Trochlear Dysplasia

David DEJOUR

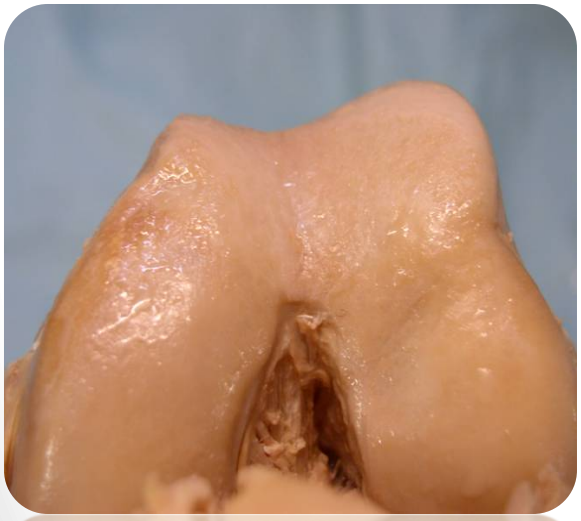
LYONORTHOCLINIC

www.lyon-ortho-clinic.com

LYONORTHOCLINIC

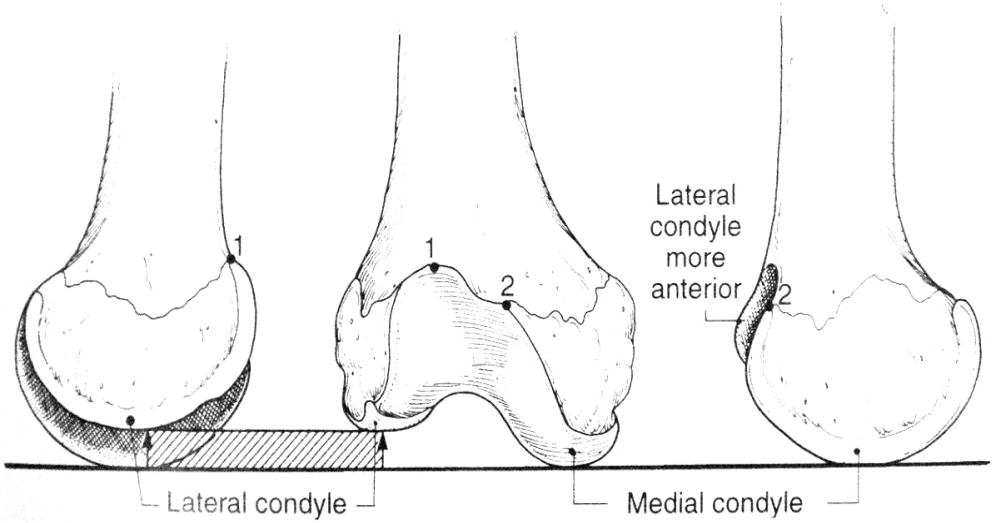
What is the normal trochlear shape and alignment ???

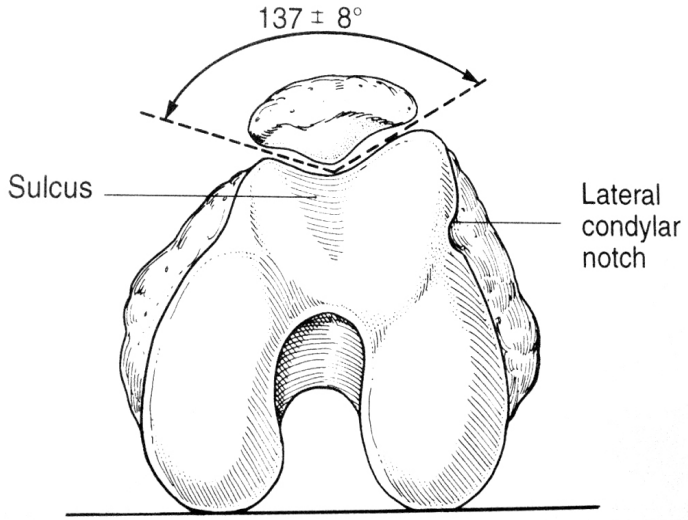
JL Jouve : Genetic definition



Anatomic definition

- **Sulcus angle 137° +/- 8**
- **Lateral condyle higher / medial**
- **Sulcus deepens distally**



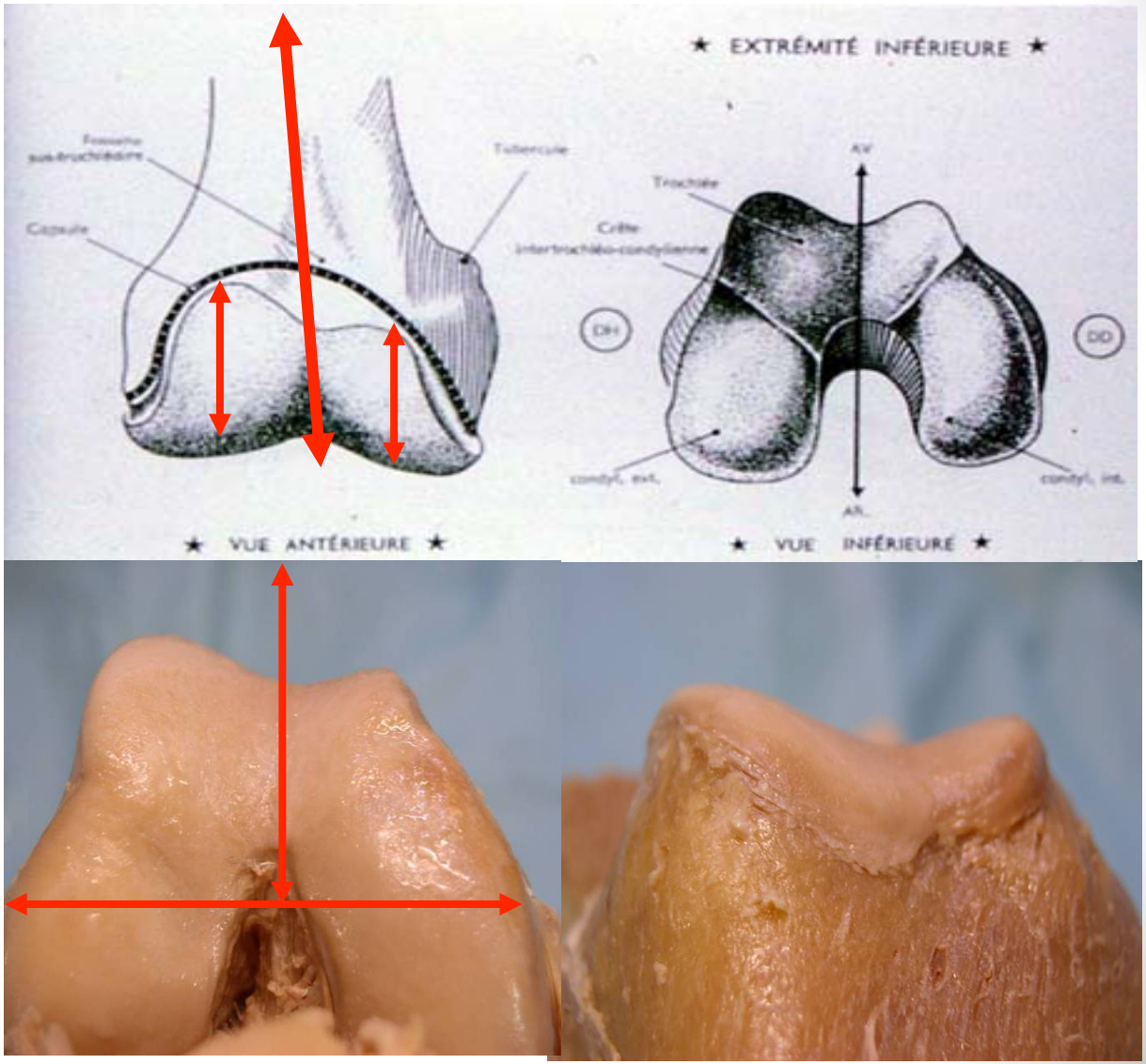


But we don’t know well..

Groove orientation

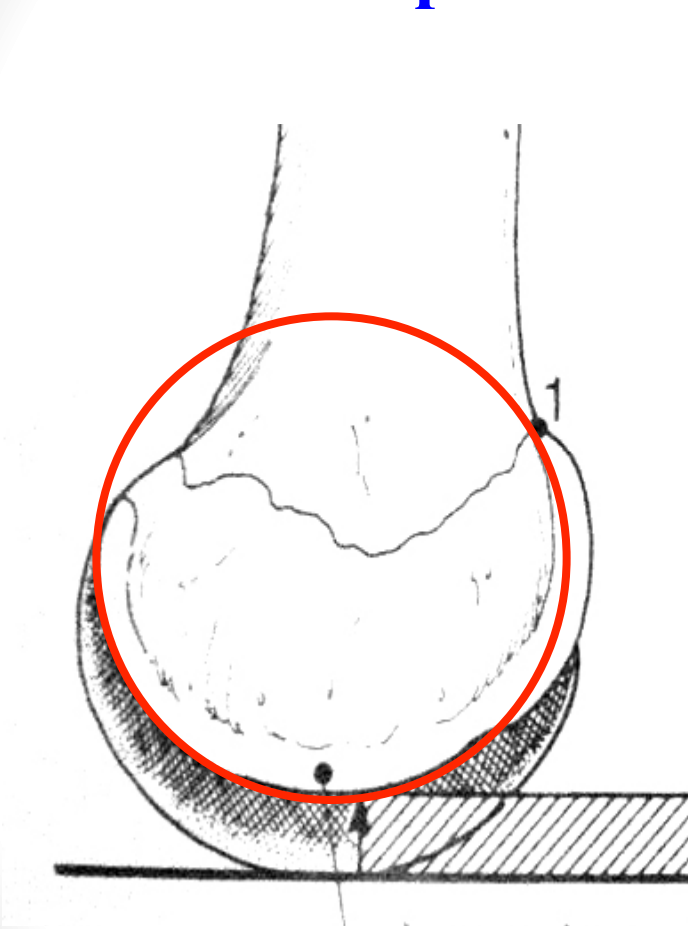
Trochlear length

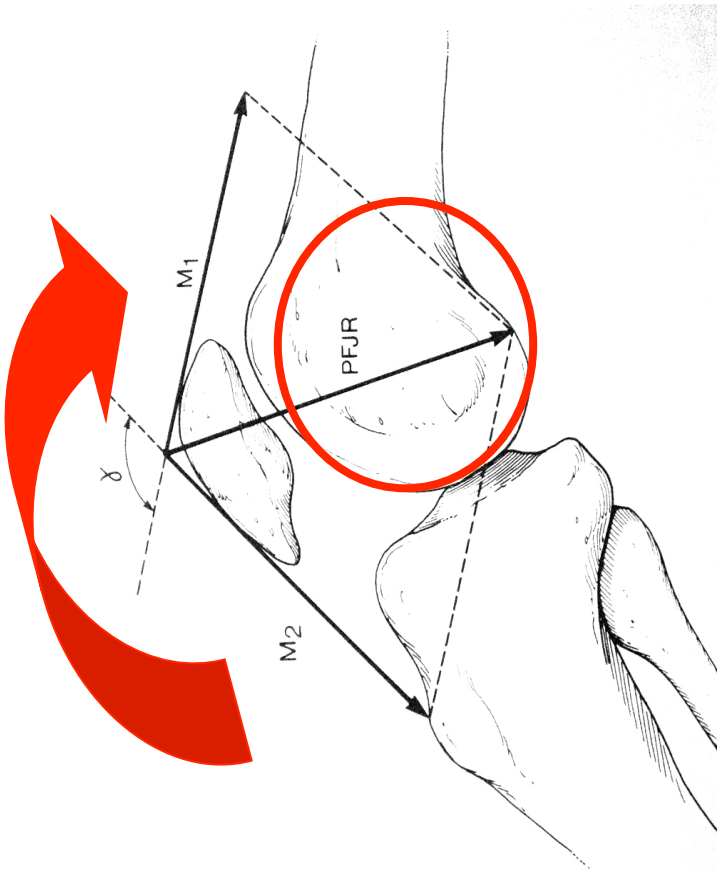
Medio-lateral position

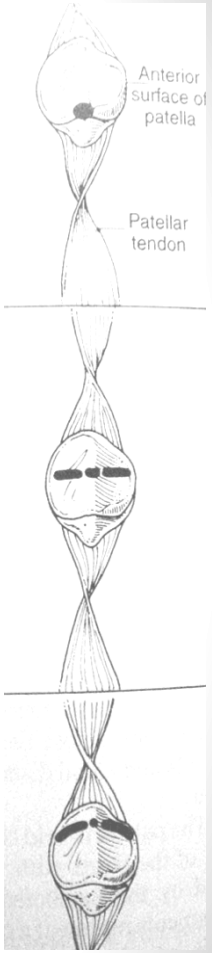


we don’t know Better..

Iranpour F. & Amis A. 2011 ISAKOS





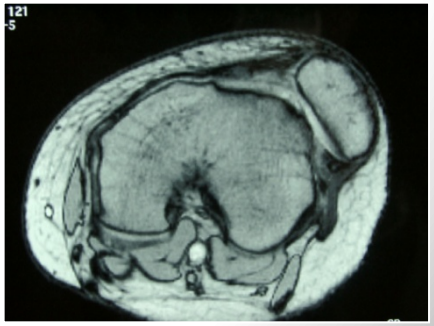


Condyle curvature and Trochlear anatomy

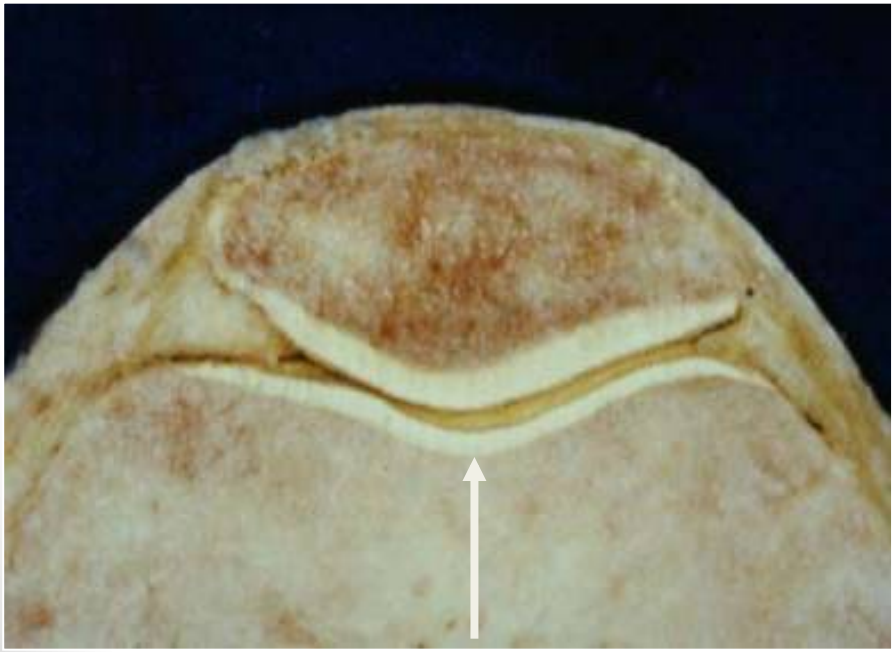
Patellofemoral stability

Bony & cartilage congruence

Soft tissue integrity

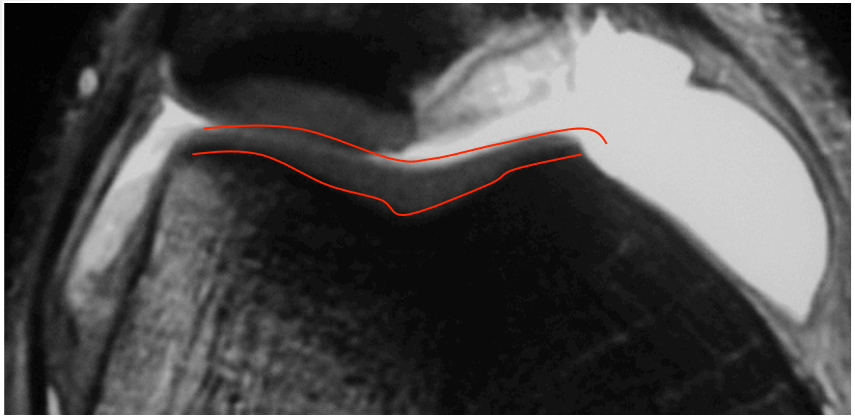


Bone – Cartilage Matching ?



Not perfect correspondence between cartilage and bone

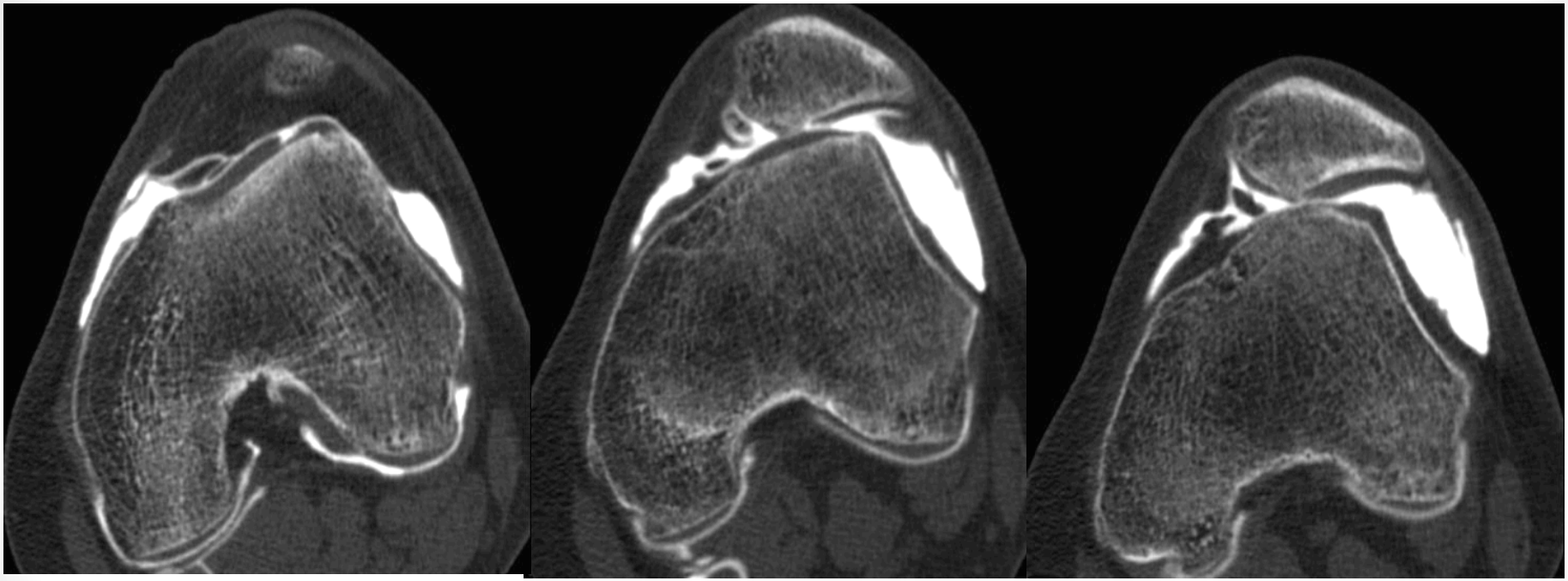
Bone – Cartilage ?



Cartilage
Thickness
May increase a
small dysplasia

If true trochlear
dysplasia
Perfect match between
cartilage & trochlear

Bone – Cartilage ?



If true trochlear dysplasia
Perfect match between
cartilage & trochlear

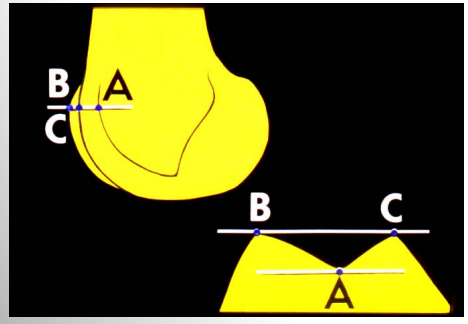
Investigations

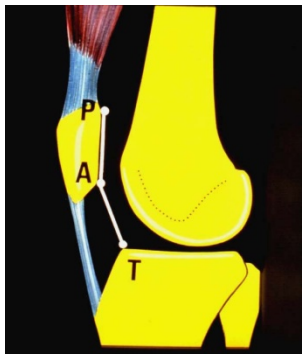
First Visit

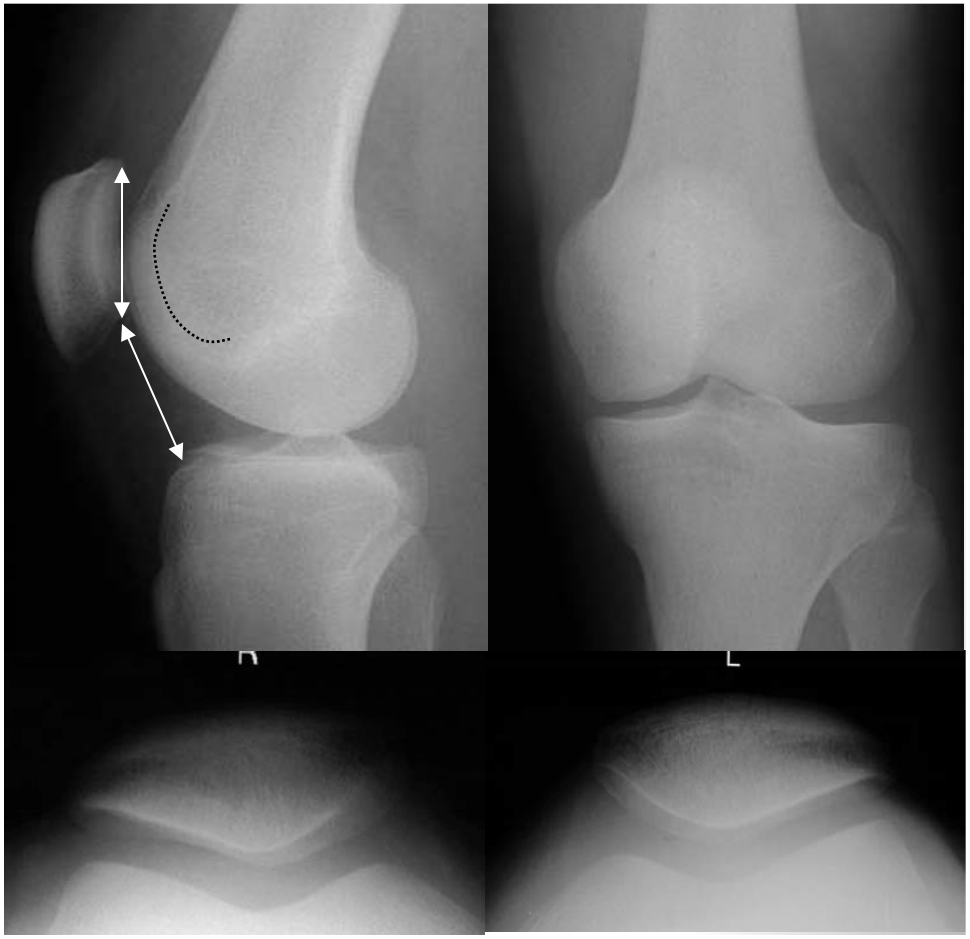
Standard X-Rays are sufficient +++

Check :

- **Trochlear dysplasia**
- **Patella height**





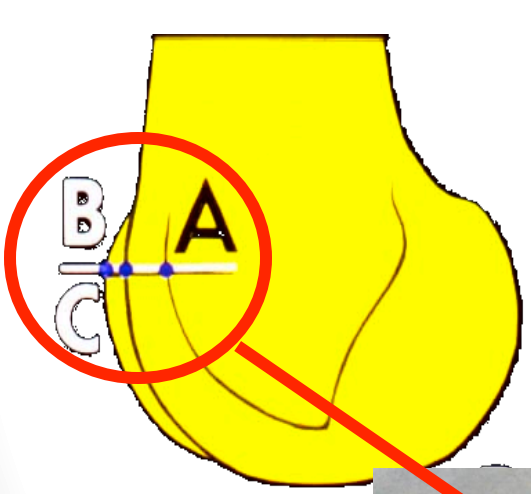


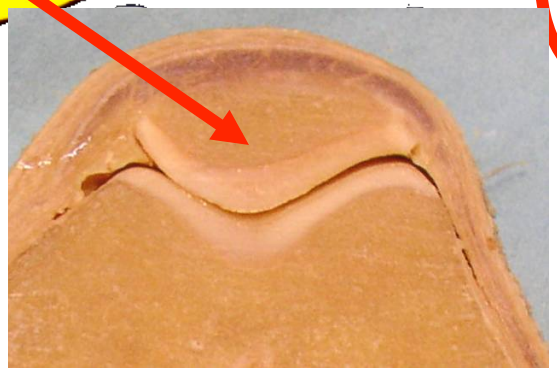
Trochlear dysplasia

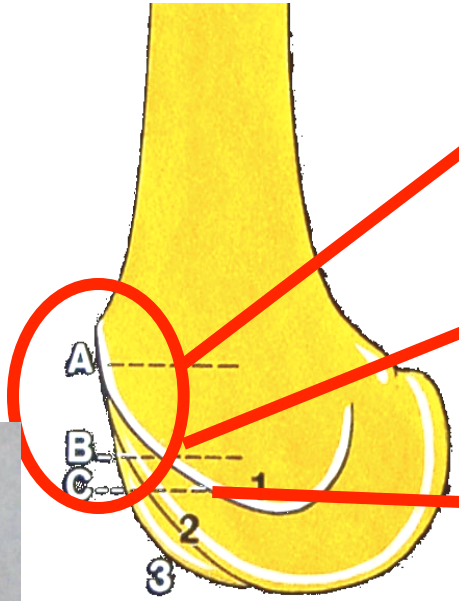
96 % Dislocation population

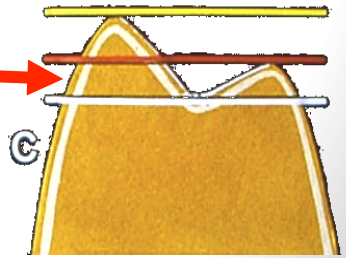
Control
3 % P = 0,001

Crossing Sign (H. Dejour)





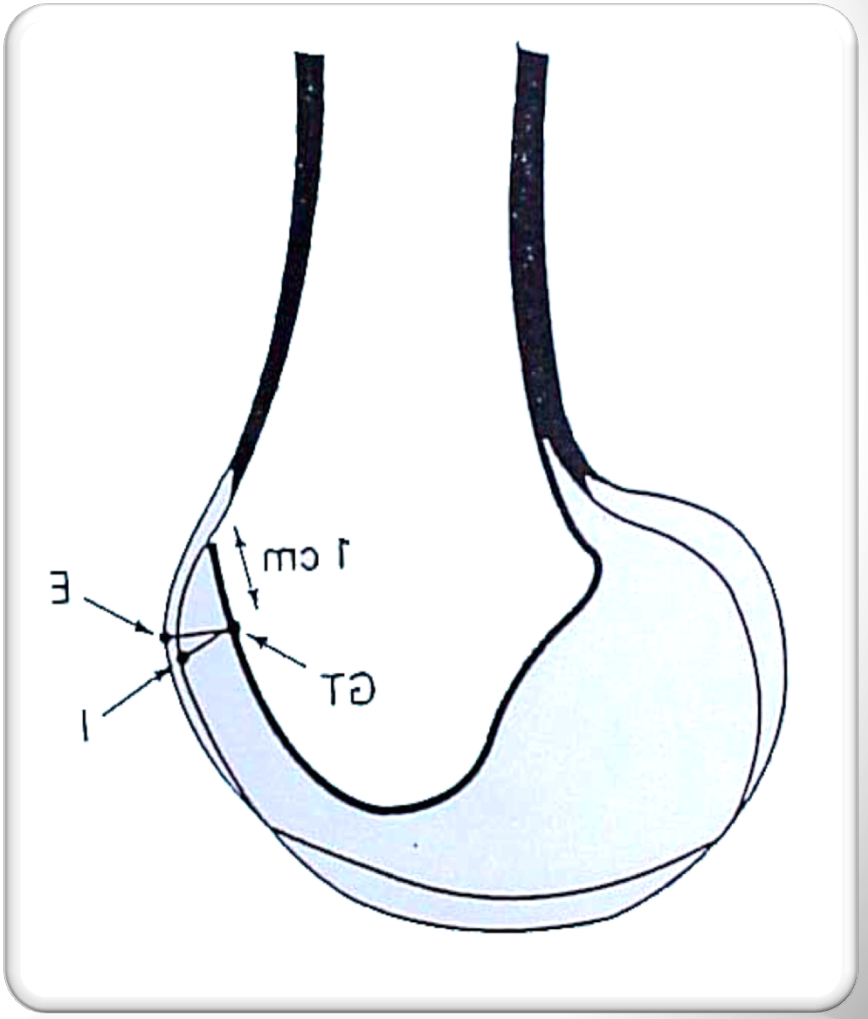


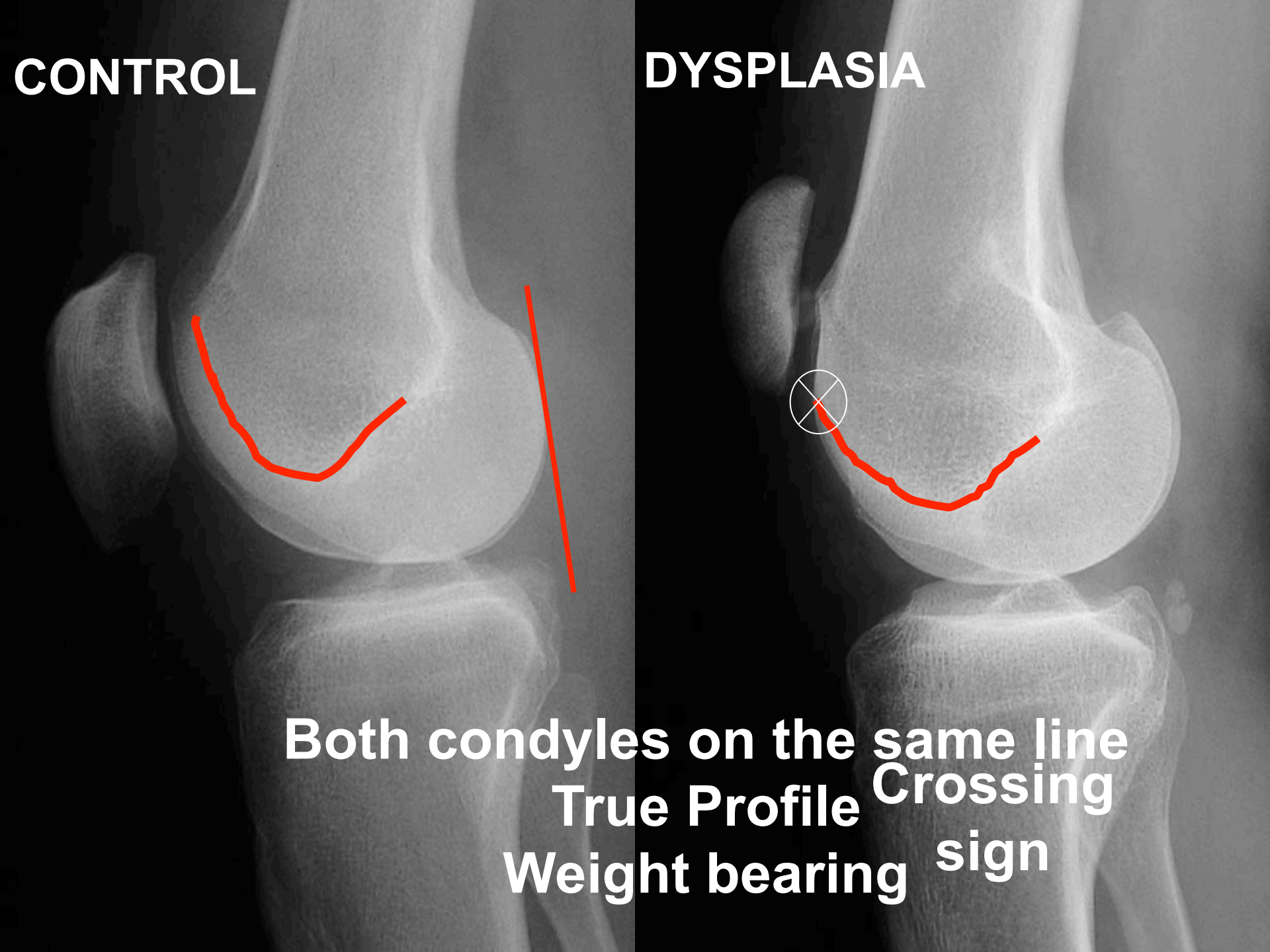


Trochlear dysplasia

Maldague

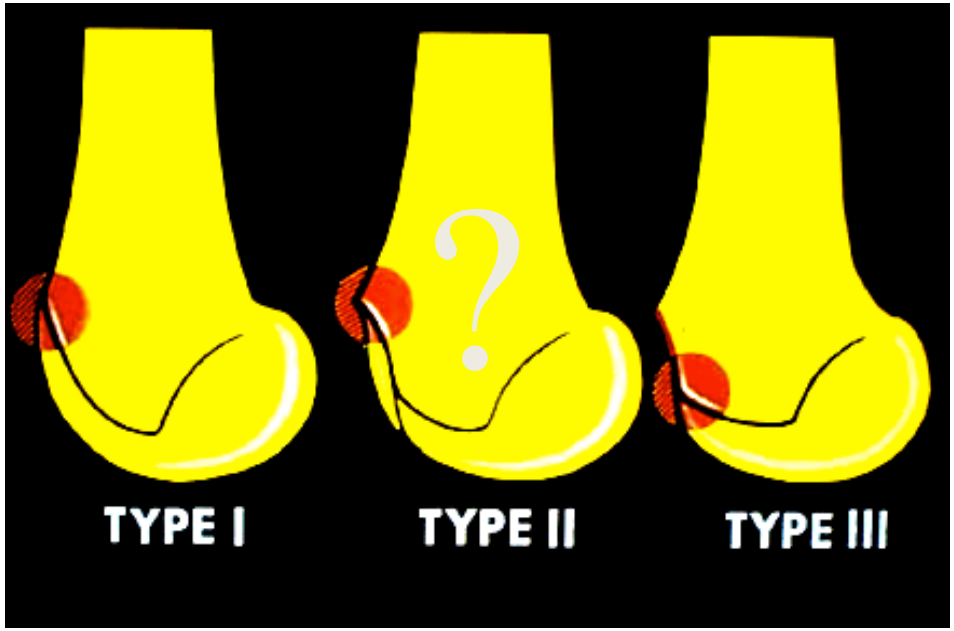
Average deepness = 6 mm
Dysplasia ≤ 5 mm




CONTROL
DYSPLASIA
Both condyles on the same line
True Profile
Weight bearing
Crossing
sign

1987 Classification

H. Dejour ***Rev. Chir. Orthop. Reparatrice Appar. Mot, 1990***



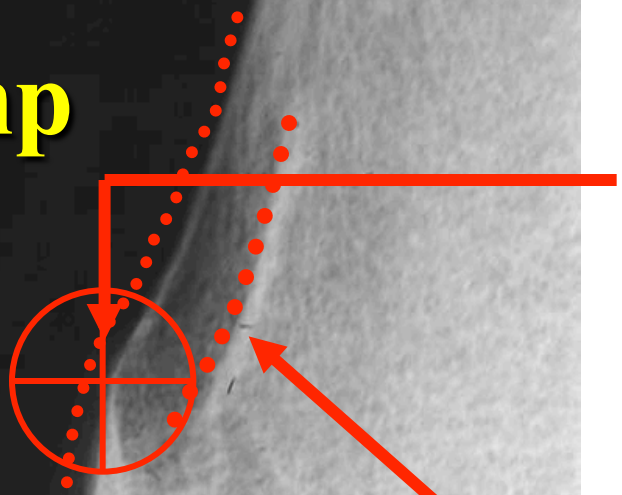
REMY F

Reproducibility of preoperative radiological analysis of dysplasia of the femoral trochlea. Intra- and interobserver analysis of 68 knees.

Rev. Chir. Orthop. Reparatrice Appar. Mot, 1998

3 Grade Dysplasia

Ski Jump



Supra trochlear Crossing Sign

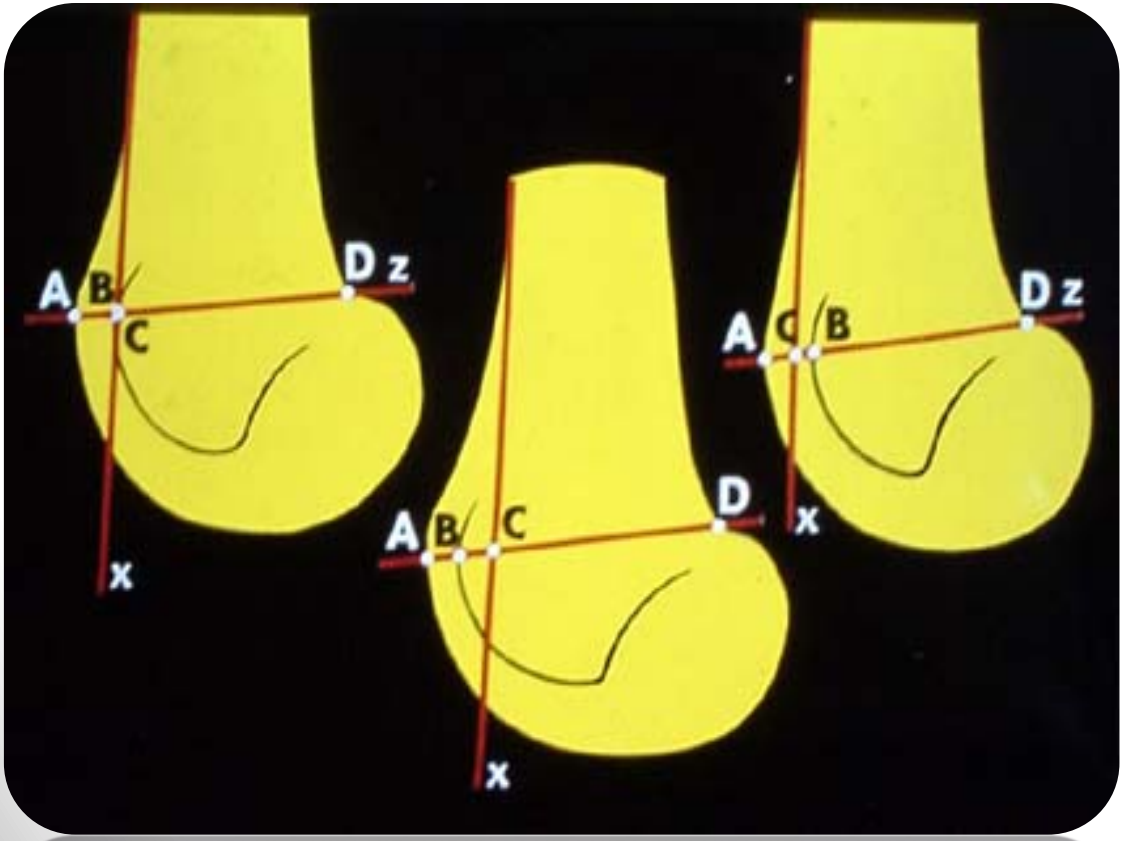
91 %

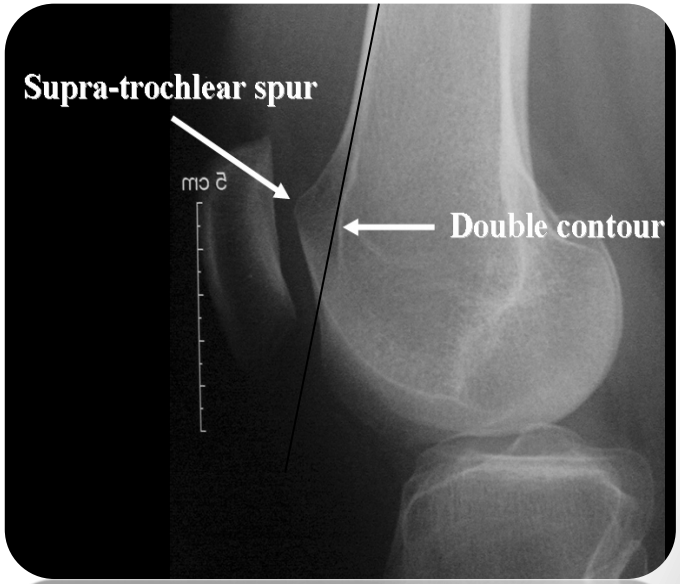
Double Contour (Medial facet)

Classification 4 Grades
X Rays + CT scan

D. Dejour and coll French J.Orthop. 2000
J Radiol 2001,
KSSTA 2006,
Sports Med Arthrosc 2007

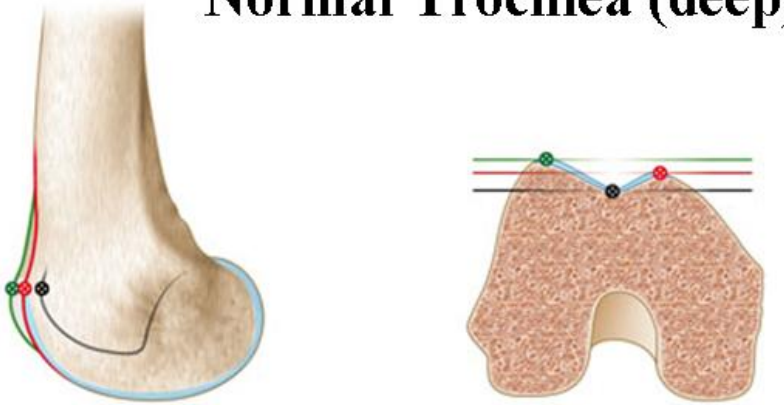
Trochlear prominence
“Bump”





a/

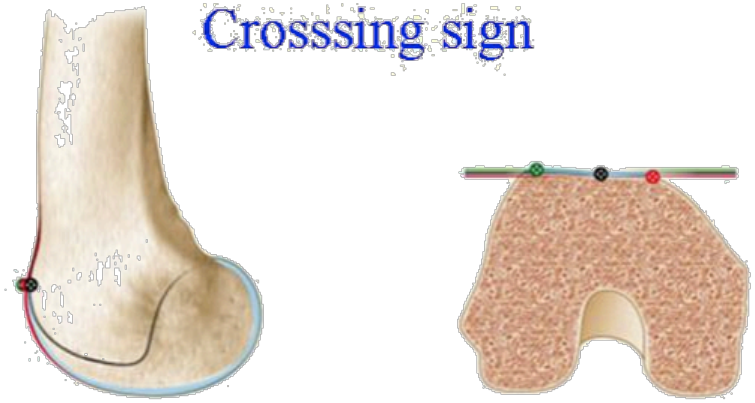
Normal Trochlea (deep)



b/

Flat Trochlea

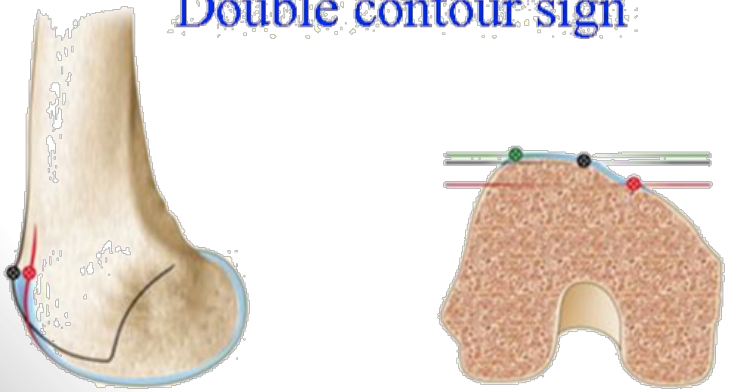
Crosssing sign



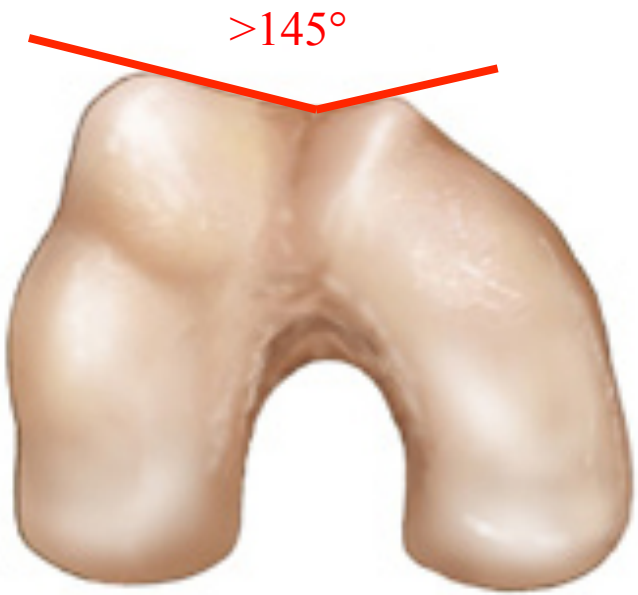
c/

Convex trochlea

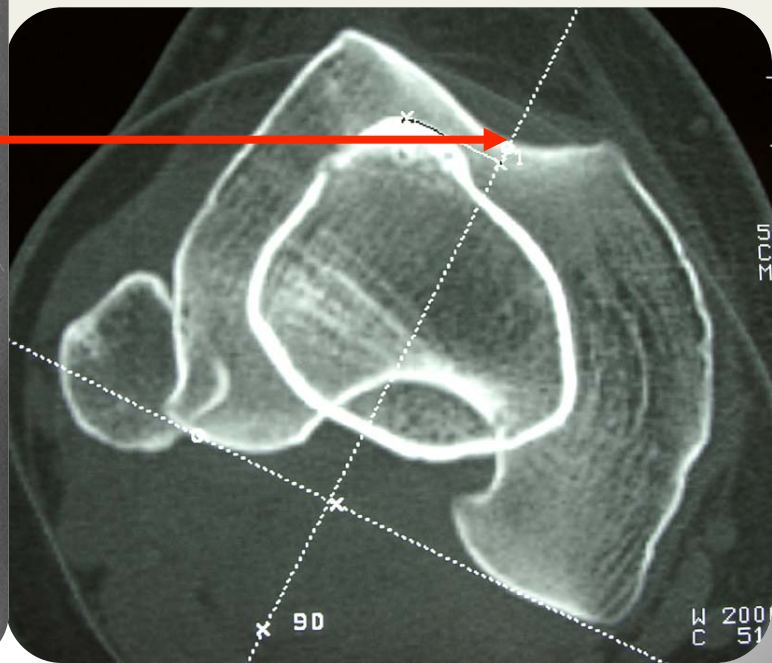
Double contour sign



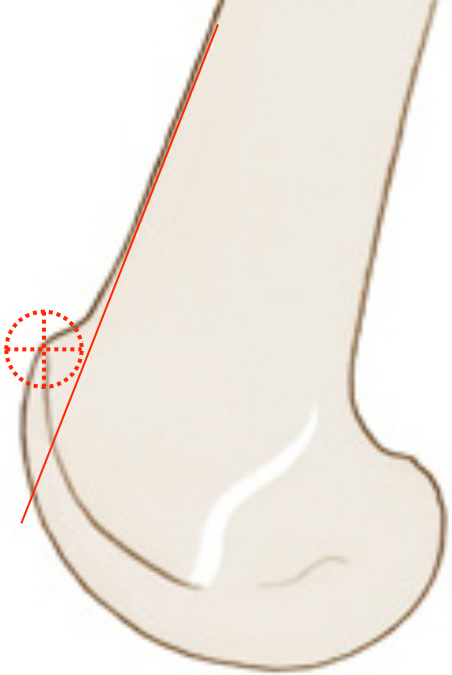
Grade A
54 %



- *Crossing Sign*
- *Shallow trochlea*

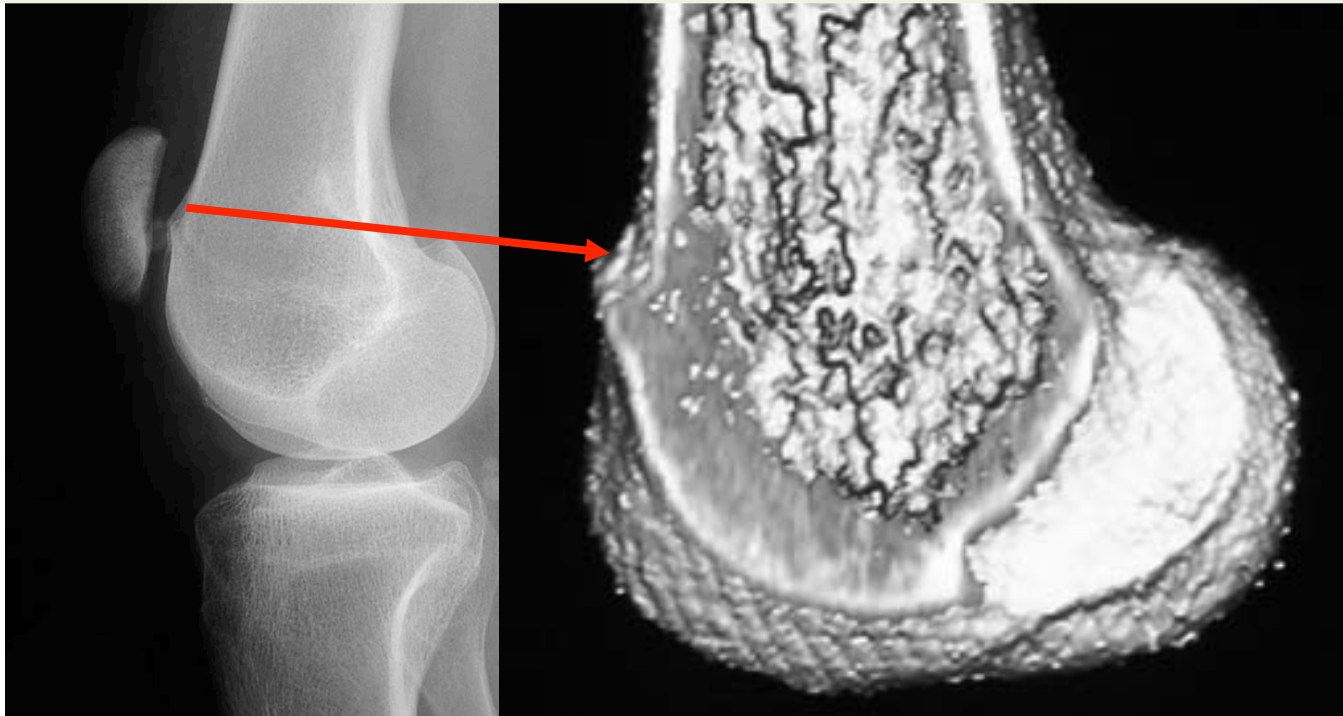


Grade B
17 %

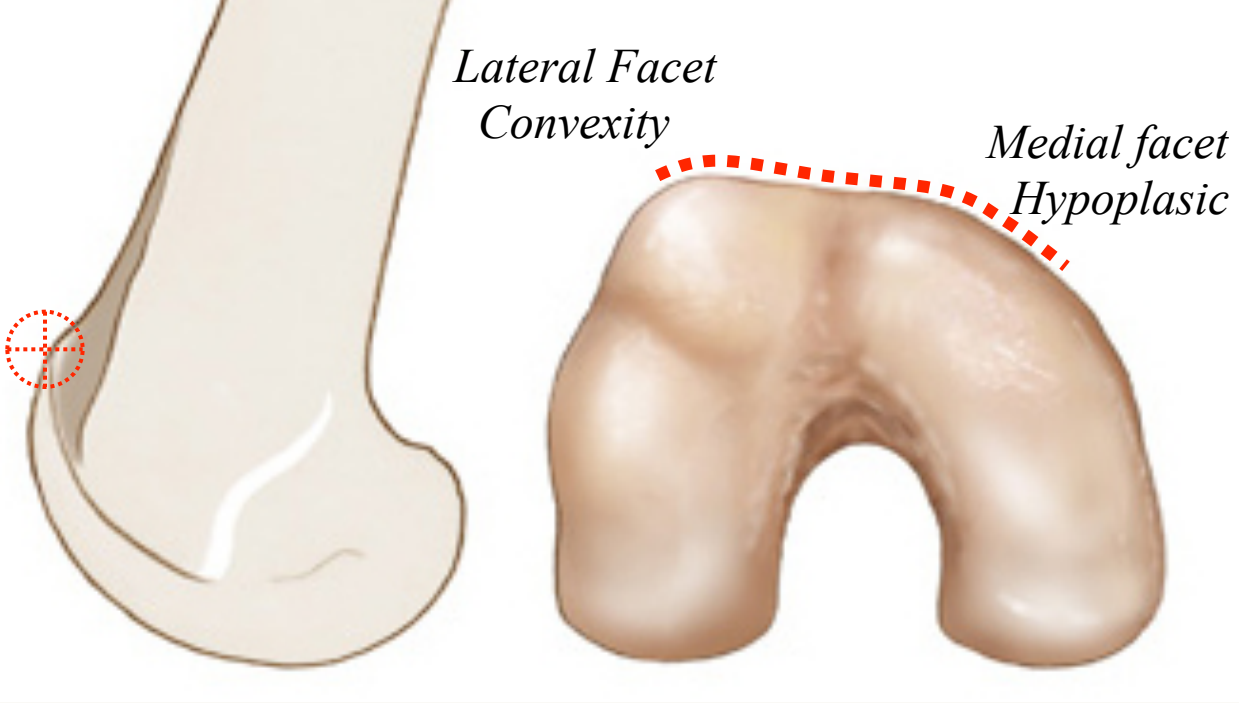


- *Crossing Sign*
- *Flat trochlea*
- *Proeminence +++*

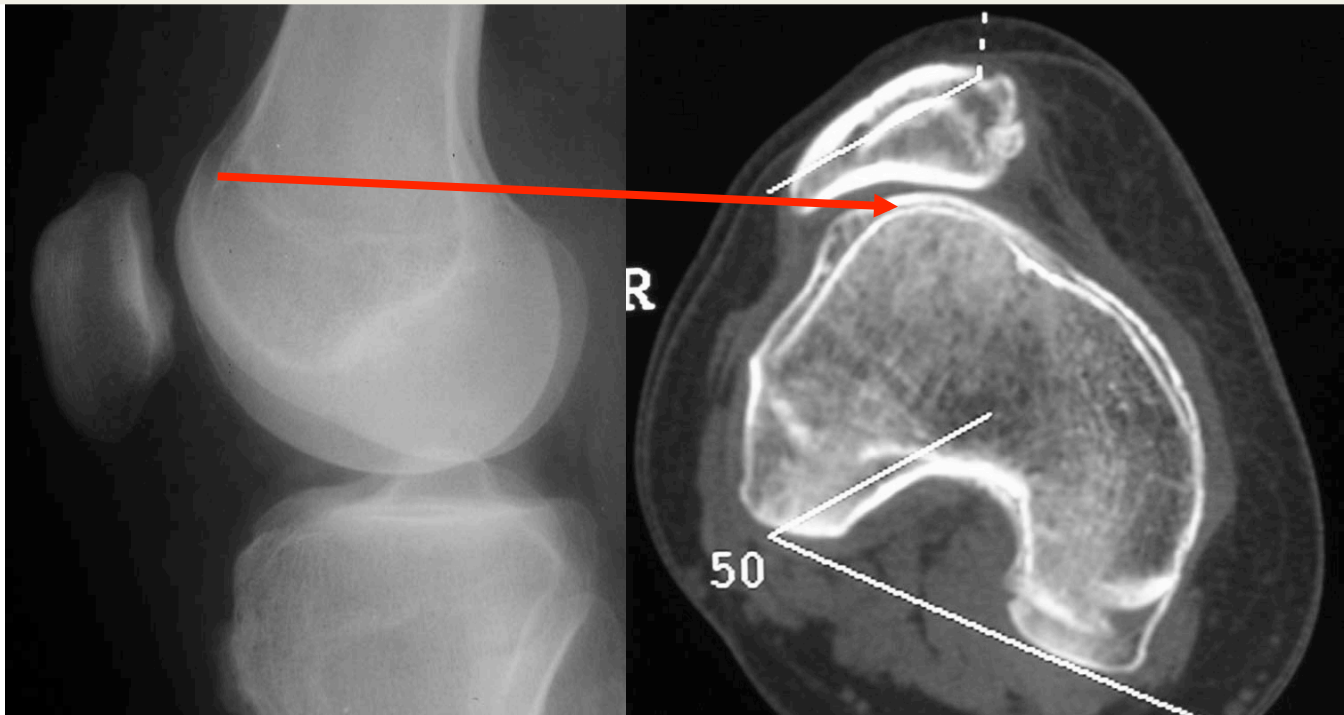
Supra trochlear spur



Grade C
9 %



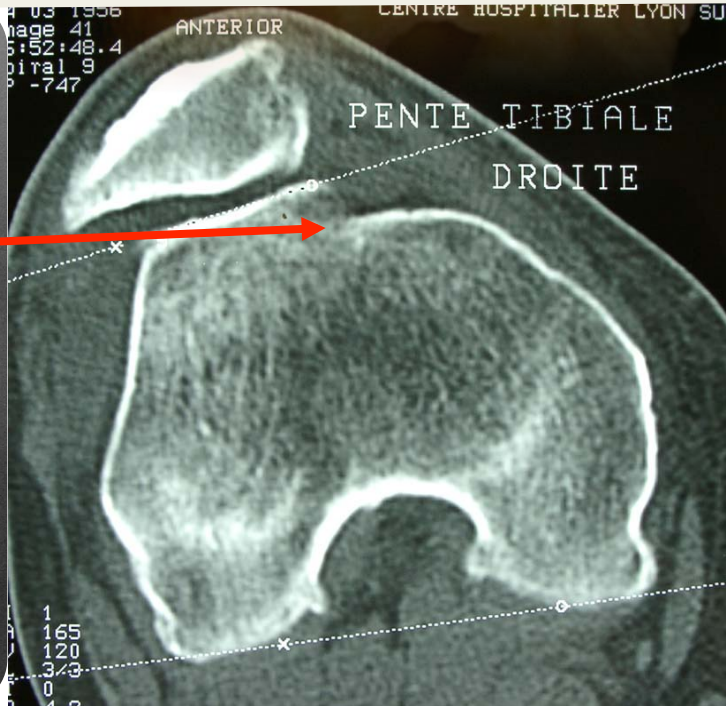
- *Crossing Sign*
- *Double contour*



Grade D
11 %

Cliff Pattern

- *Crossing Sign*
- *Supra trochlear Spur*
- *Double contour*
- *Cliff pattern*



Best statistical correlation

AJSM January 2012

Observer Agreement on the Dejour Trochlear Dysplasia Classification

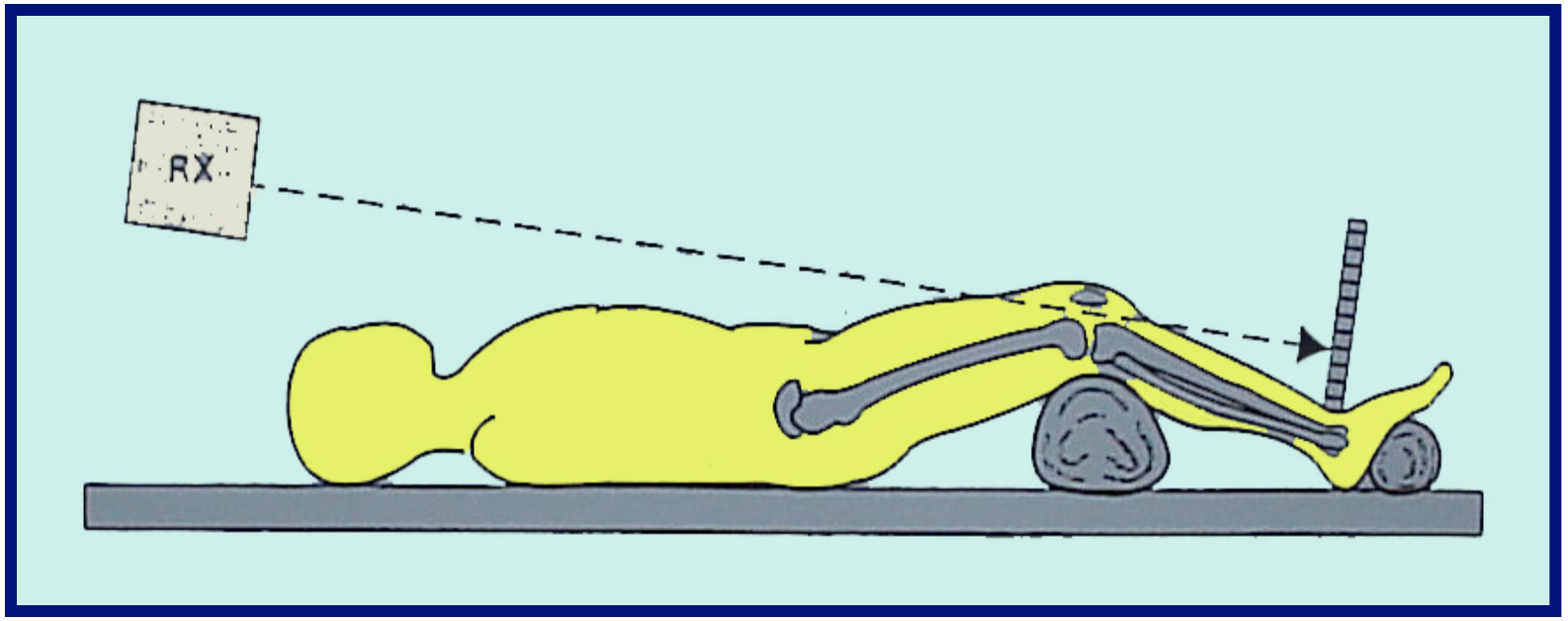
A Comparison of True Lateral Radiographs and Axial Magnetic Resonance Images

Sabine Lippacher,*† MD, David Dejour,‡ MD, Mohammed Elsharkawi,† MD, Daniel Dornacher,† MD, Christina Ring,§ MD, Jens Dreyhaupt,§ MD, Heiko Reichel,† MD, Prof., and Manfred Nelitz,† MD

- Clinical sign $p < 0{,}0015$
- Number of dislocation $p < 0{,}006$
- Residual pain after surgery $p < 0{,}005$

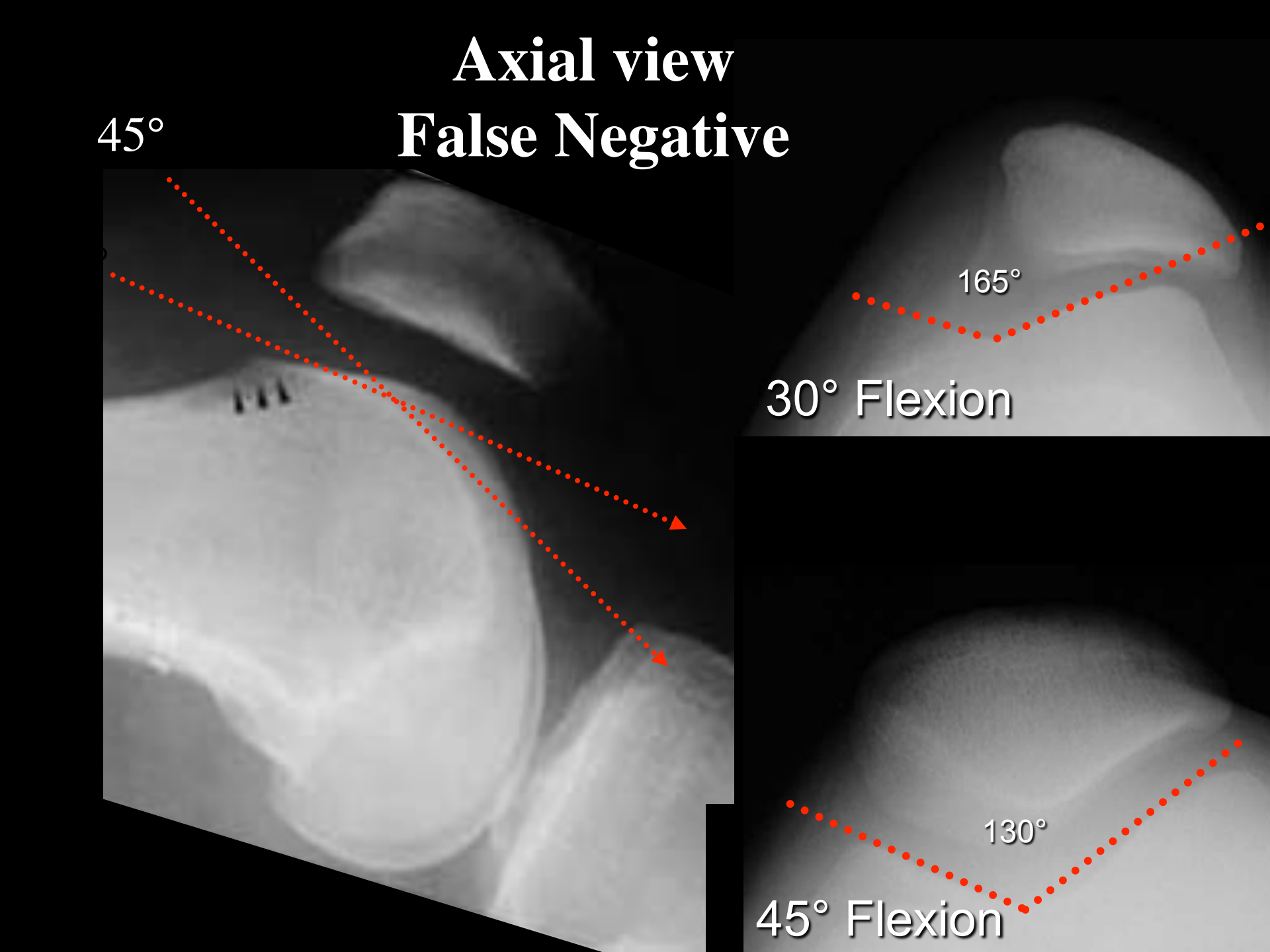
Axial View 30° Flexion

- **Knutsson procedure , Merchant ...**



Shows perfectly the upper part of the trochlea

Axial view
False Negative

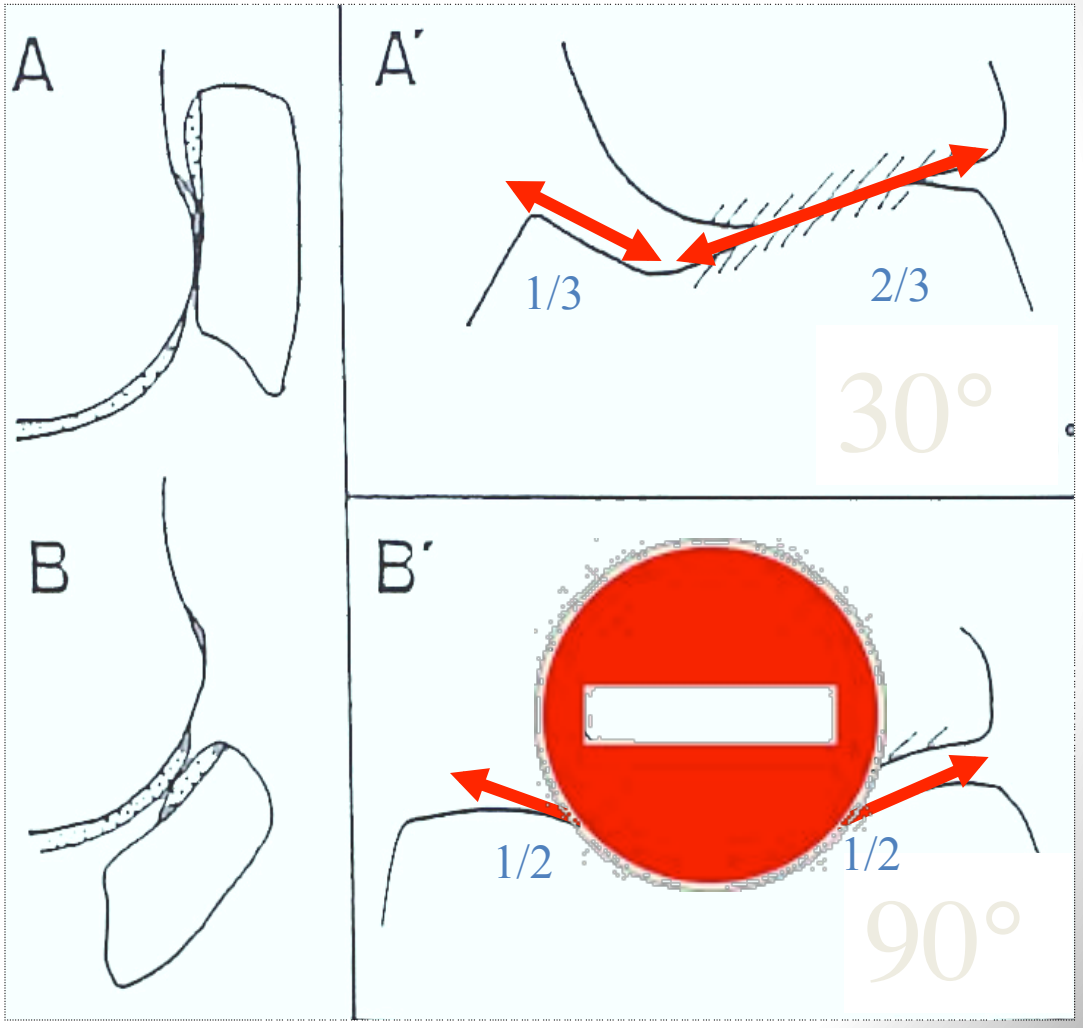


Axial view

Trochlear angle (dysplasia ≥ 150°)

How to recognize a good axial view ?

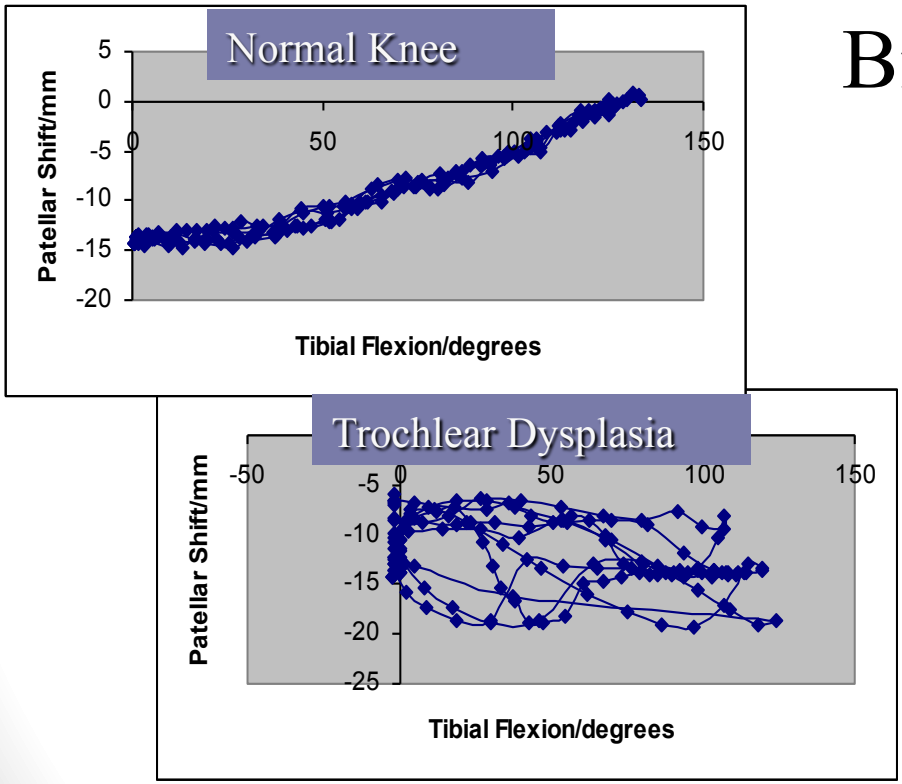
Flexion angle 30° !!!



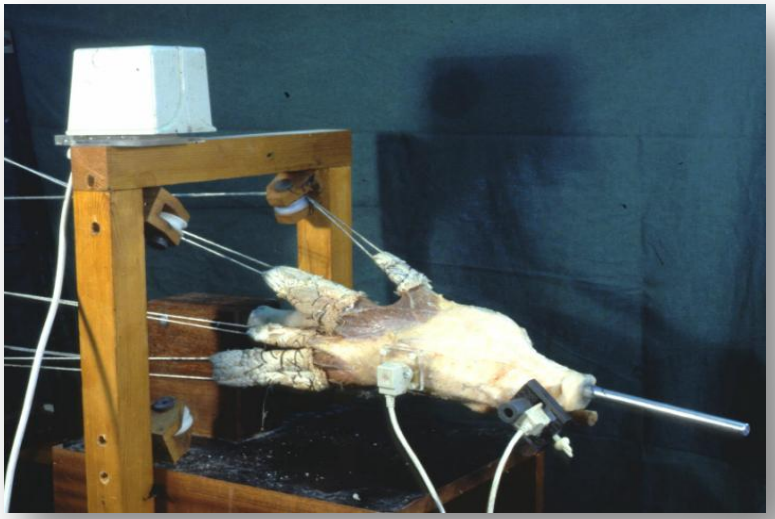
What are the consequence of a trochlear dysplasia ?

Erratic Patellar medio-lateral tracking

A A Amis, C Oguz , A M J Bull, W Senavongse, D Dejour
JBJS 2008



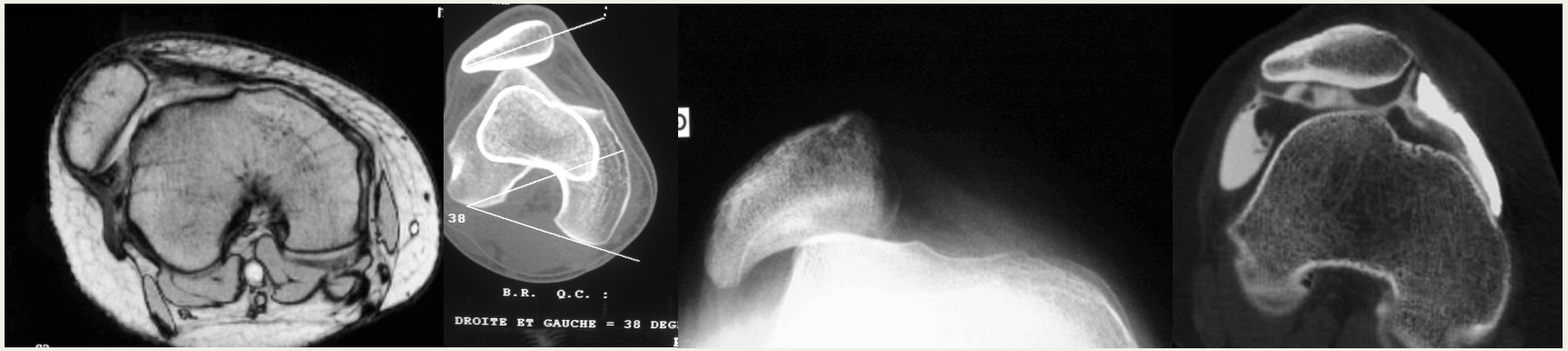
Biomechanical effect on patellar tracking



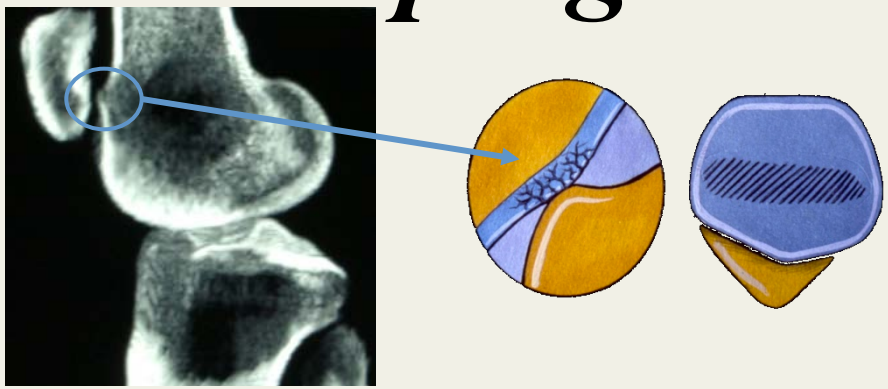
A Amis : Imperial College London (UK)

High grade Trochlear dysplasia

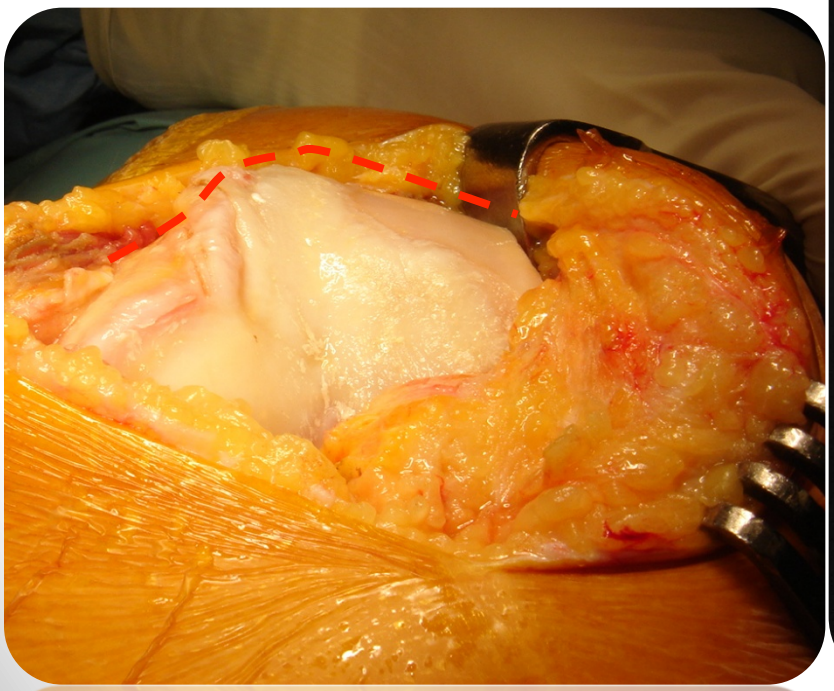
Maltracking : Horizontal plane

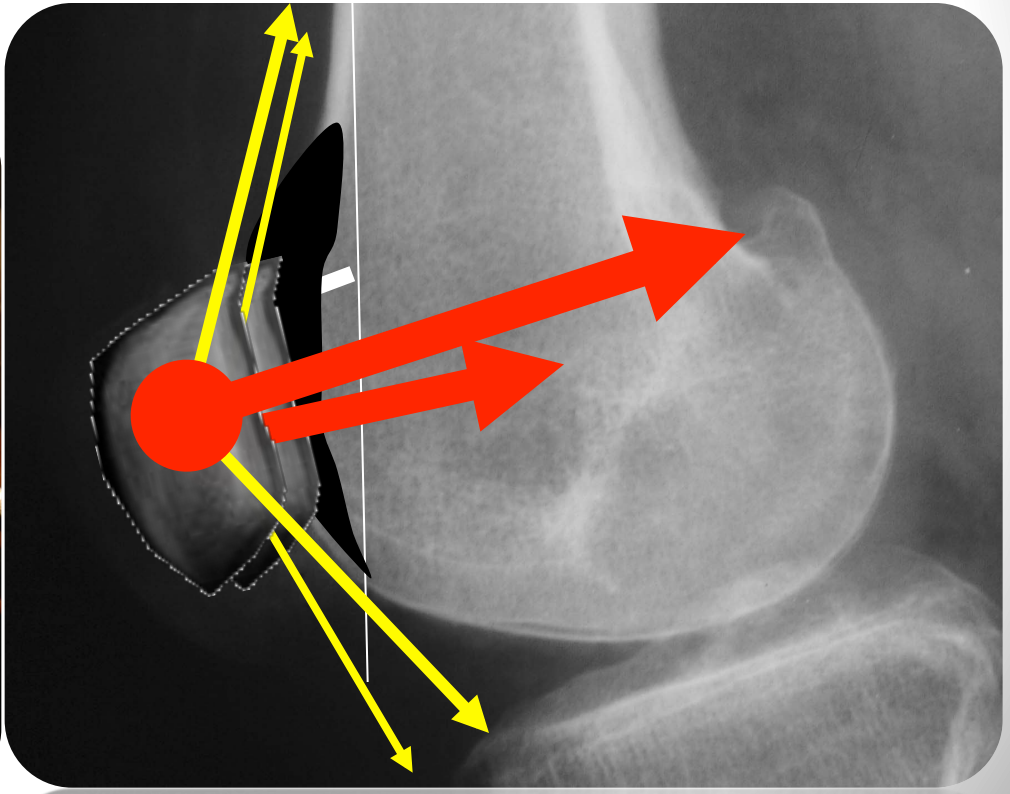


Impingement : Sagittal plane



Trochlear Prominence increases compression forces : Anti Maquet effect





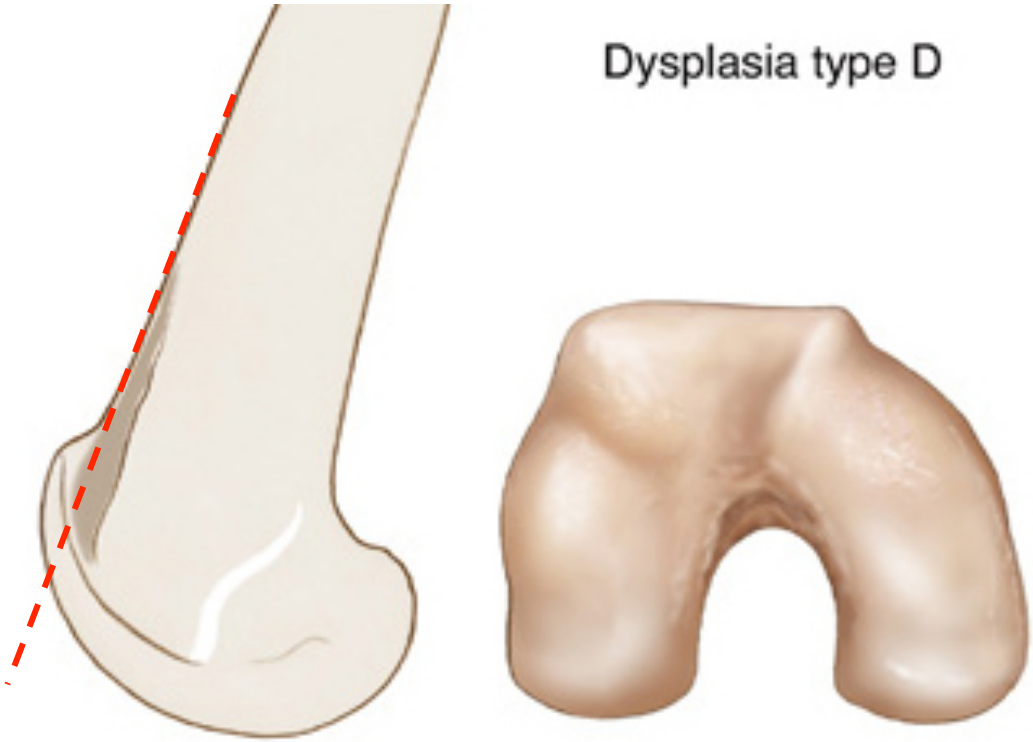
Isolated PF Arthritis

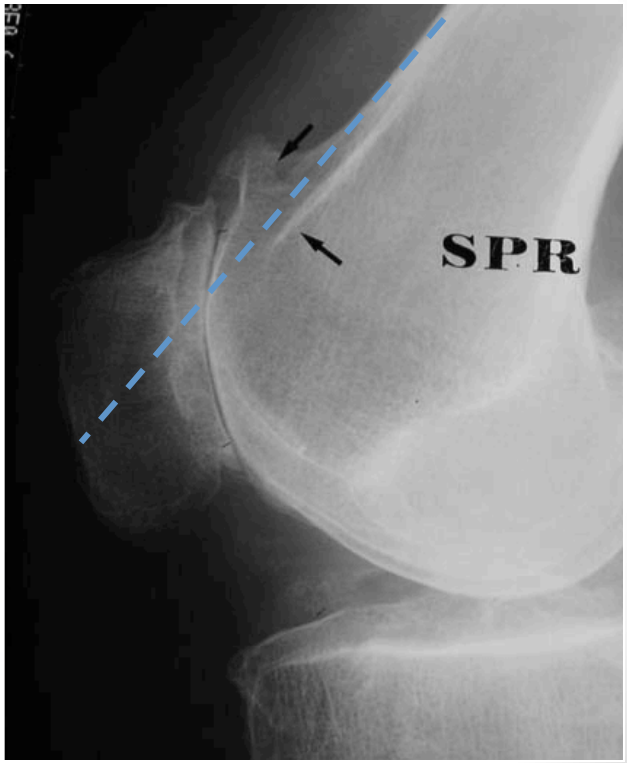
D.Dejour, J. Allain & All
French Journal Orthop 2003

Trochlear dysplasia 78 %

P<0,0059

Anti Maquet effect

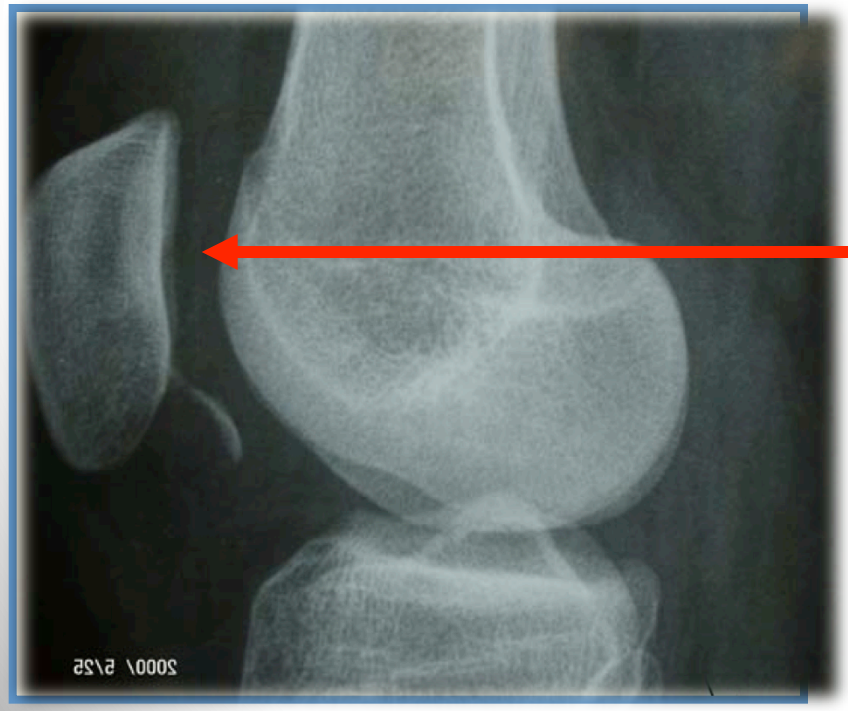


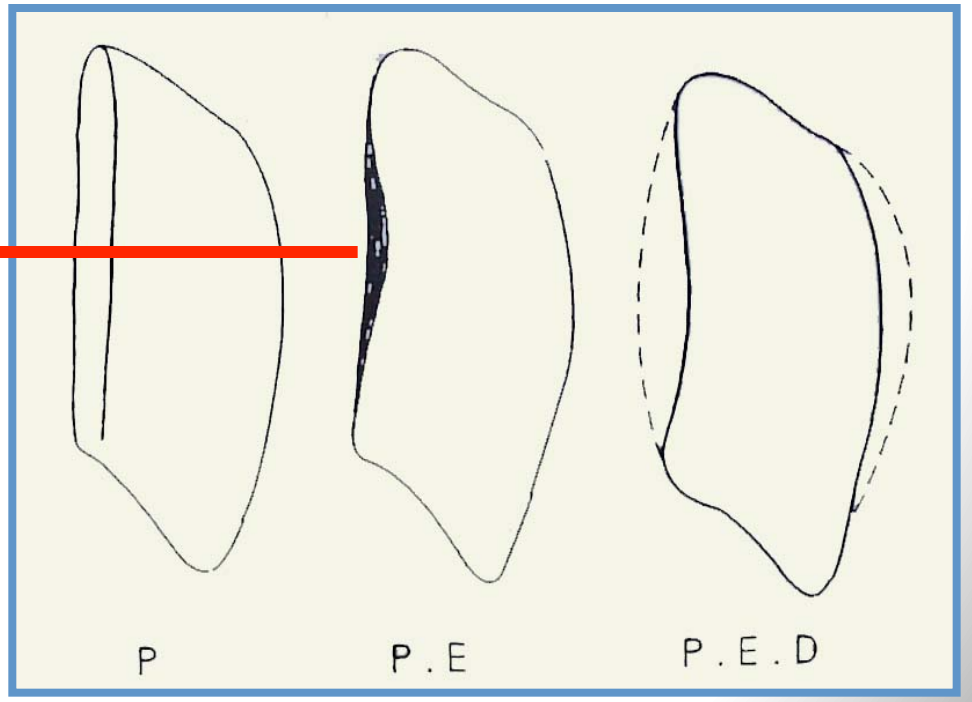


Note : Control population 3 % Patellar instability pop. 96 %

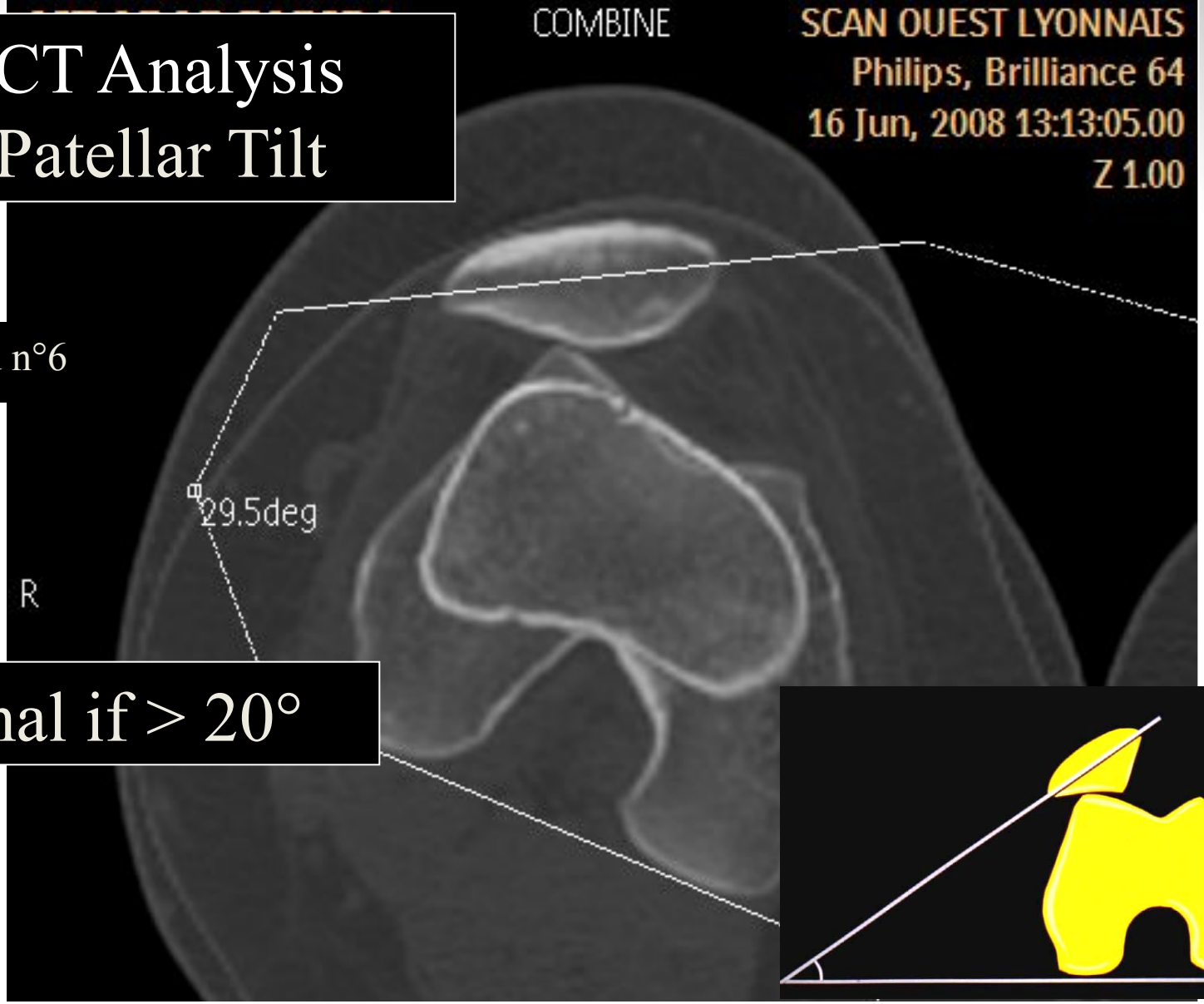
Patellar tilt

(Maldague, Malghem)



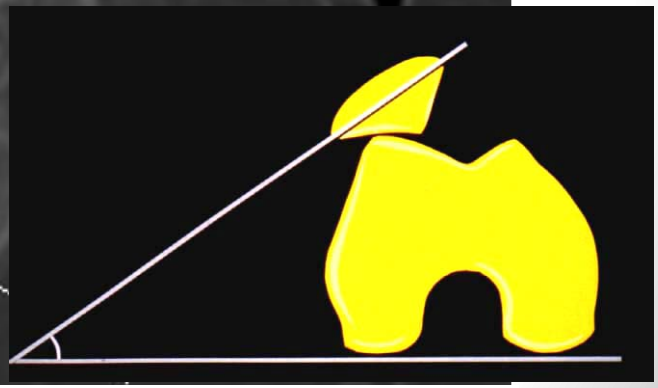


CT Analysis
Patellar Tilt

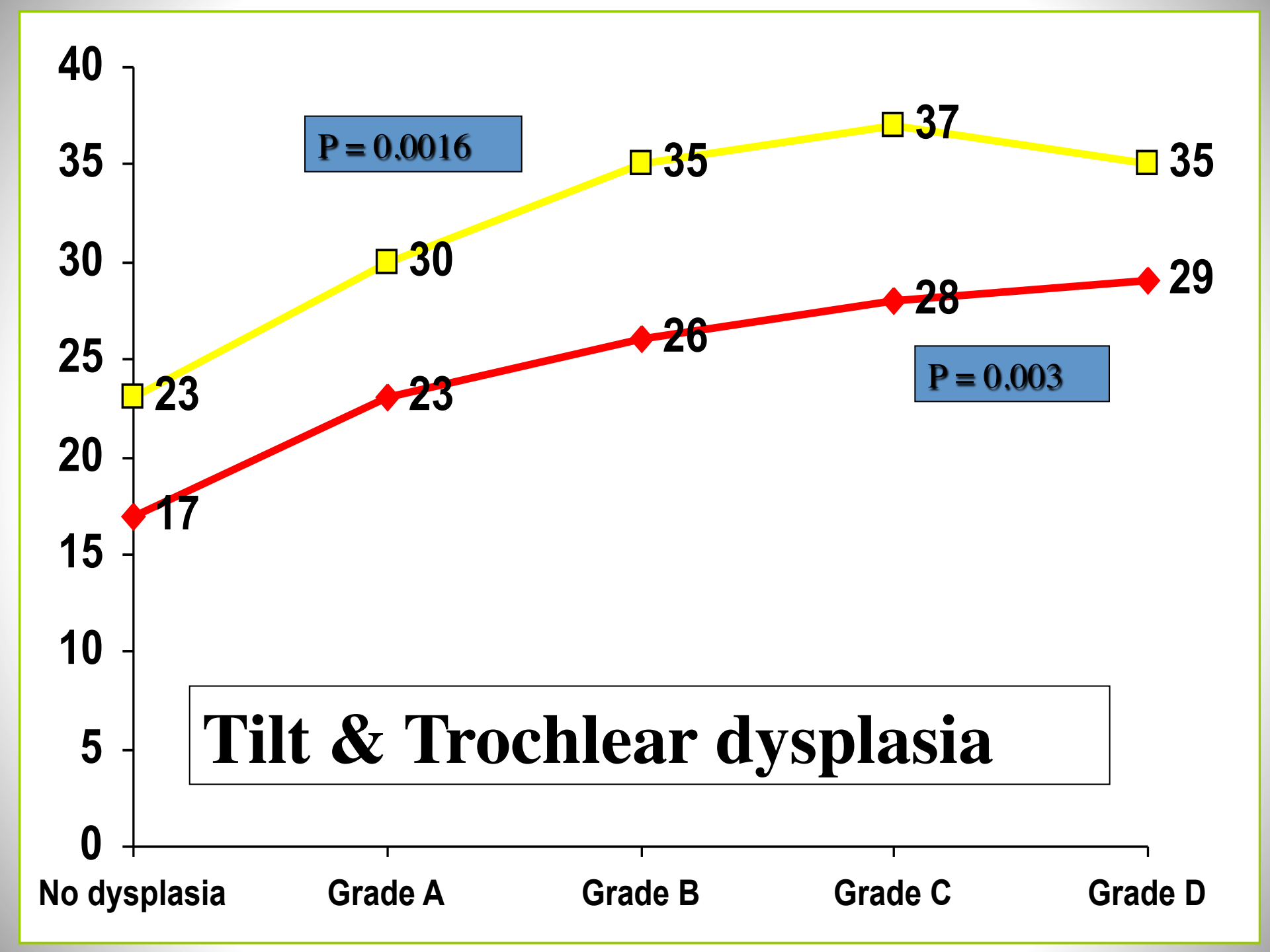


slices n°2 and n°6

Abnormal if > 20°



With and Without quadriceps contraction

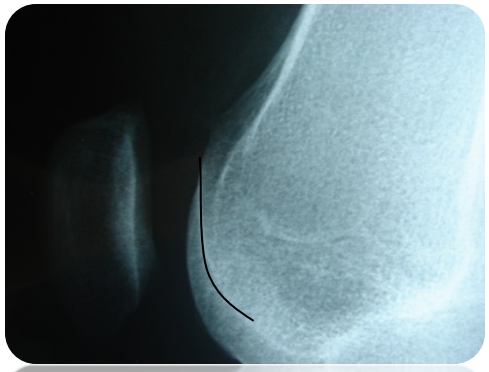

40
35
30
25
20
15
10
5
0
P = 0.0016
23
30
35
37
35
17
23
26
28
29
P = 0.003
Tilt & Trochlear dysplasia
No dysplasia
Grade A
Grade B
Grade C
Grade D

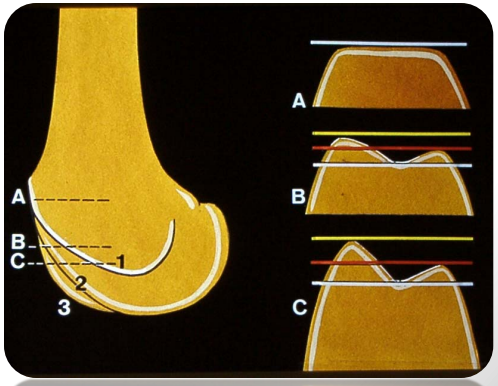
Conclusion

Trochlear dysplasia is THE MAIN factor for patellar instability

96% in dislocation group !!!!

True lateral view THE CROSSING SIGN





TWO ways to Know more about…