Radiography of Osteoarthritic Knees

Simon Hook
Senior Radiographer,

Nuffield Orthopaedic Centre, (the “NOC”)

- **The Oxford Knee**

- **Pattern of OA**
- **Lateral view**
- **Skyline view**
- **Rosenberg or Fixed Flexion views**

- **The OSSKAR device – Stress views**
- **The Oxford Knee – Aligned views**

The Oxford Knee

Uni-compartmental replacement

40 years

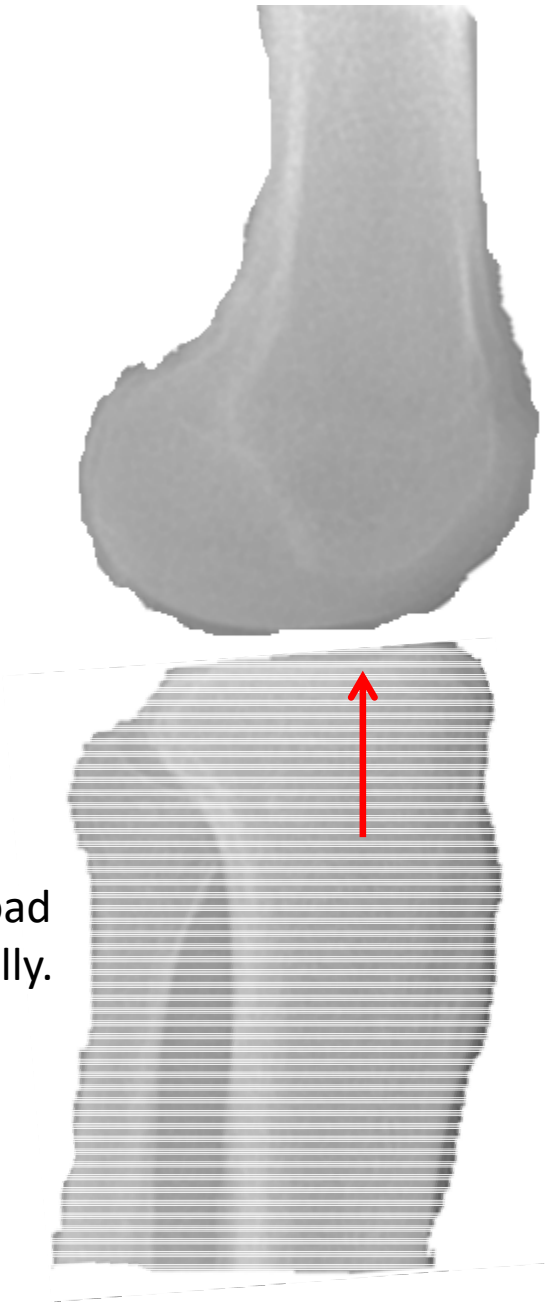
1,000,000+ Worldwide

- Quicker Recovery
- Better Outcome
- Day cases

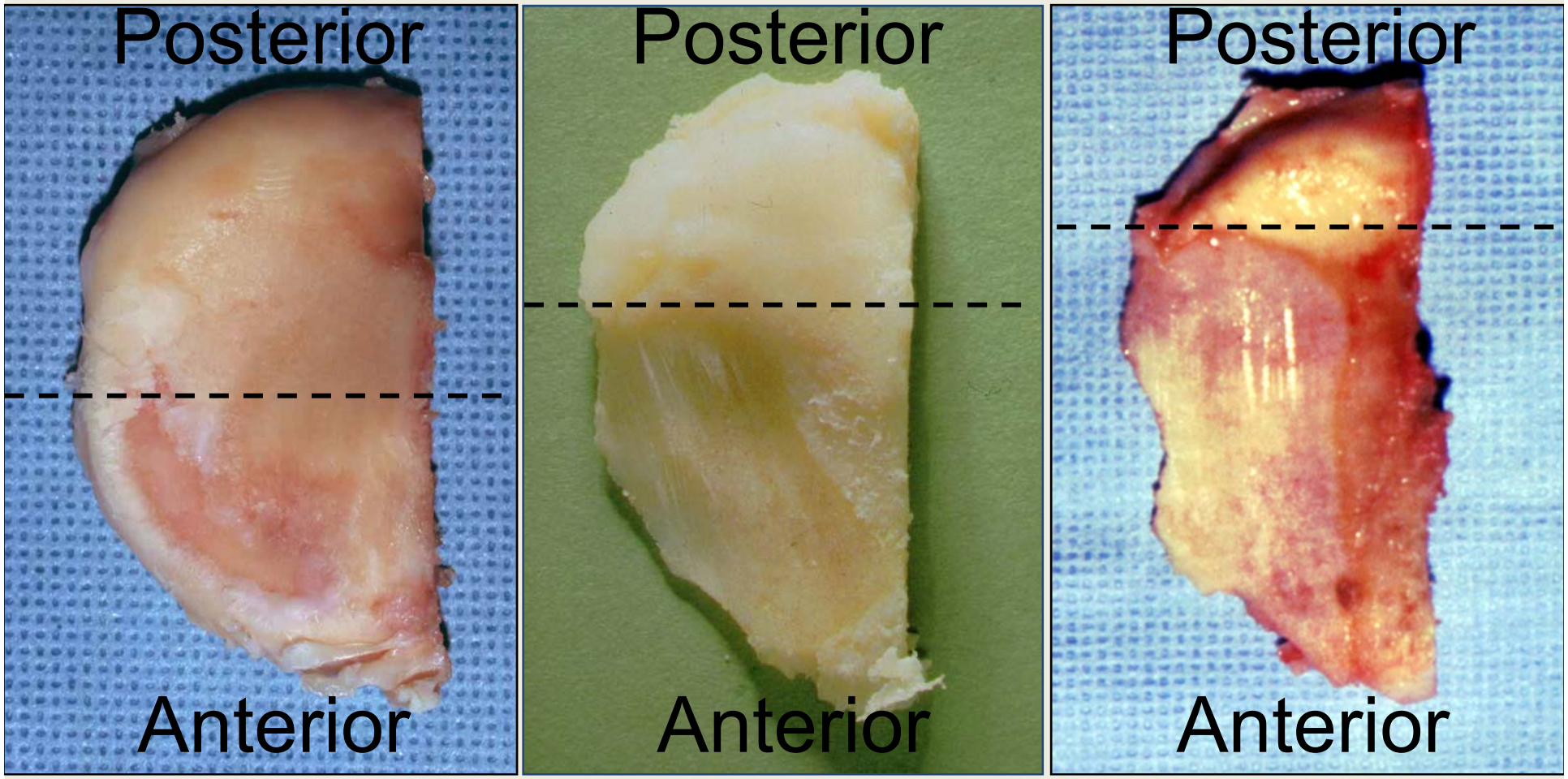
- Unicompartmental OA
- Is the PFJ acceptable?
- Is the ACL functioning?

Pattern of OA

Typically, as patient flexes, load moves posteriorly and laterally.



Typical cases



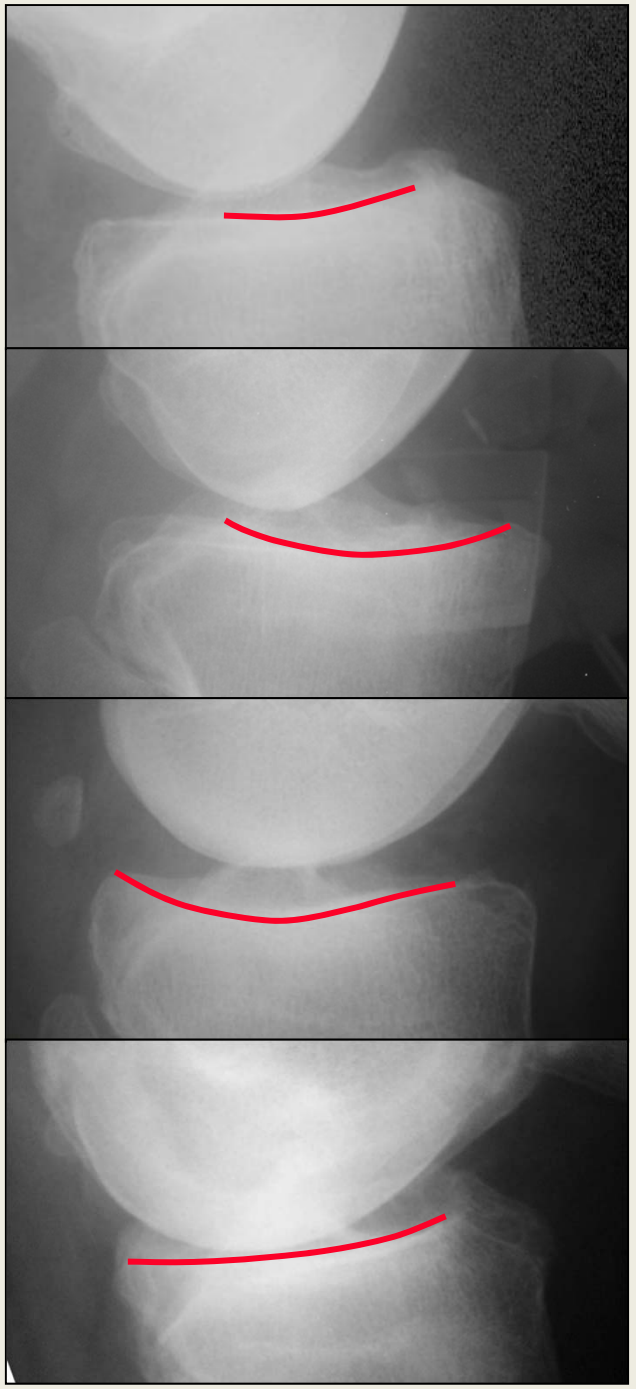
- Antero-medial OA (White et al)
- Functionally intact ligaments

Lateral shows

Functionally intact ACL

- Lateral X-ray (Keyes '92)
  - Tibial erosion does not extend to back
  - 95% predictive ACL intact
- Good quality lateral Xrays with condyles overlapping

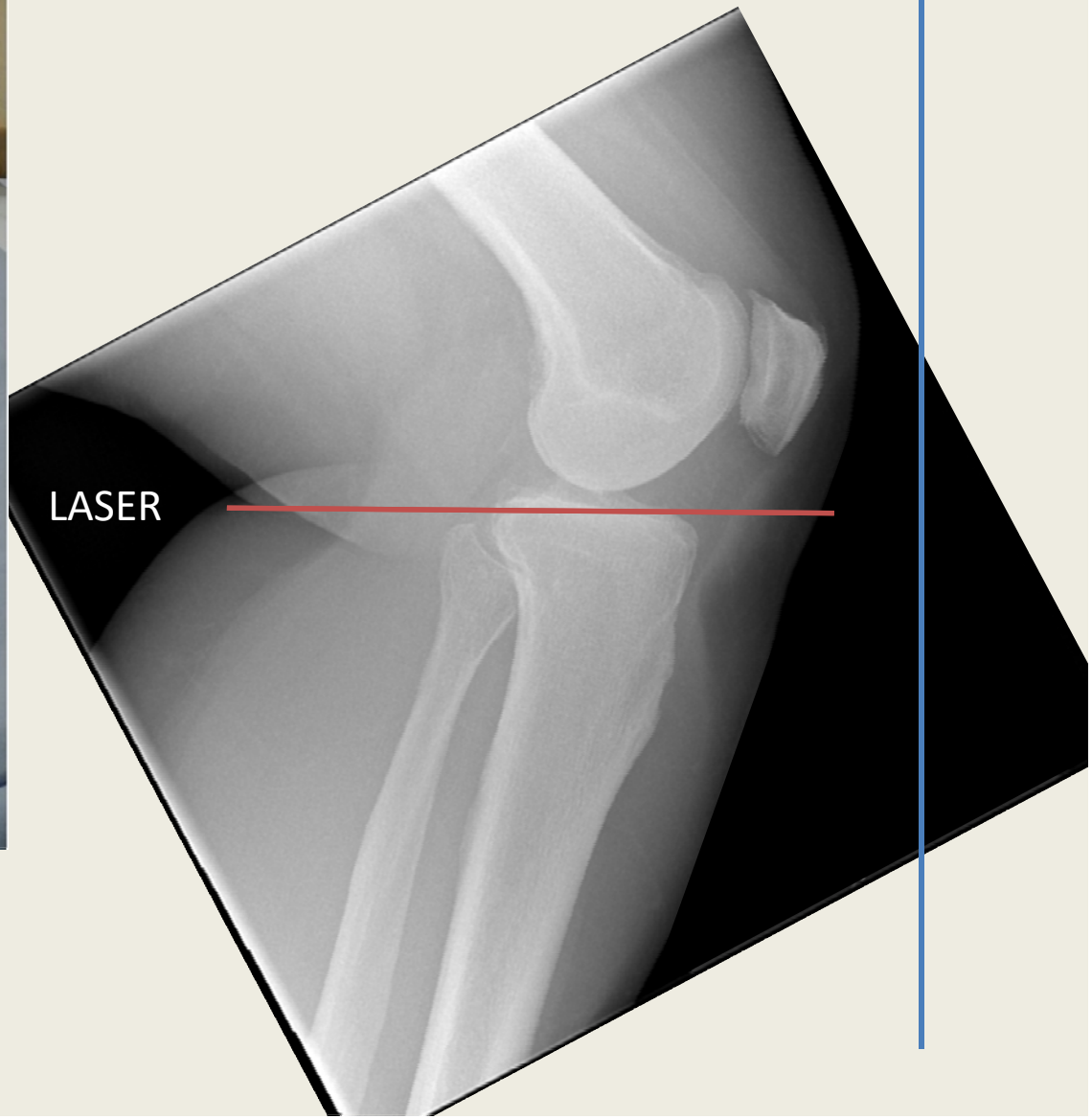
Slide from Prof David Murray



Lateral View

- 30-40 flexion.
- 5 degrees cranial angulation.
- Centred at level of popliteal fossa.

Just space for 2 fingers between bed and patella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LASER

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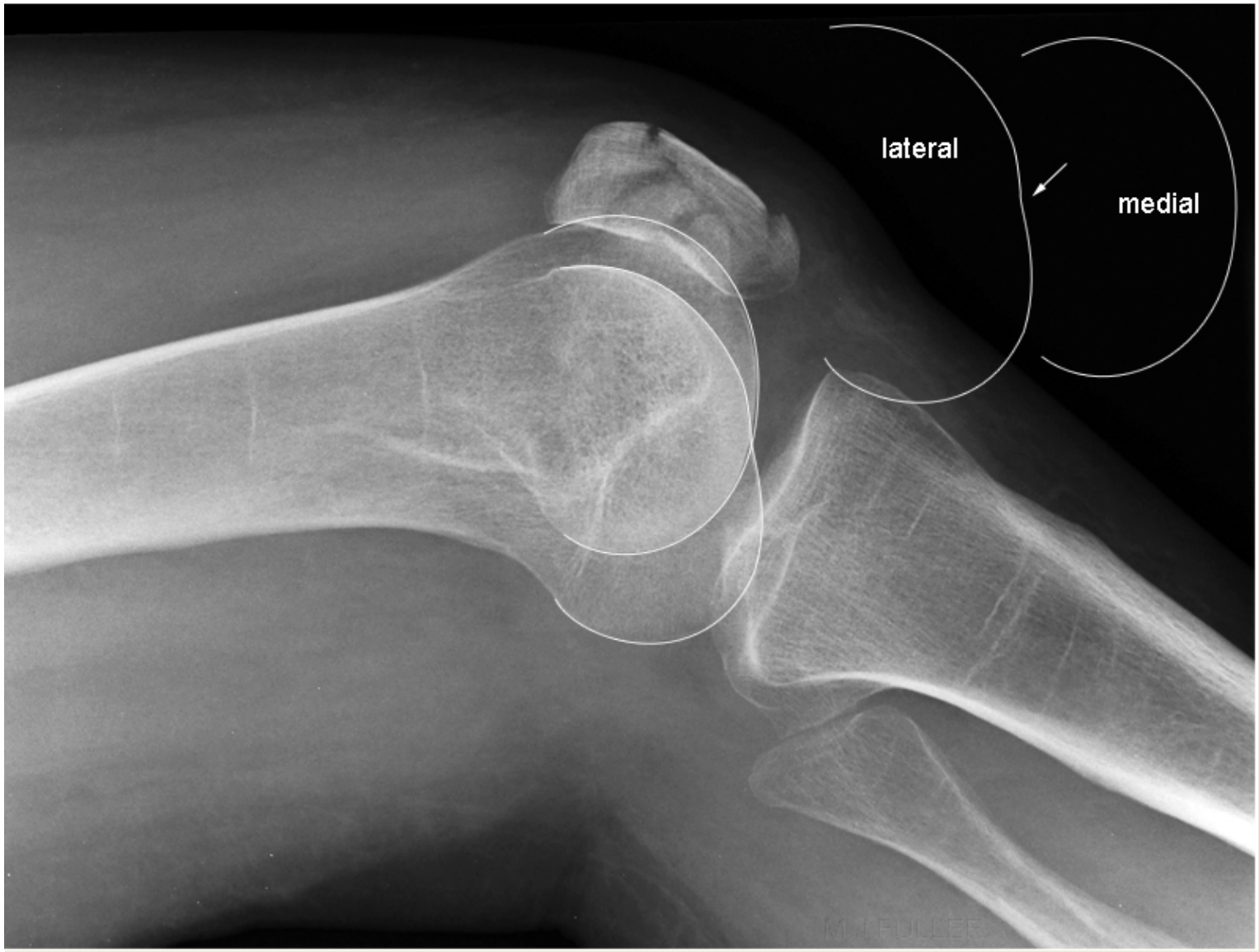
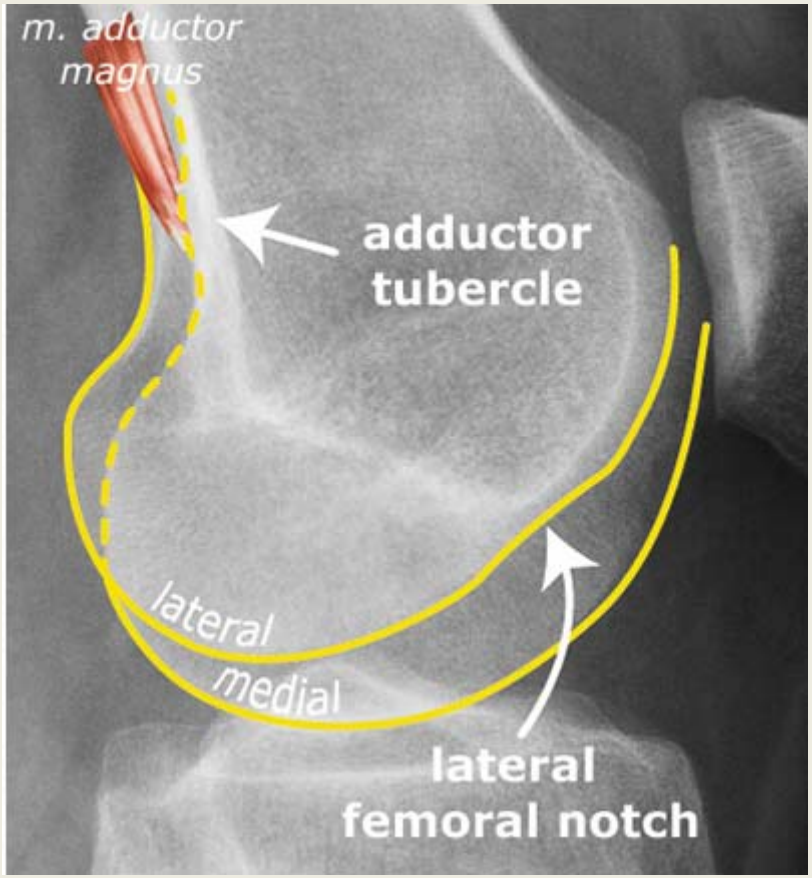
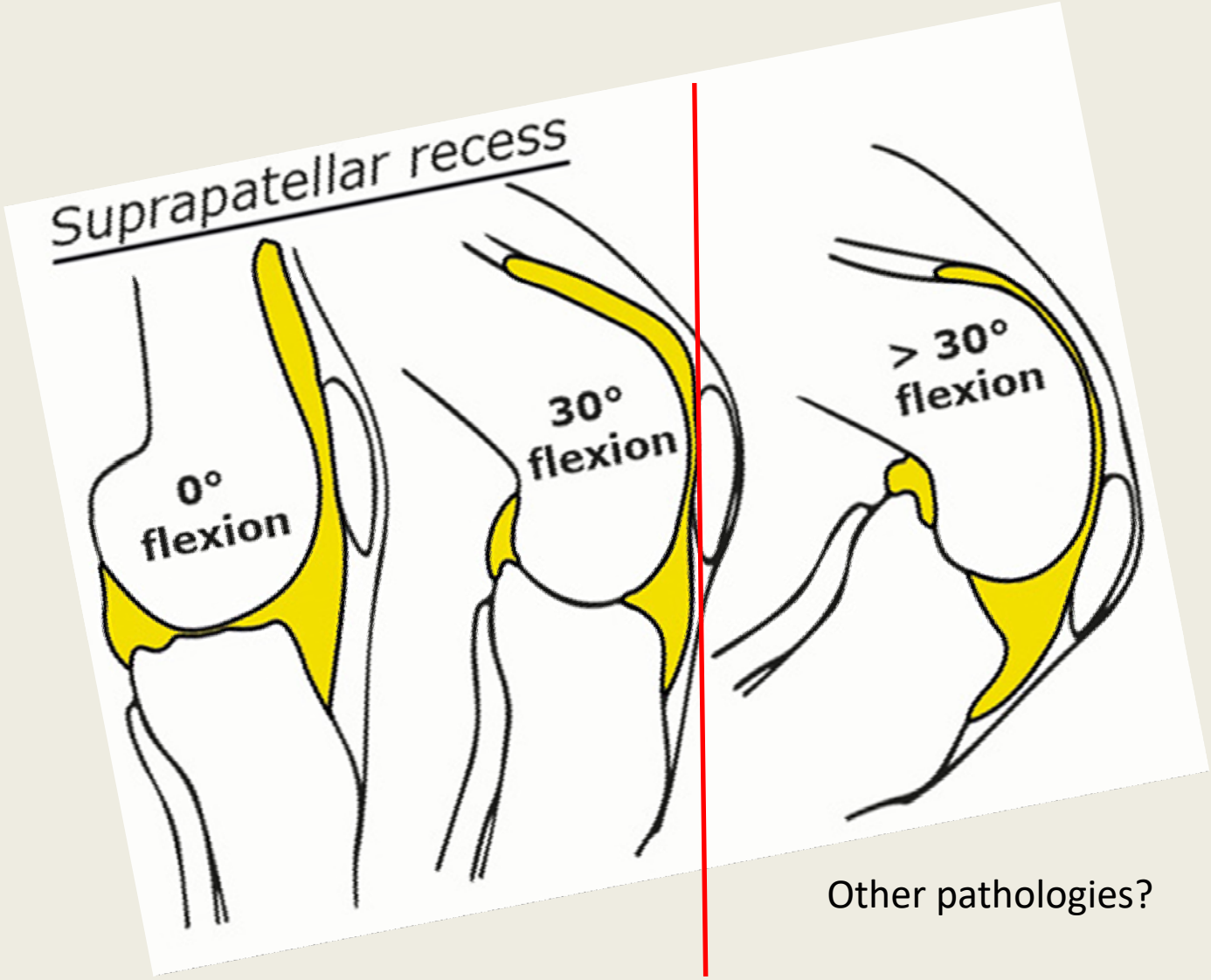


http://www.wikiradiography.net/page/Lateral+Knee+Radiography



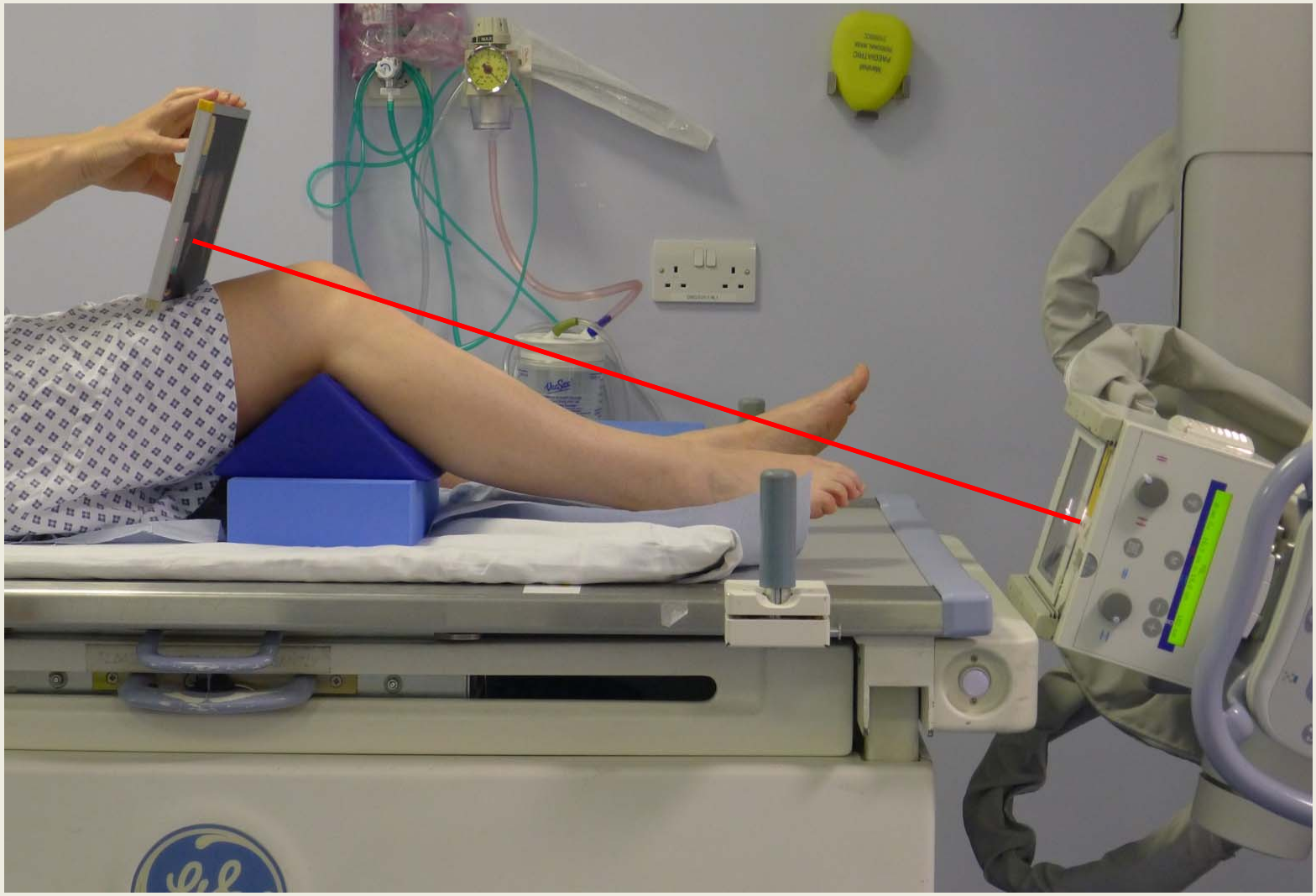
www.startradiology.com

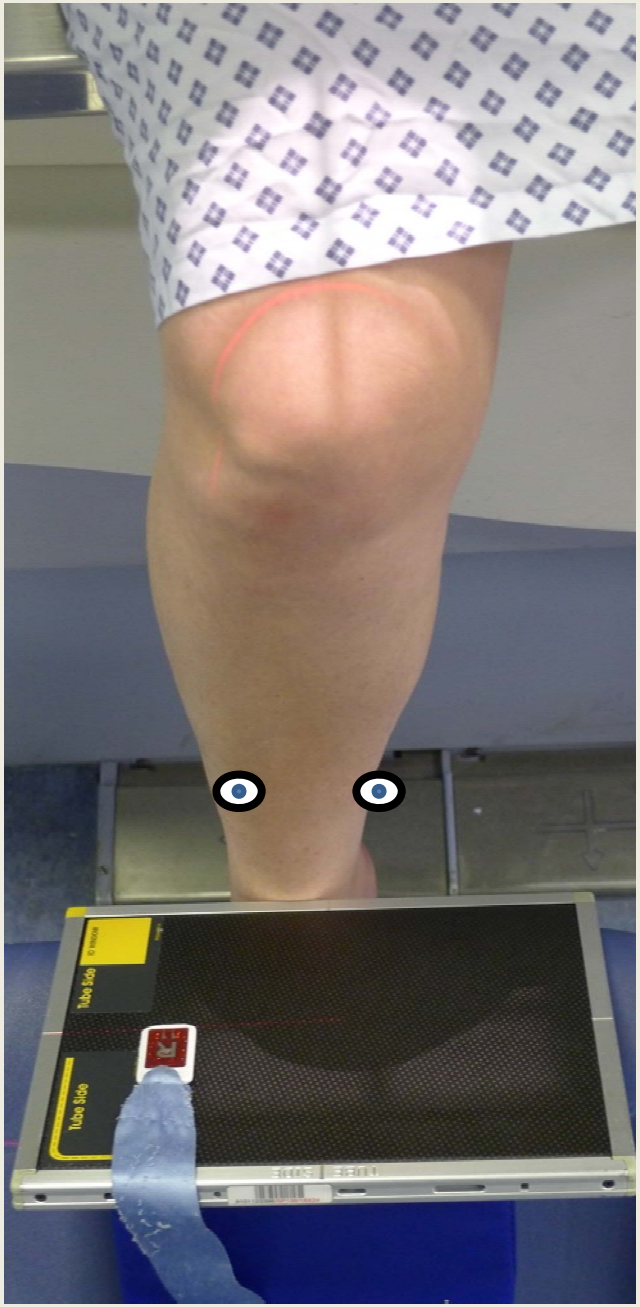
Skyline view

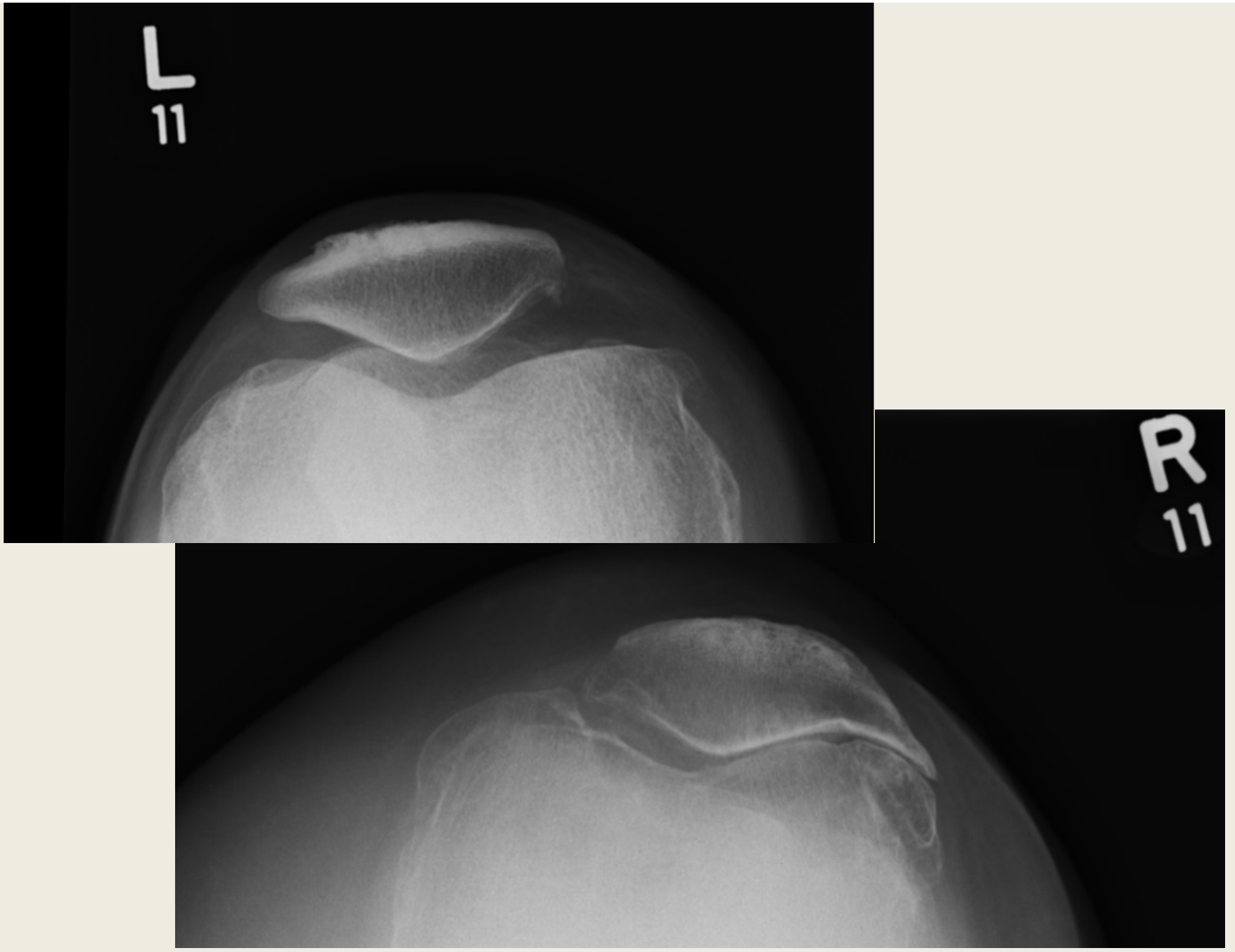


Other pathologies?

http://www.startradiology.com/internships/orthopedics/knee/x-knee/




Tube Side
Tube Side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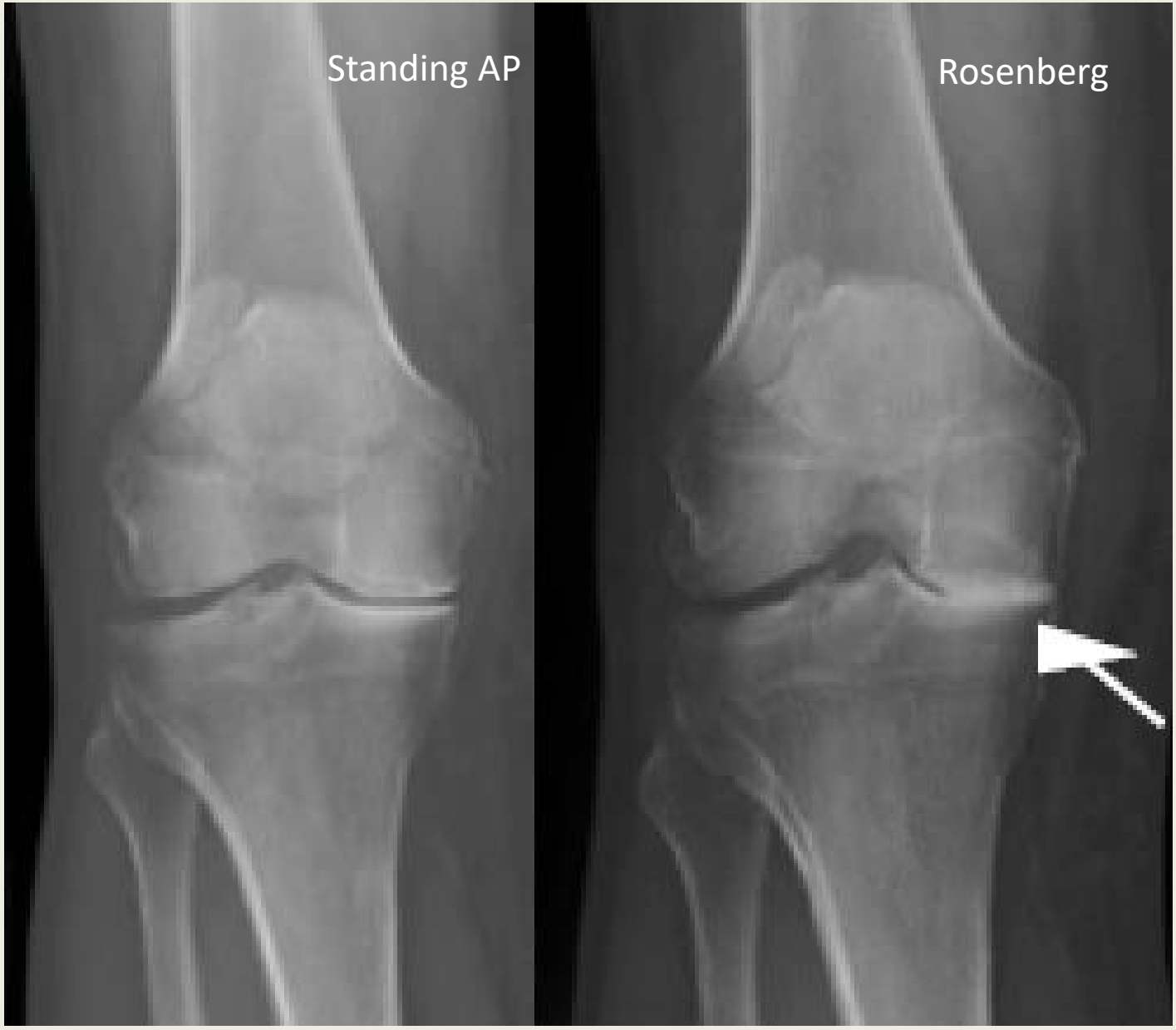
Rosenberg /fixed flexion views

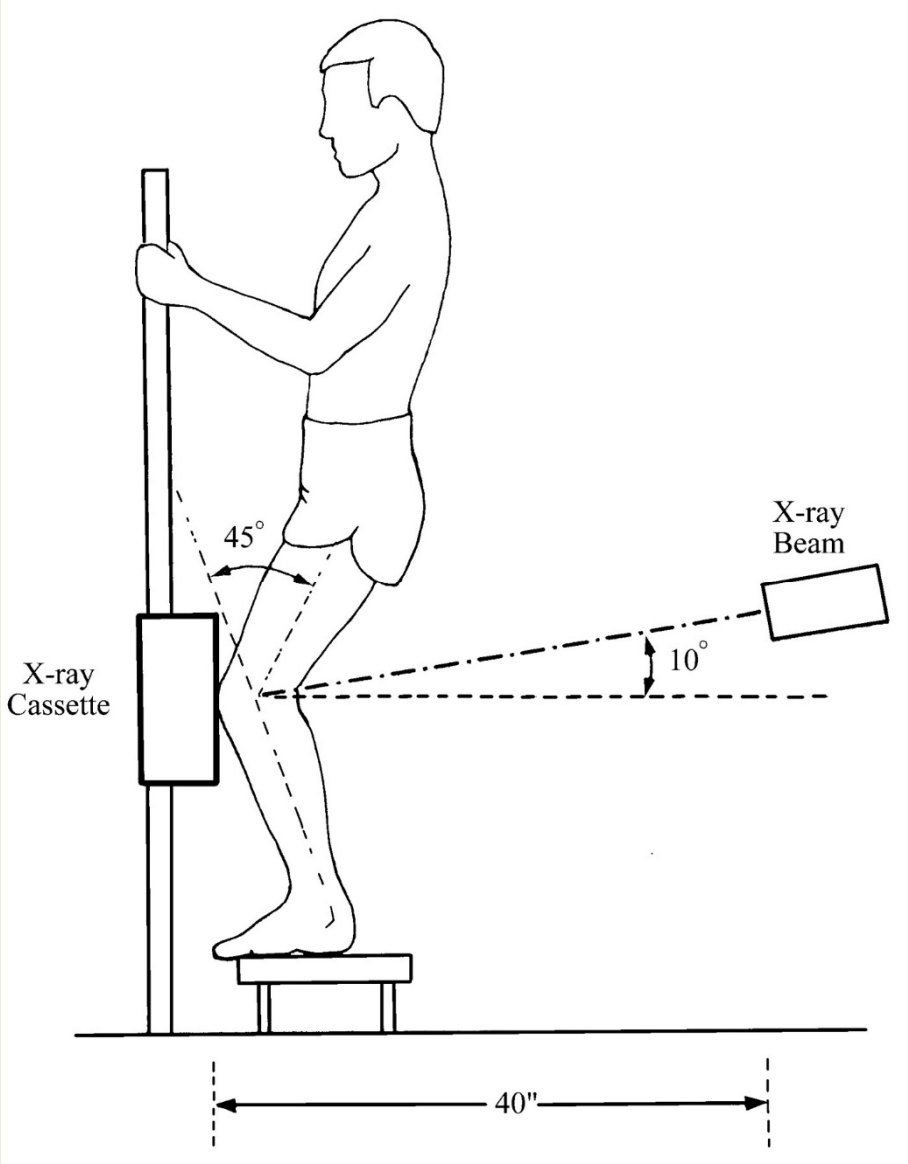


Melnic CM, Gordon J, Courtney PM, Sheth NP. A Systematic Approach to Evaluating Knee Radiographs with a Focus on Osteoarthritis. J Orthopedics Rheumatol. 2014;1(2): 6.

Rosenberg

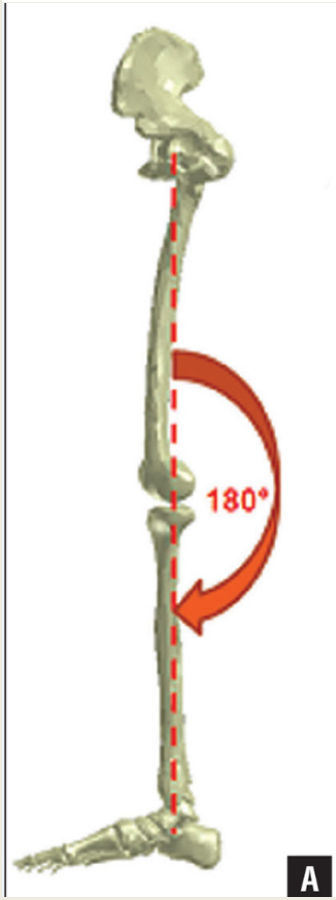
- more accurate,
- more sensitive,
- more specific (with no false positives) than the AP standing view.

Was Rosenberg wrong?



J Bone Joint Surg Am. 1988 Dec;70(10):1479-83.
The forty-five-degree posteroanterior flexion weight-bearing radiograph of the knee.
Rosenberg TD[1], Paulos LE, Parker RD, Coward DB, Scott SM.

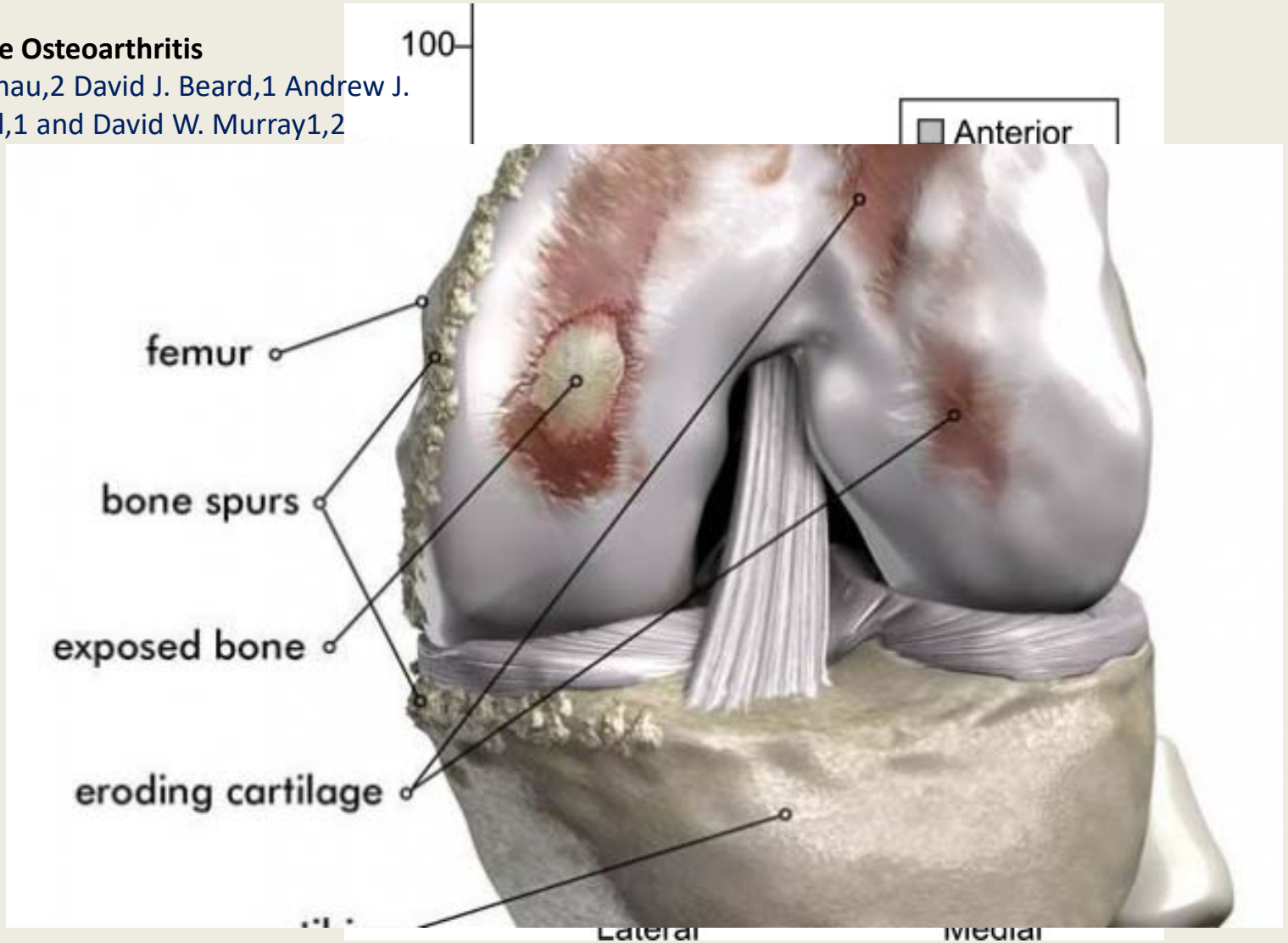
How flexed is flexed?



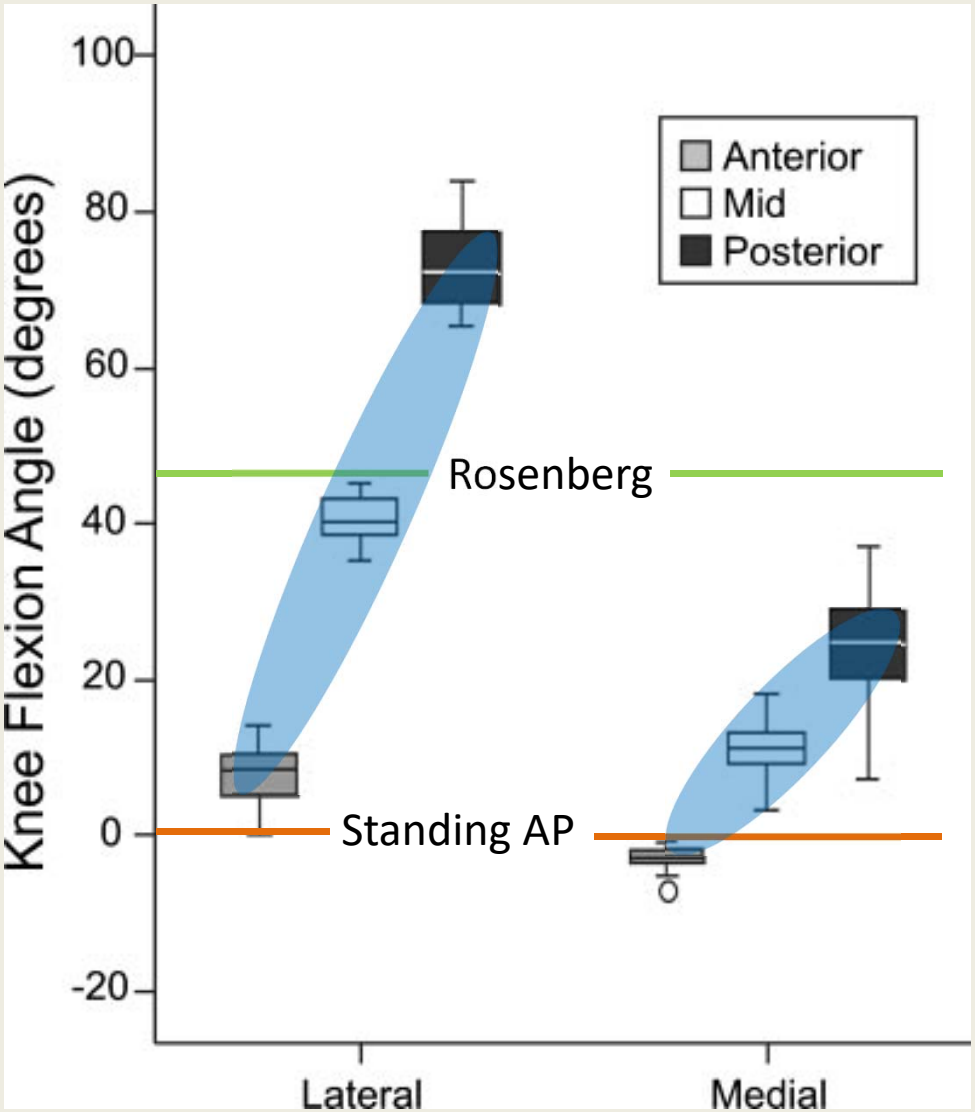
Zero flexion

Localization of the Full-Thickness Cartilage Lesions in Medial and Lateral Unicompartmental Knee Osteoarthritis

Aashish Gulati,1 Ryan Chau,2 David J. Beard,1 Andrew J. Price,1 Harinderjit S. Gill,1 and David W. Murray1,2

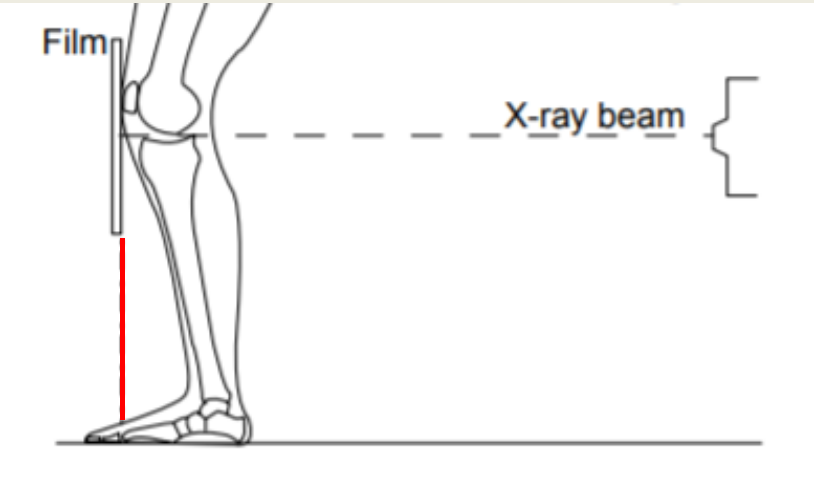


- Standing AP will probably underestimate extent of OA.
- Rosenberg at 45 degrees will probably underestimate medial compartment disease.
- 90% of unicompartmental OA occurs in medial compartment.
- As an initial exam to establish if the patient has OA, 20 degrees of flexion would appear to be a better screening tool.



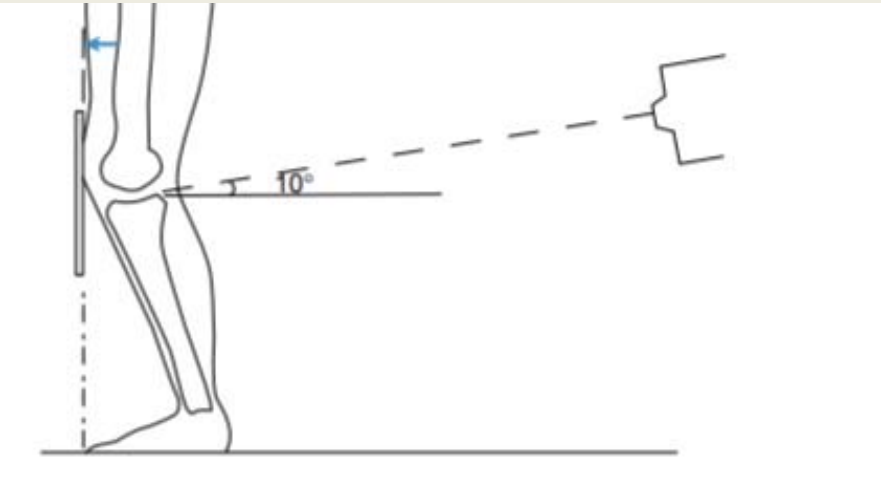
Which radiographic techniques should we use for research and clinical practice?
Buckland-Wright, C. Best Practice & Research Clinical Rheumatology Vol. 20, No. 1, pp. 39–55, 2006

MTP – Metatarsophalangeal (1999)



Reproducibility for research.
7-10 degrees flexion.

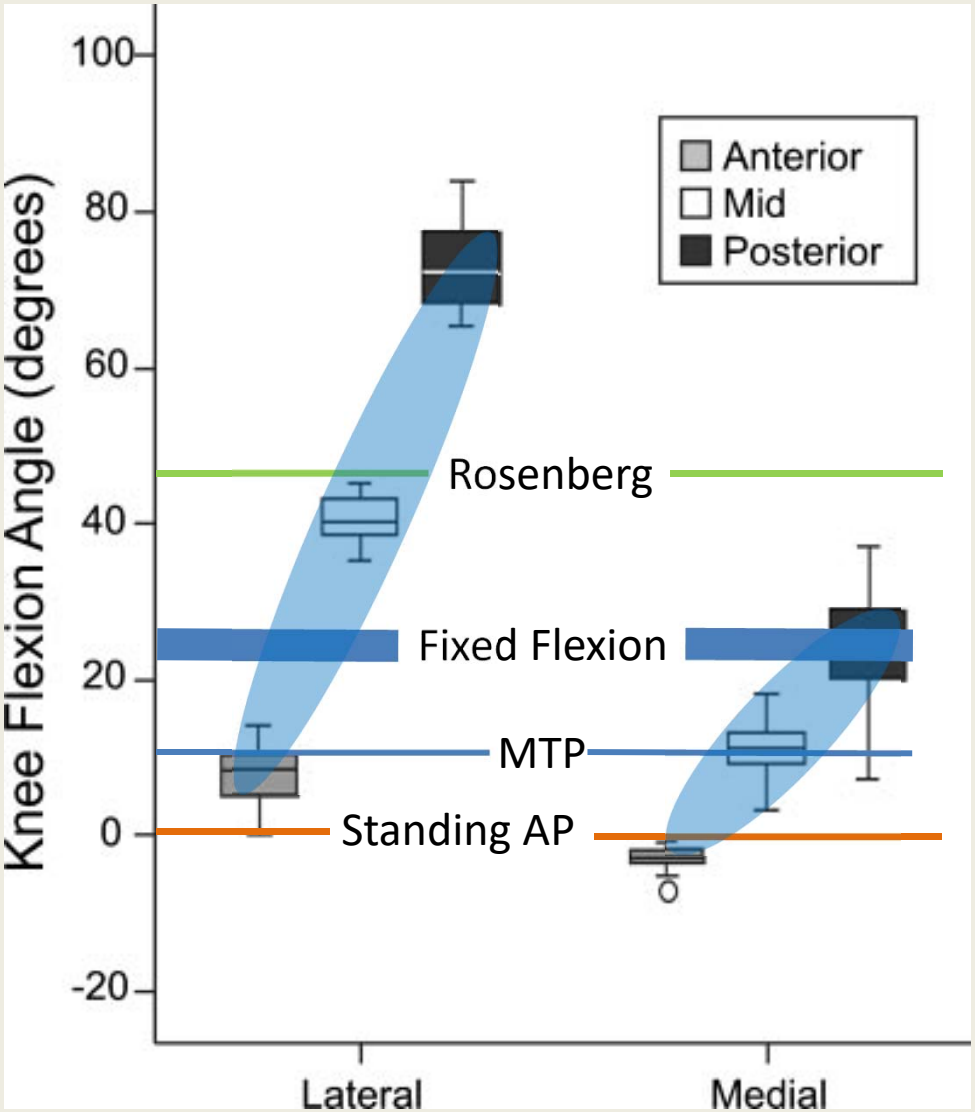
Fixed flexion (2003)

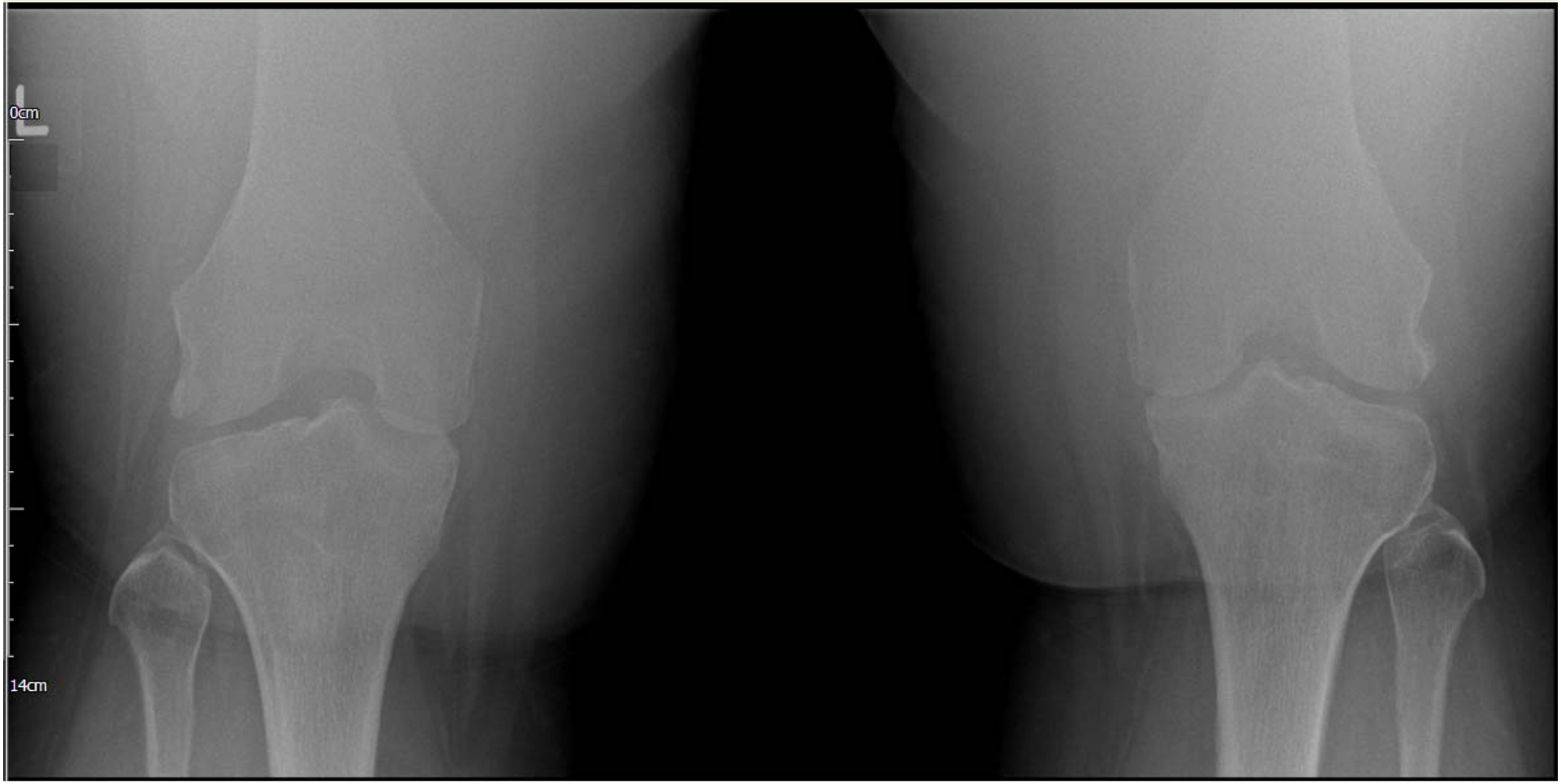


~20-35 degrees
Thigh girth will determine degree of flexion

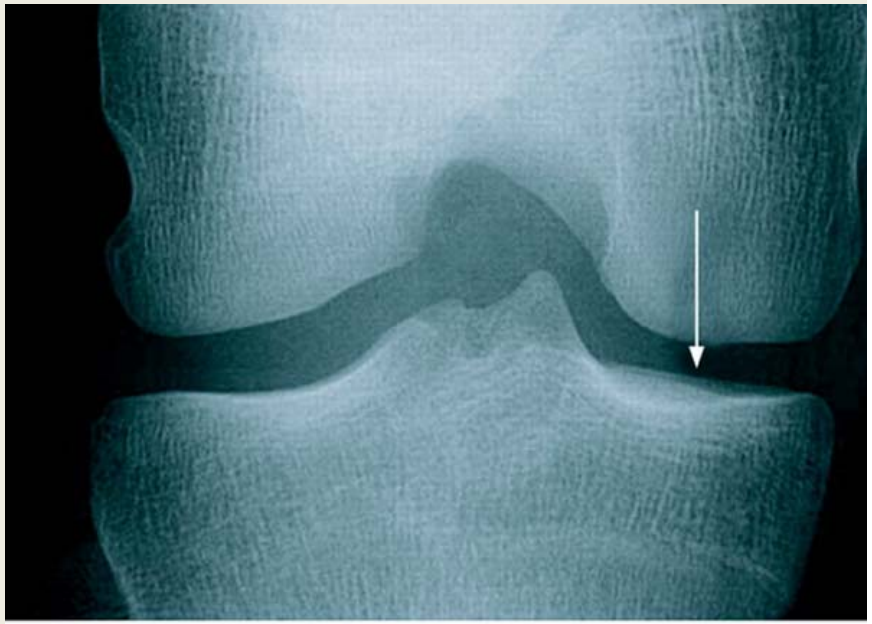
Radiographic-Based Grading Methods and Radiographic Measurement of Joint SpaceWidth in Osteoarthritis
Marie-Pierre Hellio Le Graverand,MD, DSc, PhDa,*,
SteveMazzuca, PhDb, Jeff Duryea, PhDc, Alan Brett, PhDd (2012)

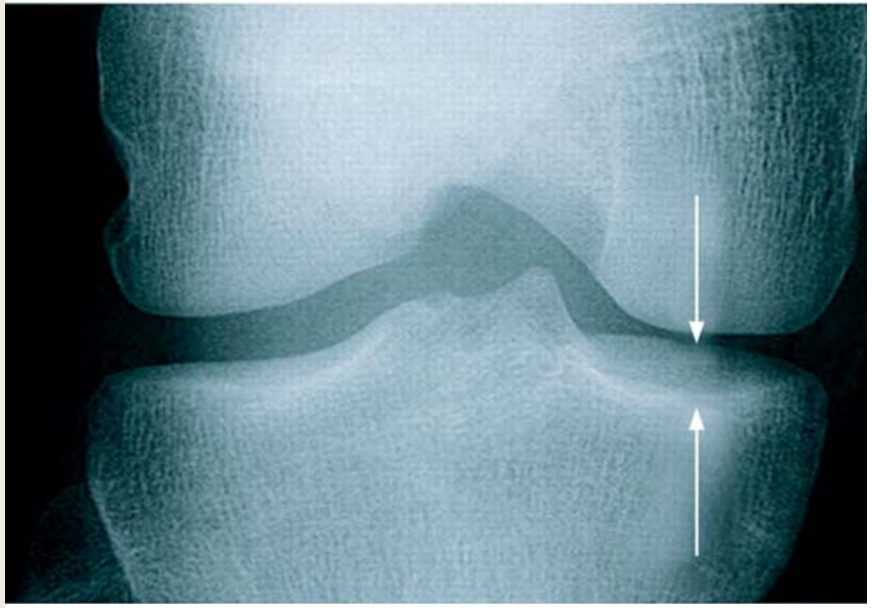
- Fixed flexion or MTP better than Rosenberg at demonstrating medial OA
- If referrer specifies "? lateral OA," 40 degrees would be better at demonstrating this.
- Is term Rosenberg used for any PA flexed view?
- AP standing still preferably to a badly aligned view that doesn't demonstrate joint space.

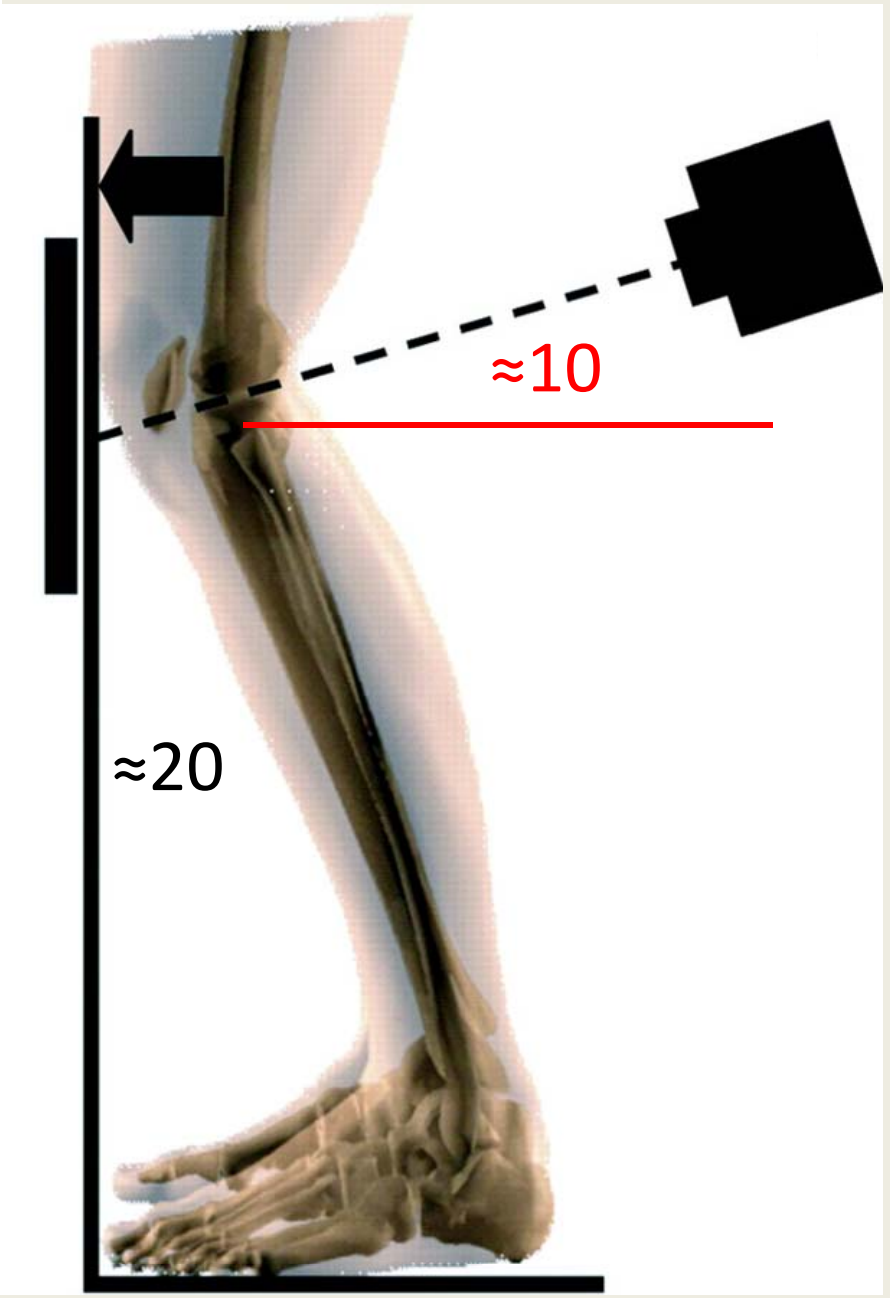




What does this tell us about the joint space?






≈10
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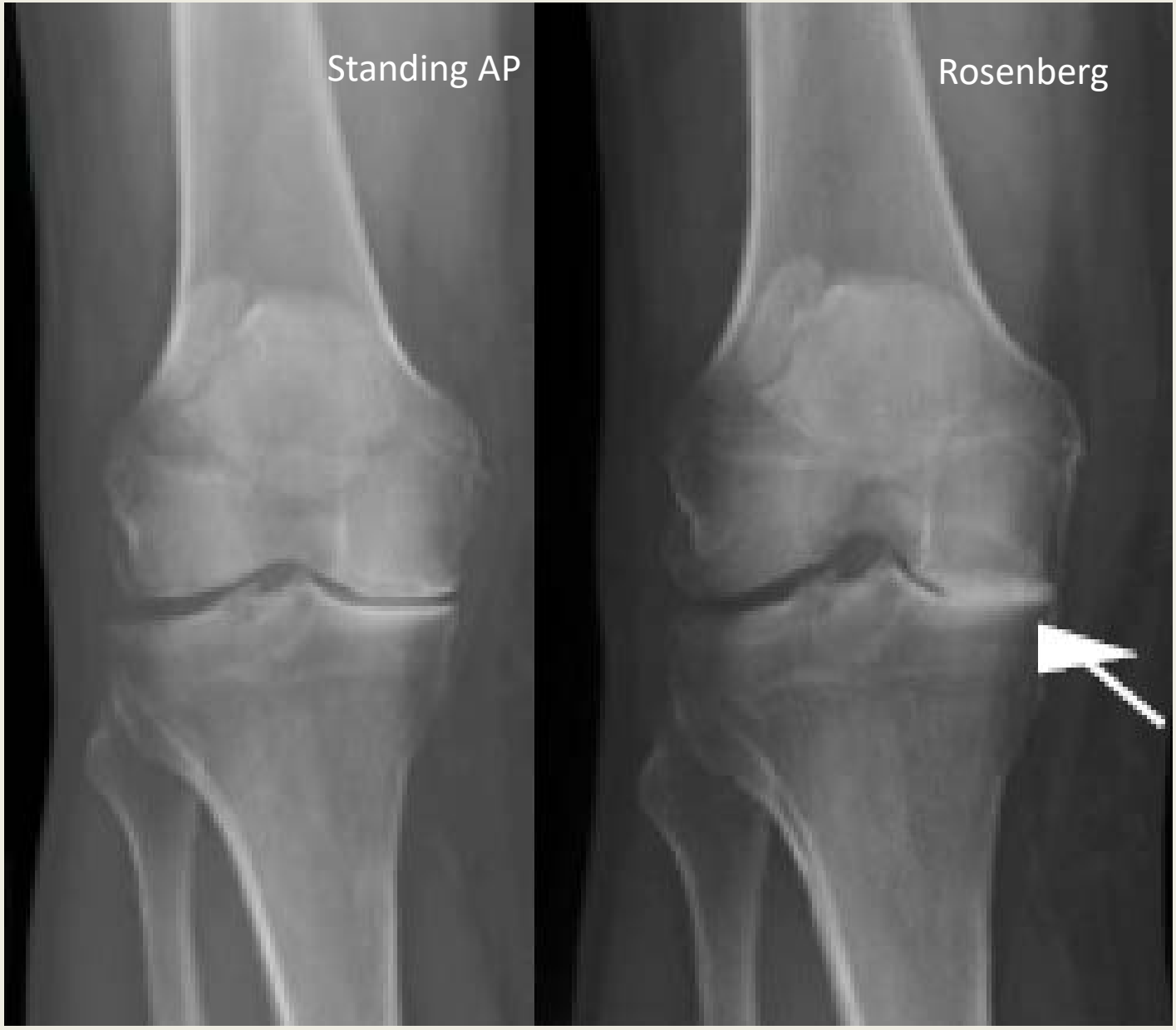

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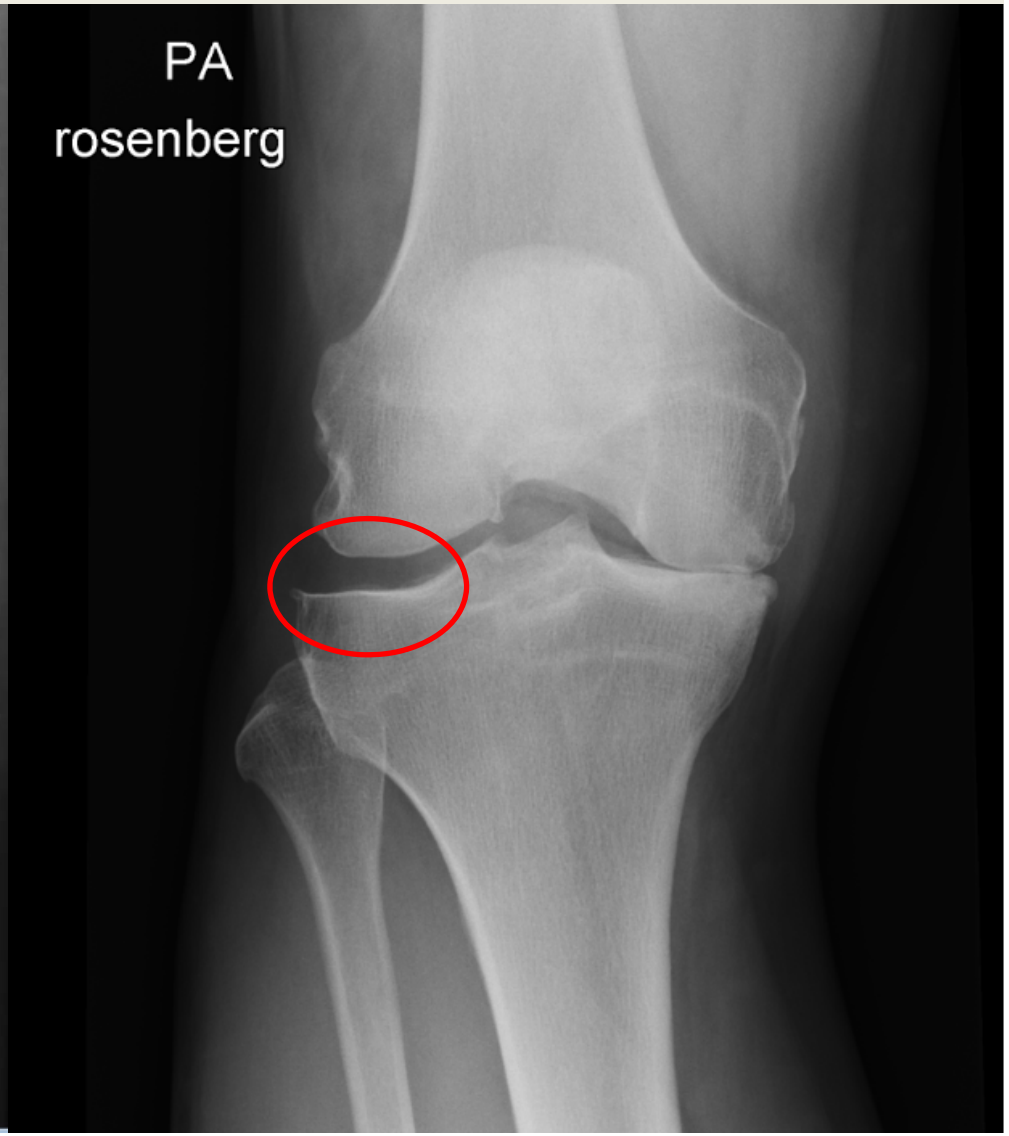
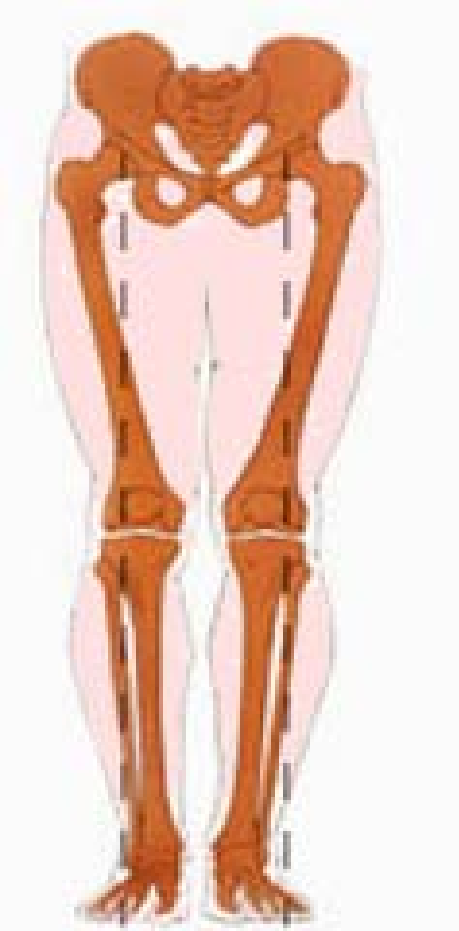
Lateral compartment OA

Medial compartment OA

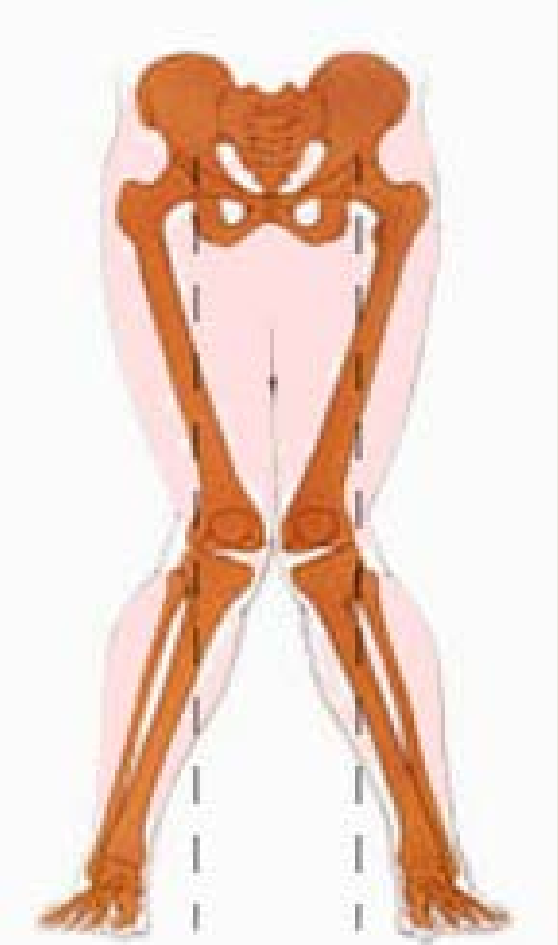


OSSKAR Device – Stress views

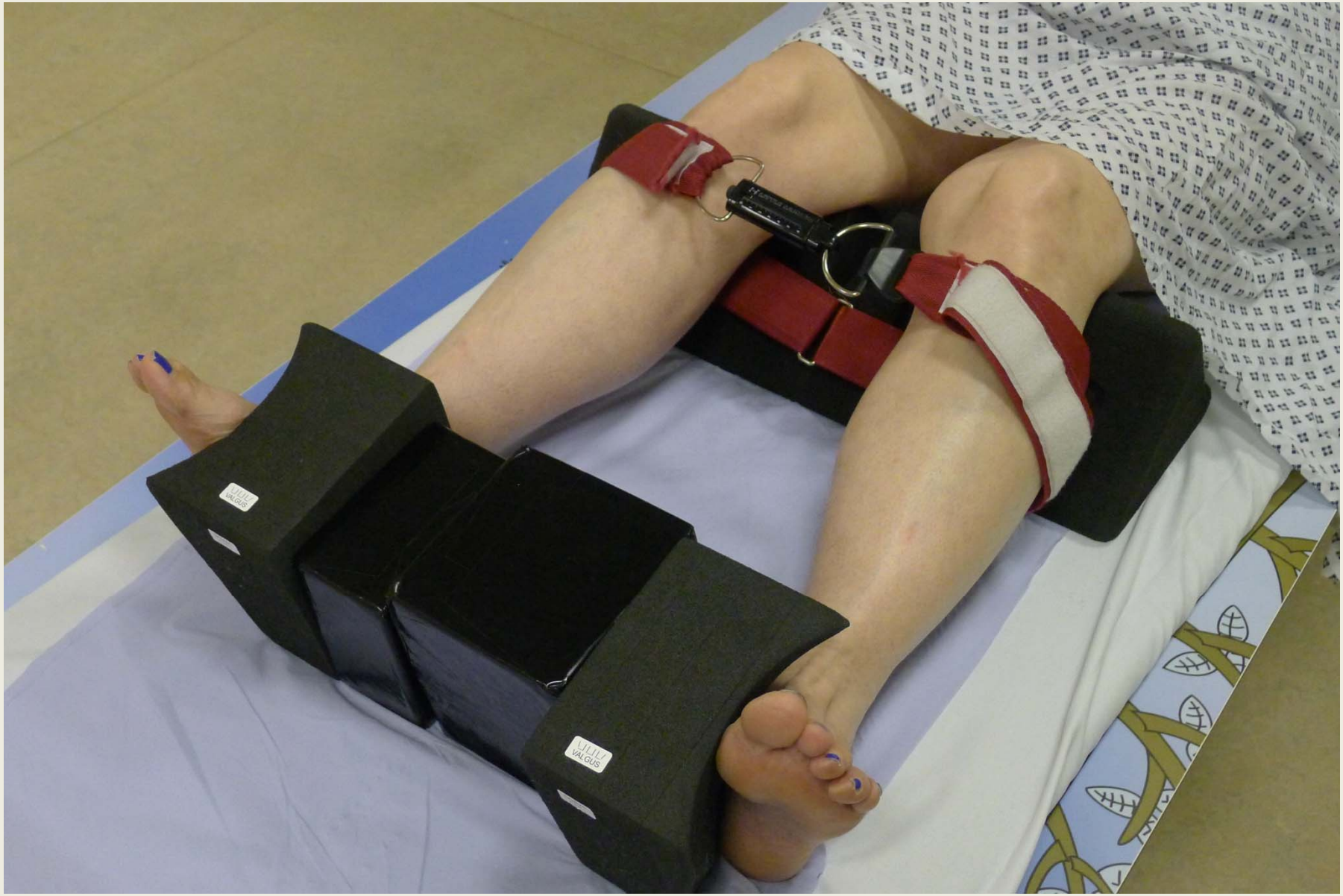
Oxford Stress System for
Knee Arthroplasty Radiographs

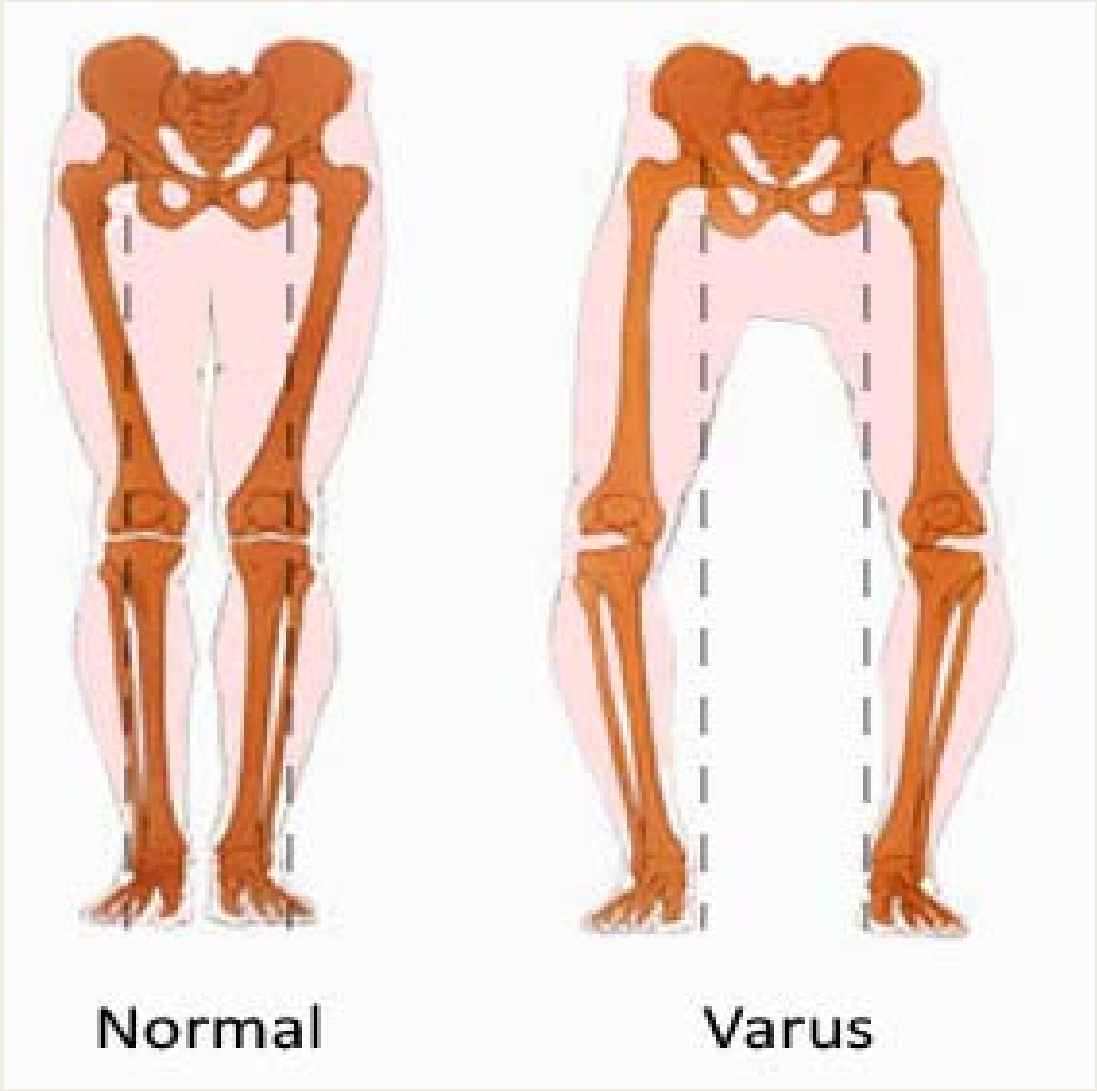


Normal



Valgus


VALGUS
VALGUS


Normal
Varus

Medial compartment OA on Varus view.

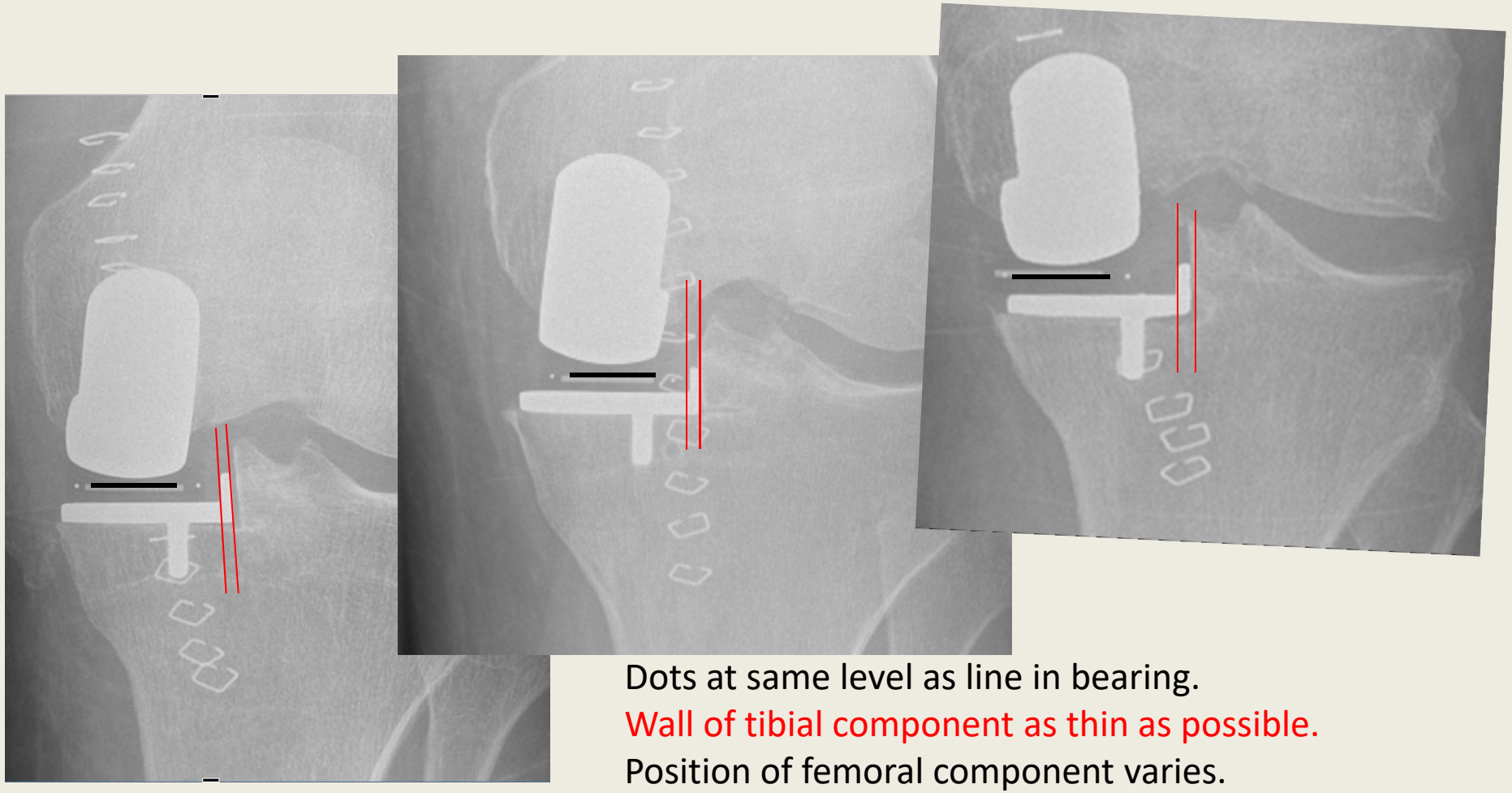
Valgus stress view demonstrates reduced cartilage in lateral compartment

Medial compartment OA on Varus view.

Valgus stress view demonstrates full thickness cartilage in lateral compartment

Oxford Knee – Aligned views

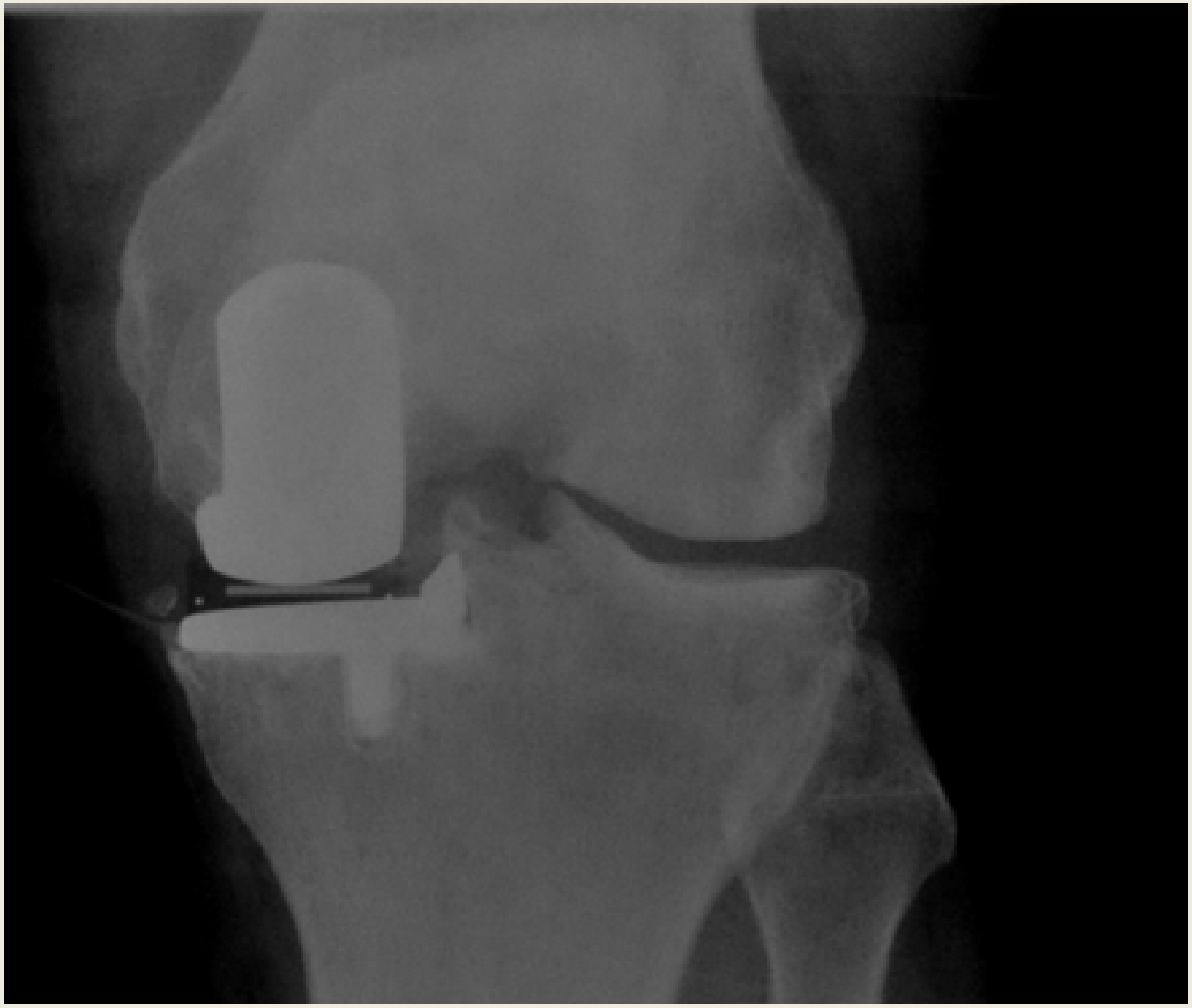
The AP view – Aligned with components

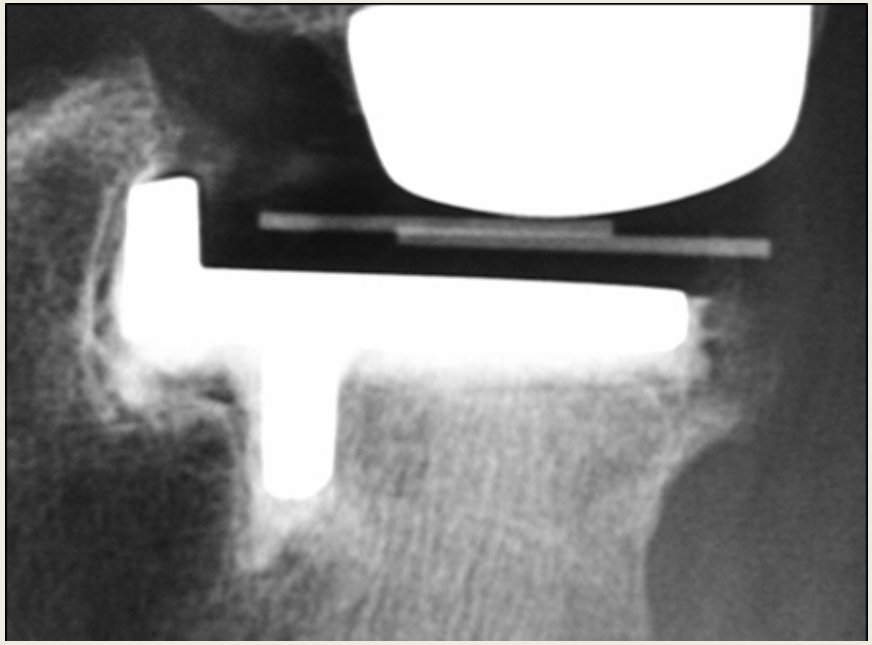


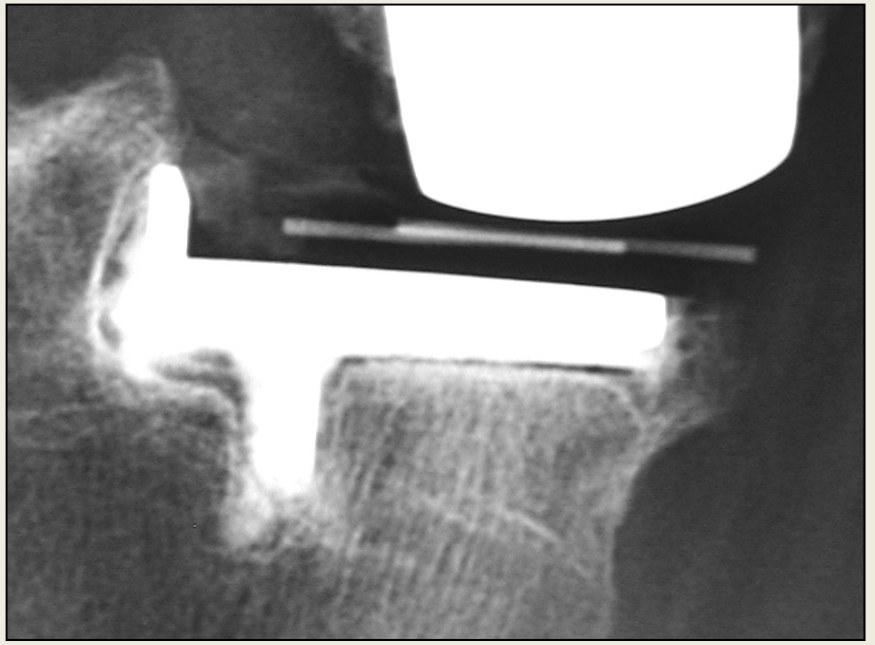
Dots at same level as line in bearing.

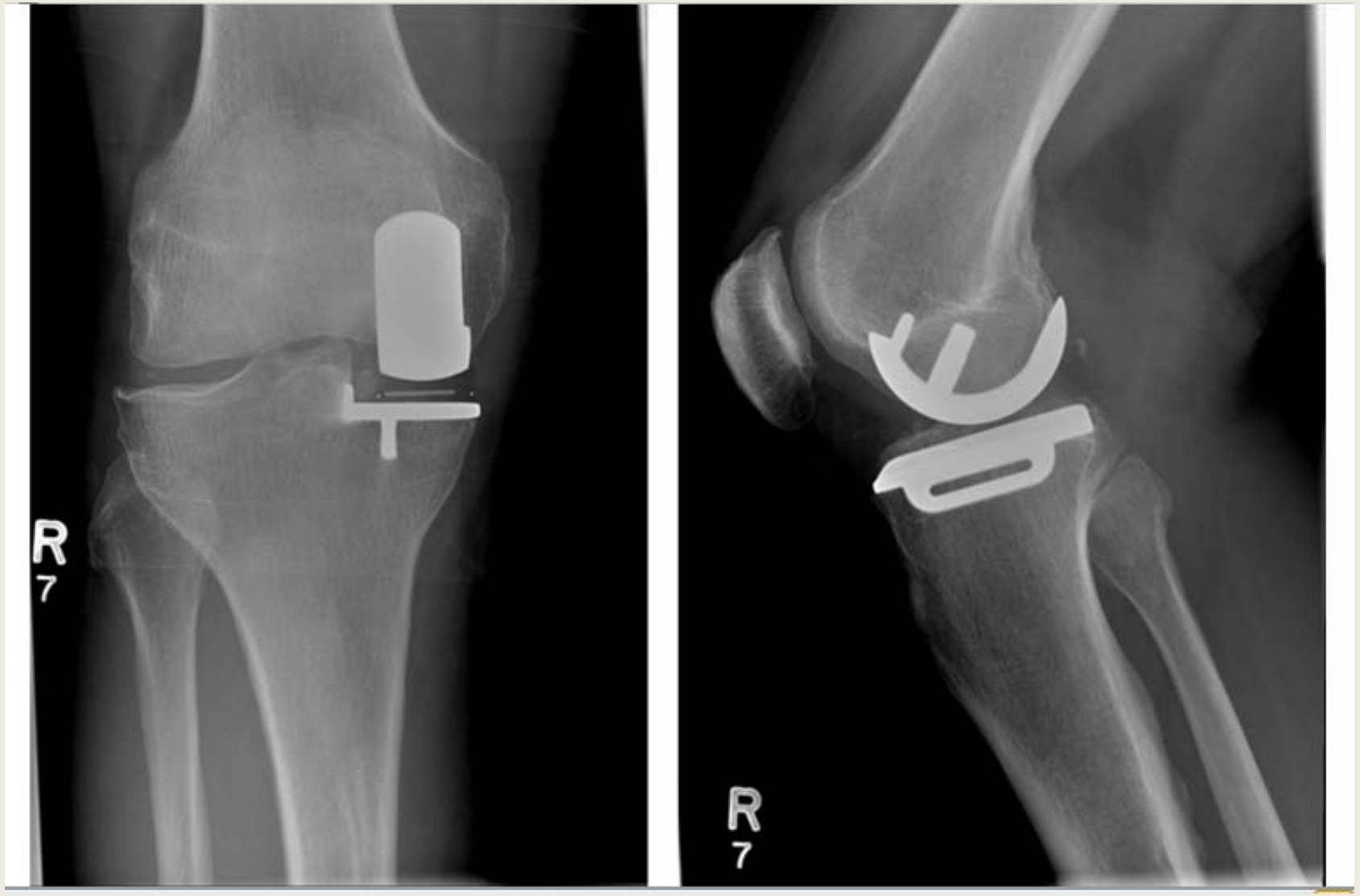
Wall of tibial component as thin as possible.

Position of femoral component varies.





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(We have vacancies)

Any questions?