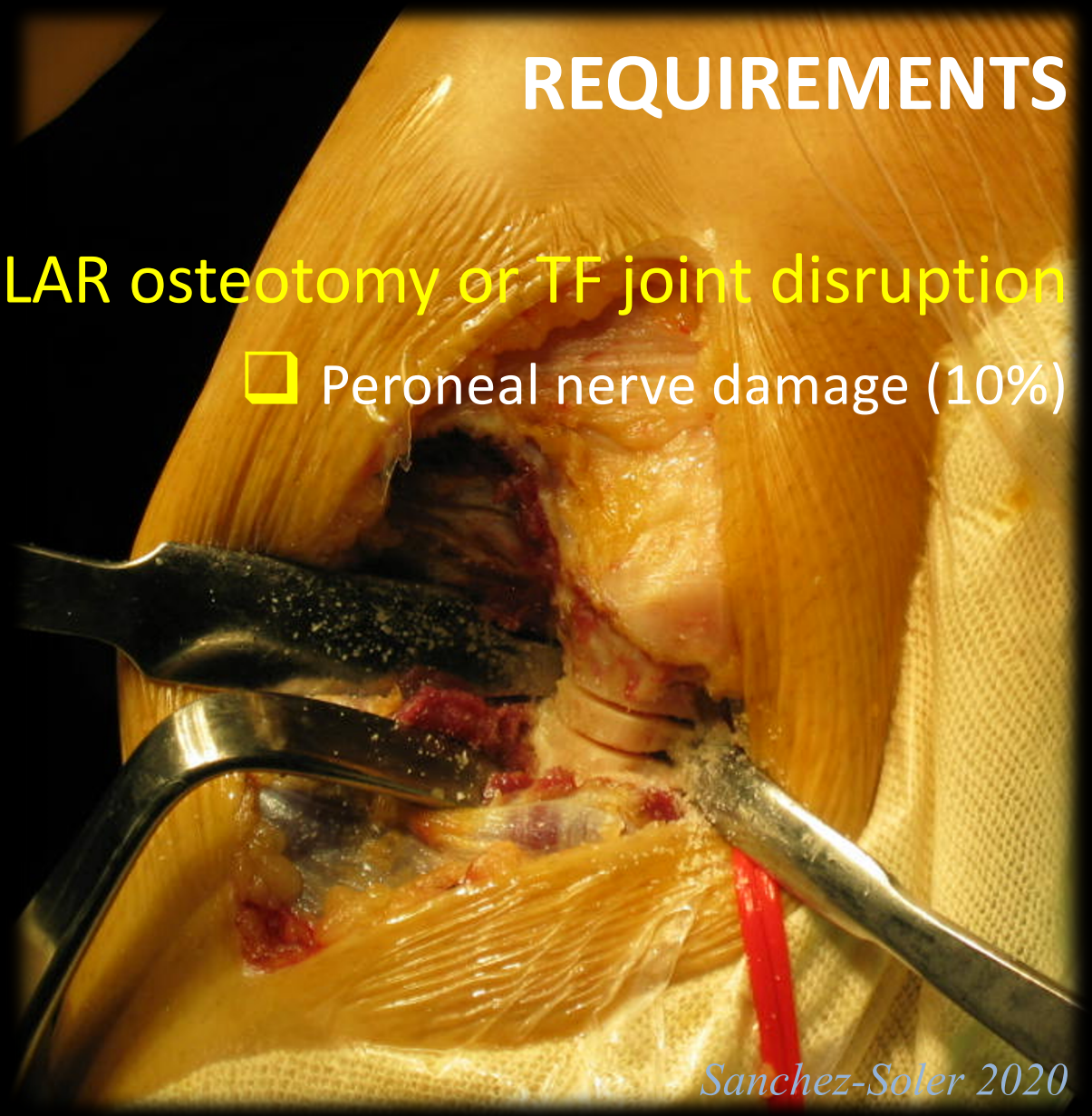
Marti 2004, Bito 2010



HTO Closed-Wedge

REQUIREMENTS

- FIBULAR osteotomy or TF joint disruption
  - Peroneal nerve damage (10%)

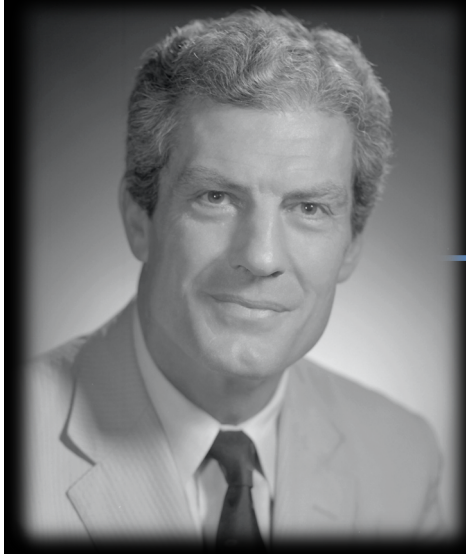


Sanchez-Soler 2020

SURVIVAL RATE

Study	No. Patients	Survival (%) 2 Years	5 Years	7 Years	10 Years	15 Years
Berman et al (1991)[10]	39	87	–	–	–	57*
Cass and Bryan (1988)[15]	86	94	87	–	69	–
Coventry et al (1993)[23]	87	–	87 (96)† (94)‡	–	66 (91)† (94)‡	–
Healy and Riley (1986)[38]	31	92	88	91	80§	–
Hernigou et al (1987)[41]	93	–	90 (100)‖	–	45 (100)‖	–
Matthews et al (1988)[70]	40	86¶	50	–	28§	–
Ritter and Fechtman (1988)[84]	78	95	80	58	58	58*
Rudan and Simurda (1991)[86]	128	–	–	–	80	70
Yasuda et al (1992)[102]	86	–	88	–	63	–

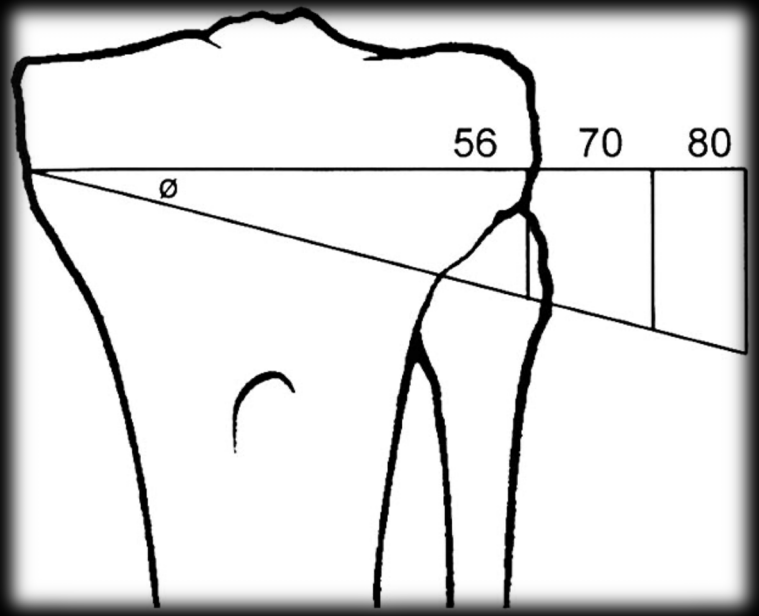
Insall & Scott, Surgery of the Knee, 4th ed.



HTO Closed-Wedge

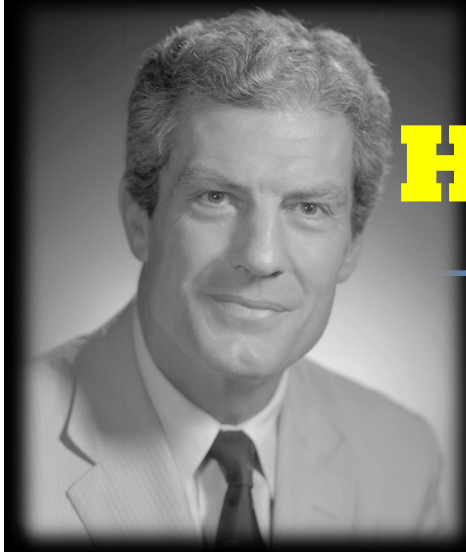
TECHNICAL ISSUES

- Bauer's rule ➔ *1º of angular correction is equal to 1mm*
- Only true when the tibial plateau measure ➔56mm
  - Average males➔ 80mm
  - Average females➔ 70mm

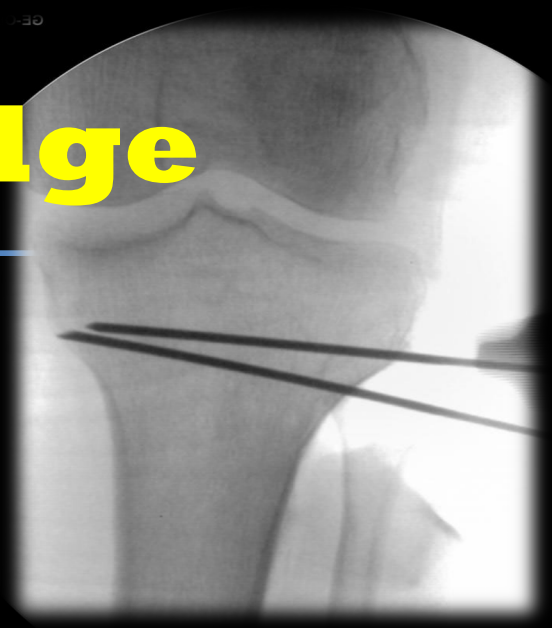


UNDERCORRECTION

Bauer 1969

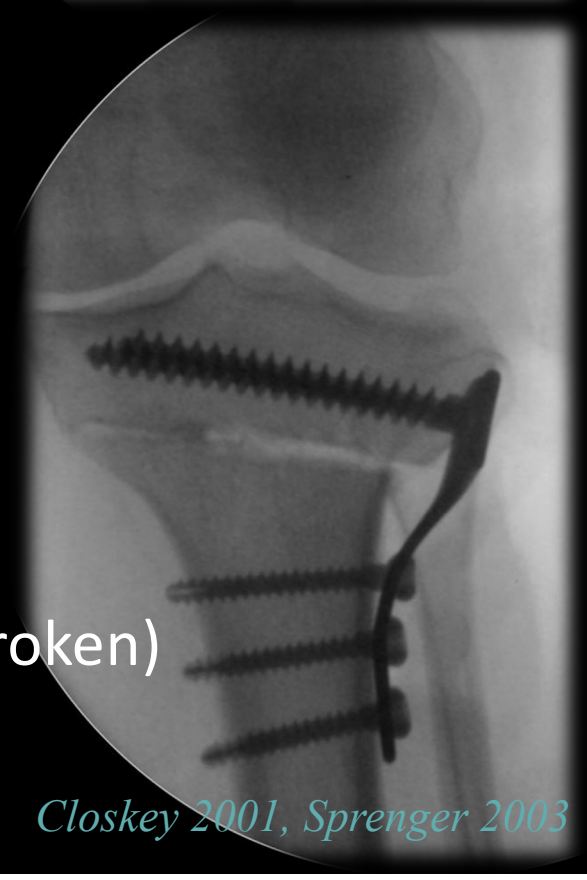


HTO Closed-Wedge



DISAVANTAGES

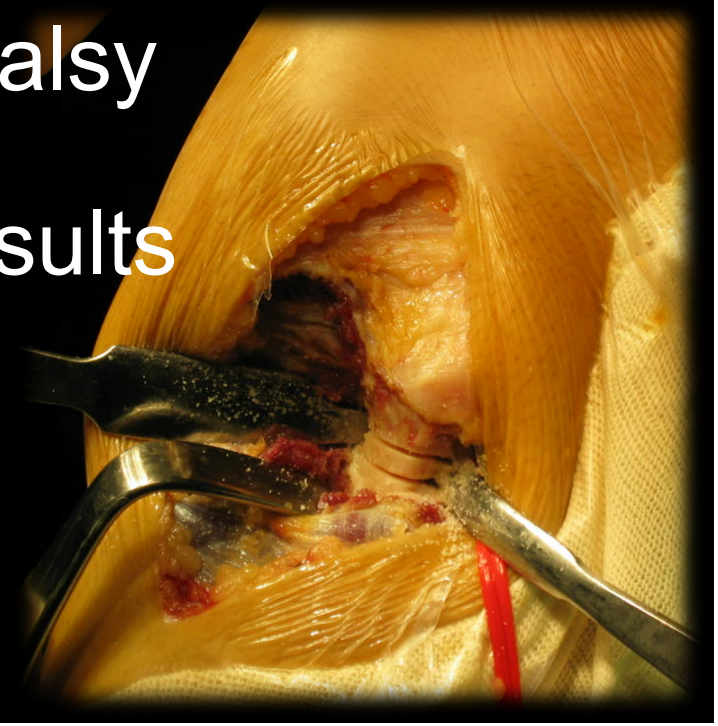
- More extended dissection
- Distortion of the proximal tibia
- Loss of bone stock
- Involved leg shortening
- Lose of correction (if medial hinge is broken)



Closkey 2001, Sprenger 2003

COMPLICATIONS

- Patella Baja
- Distortion of proximal tibia
- Peroneal nerve palsy
- Poor long-term results



Distortion of Proximal Tibia

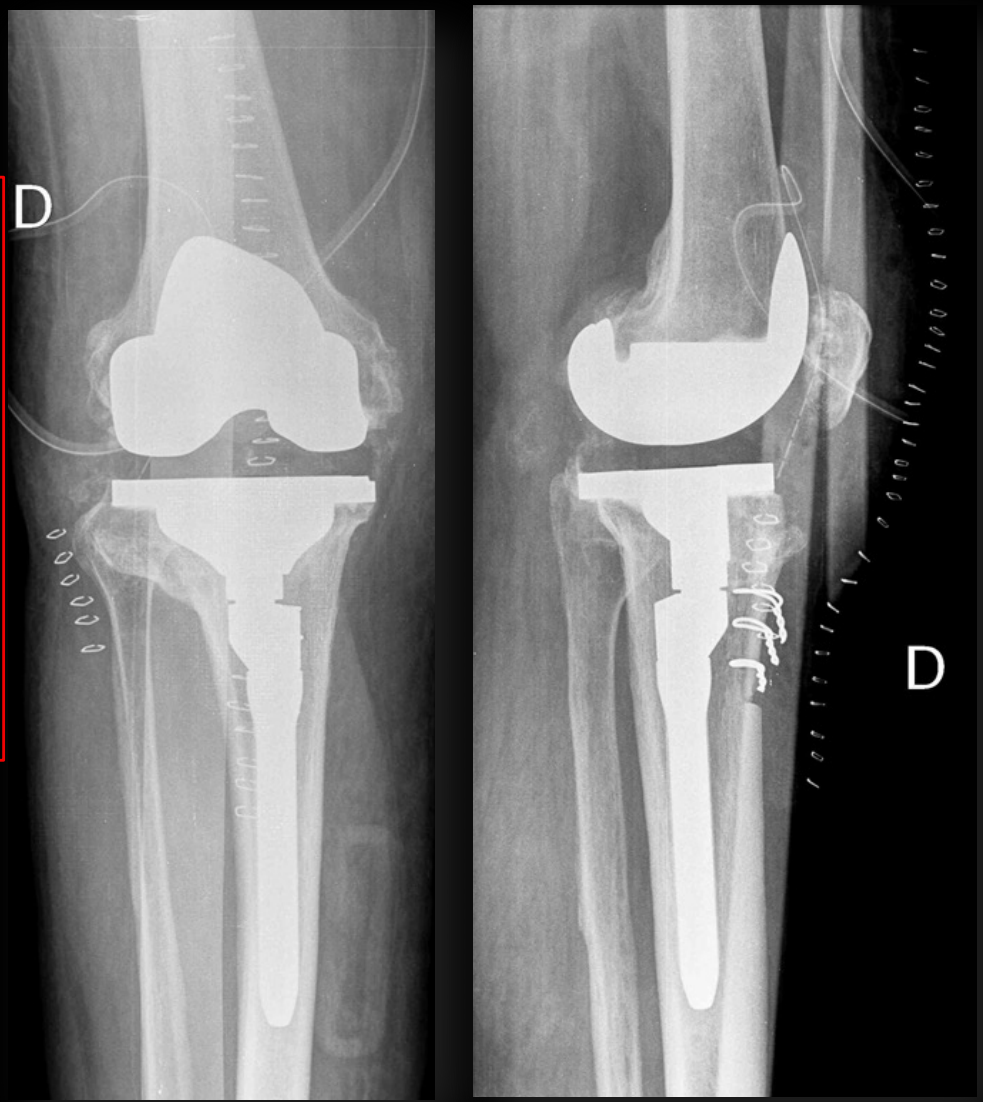
Major deformities

- Lateralization of TP
- Inverted slope
- *Patella infera*

Distortion of Proximal Tibia

Technical Tips

- Independent approach for hardware removal (avoiding further dissection)
- Asymmetric cut on tibia
- Positioning of the tibial tray with an offset tibial stem (2 plains)
- ATT cephalad transfer



‘90

Significant decline in popularity

THE JOURNAL OF BONE & JOINT SURGERY (BJ)

THE JOURNAL OF BONE & JOINT SURGERY

JB&JS

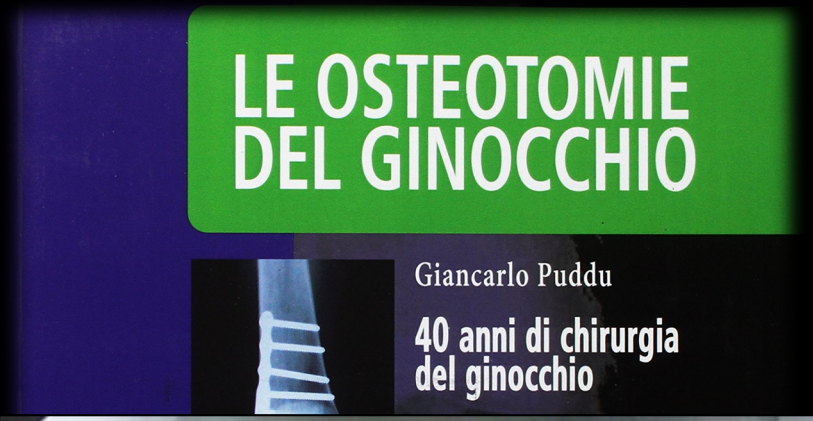
This is an enhanced PDF from The Journal of Bone and Joint Surgery
The PDF of the article you requested follows this cover page.

The Oxford medial unicompartmental arthroplasty

A TEN-YEAR SURVIVAL STUDY

D. W. Murray, J. W. Goodfellow, J. J. O’Connor
From the Nuffield Orthopaedic Centre, Oxford, England

HTO Open-Wedge

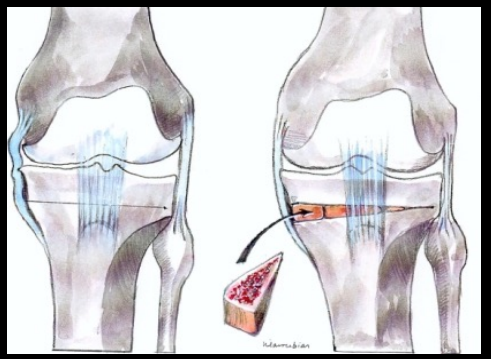


- Medially based wedge
- One single cut
- Adjustable
- No need of fibular osteotomy
- Correct alignment in two planes

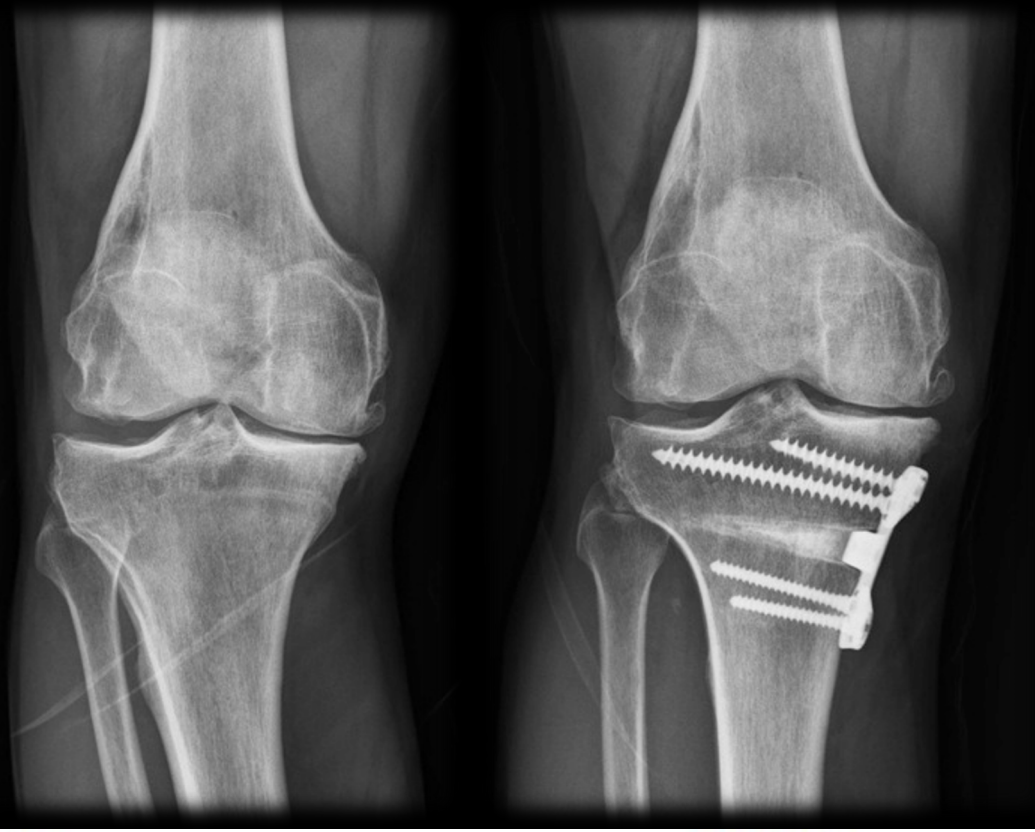
HTO Open-Wedge

Particular Indications

- Epiphyseal varus
- Pre-existing *patella alta*
- Loose MCL
- Limb length discrepancy
  - operative limb being shorter !

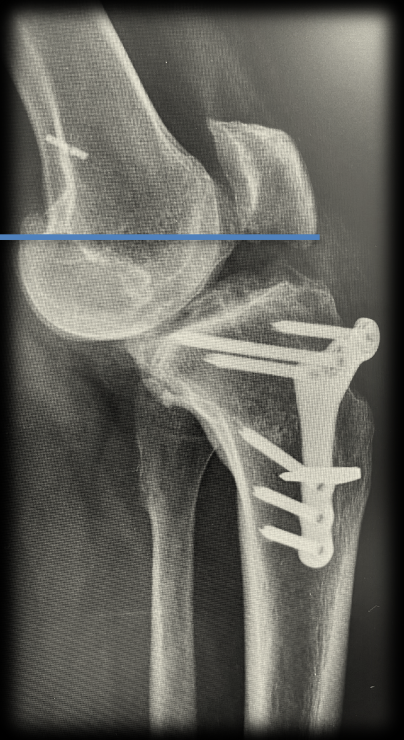


OUTCOMES



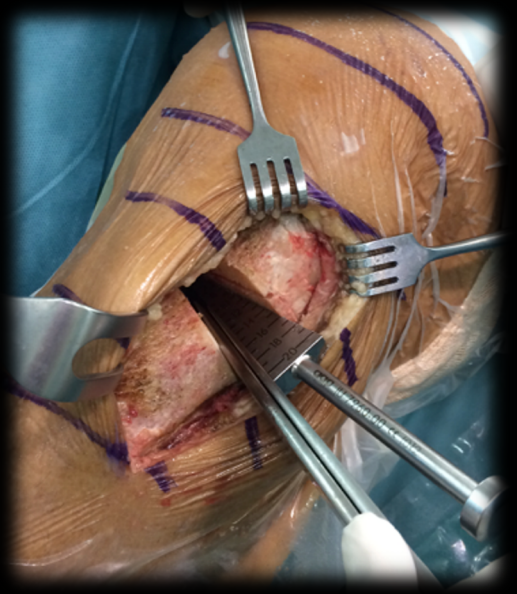
Study	Published	Implant	Failure rate
Lobenhoffer and Agneskirchner (7)	KSSTA, 2003	Spacer plate	6% in 101 patients
Spahn et al (80)	Arch Orthop Trauma Surg, 2004	Angle stable implant and spacer plate	No failure in angle stable implant, 11.7% failure in spacer plates
Staubli et al (9)	Injury, 2003	TomoFix	2% failure in 92 patients
Lobenhoffer, Agneskirchner and Zoch (88)	Orthopade, 2004	TomoFix	No failure in 262 patients, 2 patients neededrequired bone grafting.

HTO Open-Wedge



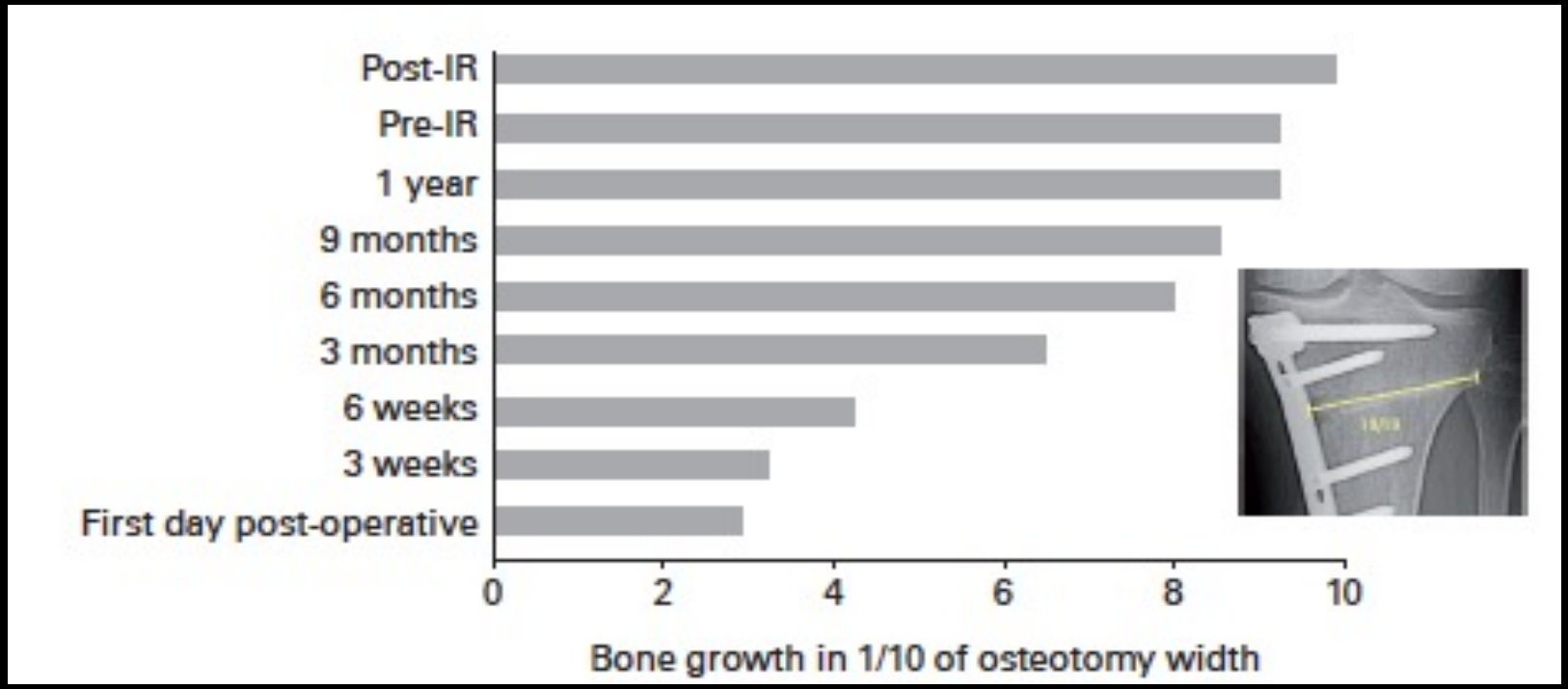
Disadvantages

- requires bone grafting
- slower progression to union
- increase tibial slope
- patellar height (*patella baja*)



Bone Grafting

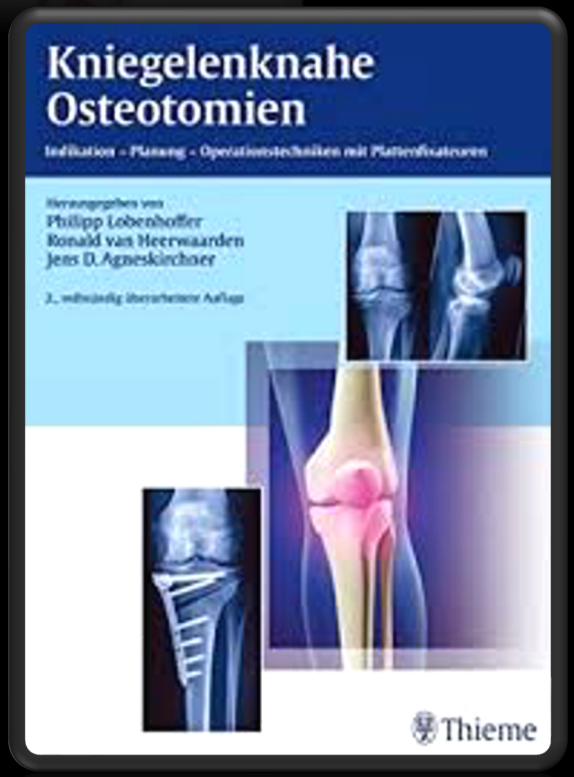
- No bone graft needed
  - 75% of the gap filled by 6 months
  - 90% consolidation by 1 year



Brinkman JBJS 2007

Slower Union

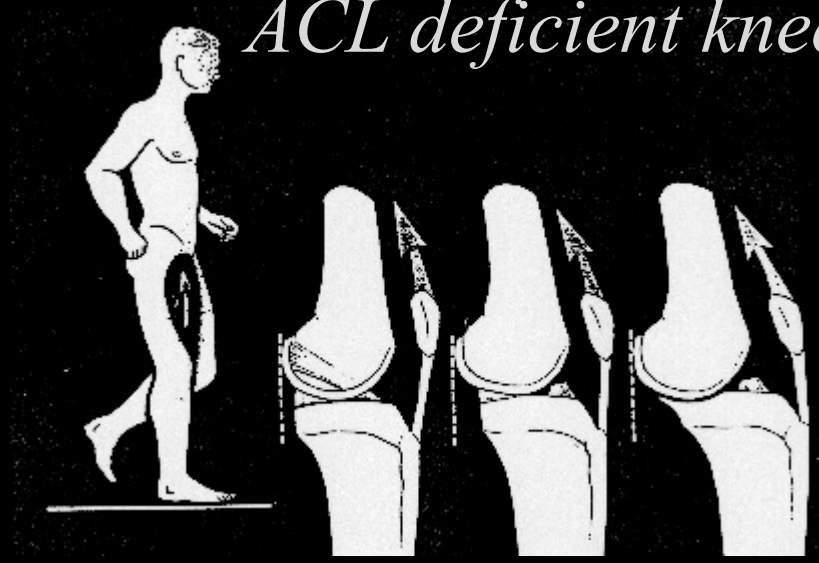
- Biplanar (cut-up)
- Locking-compression-plate

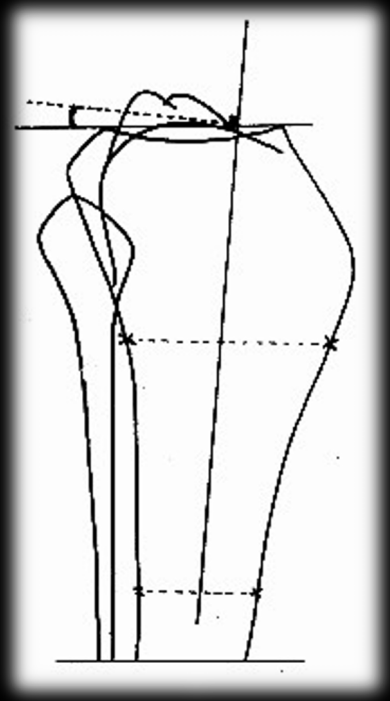


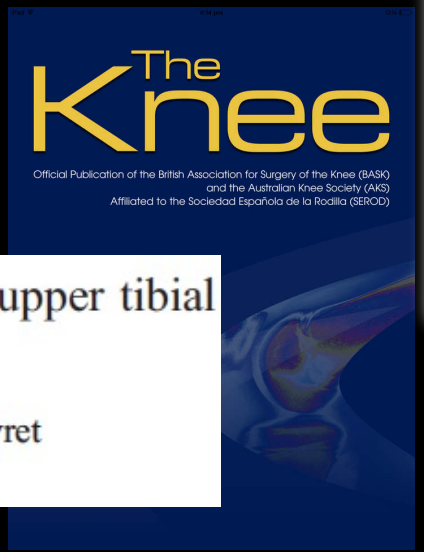
Increased Tibial Slope

The tibial slope and the anterior tibial translation in the ACL deficient knee

M. Bonnin These 1990







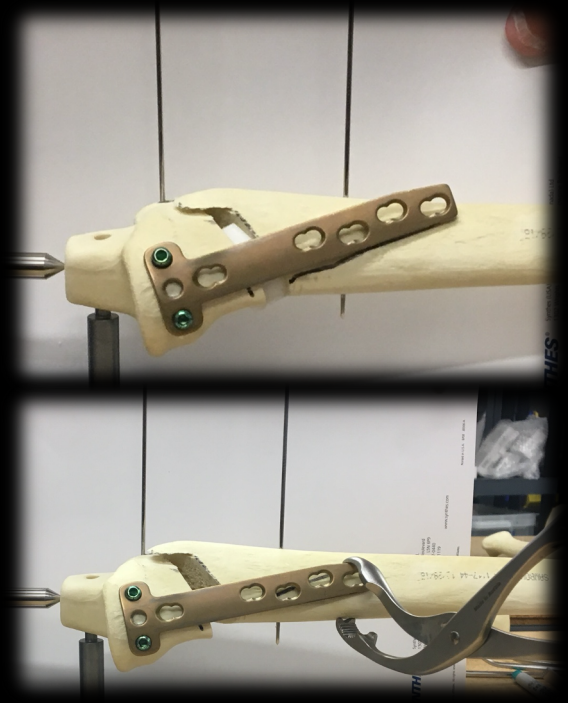
Anterior cruciate reconstruction combined with valgus upper tibial osteotomy: 12 years follow-up

N. Bonin*, T. Ait Si Selmi, S.T. Donell, H. Dejour[1], P. Neyret

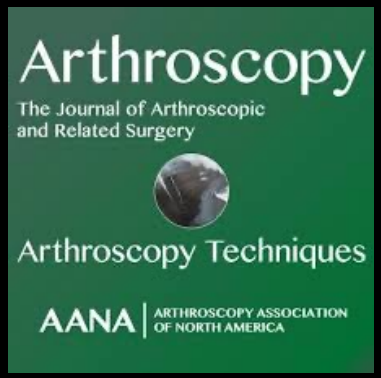
Centre Livet, Lyon, France

Avoiding Tibial Slope

- Anteriorly positioned plate
  - Counterbalanced with a clamp

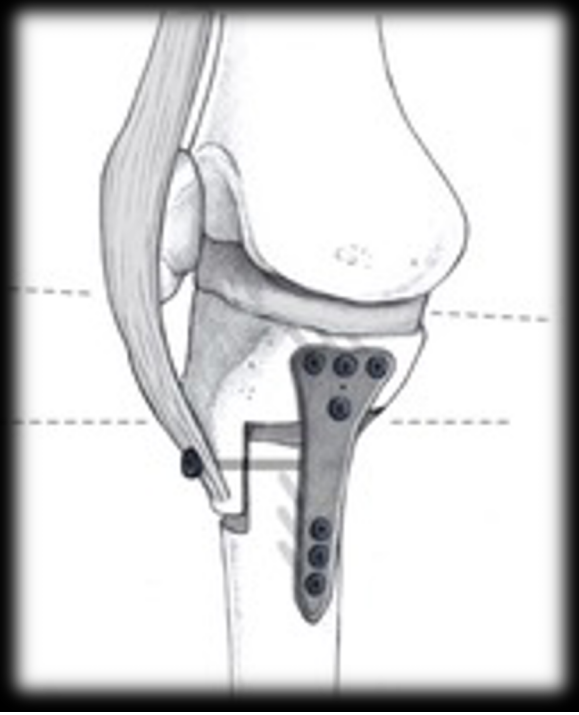


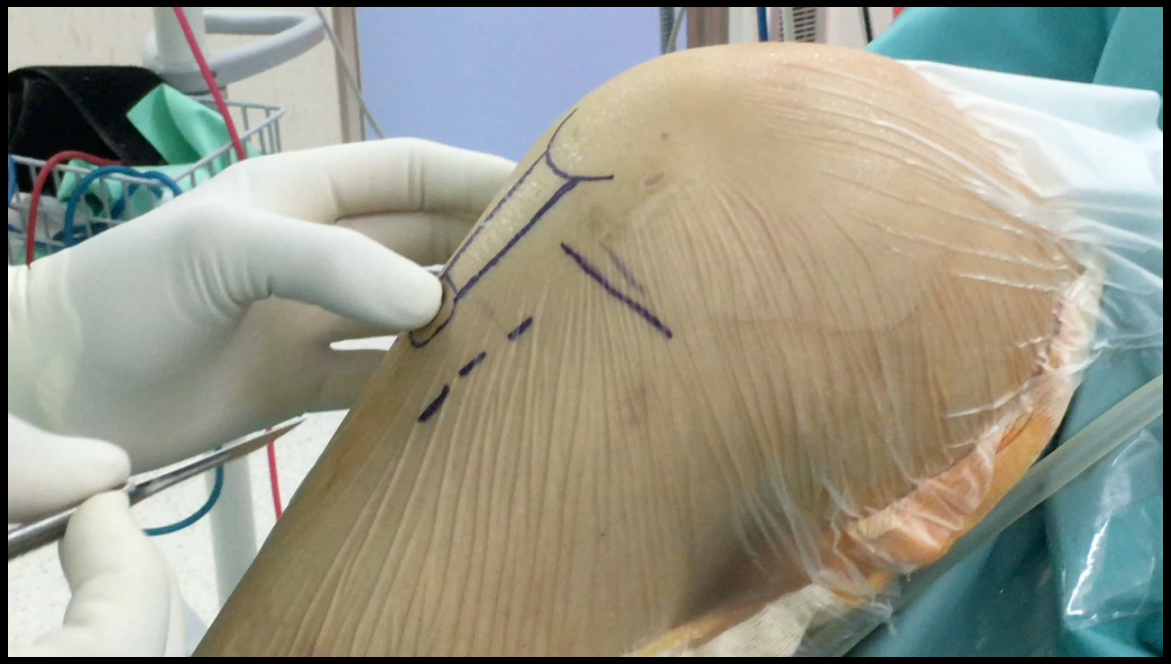
Avoiding Patella Baja



Open-Wedge Valgus High Tibial Osteotomy Technique With Inverted L-Shaped Configuration

Juan C. Monllau, M.D., Ph.D., Juan I. Erquicia, M.D., Federico Ibañez, M.D., Maximiliano Ibañez, M.D., Pablo E. Gelber, M.D., Ph.D., Angel Masferrer-Pino, M.D., and Xavier Pelfort, M.D., Ph.D.





- Cut Down
  - Keeps constant Patella - TT distanc

Open-Wedge Valgus High Tibial Osteotomy Technique With Inverted L-Shaped Configuration

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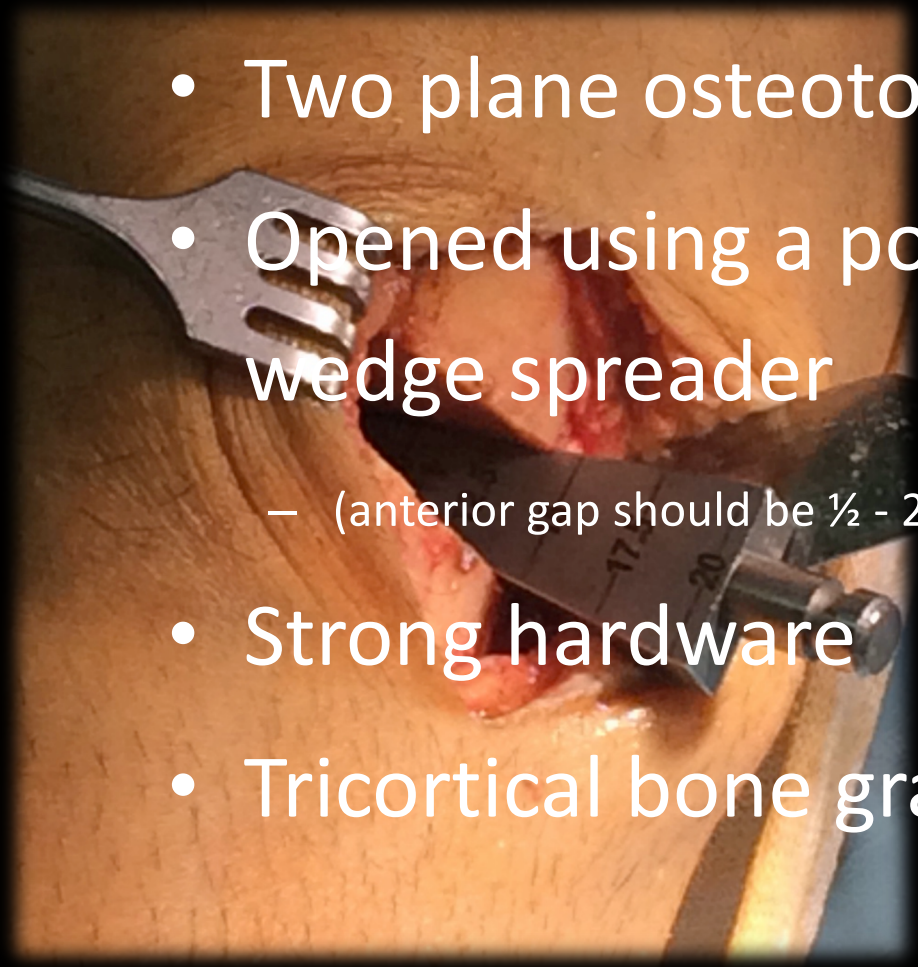
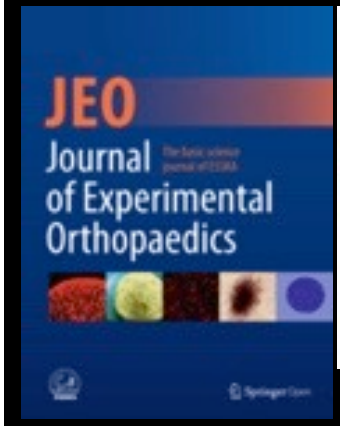


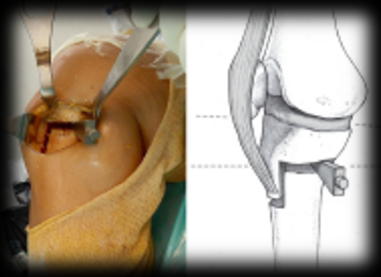
- Two plane osteotomy / cut down
- Opened using a posteriorly positioned wedge spreader
  - (anterior gap should be ½ - 2/3 the size of the posteromedial gap)
- Strong hardware
- Tricortical bone grafting

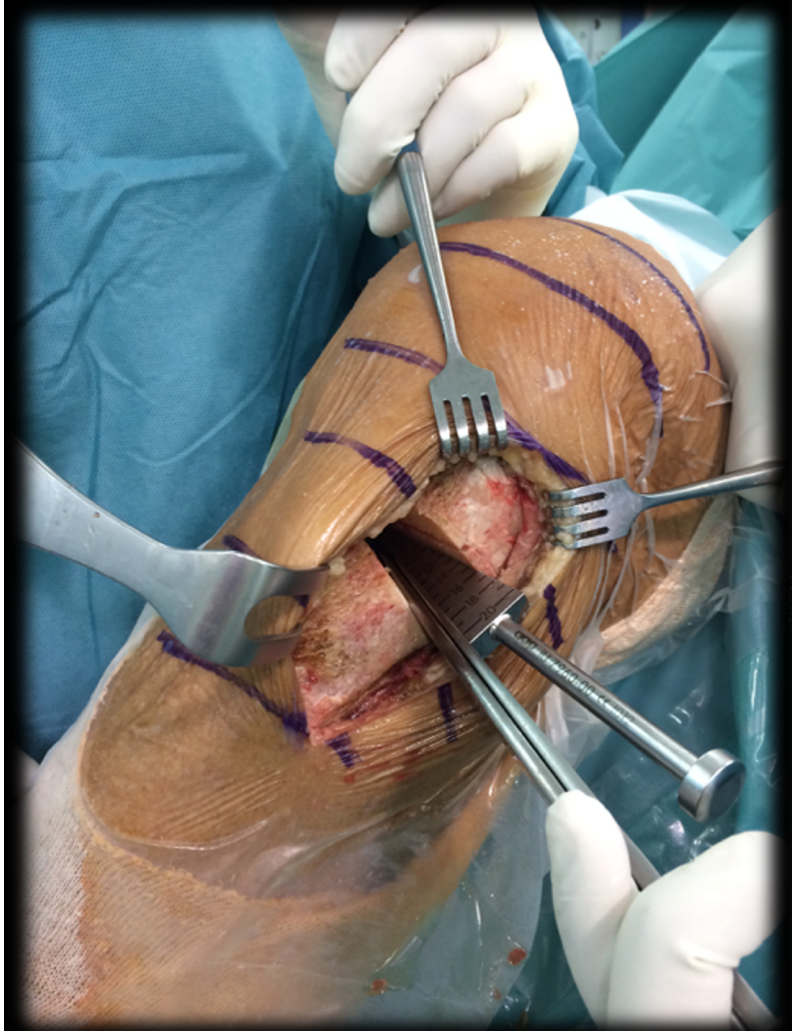


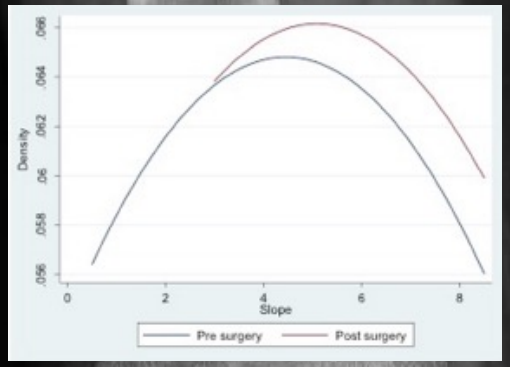
RESEARCH Open Access

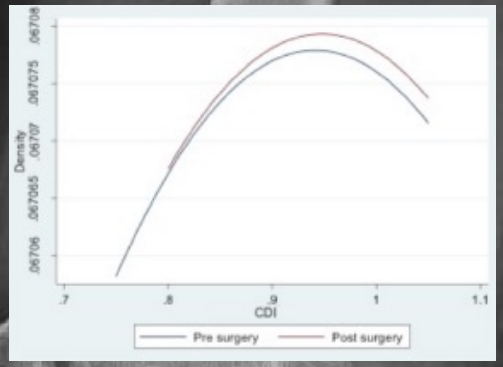
Biplane opening wedge high tibial osteotomy with a distal tuberosity osteotomy, radiological and clinical analysis with minimum follow-up of 2 years

Juan Erquicia[1], Pablo Eduardo Gelber[1,2], Simone Perelli[1*], Federico Ibañez[1], Maximiliano Ibañez[1], Xavier Pelfort[1,3] and Juan Carlos Monllau[1,4]



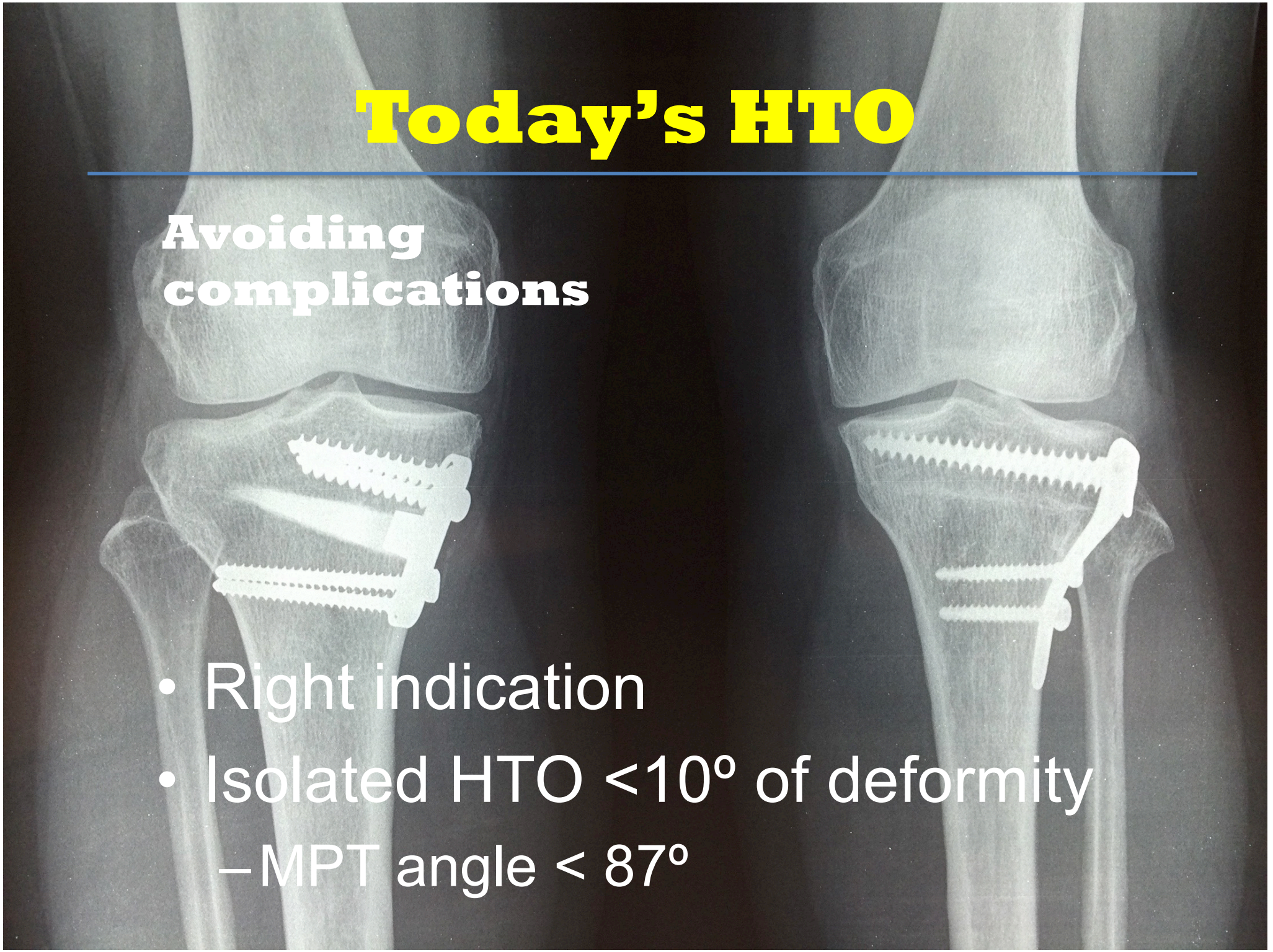






Today's HTO

Avoiding complications

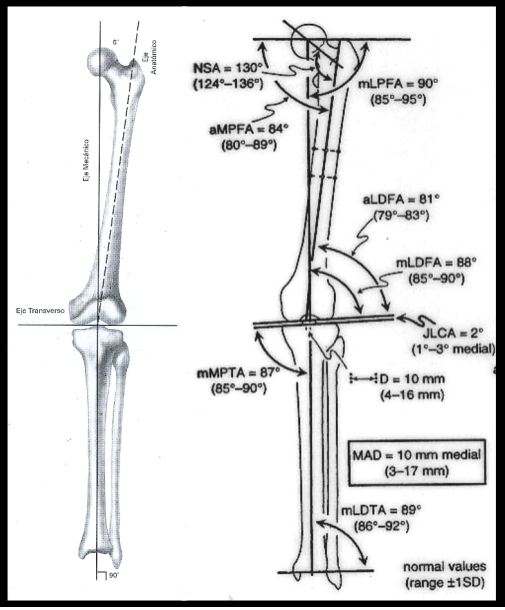


- Right indication
- Isolated HTO <10º of deformity
  - MPT angle < 87º

NOT ALWAYS is The TIBIA

Femoral varus

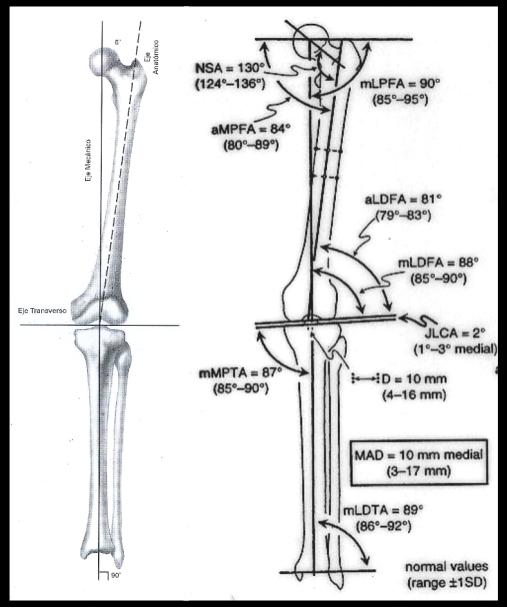
- CW Femoral Osteotomy



NOT ALWAYS is JUST TIBIAL

Combined fem & tibial varus

- **Double level osteotomy**



CONCLUSION

- Good mid-term results with either technique
- Outcome strongly depends on an optimal correction
  - Too little ➔ poor results (recurrence of the varus)
  - Too much ➔ valgus overload (OA lateral comp)
- Right indication

Take Home Message

- Major surgery
- May have complications
- Proper planning & technique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