

# Current practice in HTO for Knee OA

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# Stages of Osteoarthritis

Detailed radiological assessment is absolutely essential for an accurate indication.

Stage 1



wear < 50 %

Stage 2



50 % < wear < 100%

Stage 3



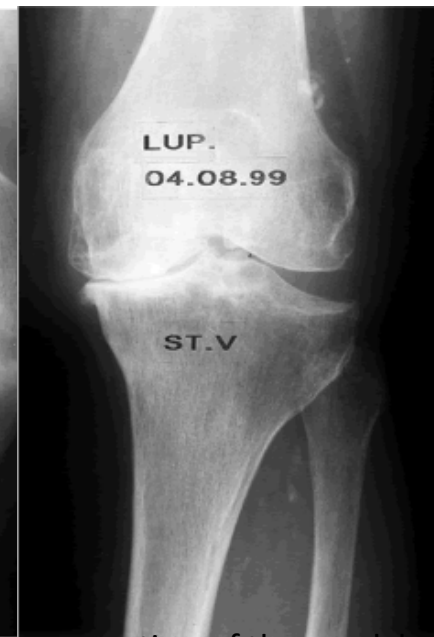
wear = 100%

Stage 4



penetration of the  
condyle in the  
tibial plateau

Stage 5



penetration of the condyle  
in the tibial plateau,  
posterolateral tibia  
subluxation and  
femorotibial decoaptation

Modified Alhåck criteria (Saragaglia et Roberts,  
Orthopaedics, 2005)

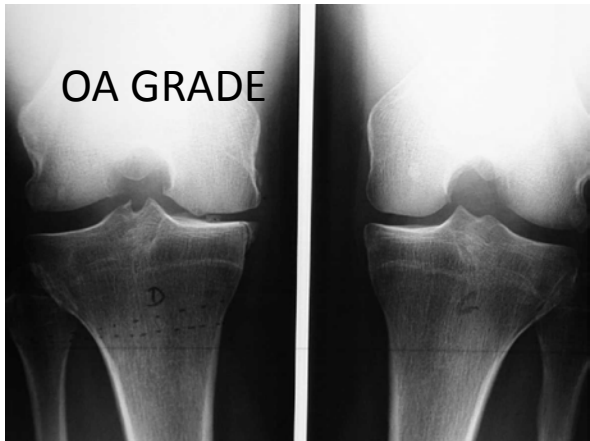
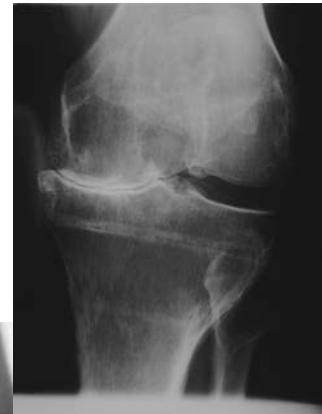
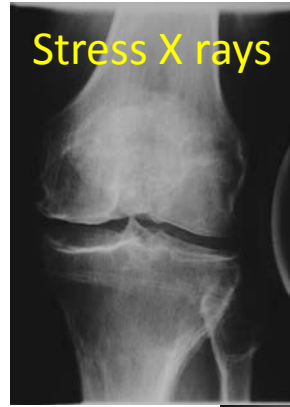
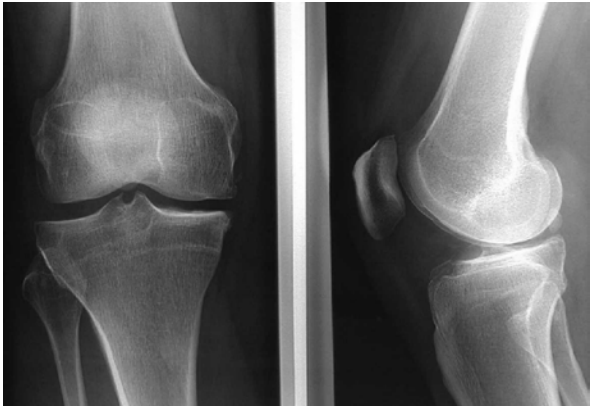
The sooner the surgery, the better and long lasting the results

Better to operate stage I, II and sometimes III

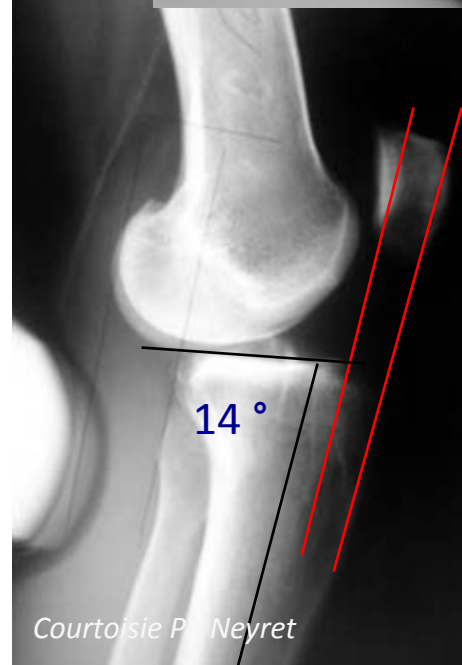
Controversial to operate stages IV or V

# X ray evaluation

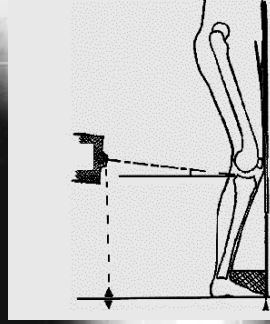
Frontal and sagittal plane  
Schuss view



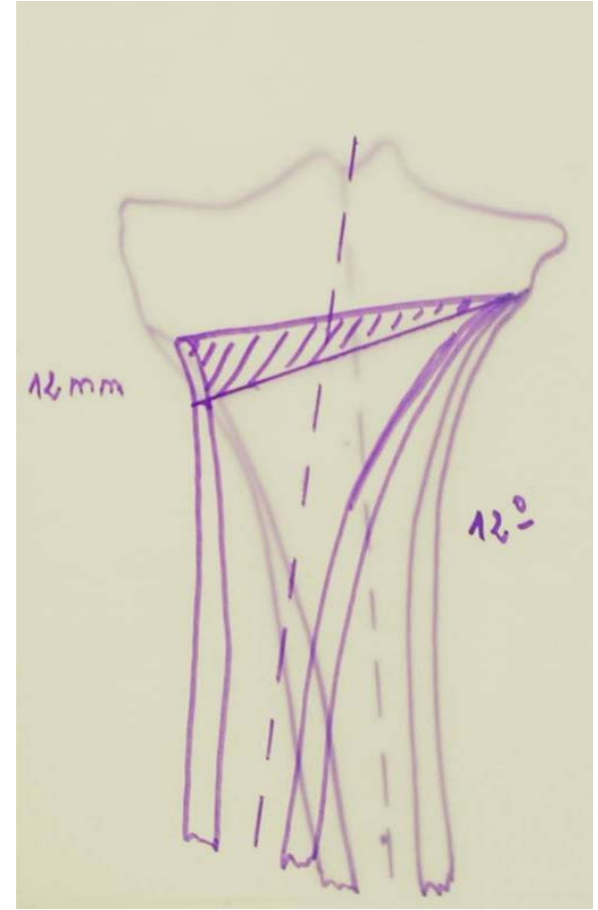
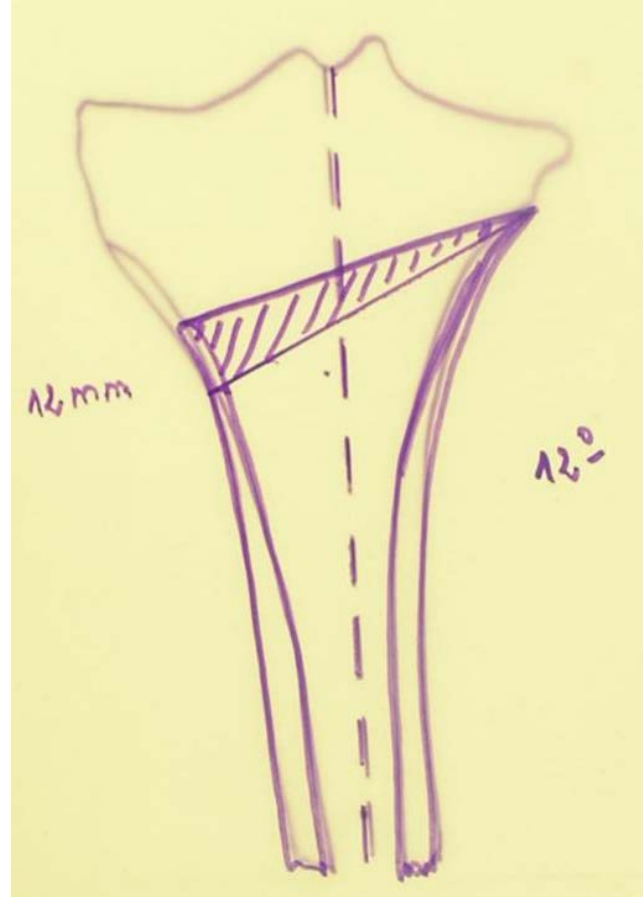
Tibial slope



Courtoisie P. Neyret



# Preop Planification

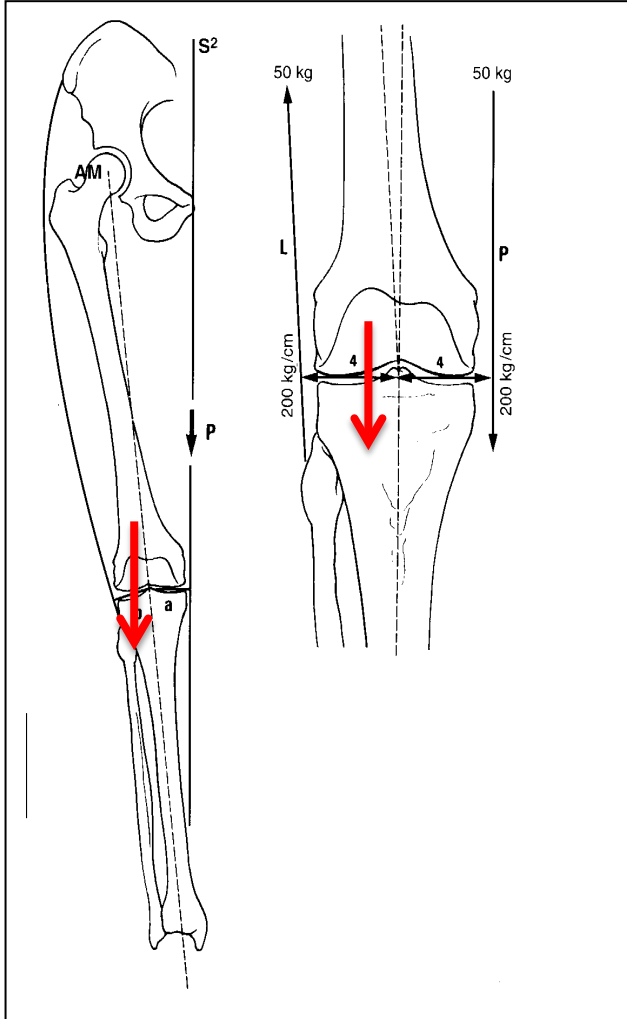


Proximal tibial osteotomy for osteoarthritis with varus deformity. A ten to thirteen-year follow-up study.

**Hernigou P, Medevielle D, Debeyre J, Goutallier D.**

J Bone Joint Surg Am. 1987 Mar;69(3):332-54.

# Preop Planification



The aim of HTO is to correct the varus deformity to transfer the constraints on the lateral knee compartment

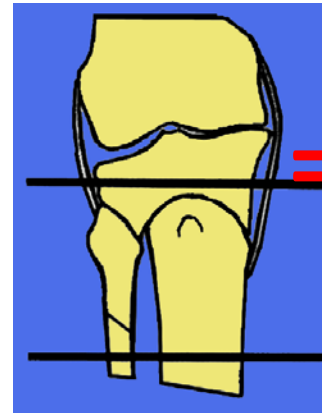
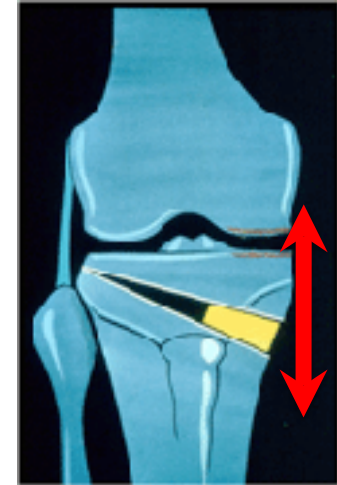
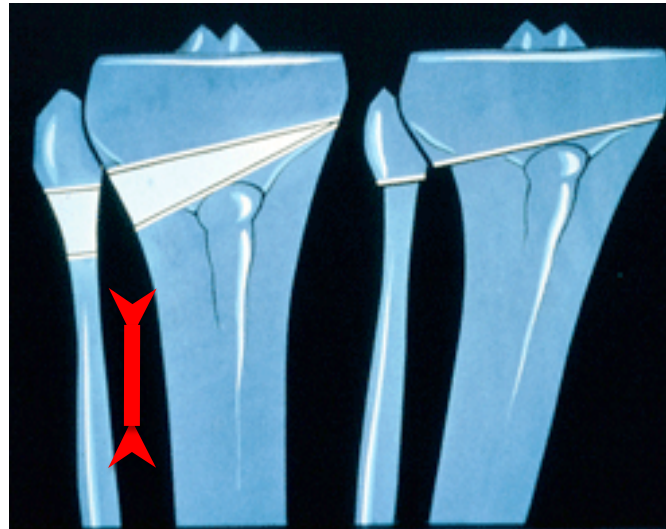
# Which Technique

Several available

Closing wedge

Opening Wedge

Dome shape



Make your choice according the clinical situations and potential benefit

Several tricks and tips



# Closing wedge

Advantage :

Bone contact

Better control for tibial slope

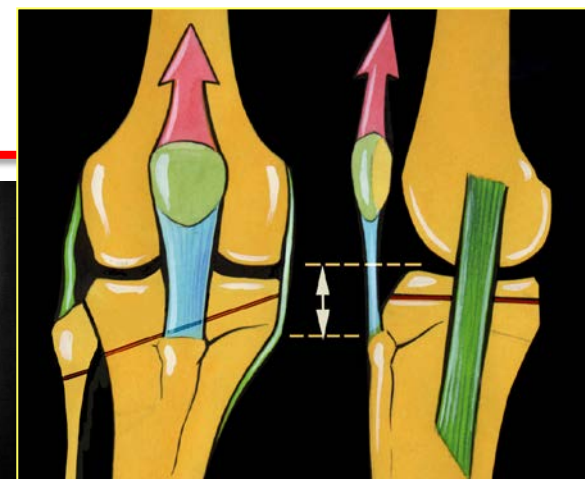
Less accuracy

But

Fibular osteotomy

Malunion of the proximal tibial

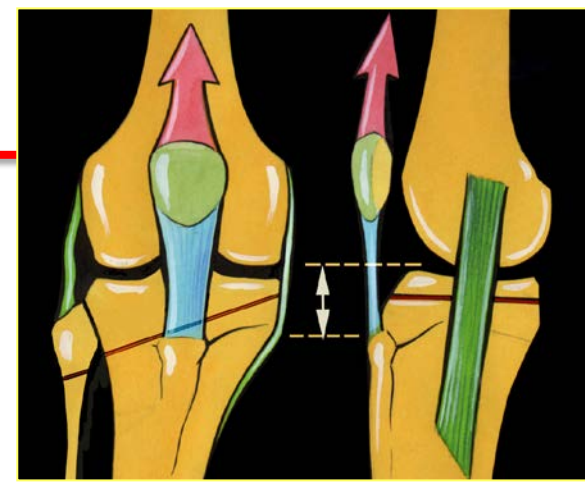
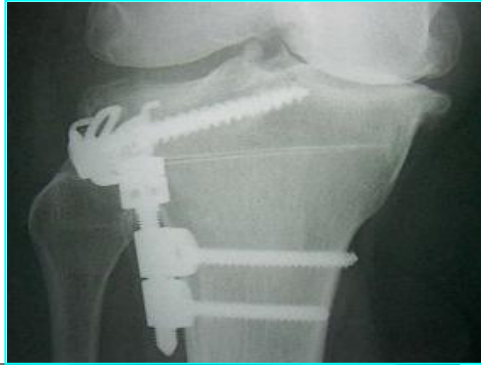
Patella Alta



[Duivenvoorden T<sup>1</sup>](#), [Brouwer RW<sup>2</sup>](#), [Baan A<sup>1</sup>](#), [Bos PK<sup>1</sup>](#), [Reijman M<sup>1</sup>](#), [Bierma-Zeinstra SM<sup>1</sup>](#), [Verhaar JA<sup>1</sup>](#).

Comparison of closing-wedge and opening-wedge high tibial osteotomy for medial compartment osteoarthritis of the knee: a randomized controlled trial with a six-year follow-up. [J Bone Joint Surg Am.](#) 2014

# Closing wedge





# Opening Wedge

Advantage

Accuracy

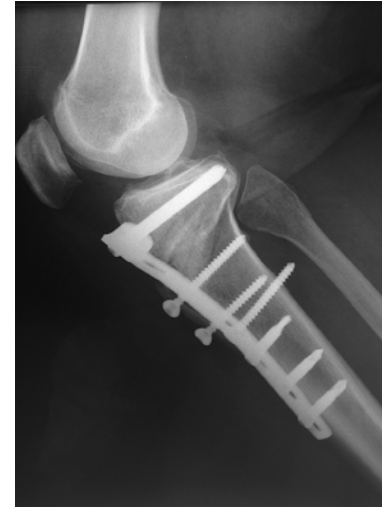
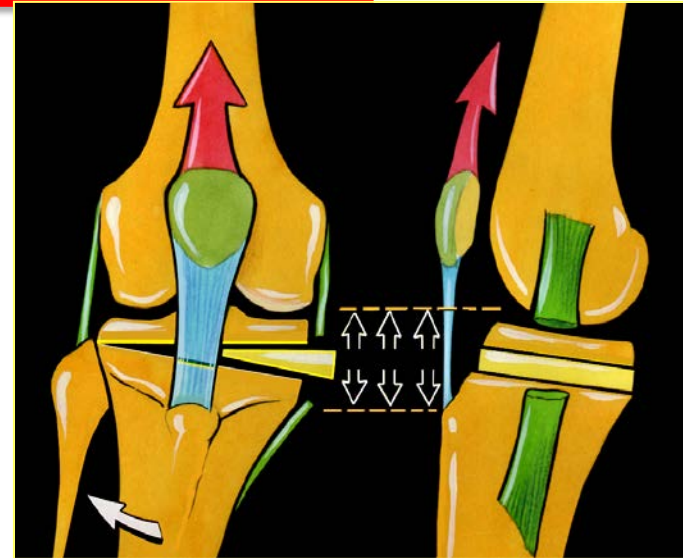
Less malunion residual deformity

Preserve posterolaterales structures

But

Patella Baja

Increase tibial slope

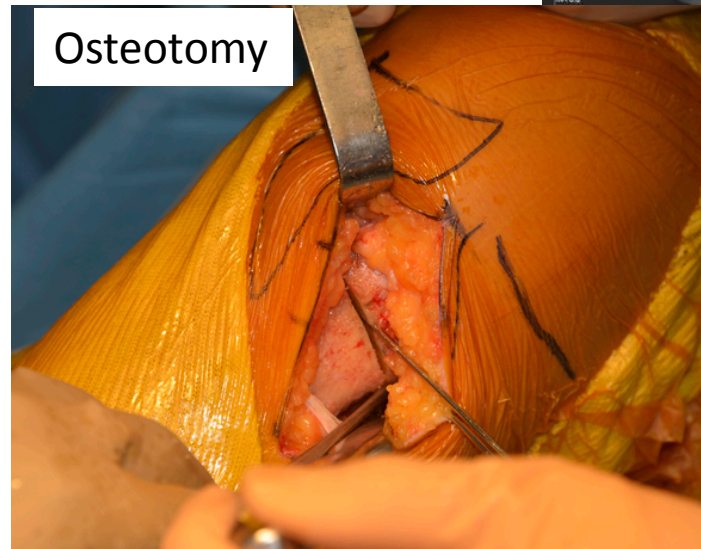
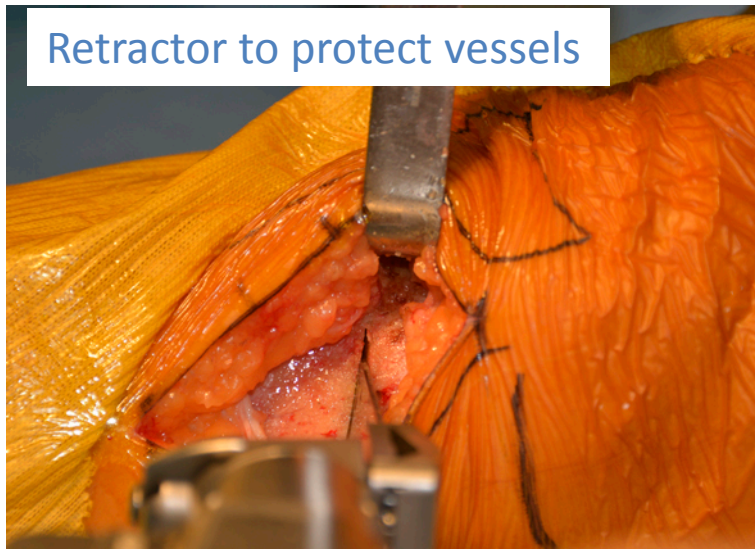
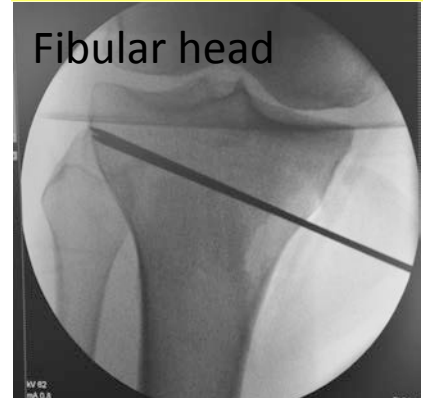
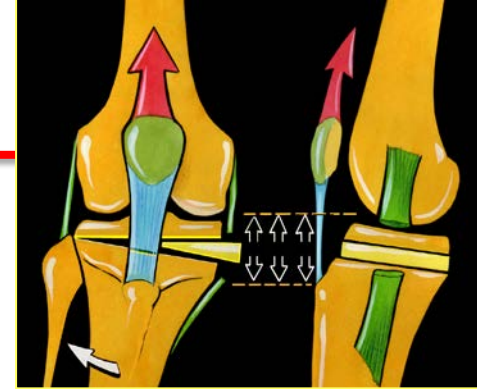
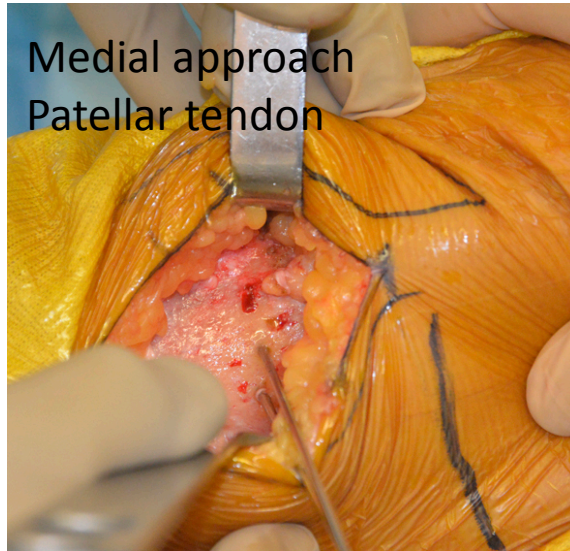


[Ducat A1, Sariali E, Lebel B, Mertl P, Hernigou P, Flecher X, Zayni R, Bonnin M, Jalil R, Amzallag J, Rosset P, Servien E, Gaudot F, Judet T, Catonné Y.](#)

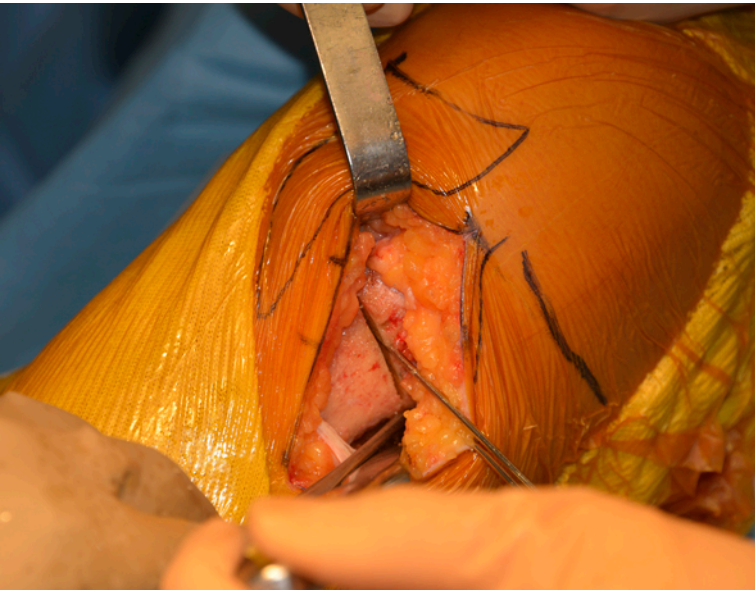
[Posterior tibial slope changes after opening- and closing-wedge high tibial osteotomy: a comparative prospective multicenter Study Orthop](#)

[Traumatol Surg Res. 2012..](#)

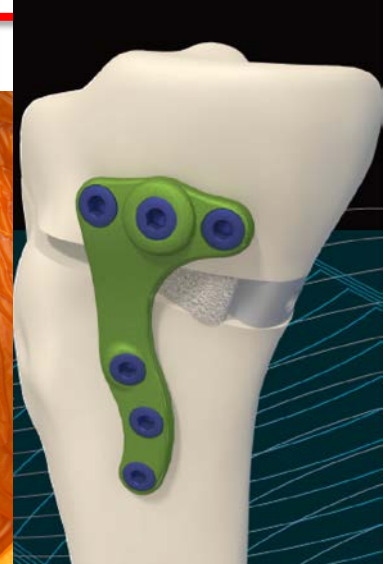
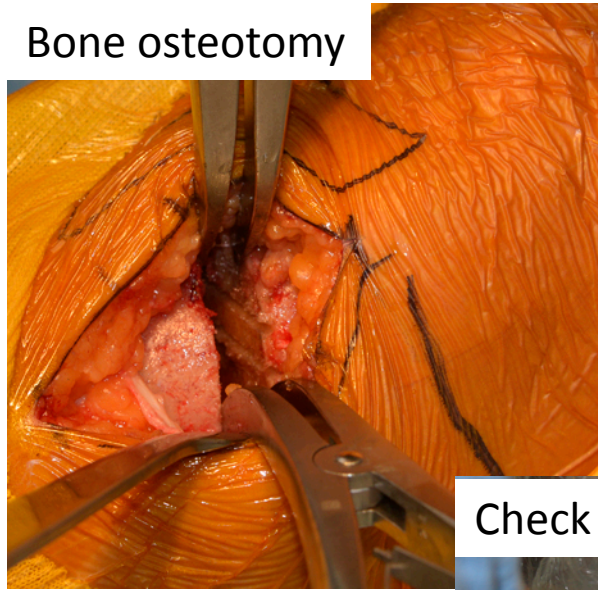
# Opening Wedge



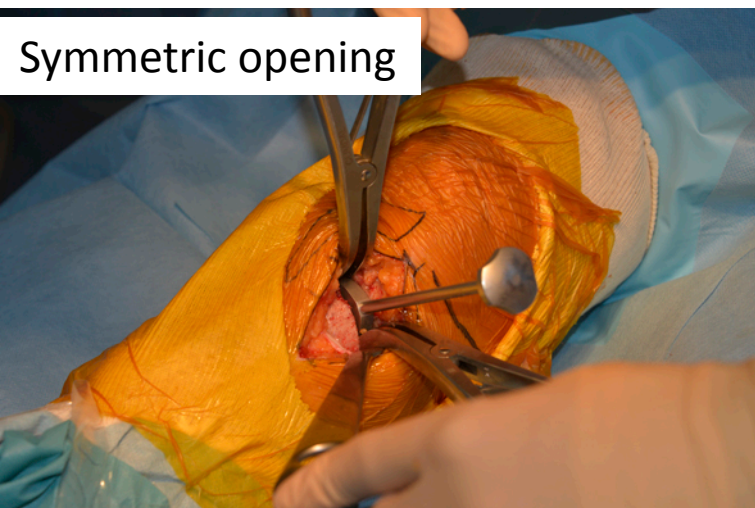
# Opening Wedge



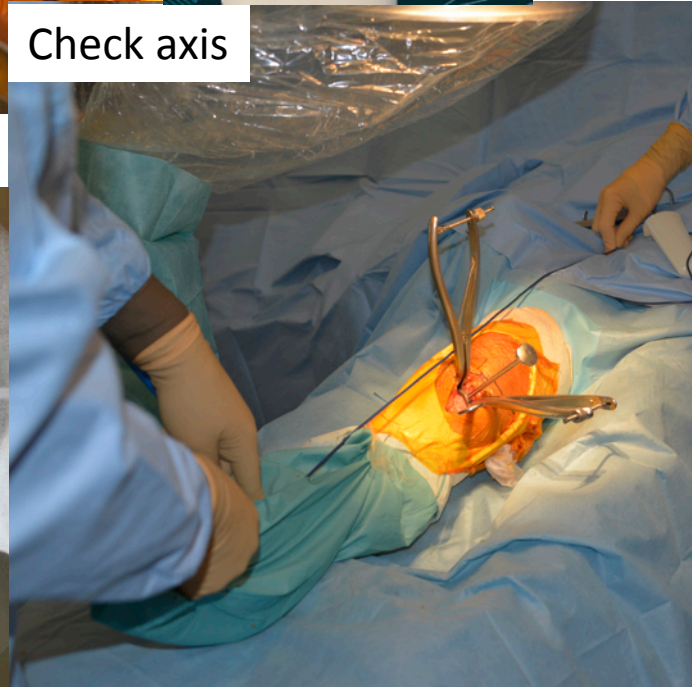
Bone osteotomy



Check axis



Symmetric opening



# Opening Wedge

Metallic wedge

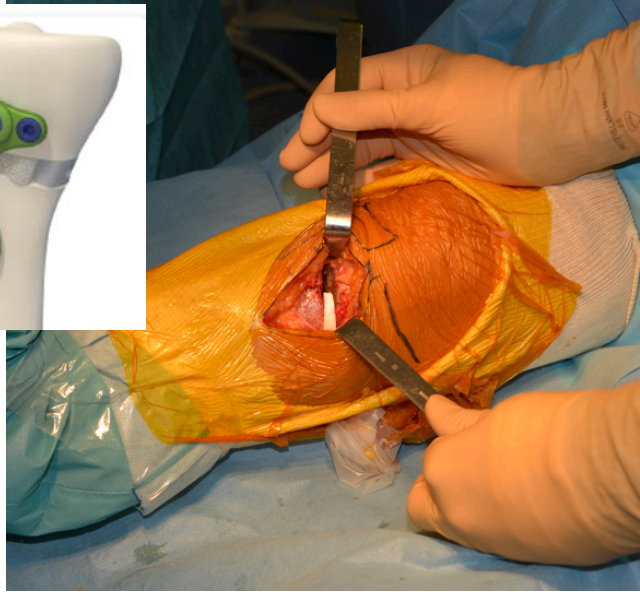
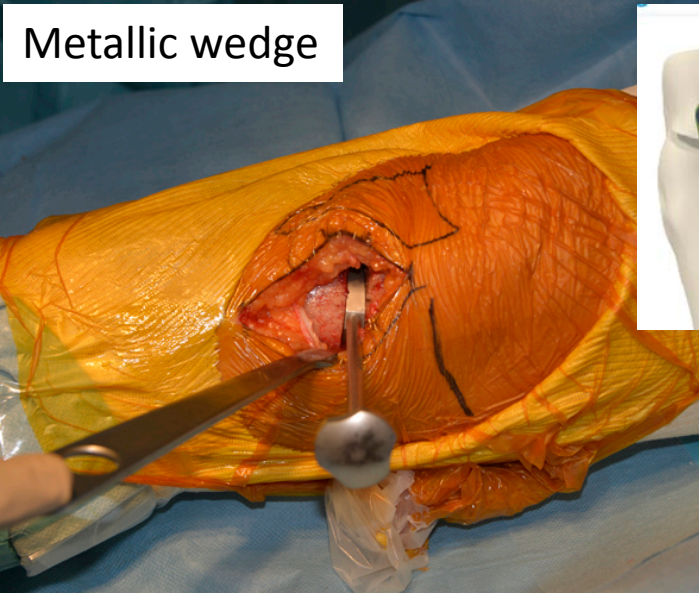
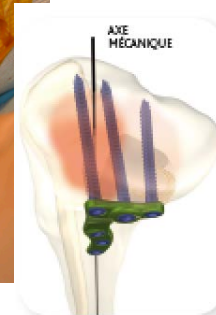
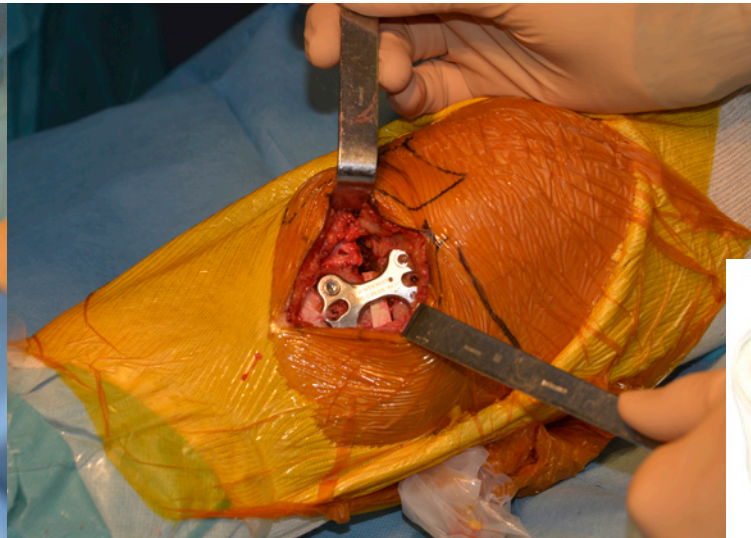


Plate and screws



# Opening Wedge



**D+ 7 years**

# Ostéotomie associated with other procedures

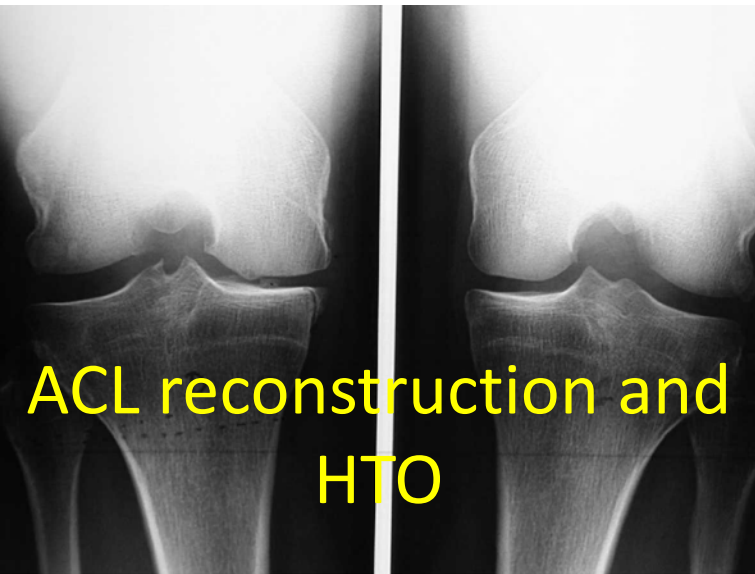
Chronic anterior laxity with Prearthrosis

Acl reconstruction and High tibial osteotomy

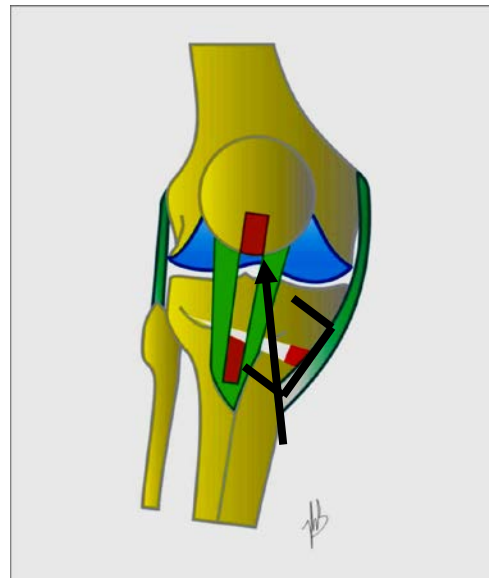
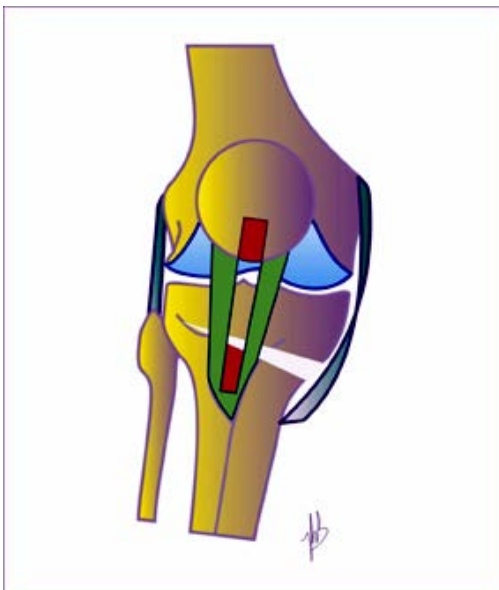
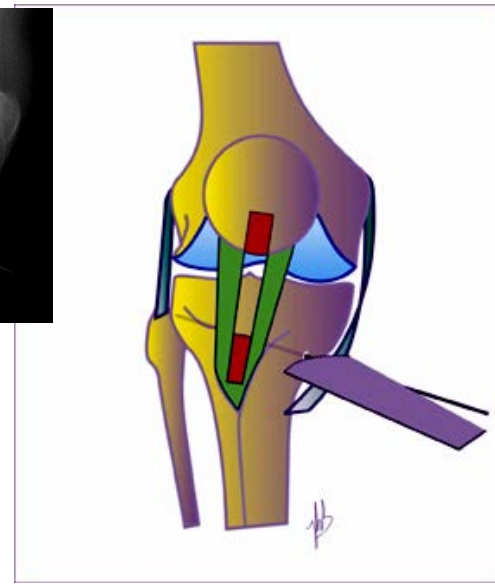
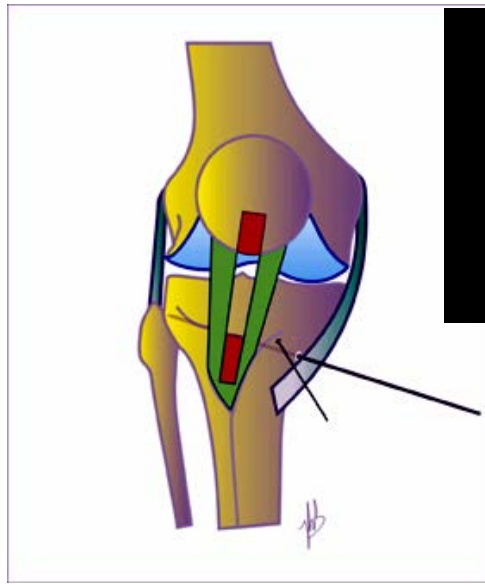
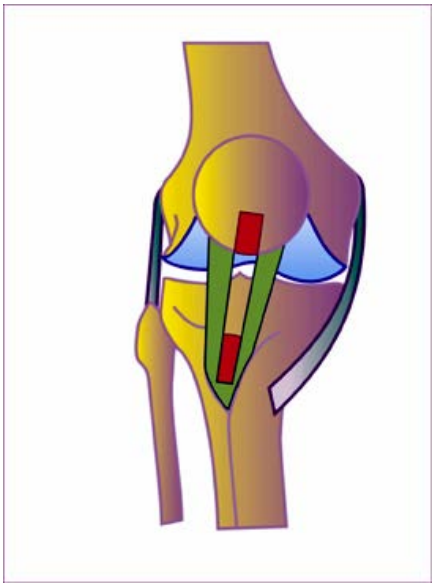
Female 35 y.

Meniscectomy and Instability

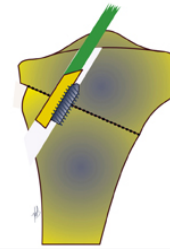
Varus deformation 5°



# ACL reconstruction and HTO



# ACL reconstruction and HTO



1 à 3 ° valgus



1 à 3 ° valgus





Literature : 15 studies.

No pain 60%

No instability 90%

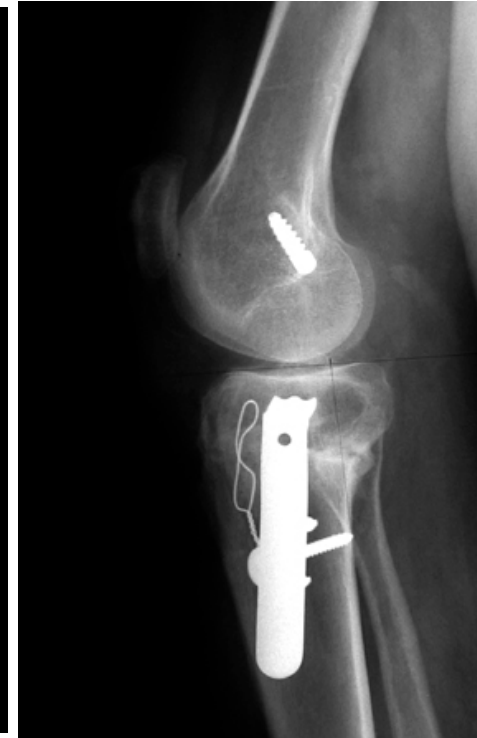
Xray :

1 - 3 ° valgus

No evolution

Patella height. : 23 %

Tibial slope+++



# ACL reconstruction and tibial slope

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Failure in Acl reconstruction

ACL reconstruction and deflexion osteotomie  
(Anterior closing osteotomy)

Deflexion Osteotomy

M Bonnin

[Dejour H1, Bonnin M Tibial translation after anterior cruciate ligament rupture. Two radiological tests compared..J Bone Joint Surg Br. 1994 Sep;76\(5\):745-9.](#)



# ACL reconstruction and tibial slope

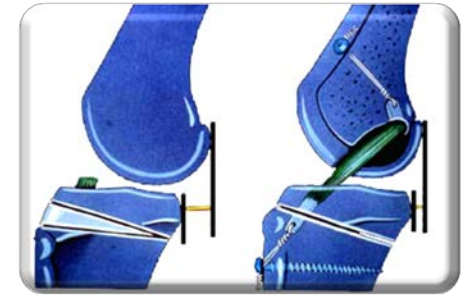
Pain, Instability and Varus  
Knee OA

Objective

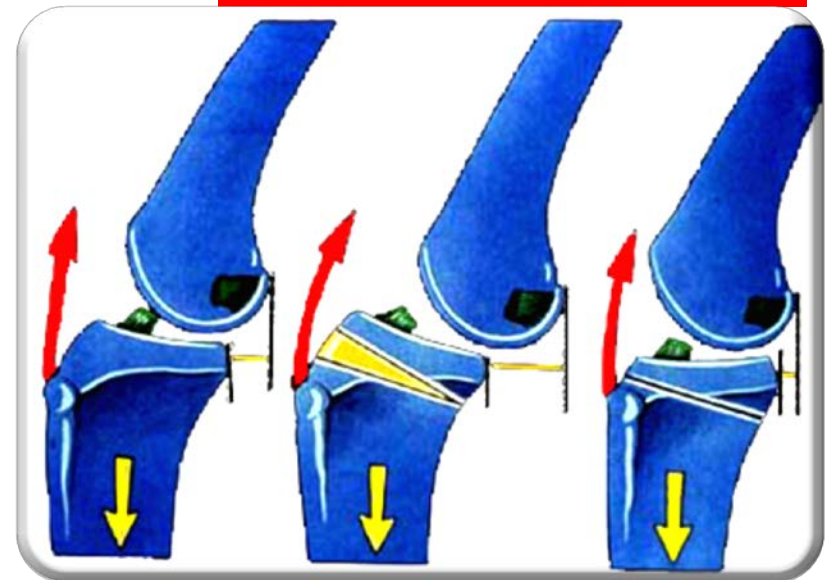
T slope at  $4^{\circ}$

Medial approach

Efficiency on anterior tibial  
translation



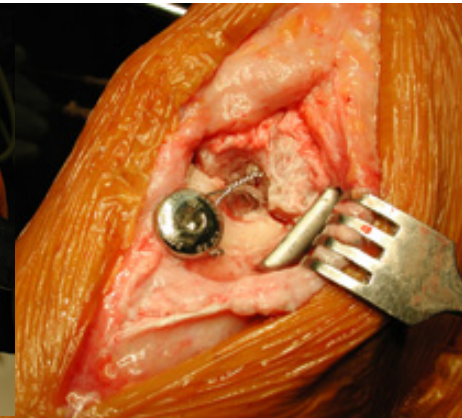
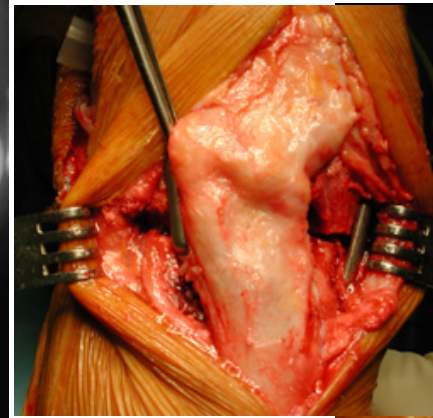
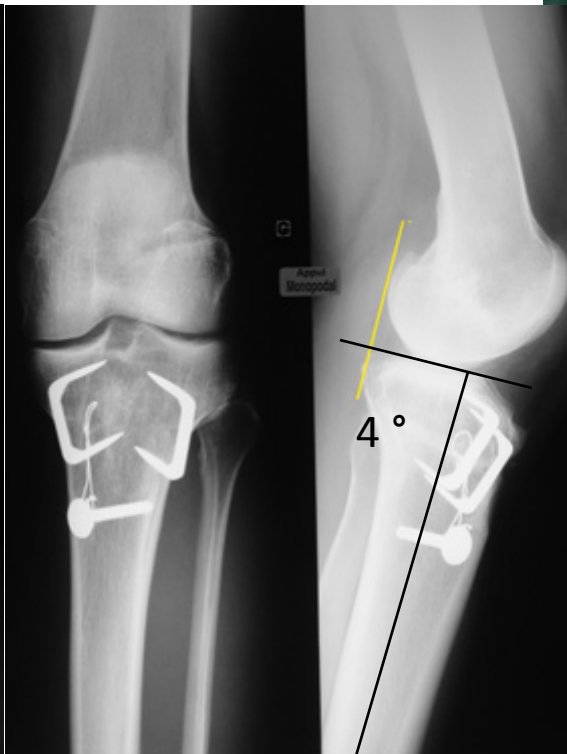
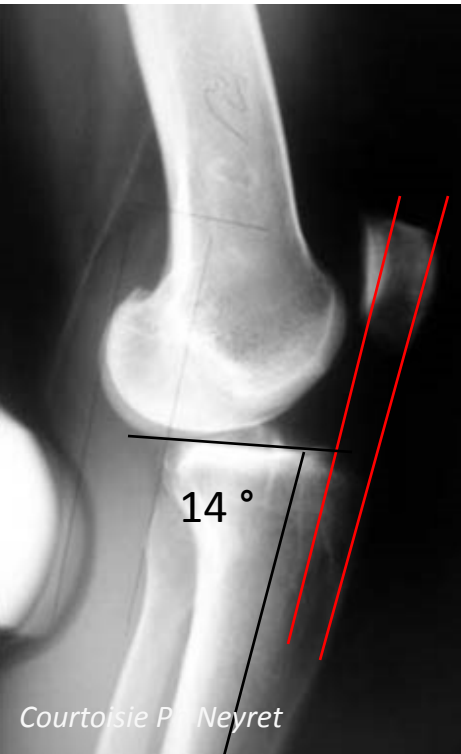
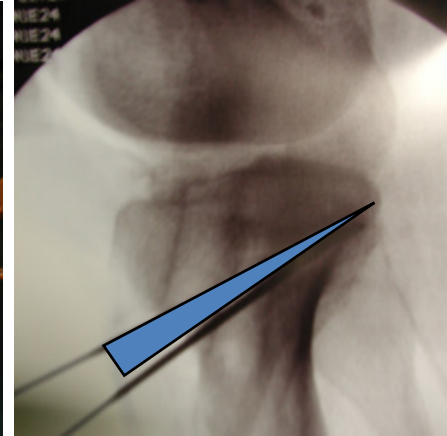
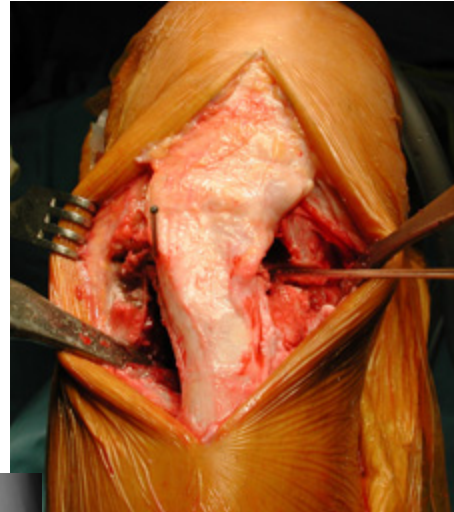
Excessive Tibial slope  
 $> 13^{\circ}$



Dejour D, Kuhn A, Dejour H. Ostéotomie tibiale de déflexion et  
laxité chronique antérieure, à propos de 22 cas. Rev Chir  
Orthop 1998 ; 84 SII : 28-29.22 cas

# ACL reconstruction and tibial slope

Ostéotomie de déflexion  
Pente tibiale excessive > 13°

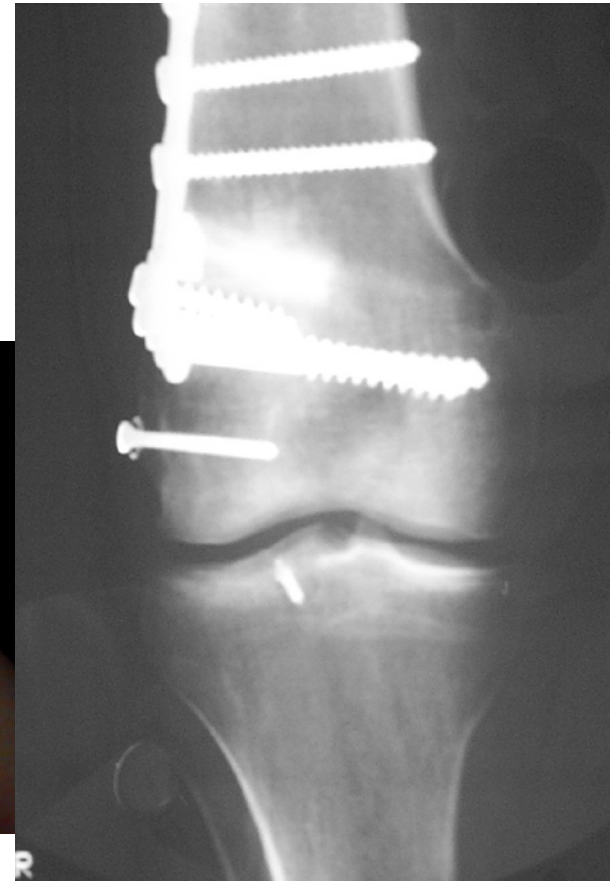


# Intra-articular surgery and osteotomy to protect the knee

Mensicus allograft

Preventive Osteotomy???

Cartilage defect surgery



# HTO in 2015 : literature review

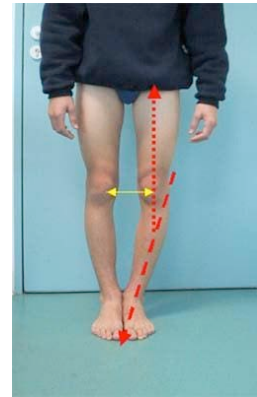
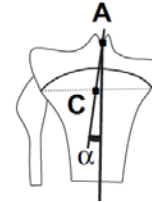
## Survivorship analysis

Author	n=	5 y.	10 y.	15 y.	20 y.
Dubrana France SOO 2007	214	92%	85%		
Flecher, CORR, 2006	372	95%	93%	90%	85%
Tang, Knee, 2005	67	90%	75%	67%	66%
Huang, 2005	93	94%	87%	75%	
Koshino, Knee, 2004	75	97%	96%	93%	
Aglietti, J Knee surg 2003	61	96%	81% at 10 y.	73% at 15 y.	
Sprenger, JBJS Am 2003	76	86%			
Billings, JBJS Am 2000	64	85%	53%		
Jenny, RCO,1998	109	96%	91%	75%	
Coventry, JBJS, 1993	87	89%	75%		

Failure : revision by TKA

# Prognostics factors

- Joint space narrowing  $< 50\%$
  - Constitutional varus  $> 5^\circ$
  - Age  $< 60$  y.
  - Laxity: no or moderate
  - Global Varus  $< 15^\circ$
  - Mobility:  $5^\circ - 100^\circ$  No flexum
- 
- No osteophytes
  - No obese patients
  - Evolution less than  $< 24$  months



Vielpeau, SOFCOT 1991  
 Lootwoet, RCO, 1993  
 Koshino, Knee, 2004  
 Tang, Knee, 2005  
 AAOS guide lines 2000

Spahn, Osteoarthritis and Cartilage, 2006



# Correction Value /Axis

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Better Results with overcorrection

Goutallier, *RCO*, 1986

Symposium *SOFCOT*, 1991 (Segal)

Lootwoet L., *RCO*, 1993

Koshino T, *Knee*, 2004

**3° à 6° de valgus**

Yasuda, *CORR*, 1992

Majima , *CORR*, 2000

Amendola, *Arthroscopy*, 2003

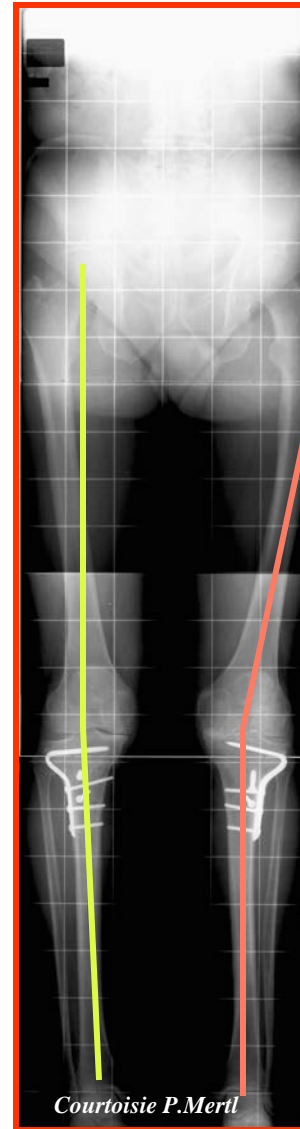
Sprenger, *JBJS Am*, 2003

Aglietti, *J Knee surg*, 2003

Williams, *Current Orthopaedics*, 2006

**10° à 16° de valgus anatomique  
(angle fémoro-tibial)**

*Amendola = 3° à 5° de valgus  
mécanique*

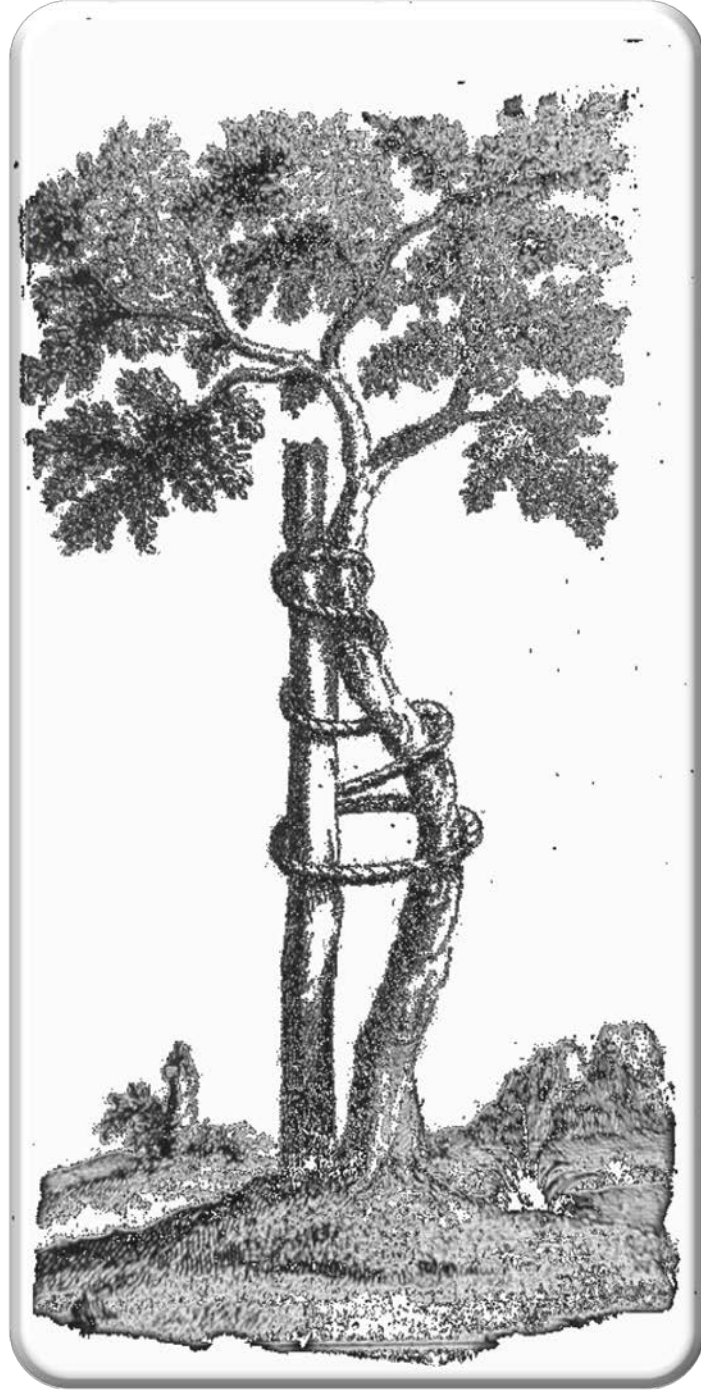




# Conclusion

- HTO for medial osteoarthritis at 60 y.old is always a good option for the patient with but the incidence is decreased
- HTO in association with meniscal , cartilage and Acl disorders for young active patient is very relevant and efficient.
- There is no indication for preventive osteotomy in excessive asymptomatic significant GVR of the young
- Several techniques but Respect de technique

Vessels, Lateral Hinge





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# L'Arthroscopie

à paraître  
Juin 2015

