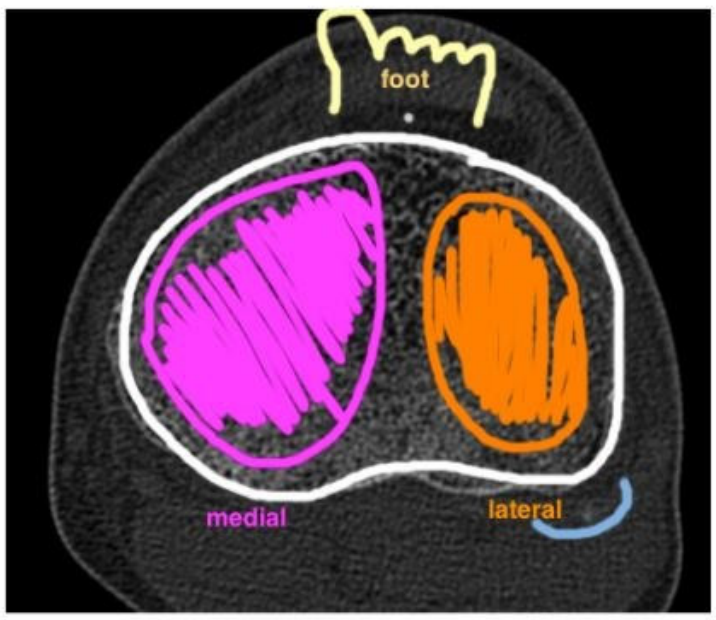
Principles of arthroplasty

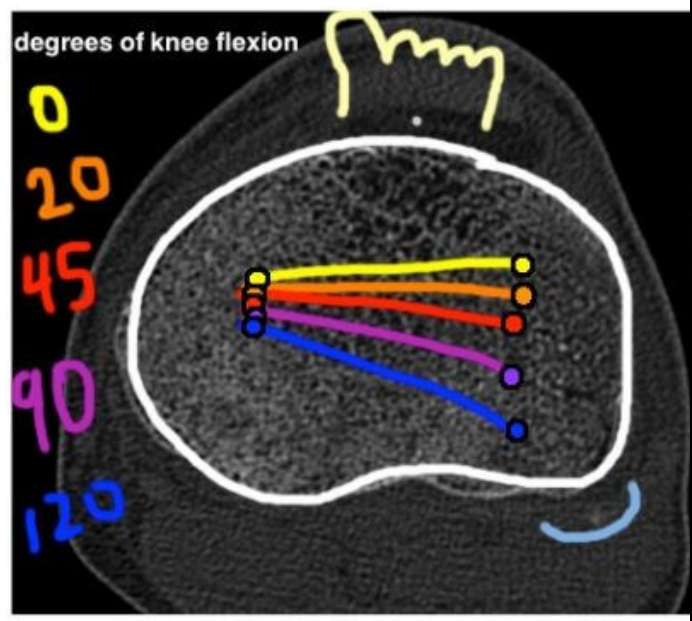
Learning Objectives

- Understand basics of cuts
- Importance of alignment
- Introduce soft tissue balance
- Alignment and offsets
- Uncemented /Cemented implants

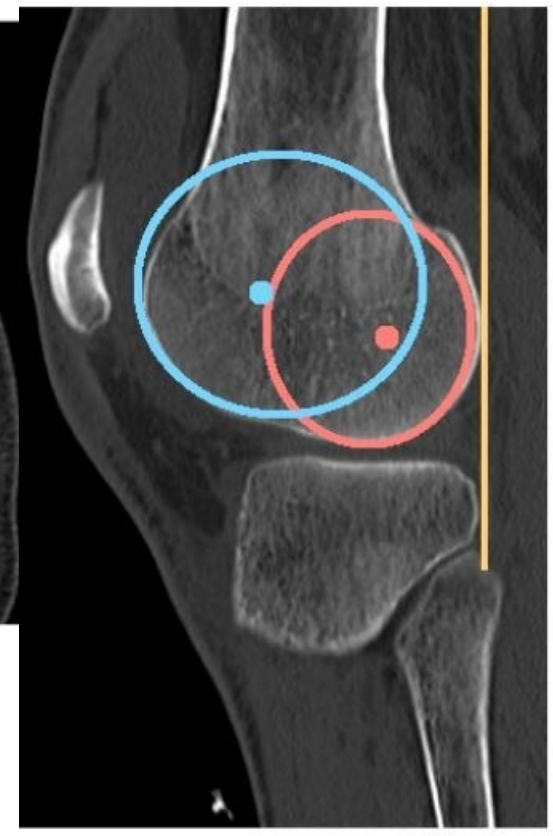
Normal knee alignment



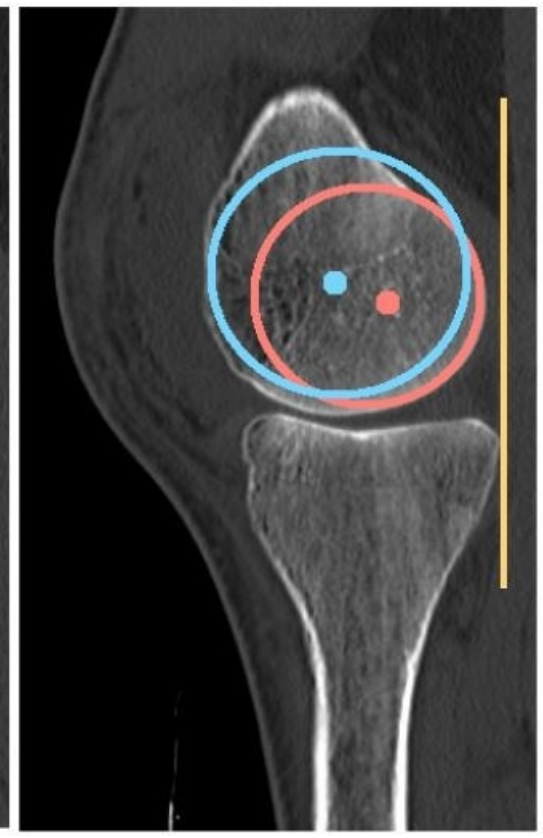
AXIAL VIEW of TIBIAL JOINT SURFACE



CENTER OF ROTATION



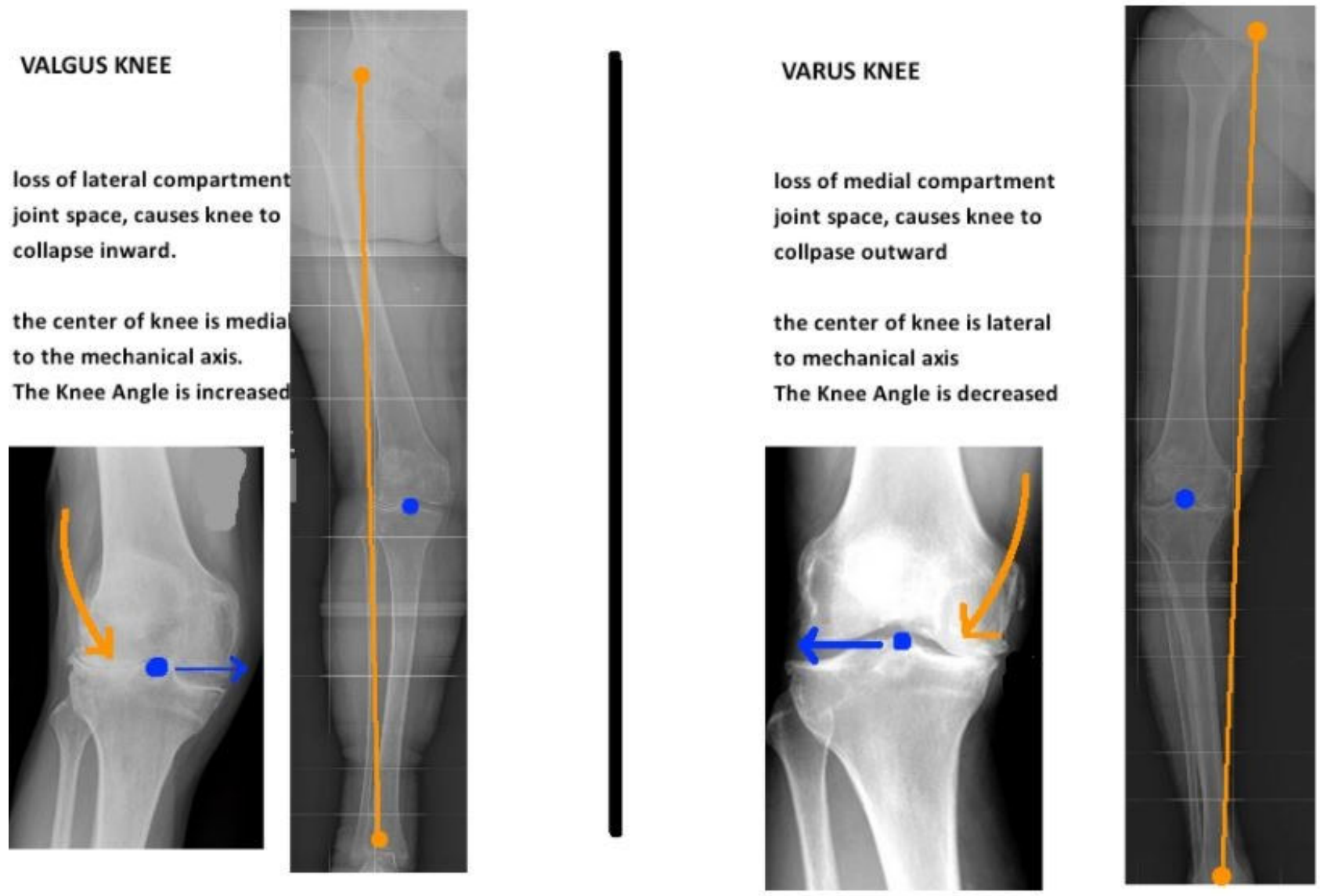
LATERAL FEMORAL CONDYLE



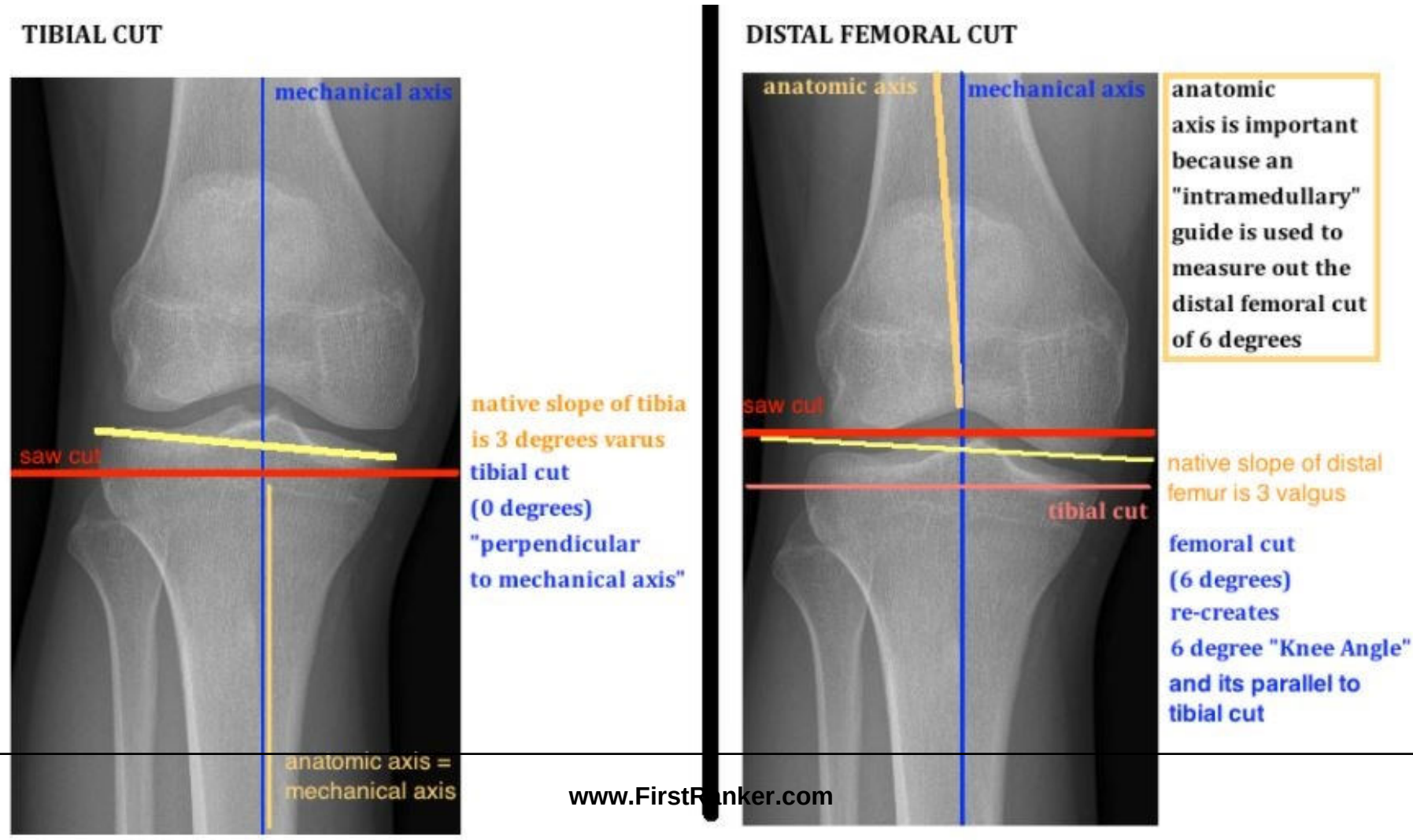
MEDIAL FEMORAL CONDYLE

Normal joint line

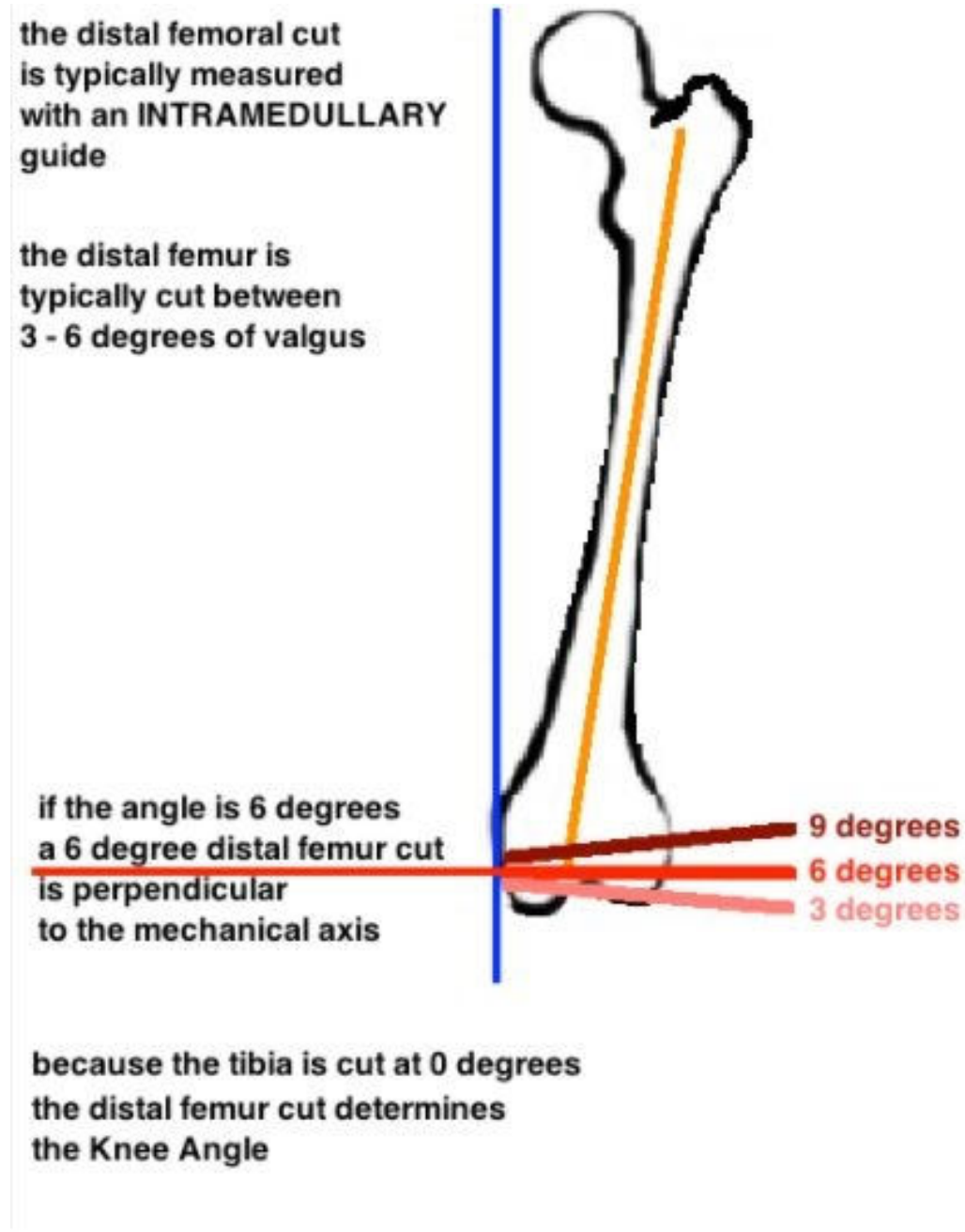
Knee alignment



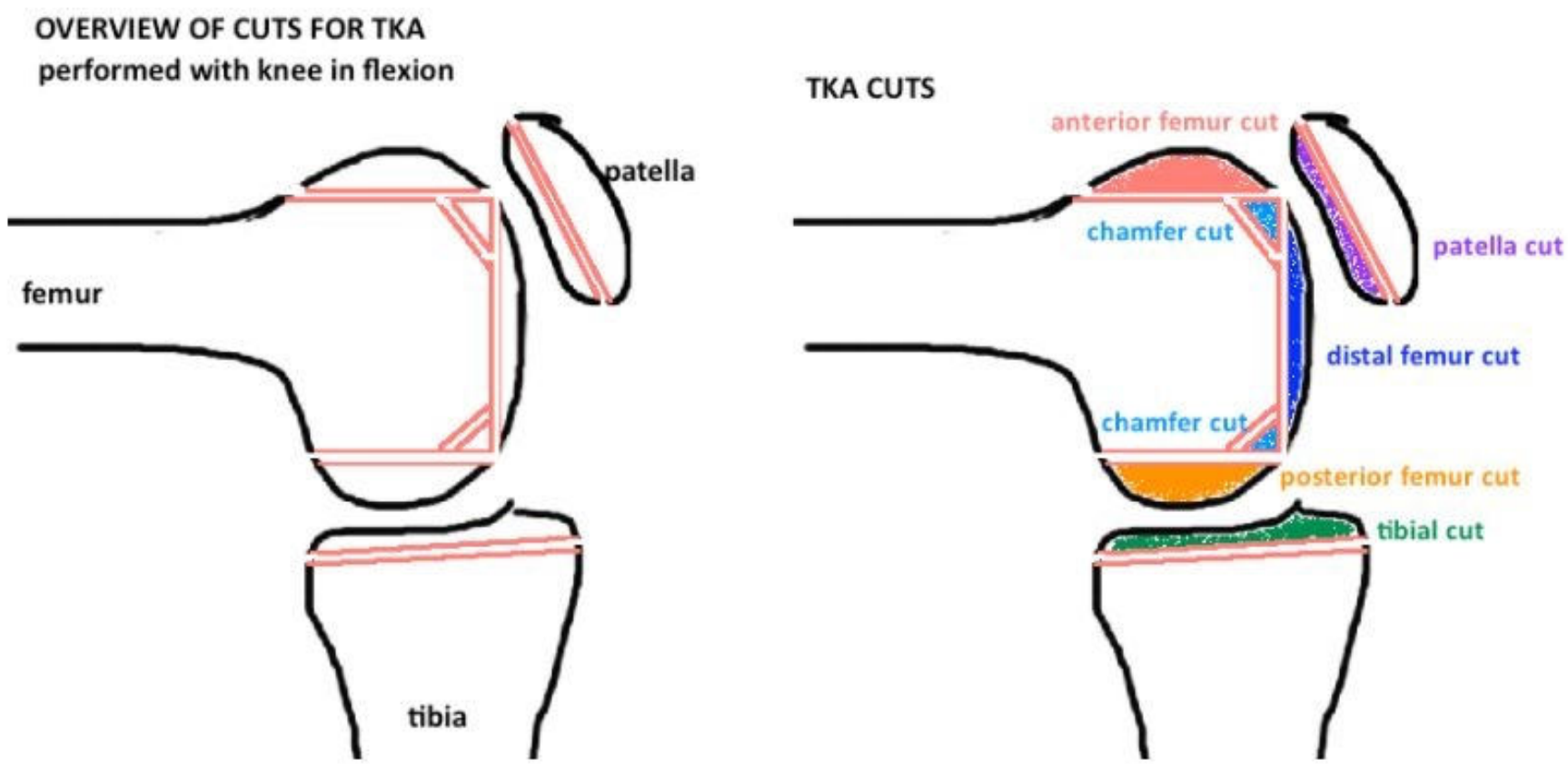
Total Knee arthroplasty- Basics



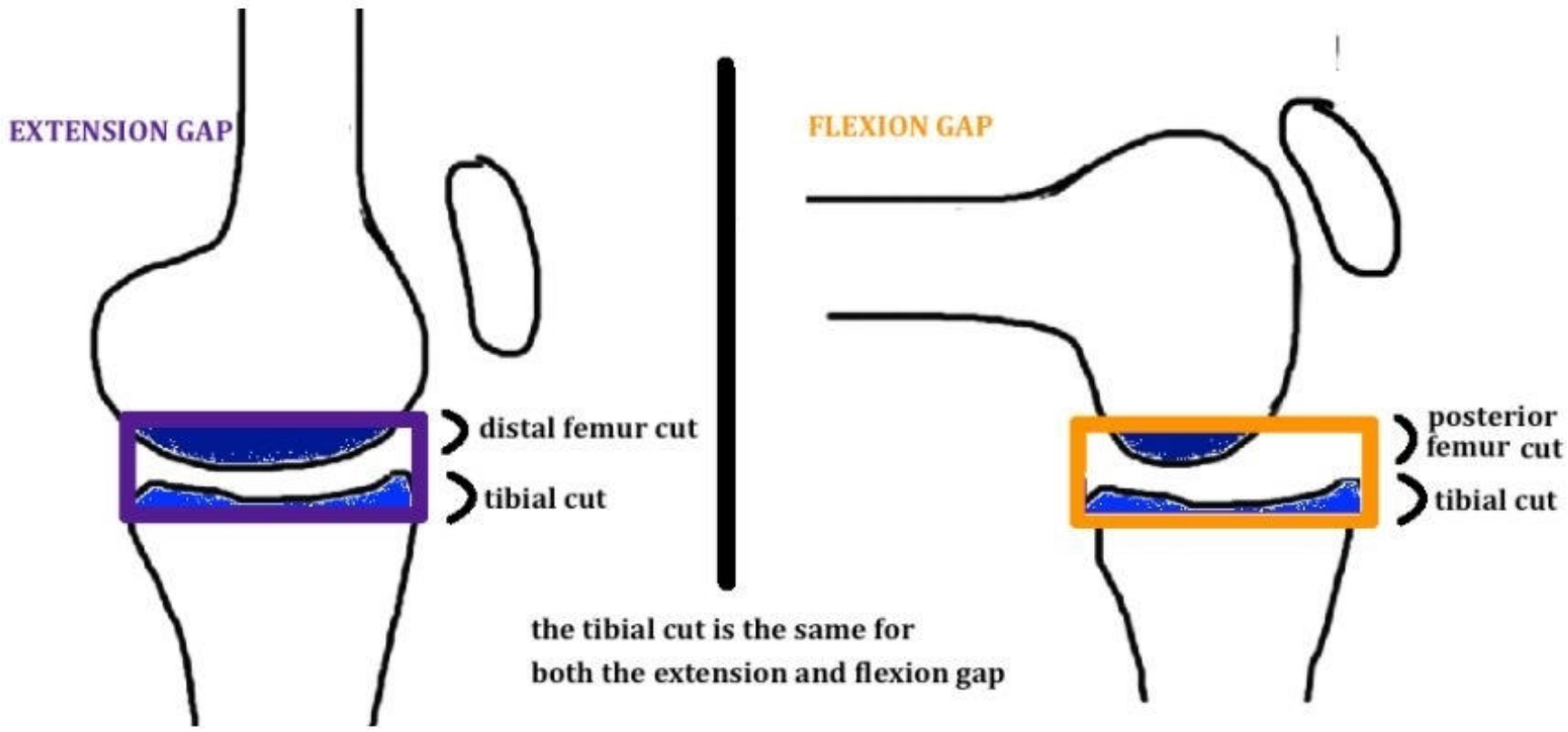
Total Knee arthroplasty-basics



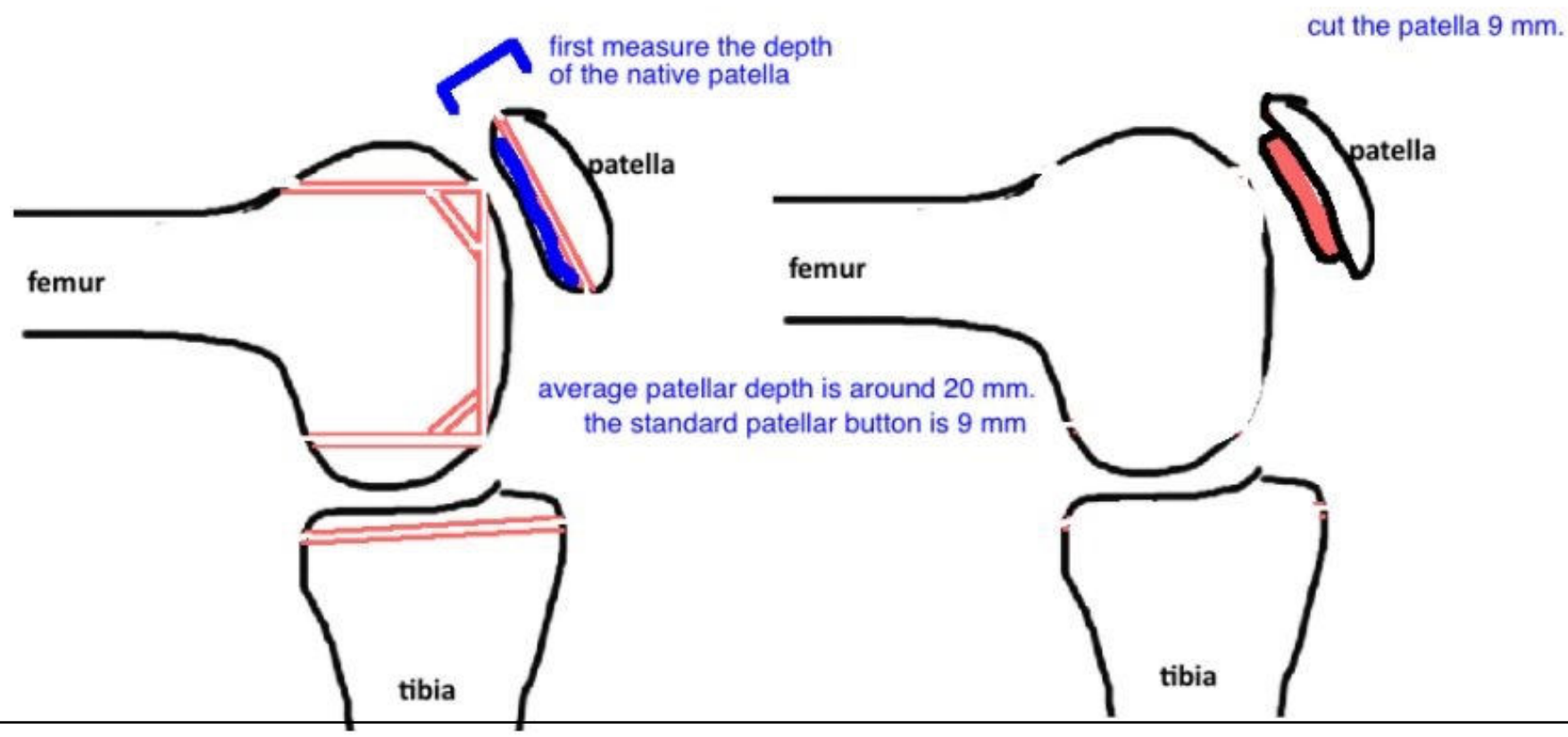
Total Knee arthroplasty-Bony cuts



Total Knee arthroplasty- Gaps



Patellar resurfacing



Case 1-53 y/F

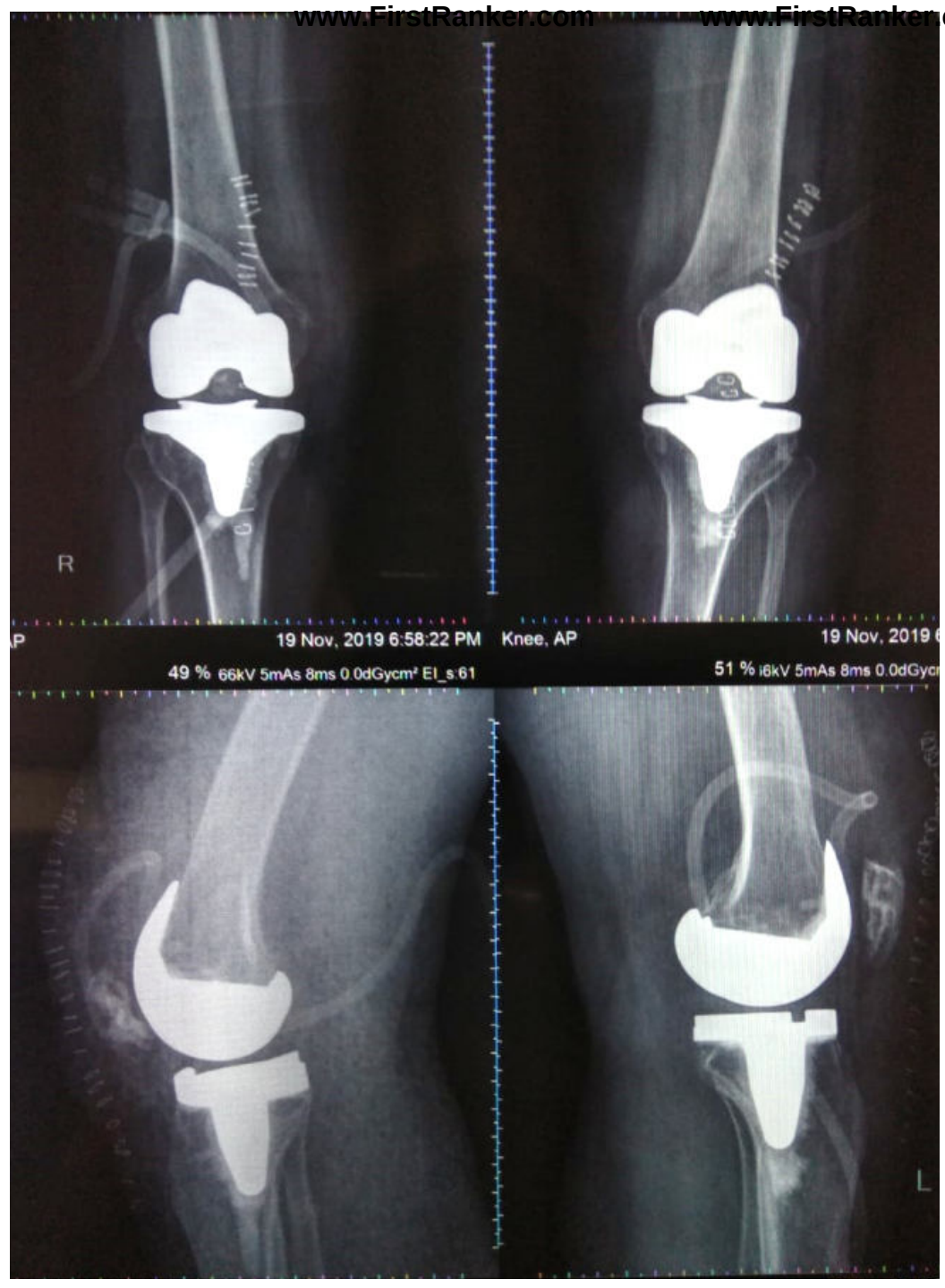
- Pain over B/L knee since 2 years
- Difficulty in walking since 2 years
- Walking without aid
- H/o morning stiffness for more than a hour since 14 years
- Pain B/L shoulder and left elbow
- OKS 18 R, 19 L

On examination

- Medial and lateral joint line tenderness B/L knee.
- Medial patellar facetal tenderness
- Crepitus present over b/l knee.
- valgus RT. 22 degrees, LT. 19 degrees in standing, correctable partially
- No medial laxity
- Range of motion: flexion 8-110 degrees on rt side, 5-100 degrees on left side

Clinical Diagnosis??
Next investigations?

Pre-Op X-Rays



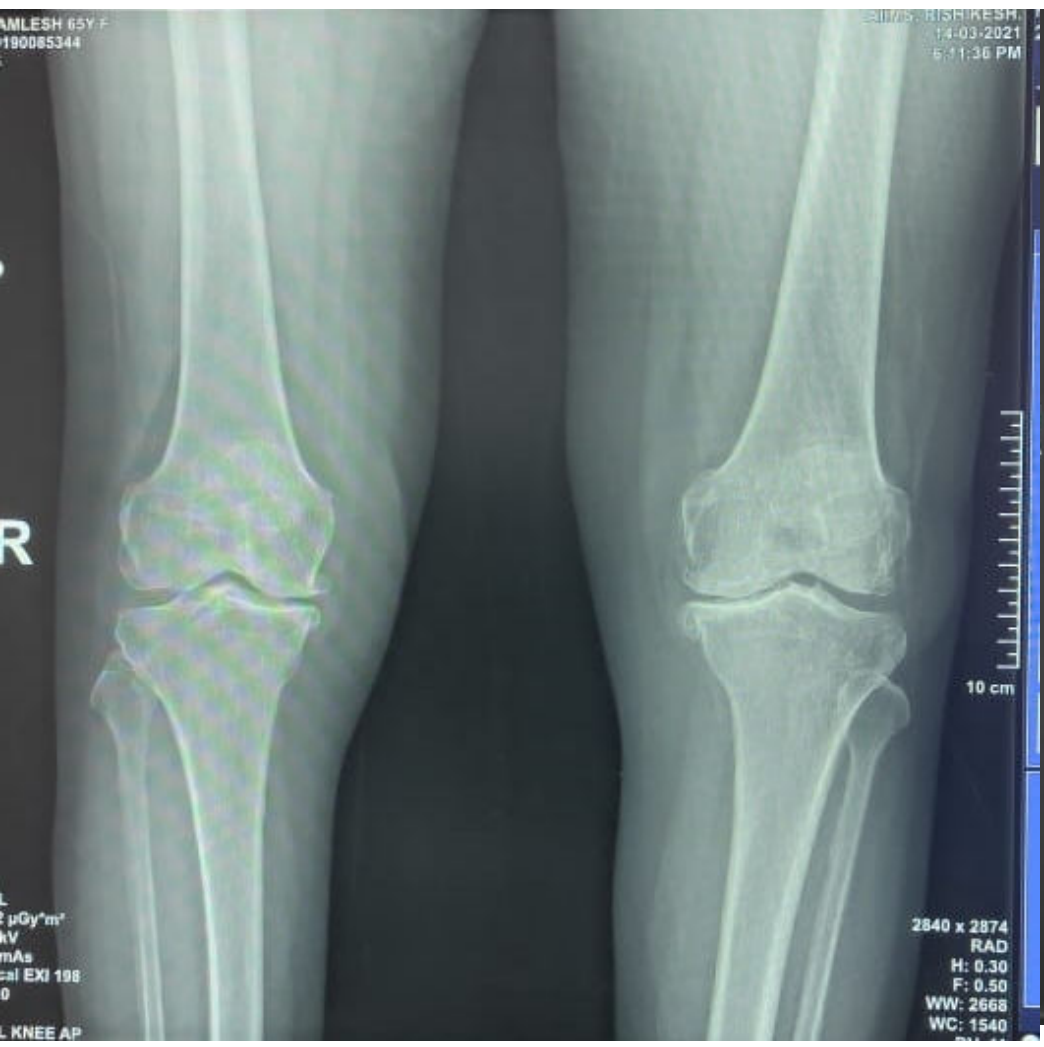
Case 2

- C/O: Bilateral knee pain x 8-10yrs
- Walking with support *2 years
- OKS 21 R, 20 L

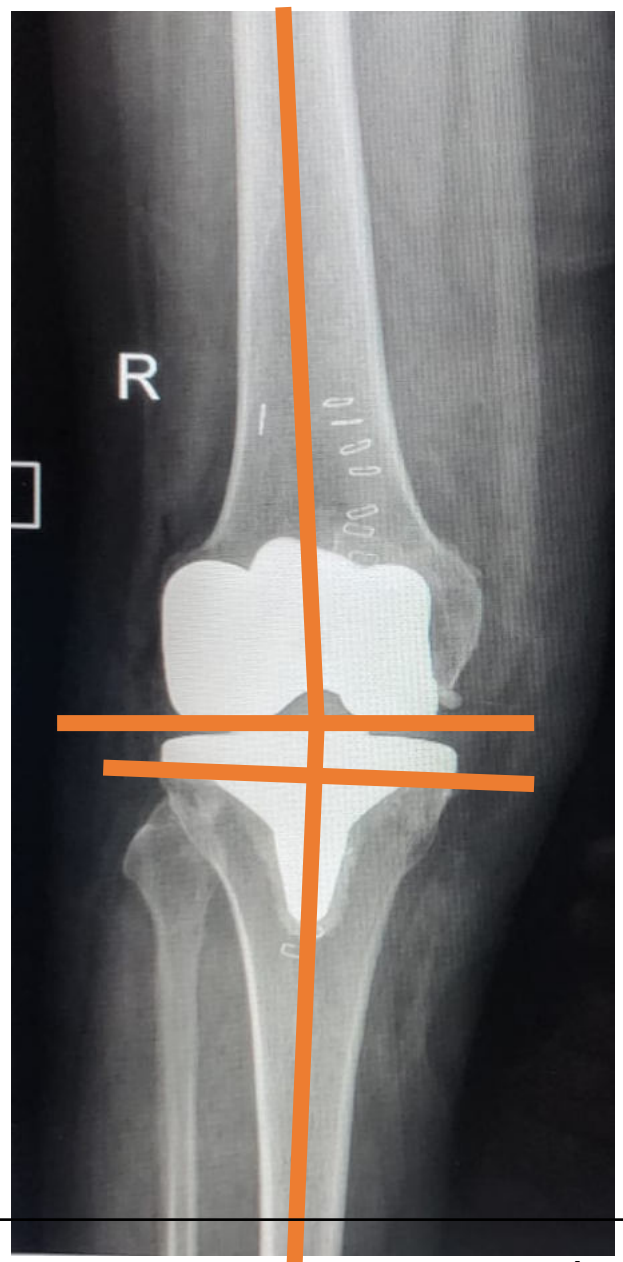
15° varus deformity right and 20° varus deformity left

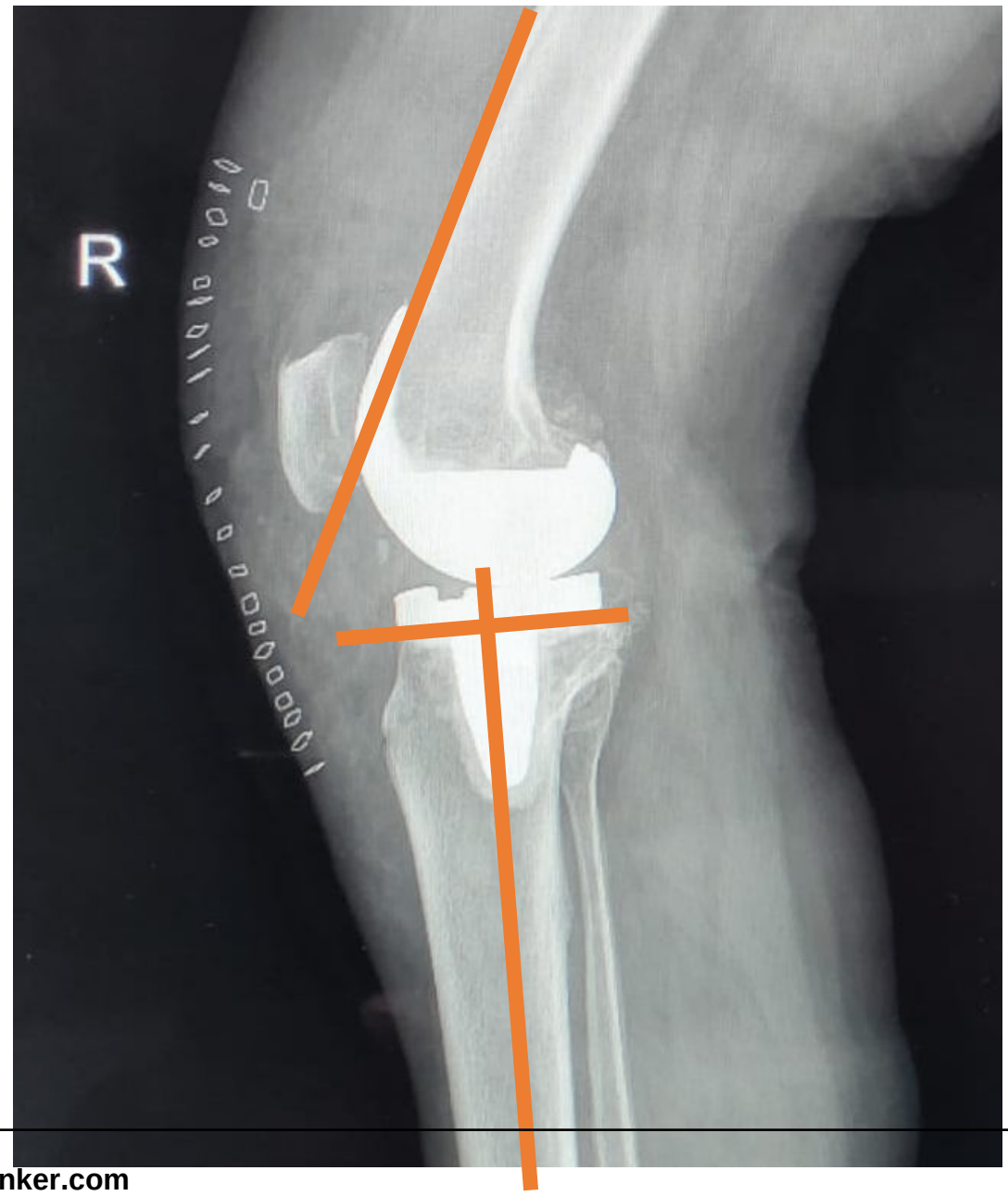
10 ° FFD on right, 5 ° on the left

Pre-op X rays

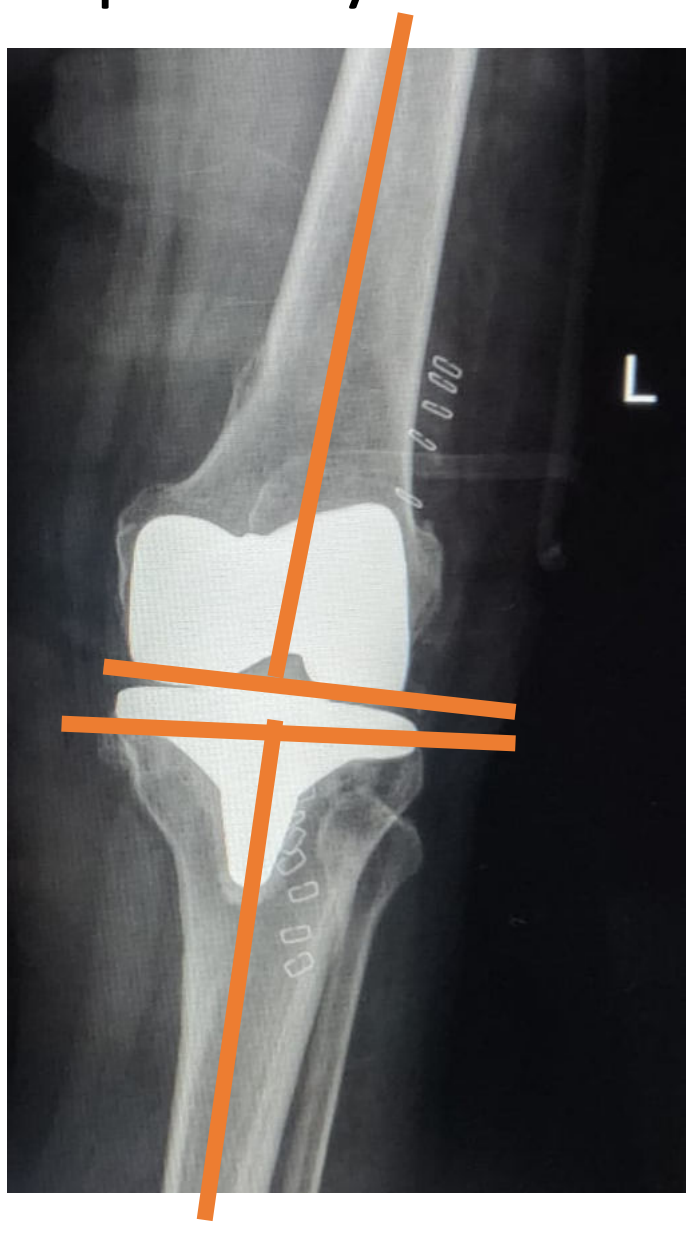


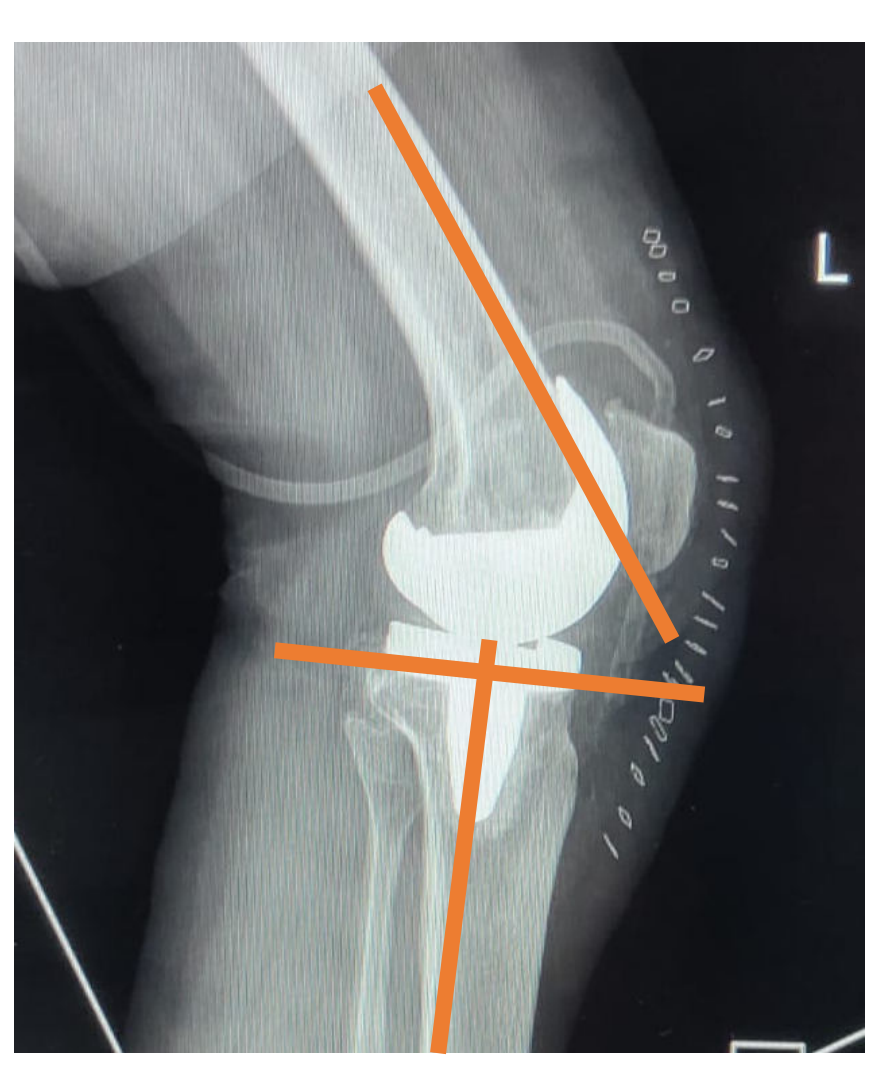
Post-op Xray



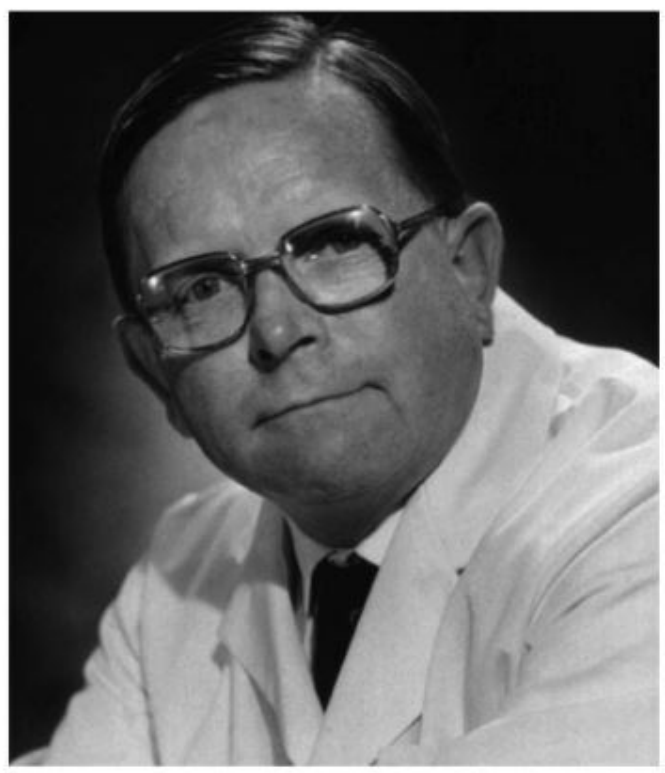


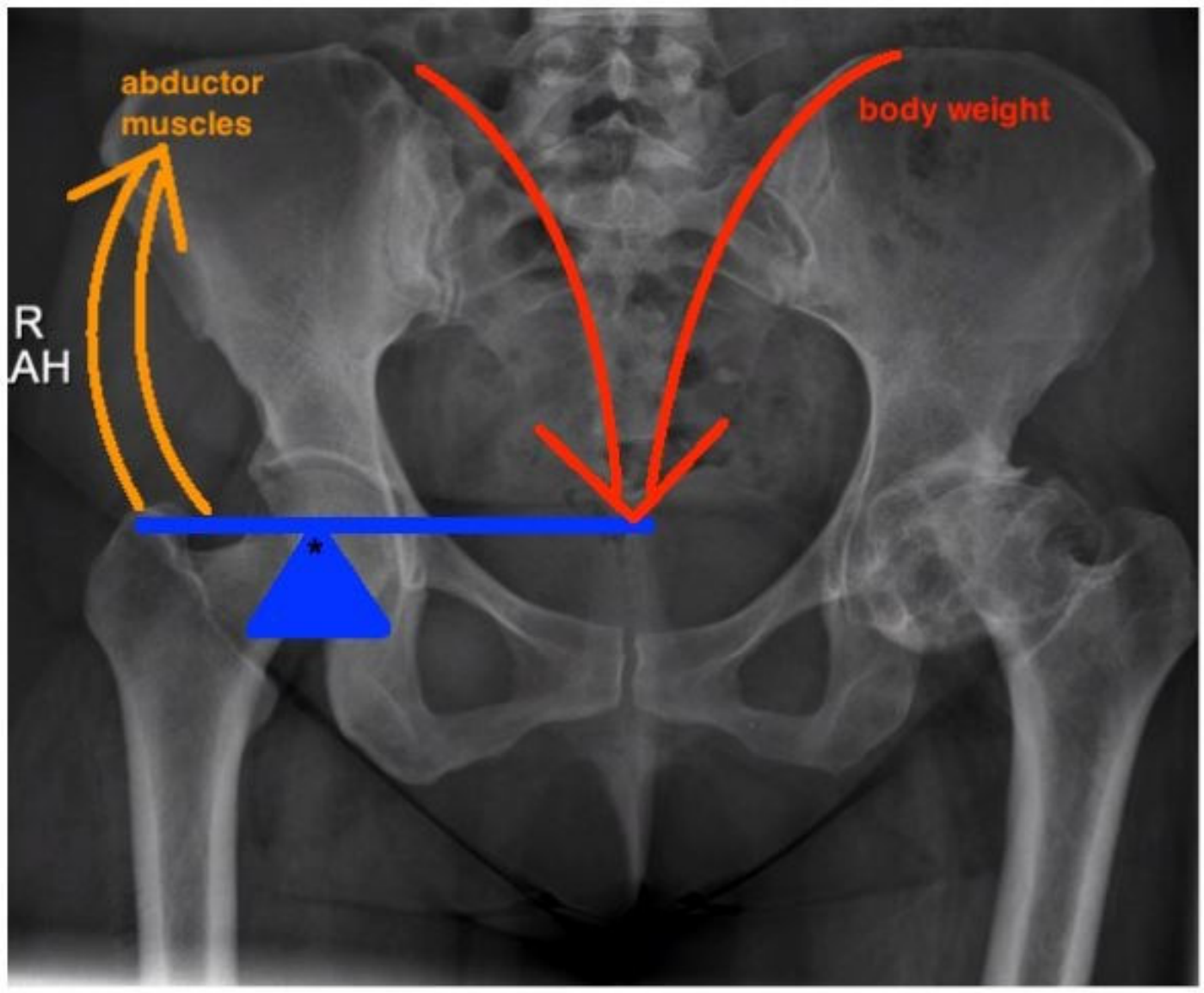
Post-op Xray



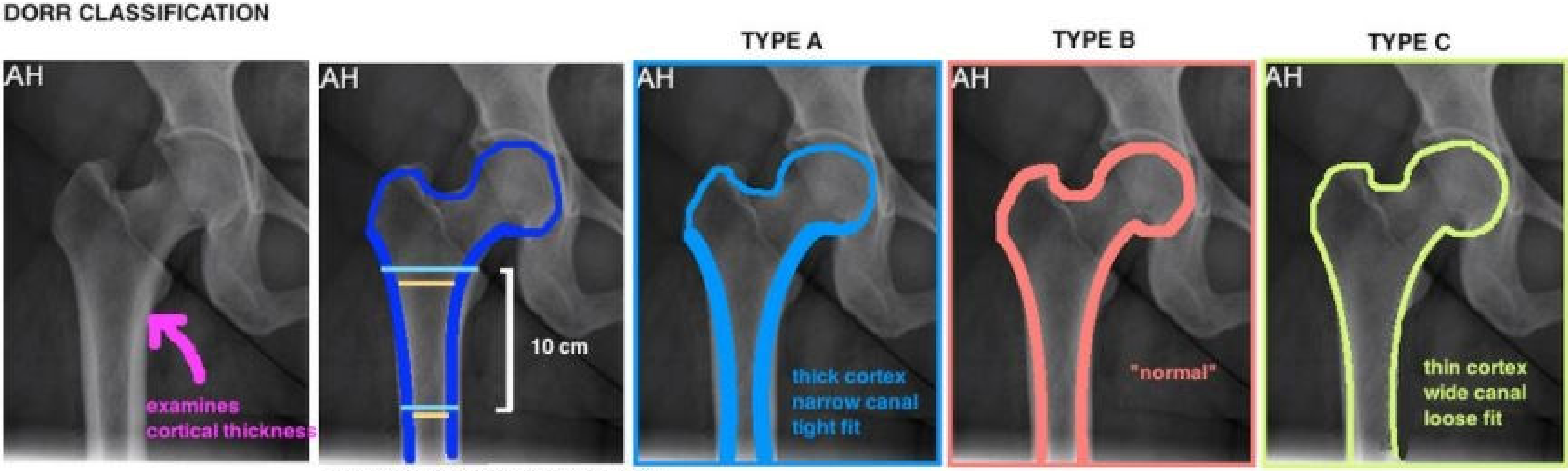


Principles of THA





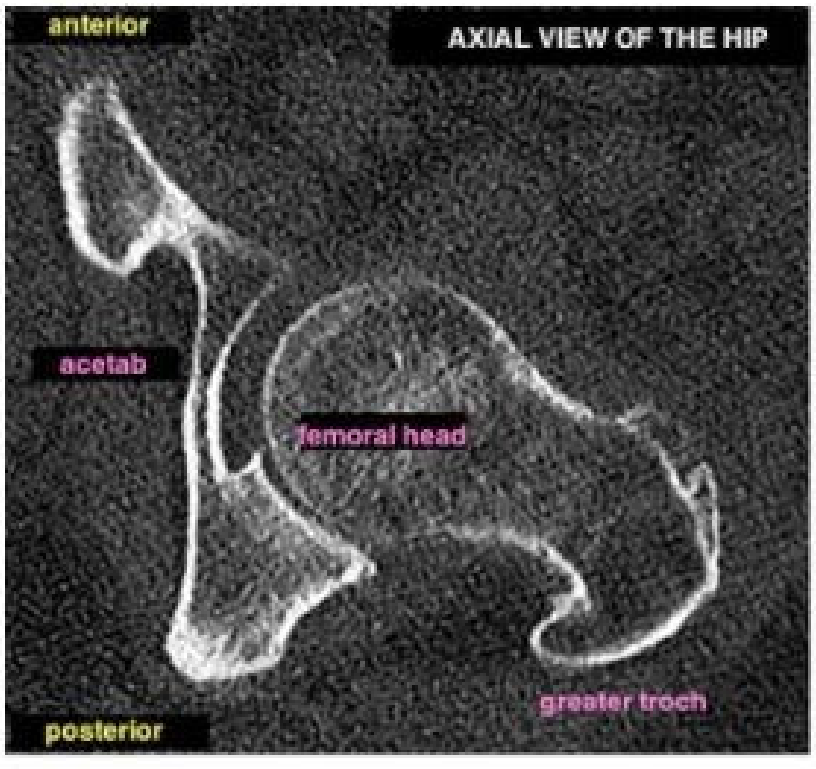
DORR CLASSIFICATION

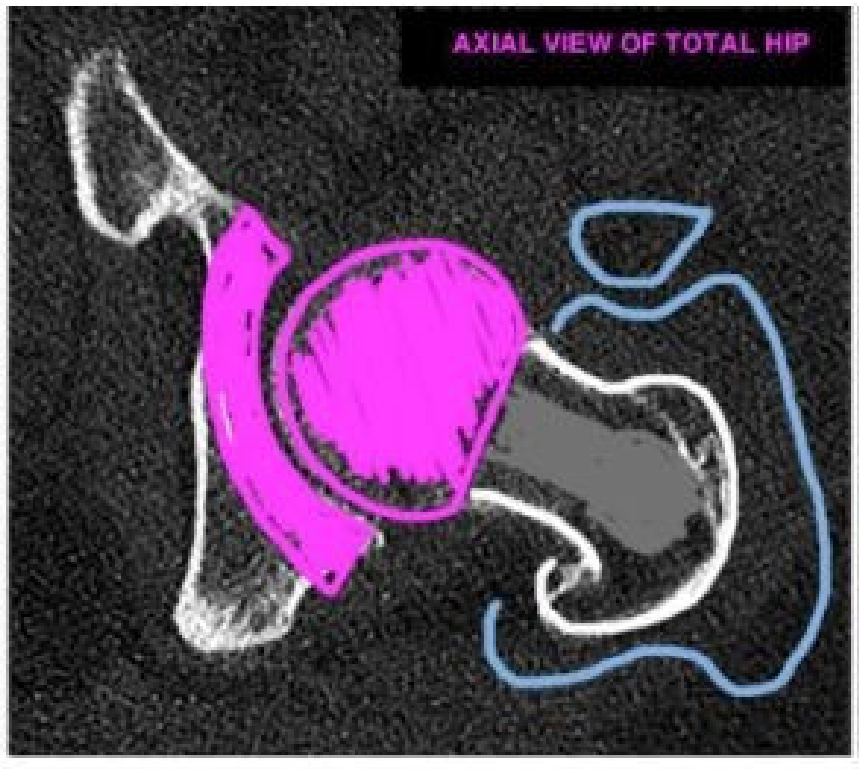


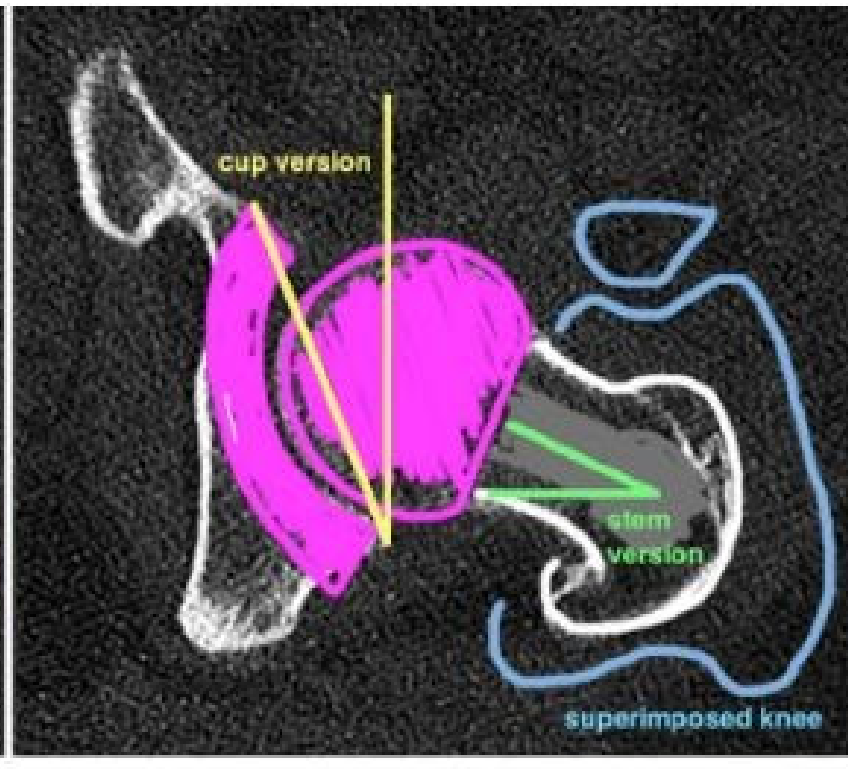
= cortical width minus canal width
(@ 10 cm below lesser)

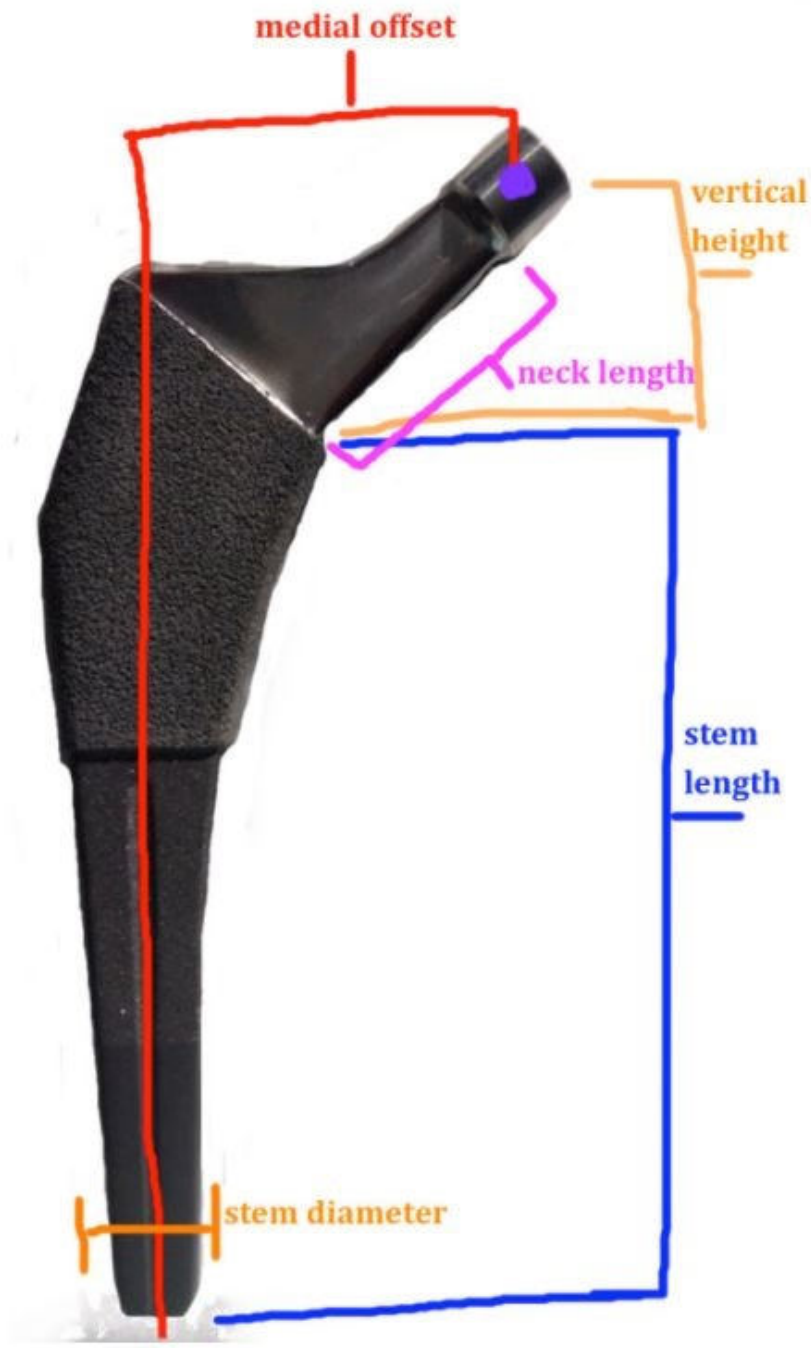
divided by...

cortical width minus canal width
(@ lesser)

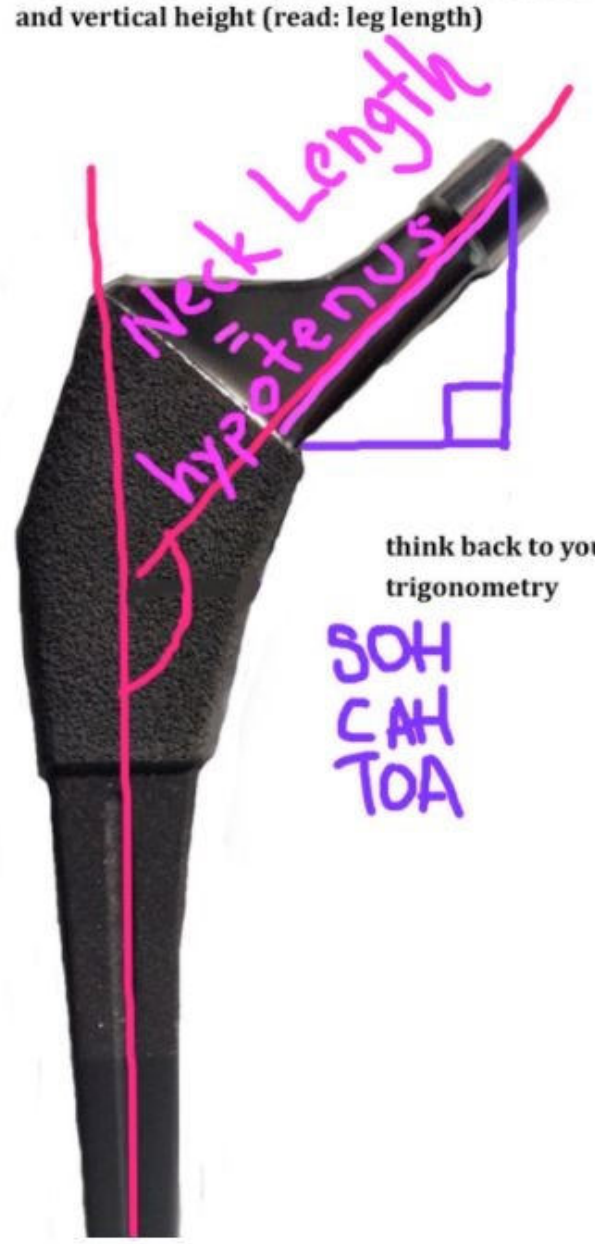






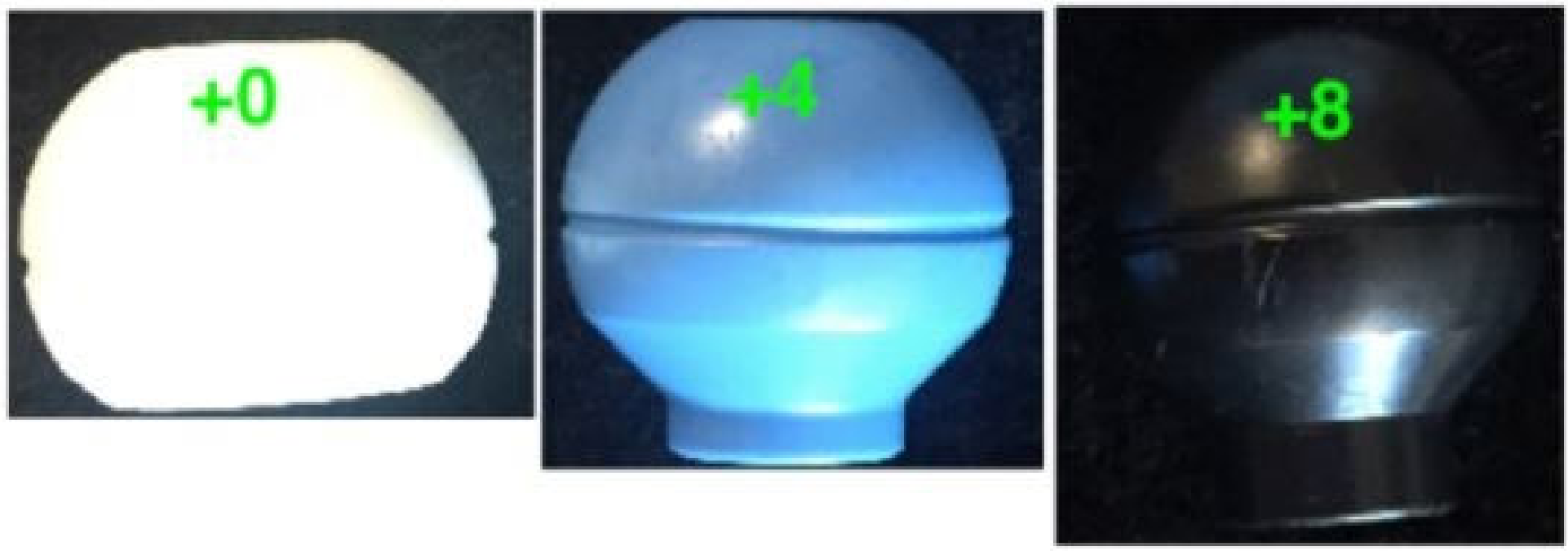


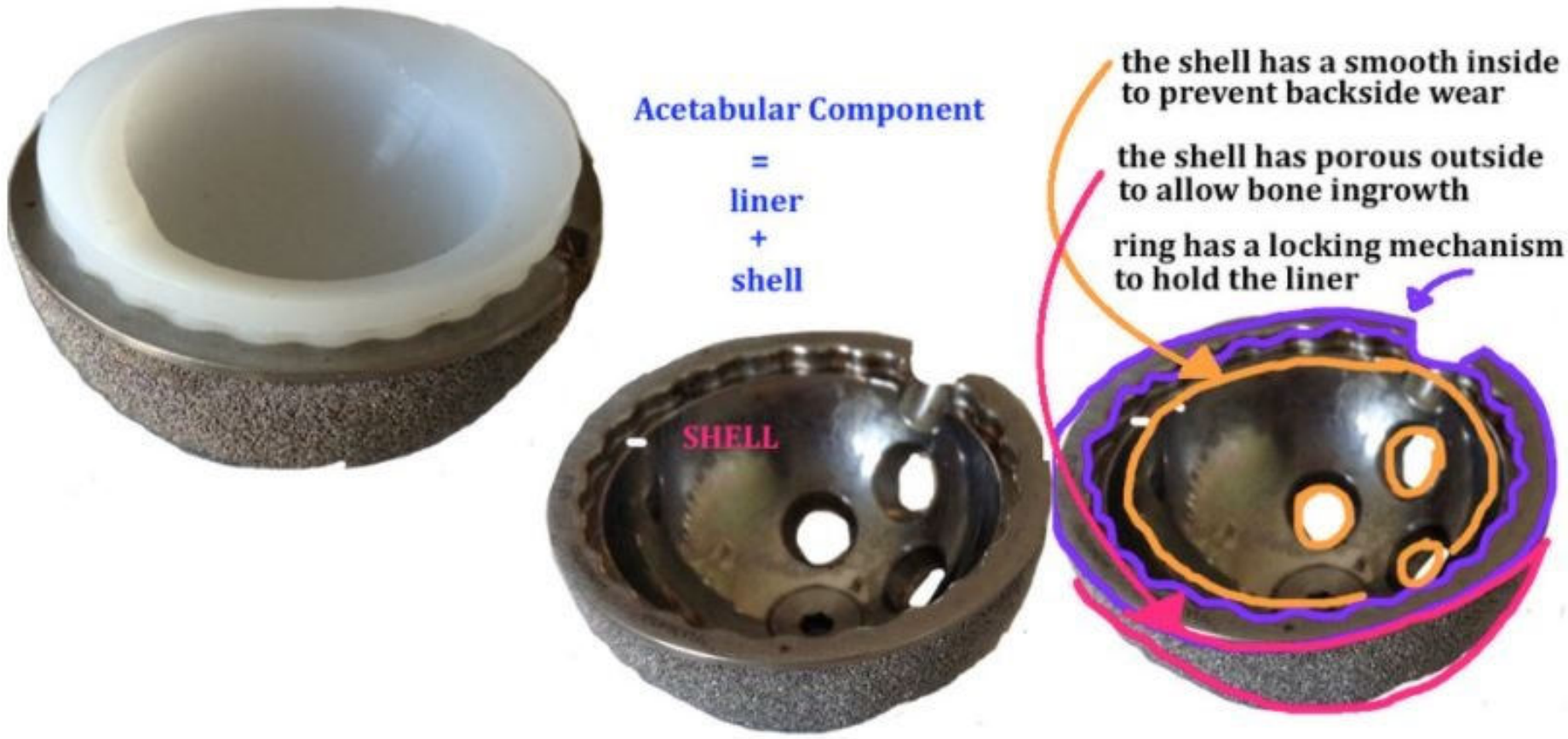
its important to recognize that neck length is a diagonal therefore, increasing neck length, also affects medial offset and vertical height (read: leg length)

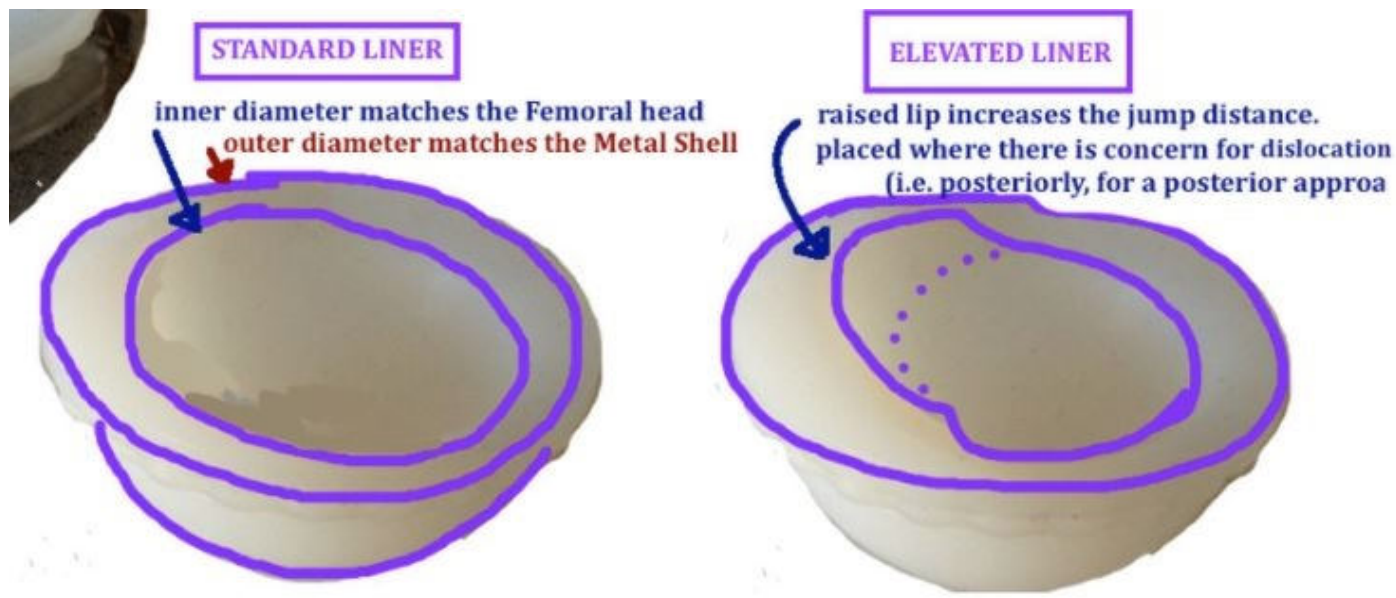


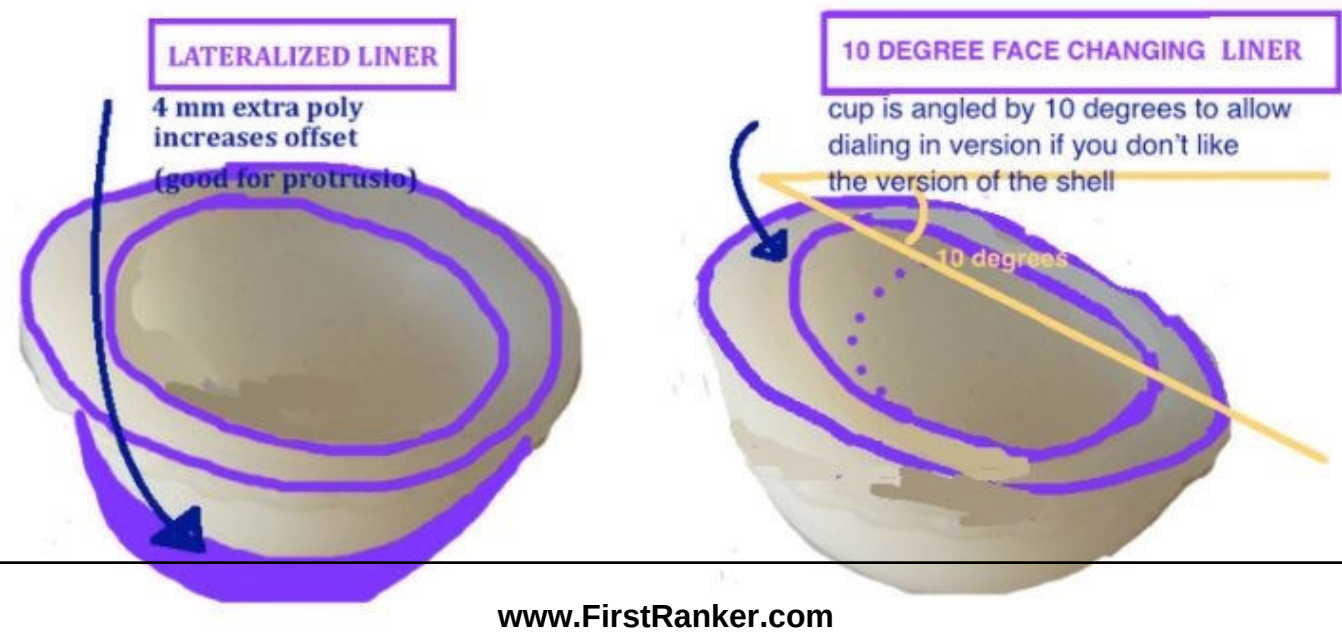
think back to your days of trigonometry

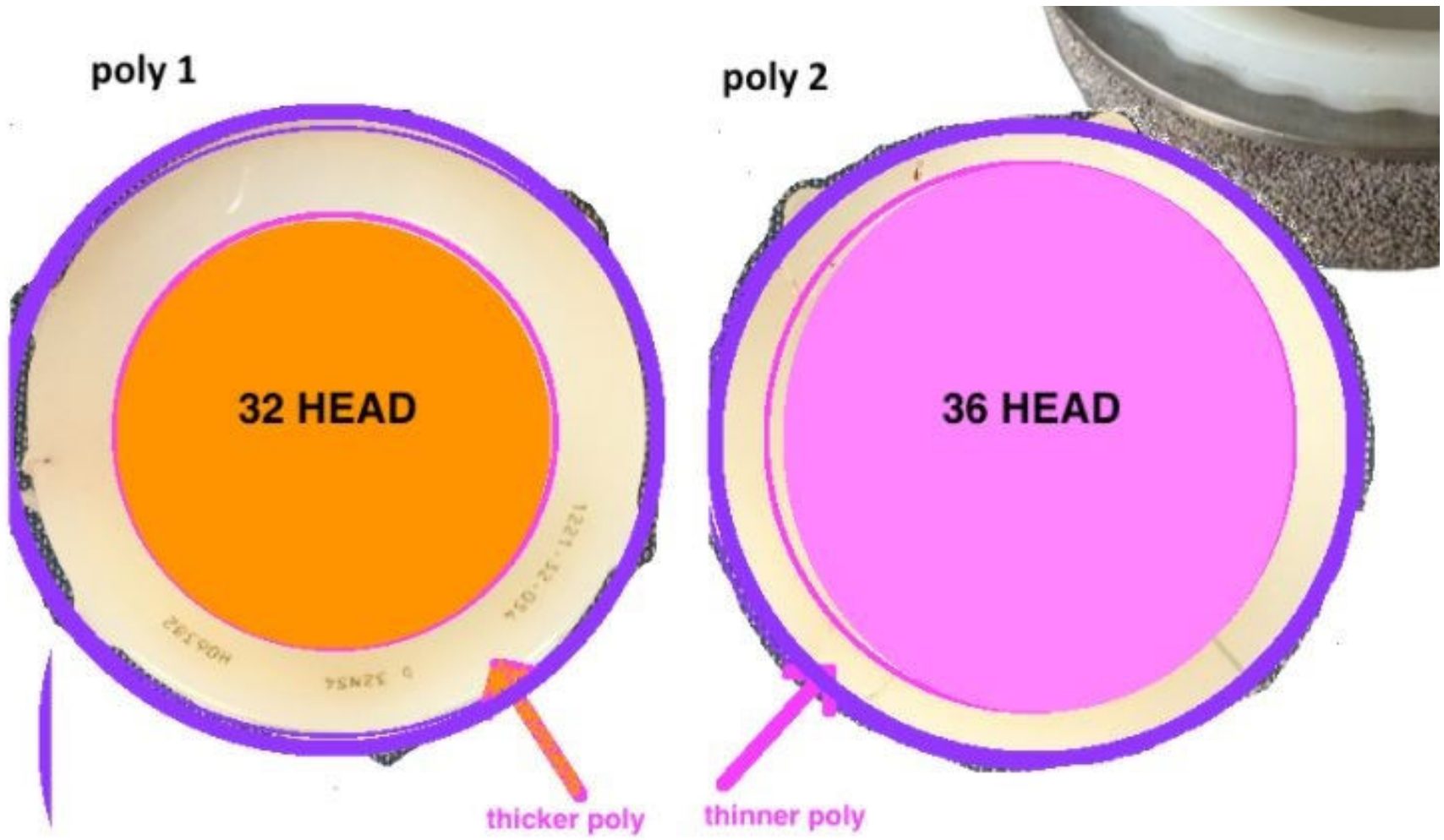
SOH
CAH
TOA

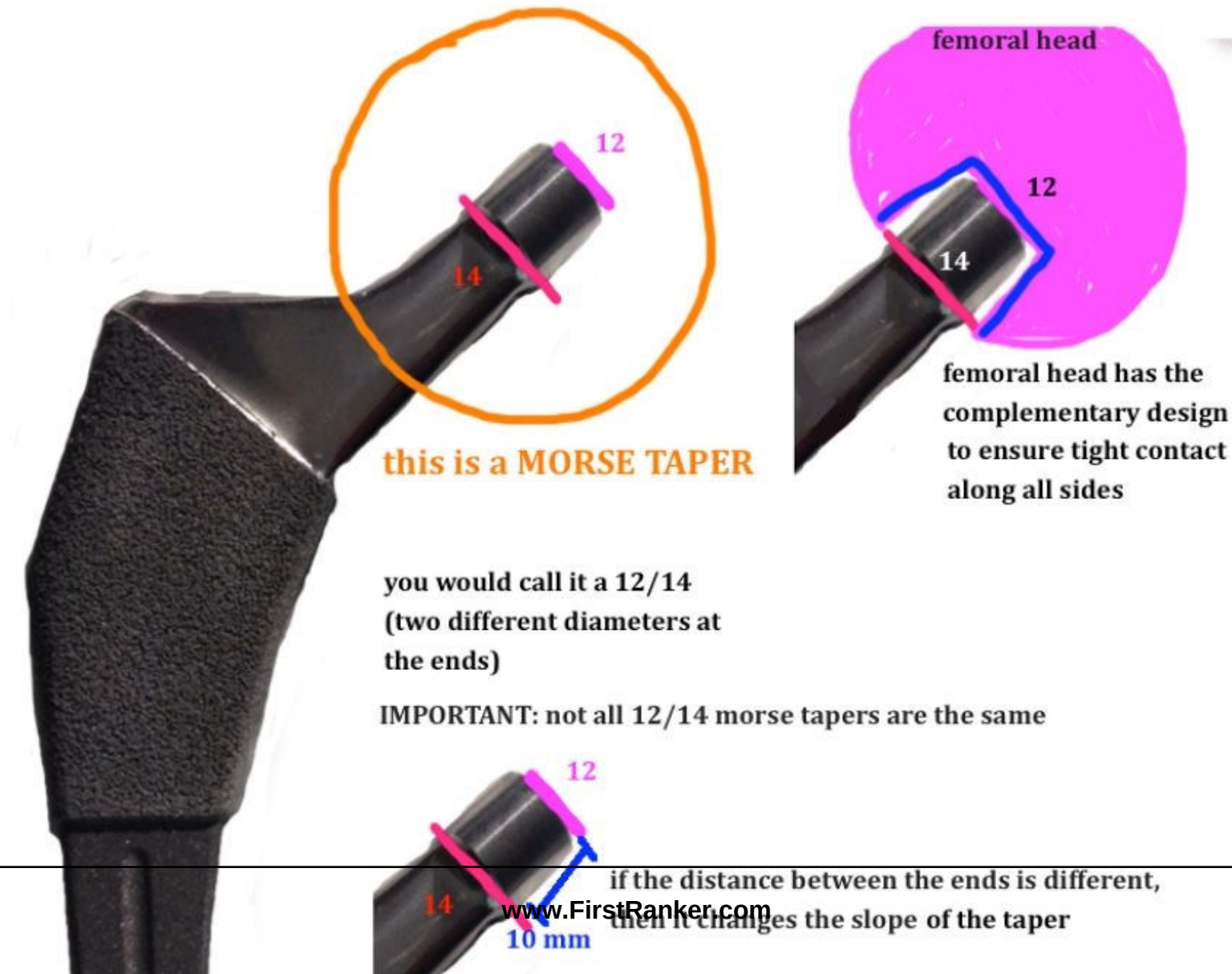


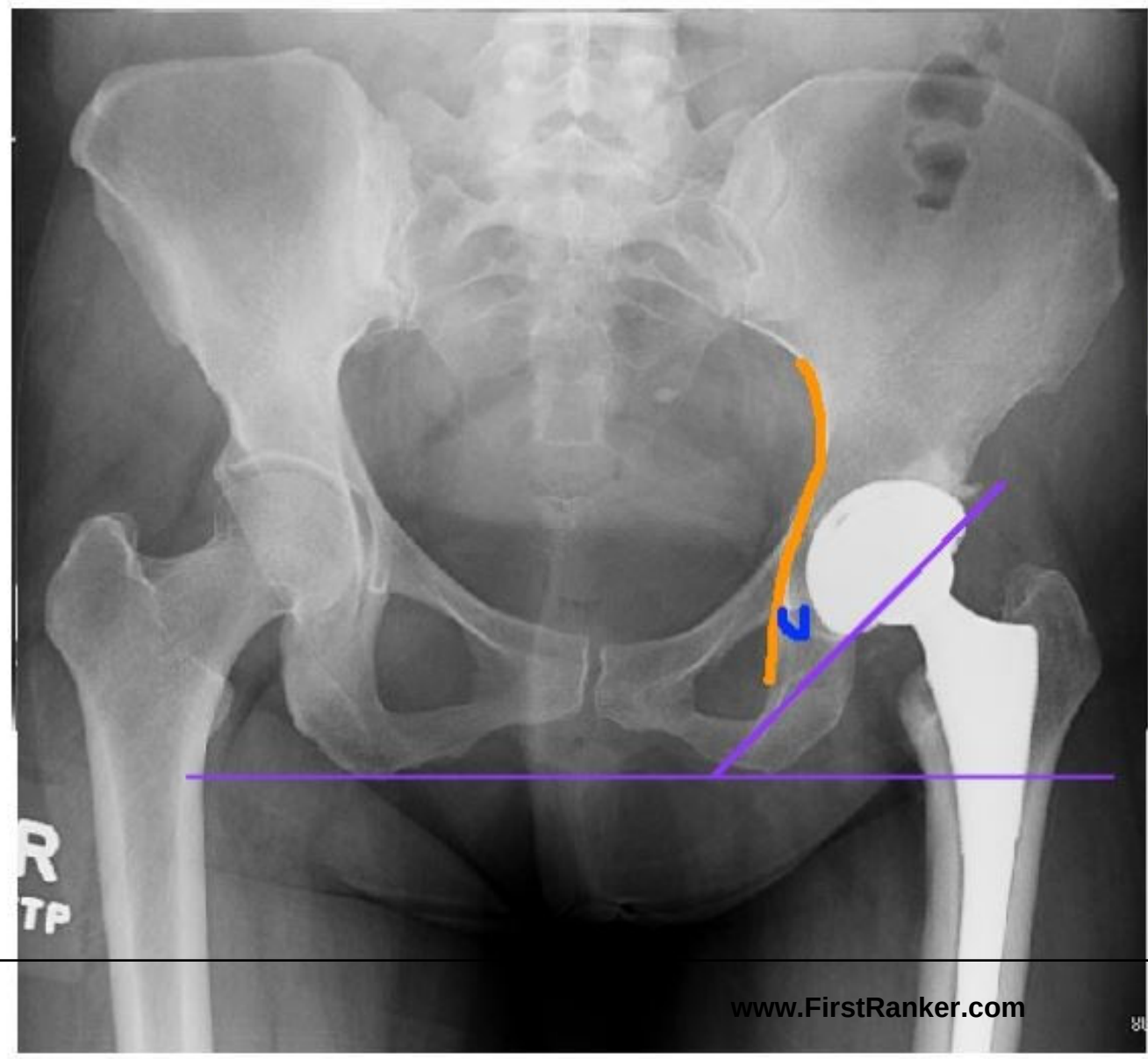












INCLINATION

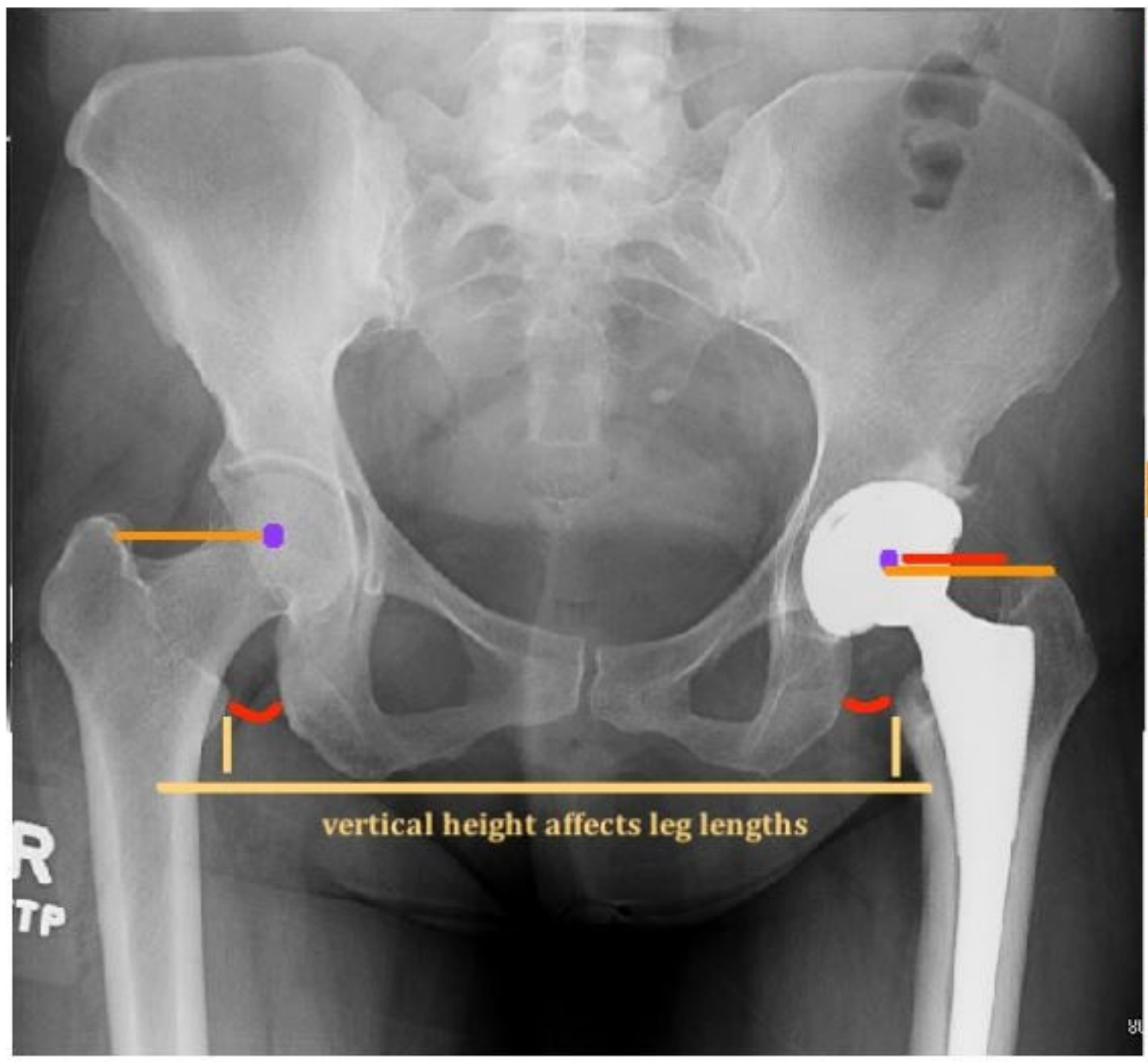
angle between 2 lines
1. horizontal reference
(line across ischial tuberosities)
2. line across rim of cup

DEPTH

cup should sit up against the ilio-ischial line for appropriate depth

HEIGHT

inferior aspect of cup should sit at the tear drop. use contralateral side as a reference



MEDIAL OFFSET

center of femoral head to center of stem

you can also compare the distance
lesser troch - to - ischium on each side

VERTICAL HEIGHT

general rule - center of femoral head
should be at the same level as
the tip of the greater troch

for accurate measurement
to determine
leg lengths - distance of lesser troch
to vertical line across ischial tuberosities

Case 3

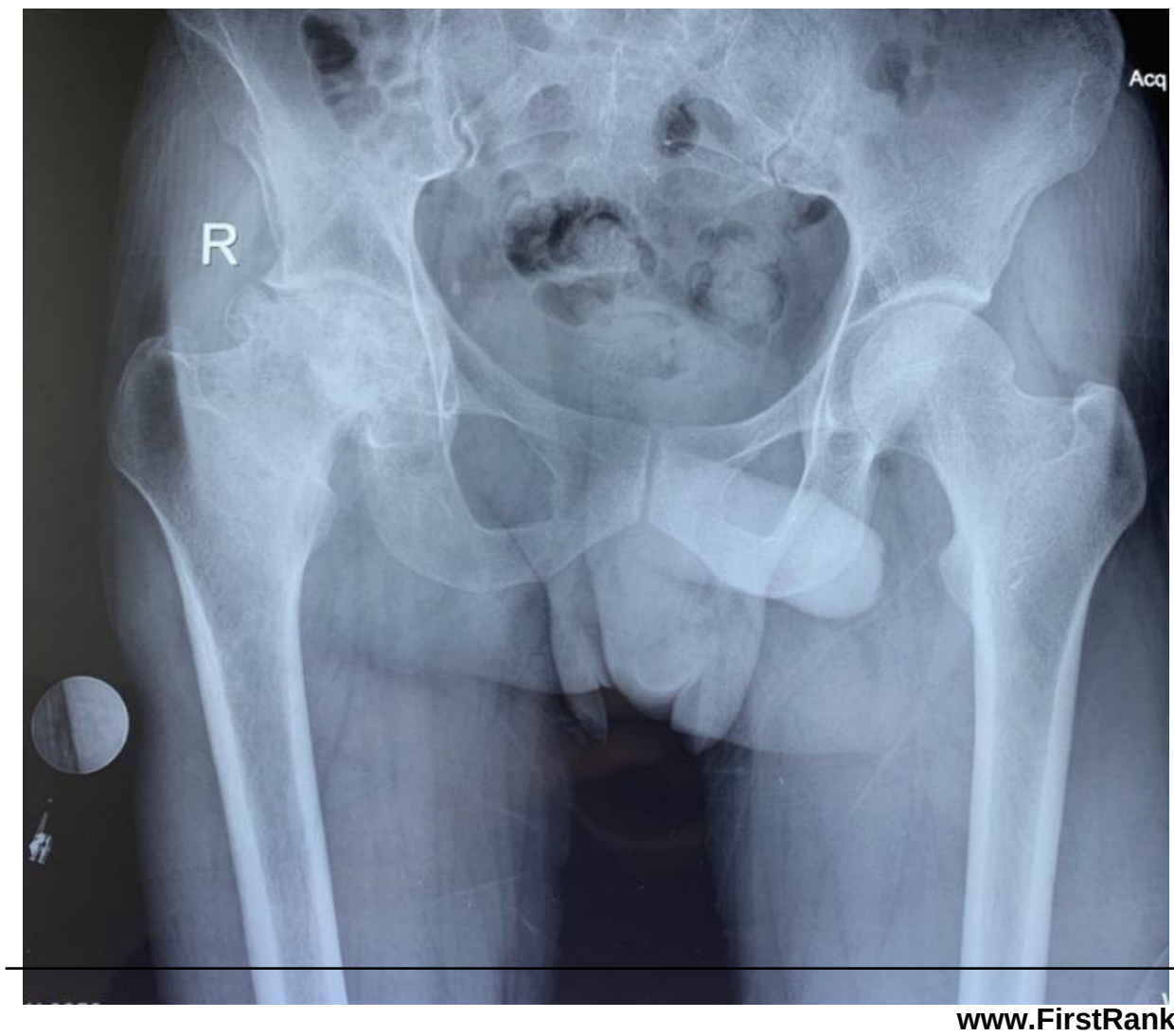
- Patient presented with C/o pain in right hip x 3 yrs
- Gradually progressive, dull aching in nature
- Pain increases on walking and strenuous activities
- Relieves on taking medication and rest
- H/o indigenous medication intake for 1 year till dec 2019
- No H/o trauma, fever, TB contact or ATT intake

- Tenderness at anterior hip point

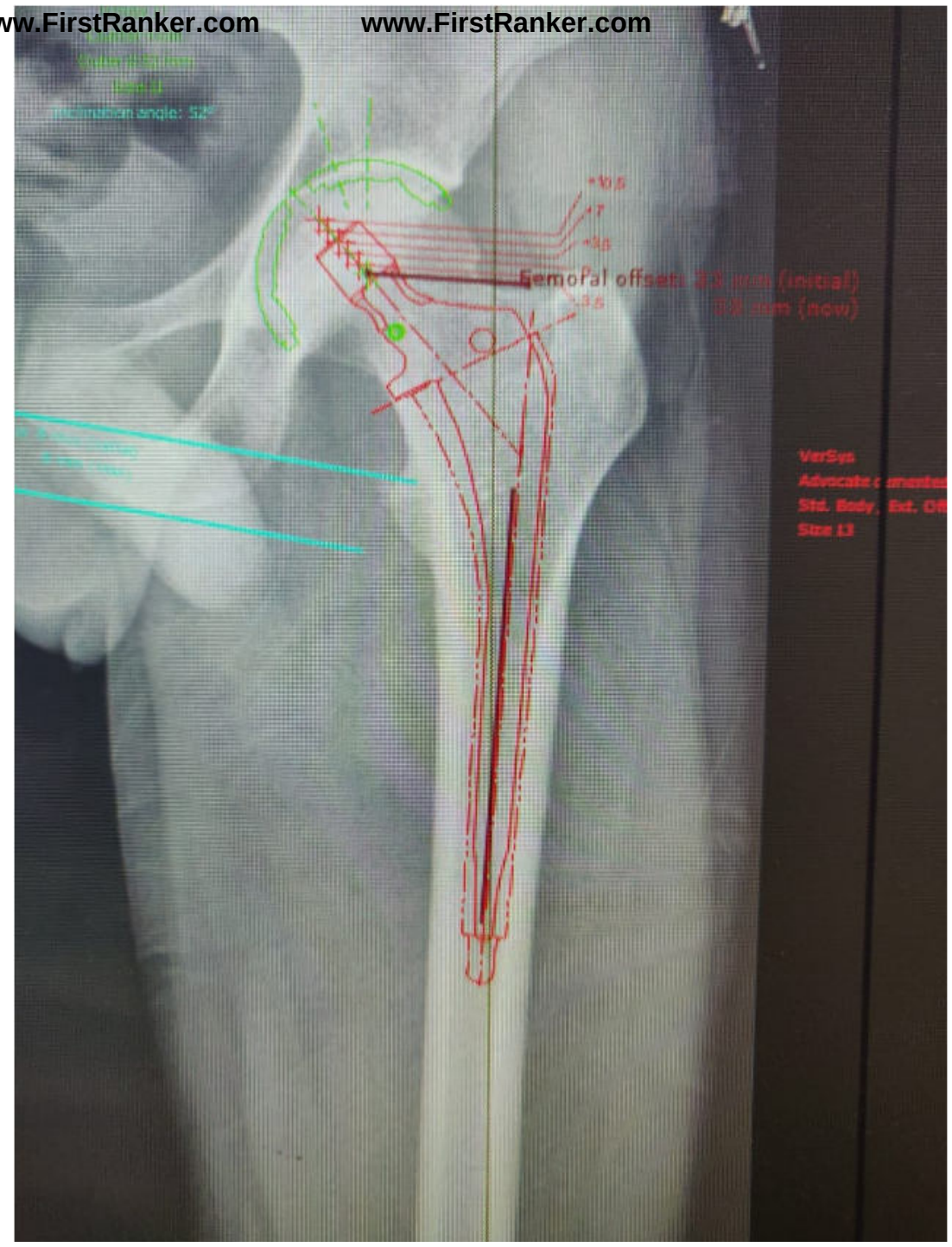
➢Deformity- Right limb

- 10* FFD (Thomas test)
- 10* external rotation
- 20* adduction deformity
- 2 cm supra-trochanteric shortening

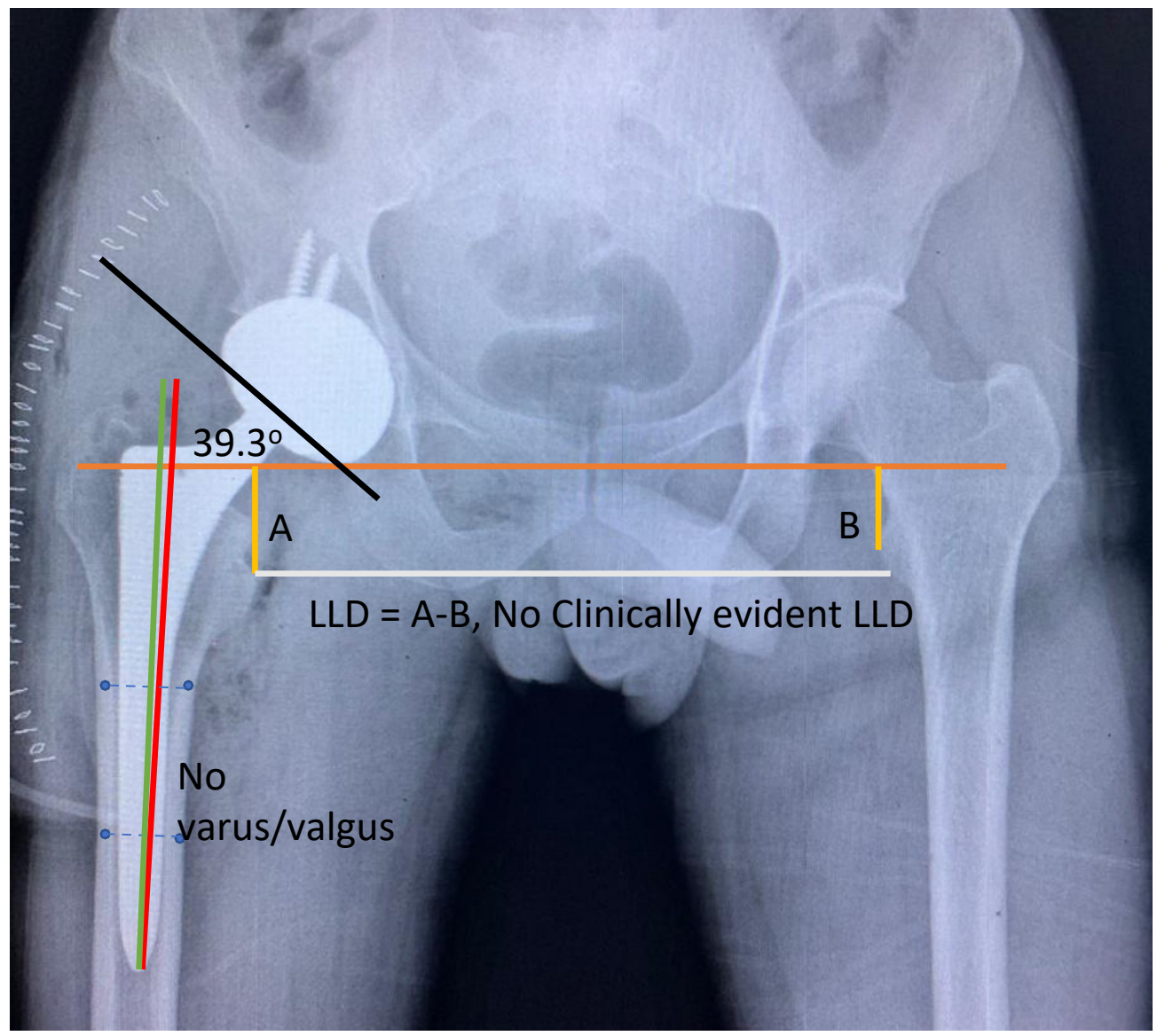
Pre-op x ray



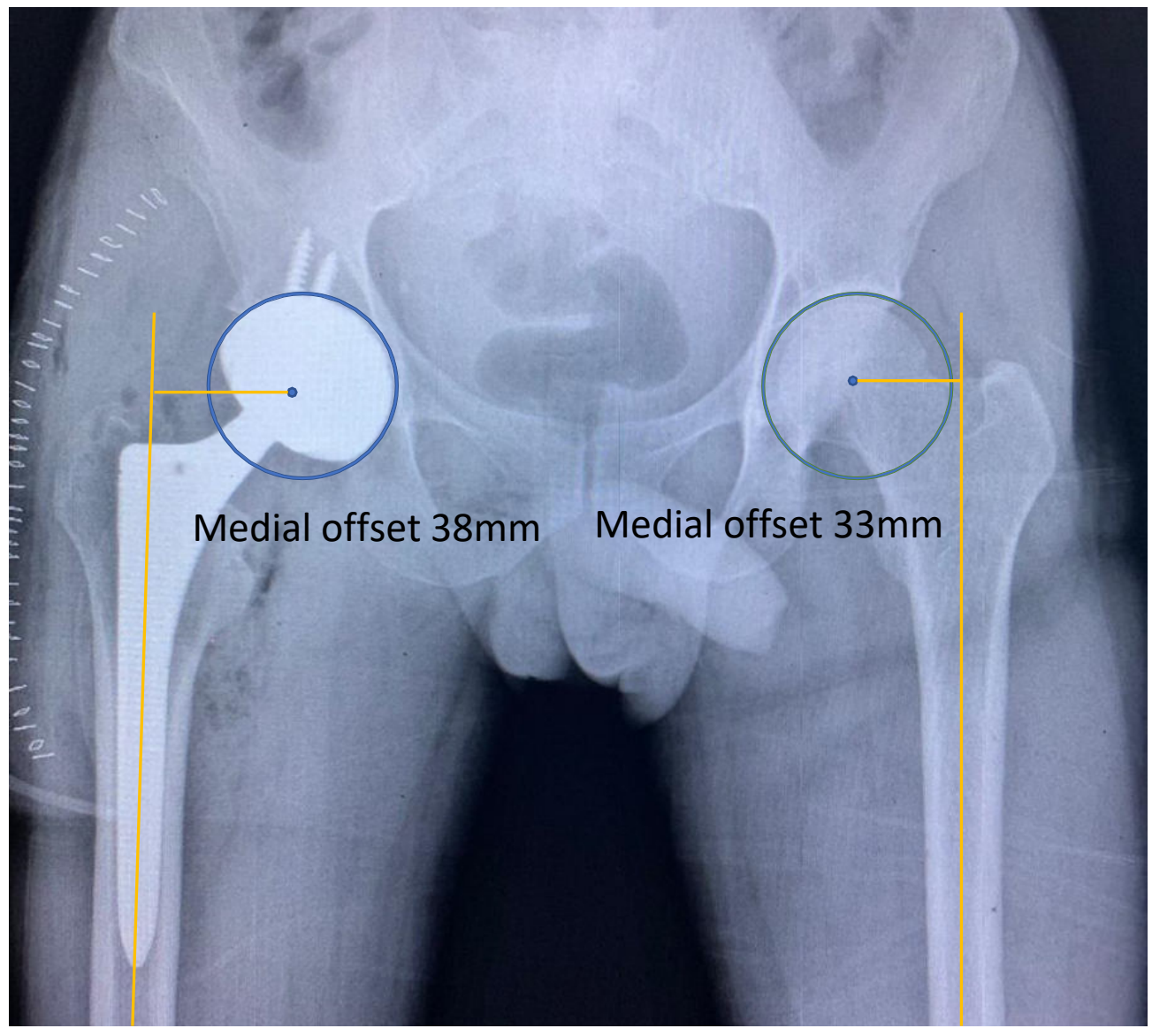
Pre-operative Templating



Post-op x ray



Post-op xray



Case 4 57 years old male

- C/o Low back ache x 10-12 yrs
  Neck pain x 8-9 yrs
  B/L hip pain x 3-4 yrs
- K/C/O Ankylosing spondylitis

Examination

- Gait : Stiff Hip Gait, walks with support

	Right (degrees)	Left (degrees)
Flexion	20-80	40-60
Extension	-	-
Adduction	-	20 fixed
Abduction	15 fixed	-
IR	0-20	-
ER	0-10	20 fixed

2 cm apparent shortening left side with flexion deformity

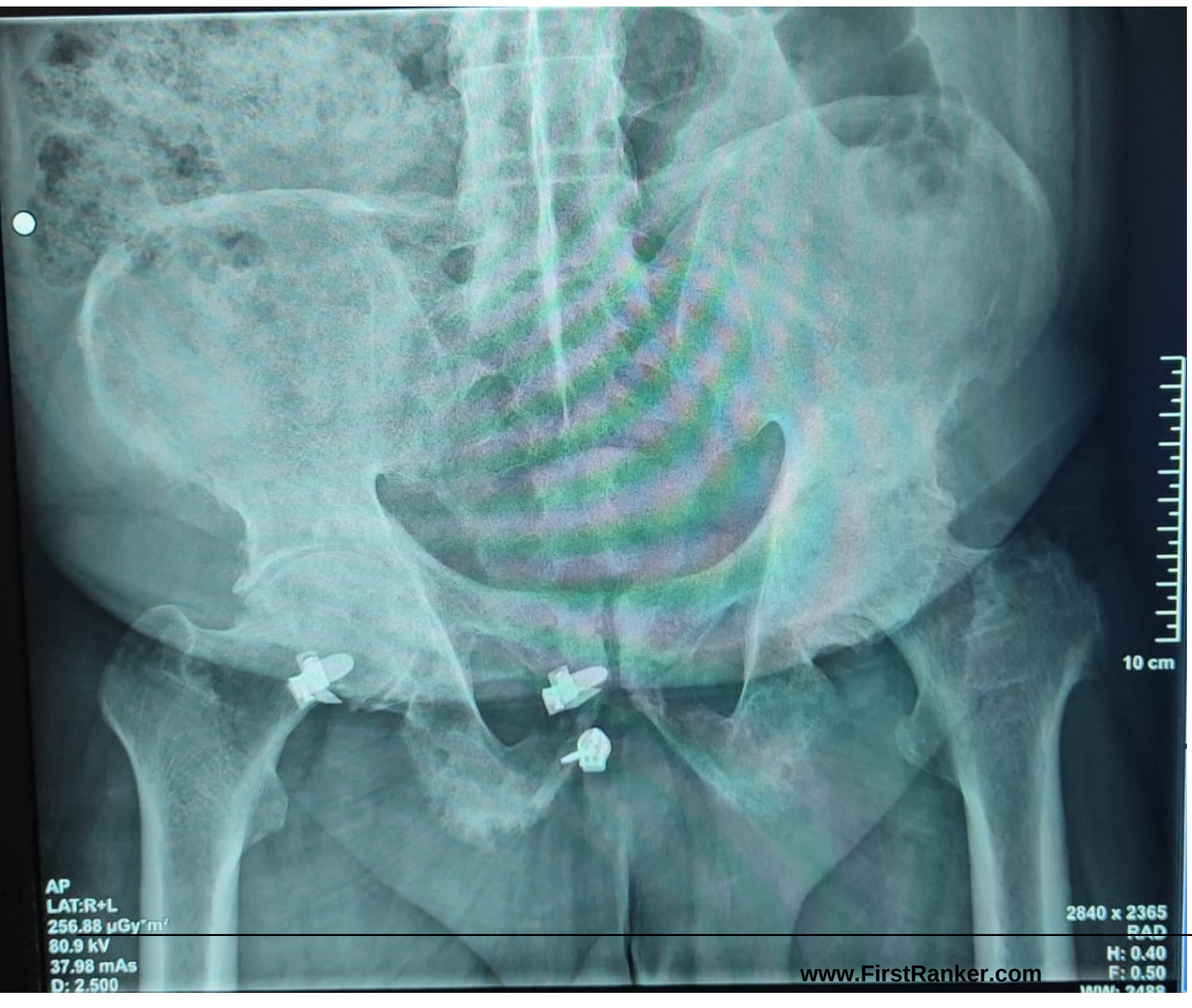
Examination

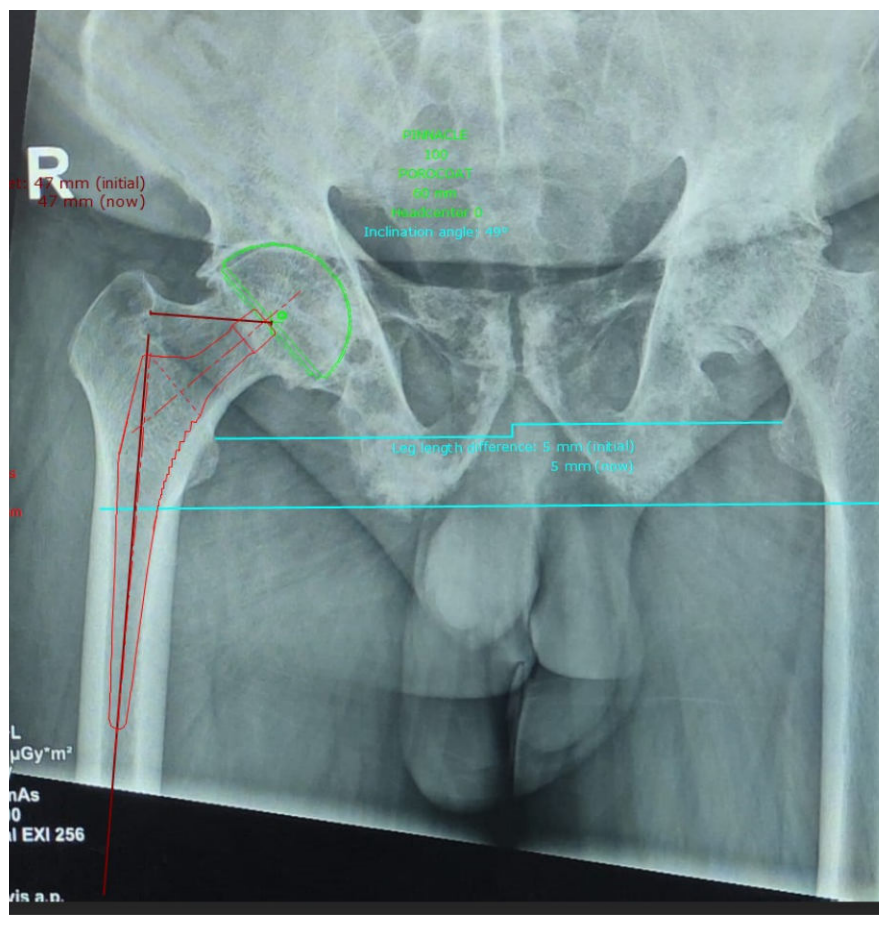
- Measurements:

	Right (cm)	Left (cm)
Apparent length	107	105
True length	91	89
Femur length	46	46
Tibia length	40	40

Examination

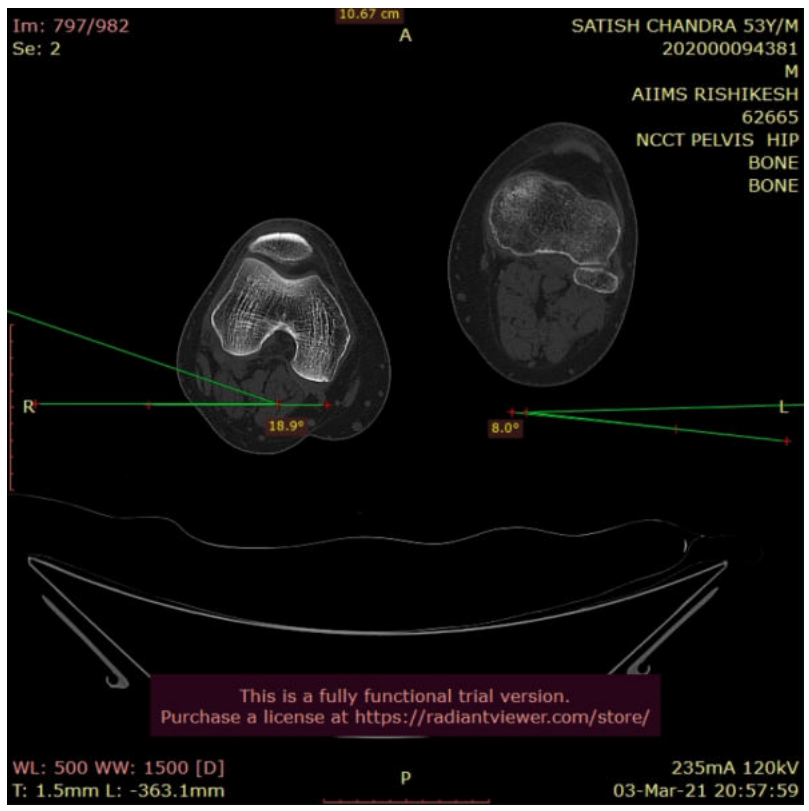
- Cervical spine- wall to occiput-33 cm
  wall to tragus- 41 cm
  ROM- 5° rotation
- Chest expansion- 0.5 cm
- Mod. Schober test- 0.5 cm increase in forward flexion
  - Ganslen test- +ve
  - FABER test- could not be performed, because of the ankylosed hips

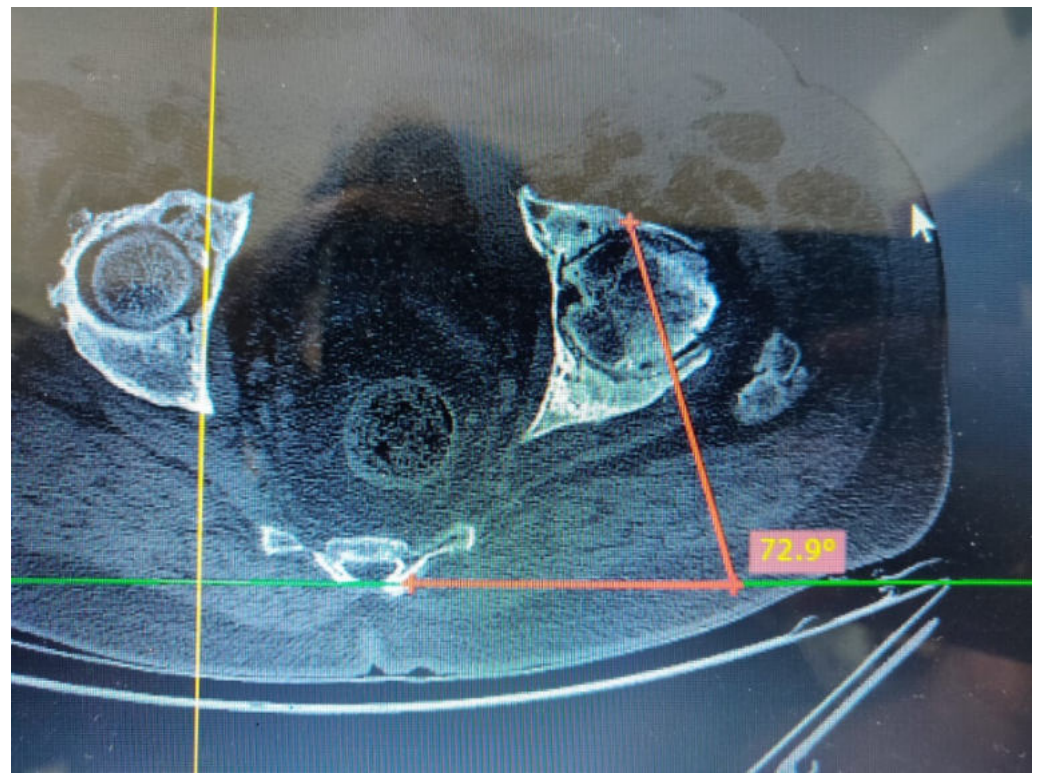




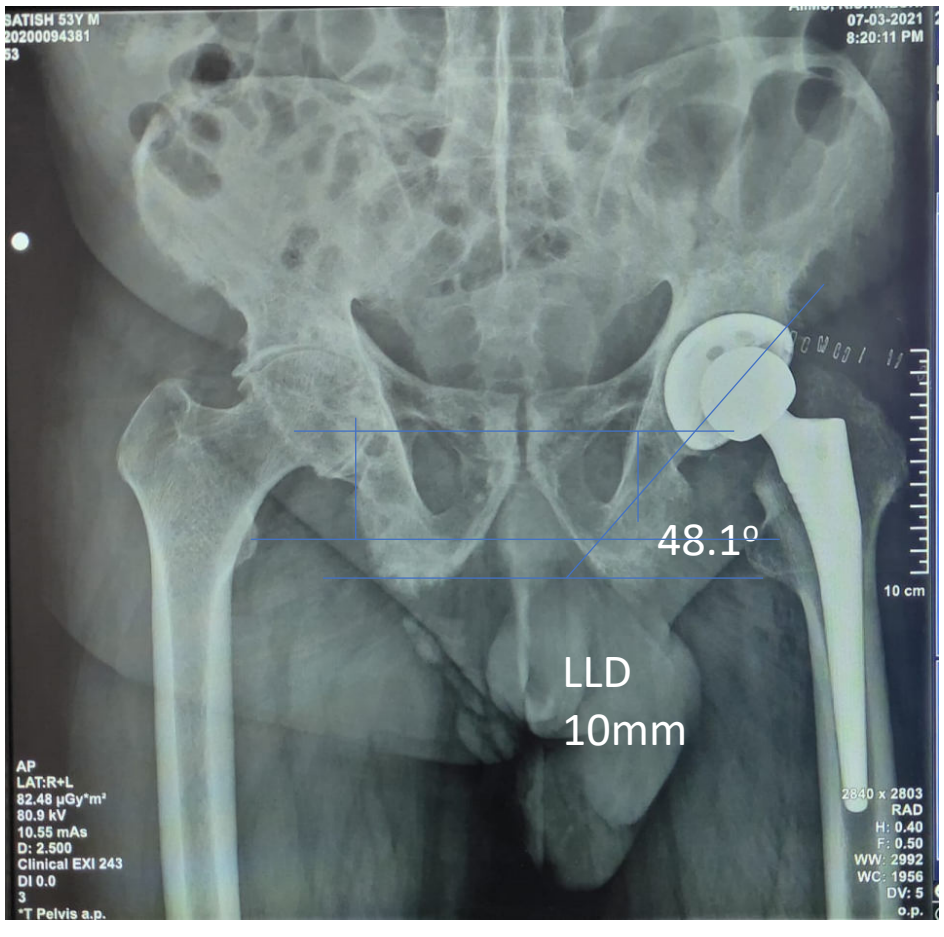
Templating Cup Size – 56
Stem size - 11

Pre-operative CT





- Right FA – 18.9
- Left FA - 8



Post op Radiograph

Conclusion

- Surgery of the century
- Extremely satisfying results
- Good long- term results
- The problem of arthritis will increase as our population ages
- Revisions are challenging – Bone defects and soft tissue problems

Thank you