PAO Surgical Technique

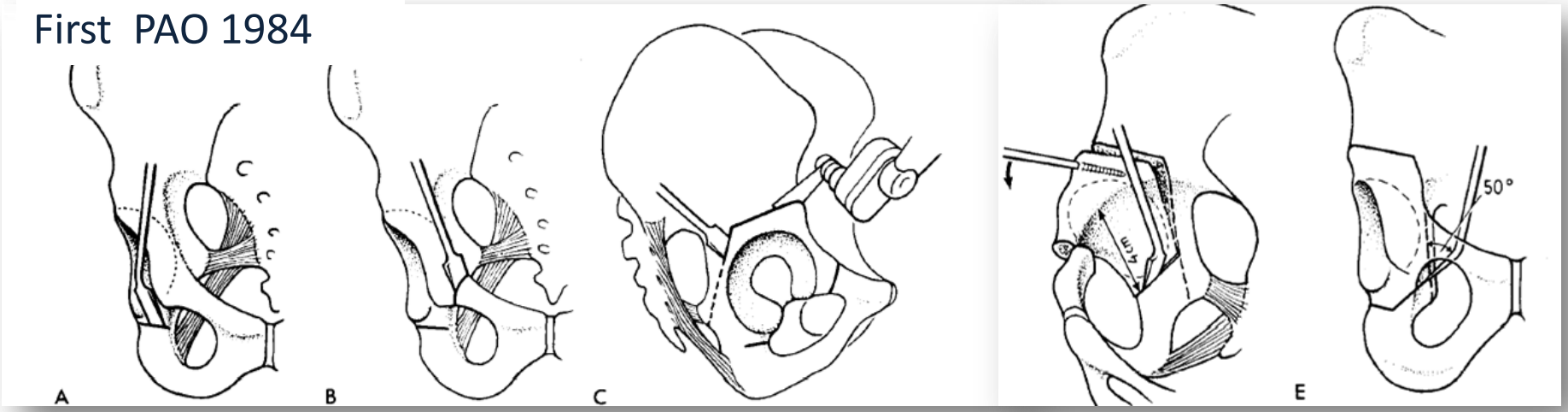
L. Turchetto

A new periacetabular osteotomy for the treatment of hip dysplasia

R. Ganz, K. Klaue, Tho Son Vin, J. Mast

Clin Orthop 1988; 232:26-36

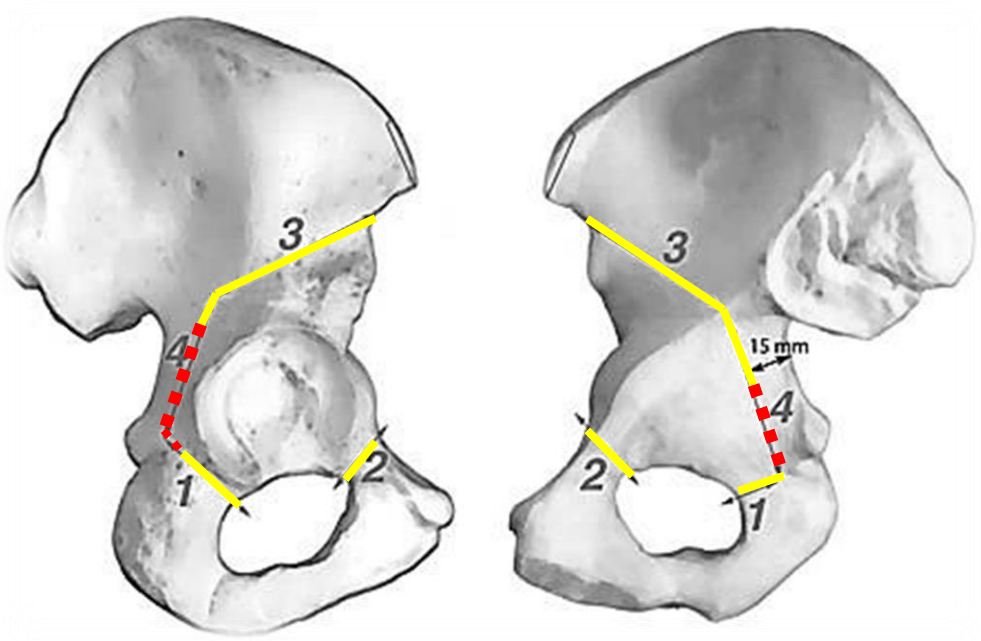
First PAO 1984



Advantages:

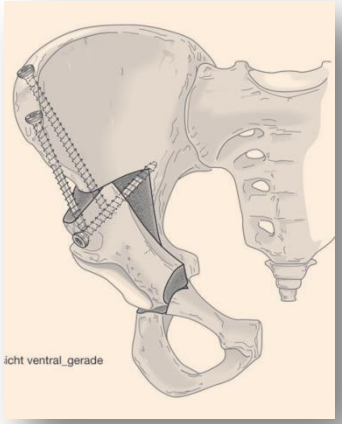
- Ability to correct deformity in all planes
- Continuity of the posterior pelvic column
- True pelvic shape remains unchanged

Osteotomies sequence



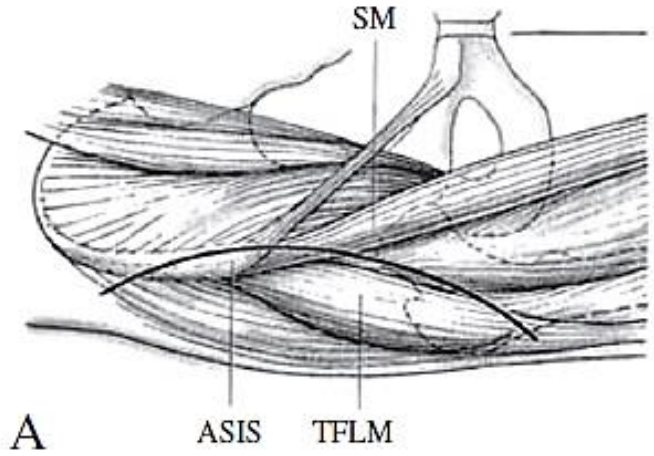
1 Ischial + ''Controlled fracture'' of lateral cortex
2 Pubic
3 Supraacetabular
4 Retroacetabular + ''Controlled fracture''

Special Surgical Instruments



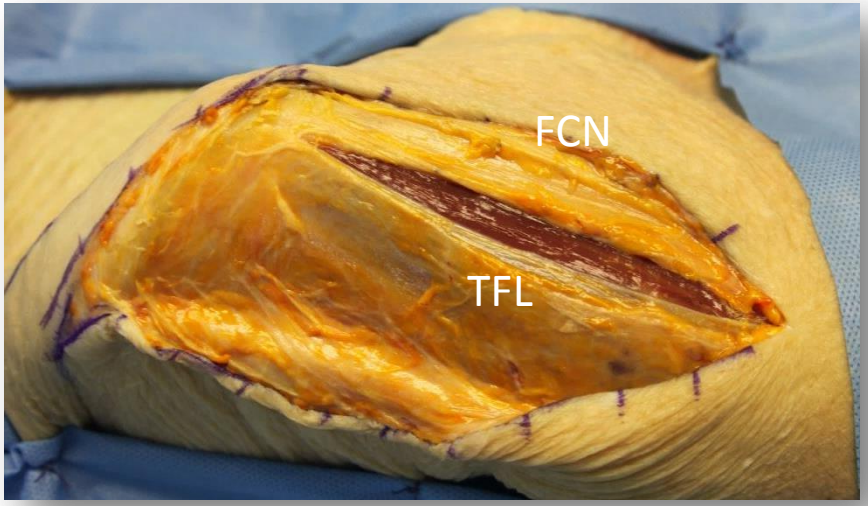
Accuratus AG. Switzerland

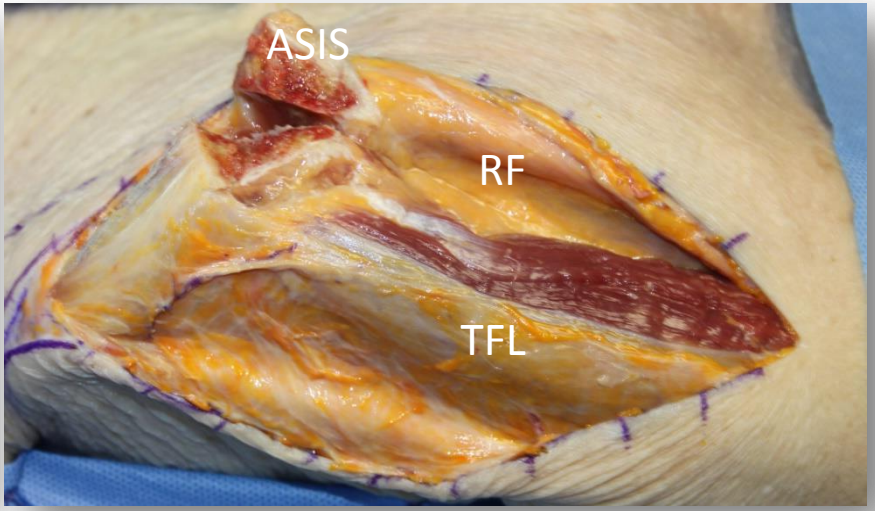
Surgical Technique



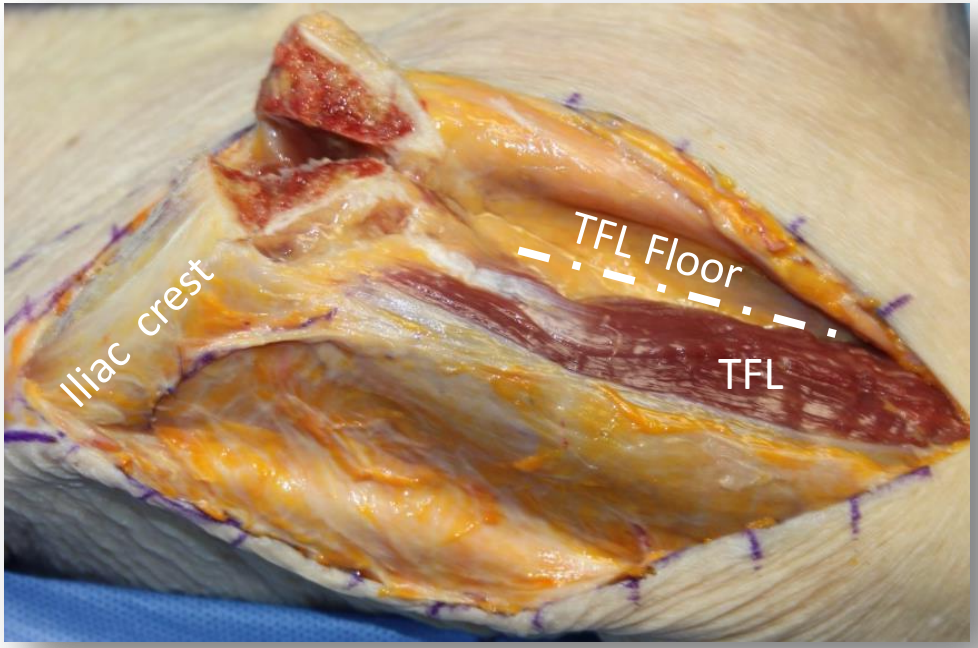
- Supine
- Radiolucent table
- Freely draped leg

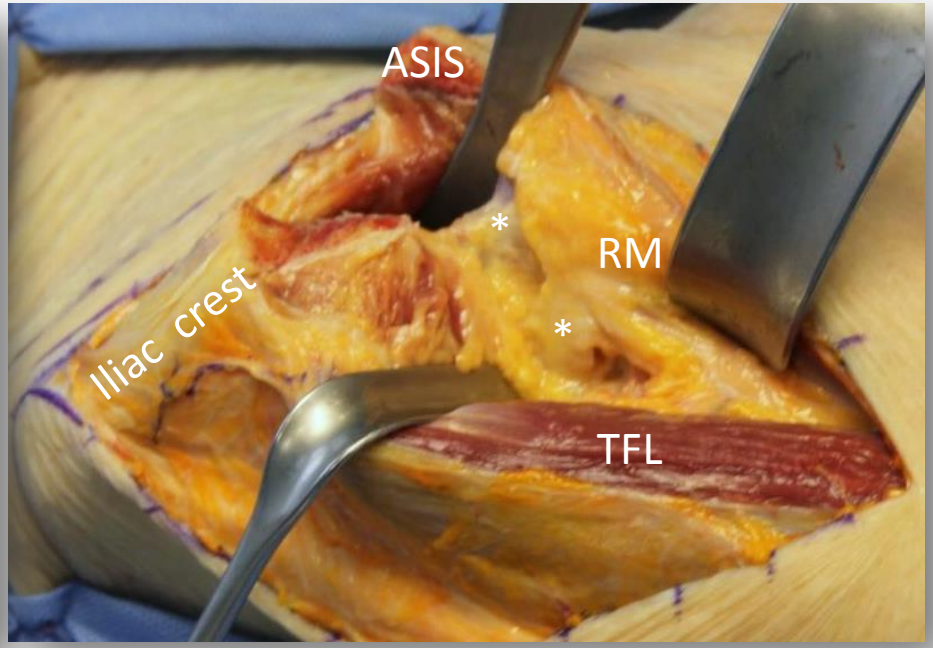
- **Modified Smith Petersen approach**
- **Incision starts at the Iliac crest, continues at the ASIS and swing to the thigh**



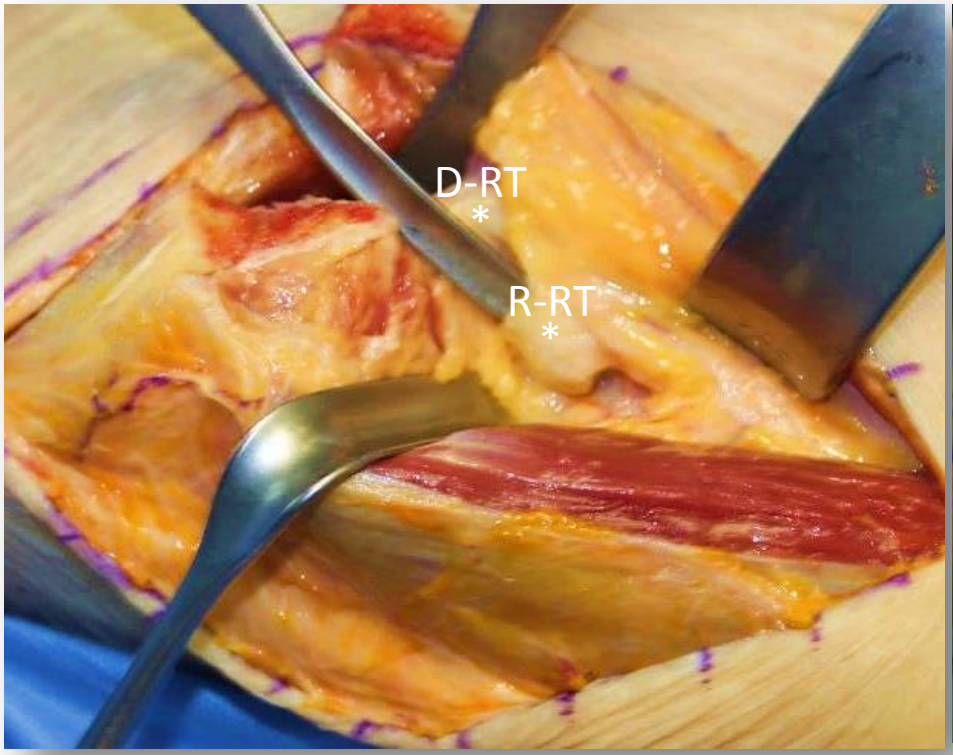


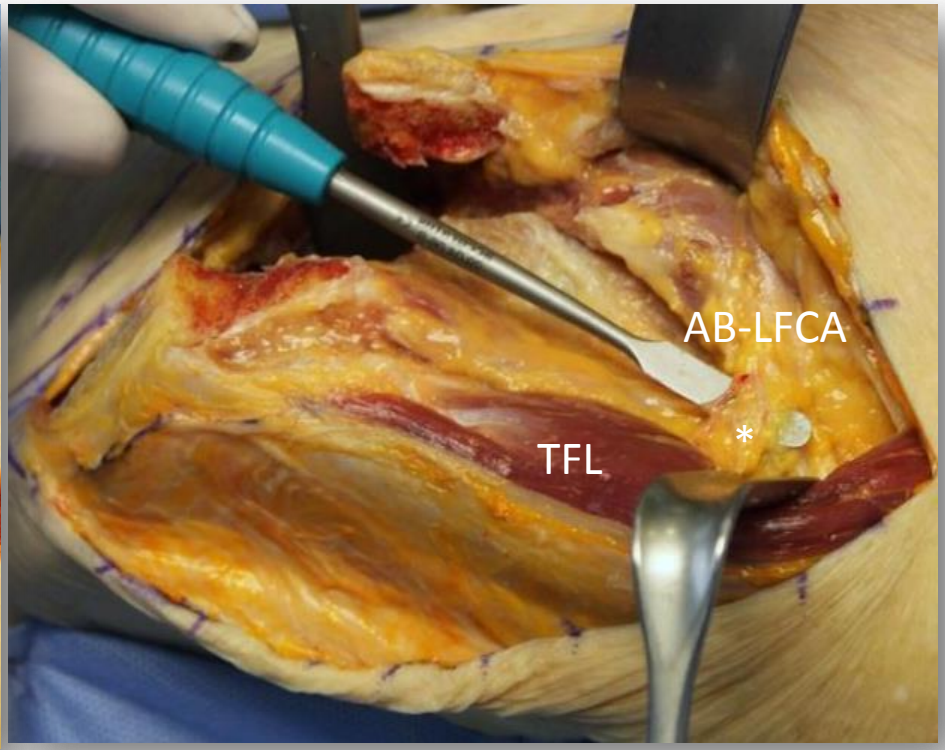
- The fascia of TFL is split lateral to the FCN and the muscle is pulled laterally
- The ASIS is osteotomized and reflected medially



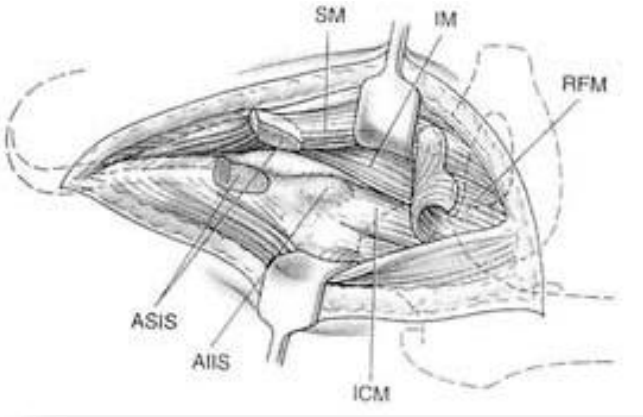


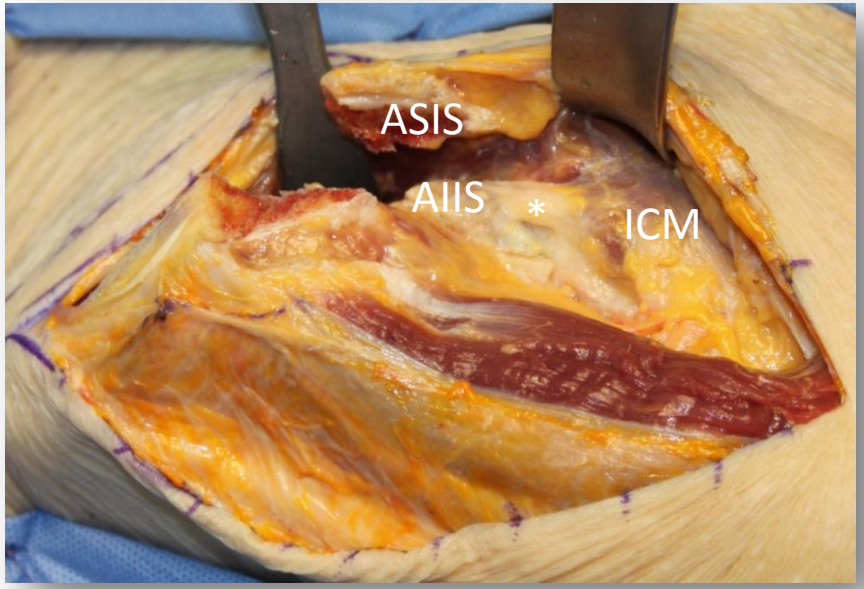
- The **external oblique muscle** is detached subperiosteally from the Iliac crest
- The inner table of the iliac wing is dissected subperiosteally up to the linea terminalis
- Longitudinal incision of TFL floor exposes the lateral border of RF with its D and R tendon

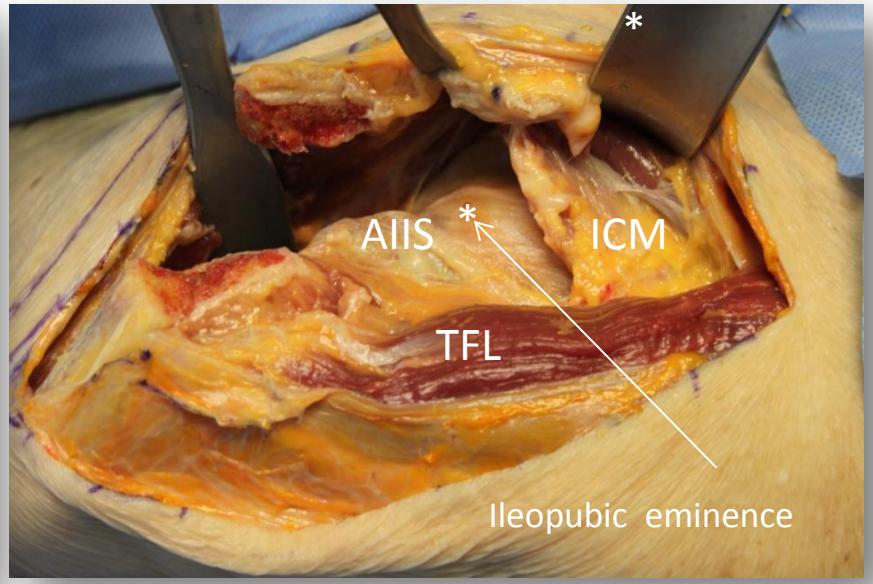




- lateral border of RF with its D and R tendon
- Distally, the rami ascendentes of LFCA to the TFL



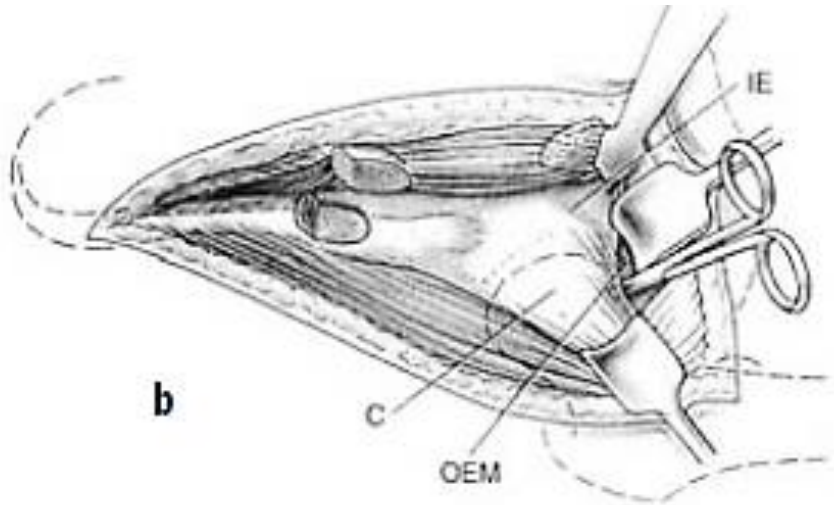


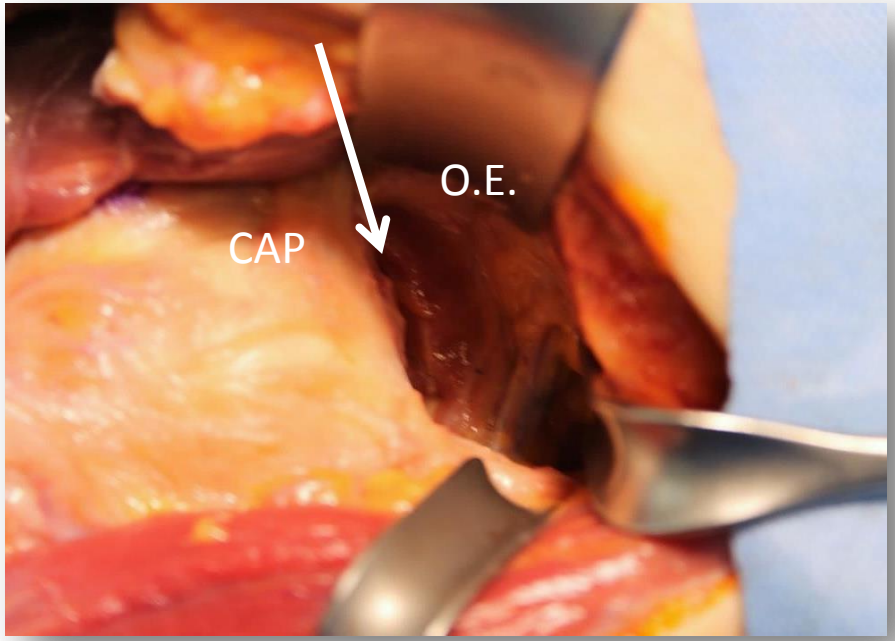


- The ICM is mobilaized from the distal border of the AIIS and the capsule
- The ileopctineal bursa is opened and a pointed H driven into the pubic ramus 1.5 cm medial to the ileopubic eminence

Ischial preparation

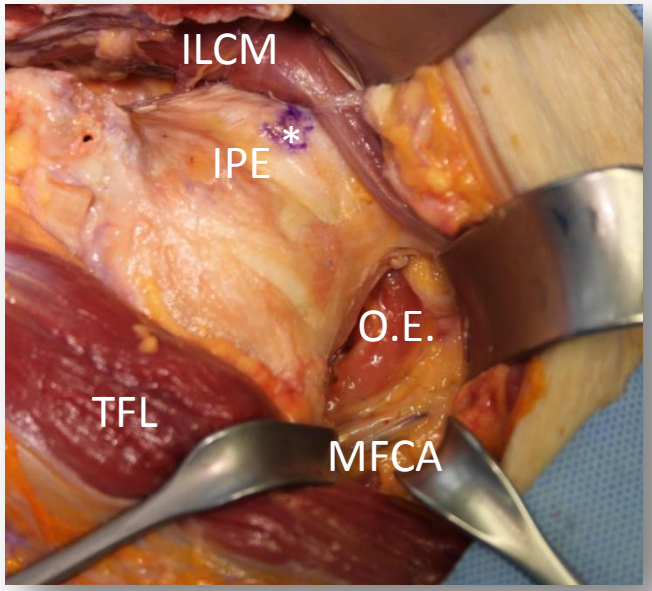
Memorize the topography!

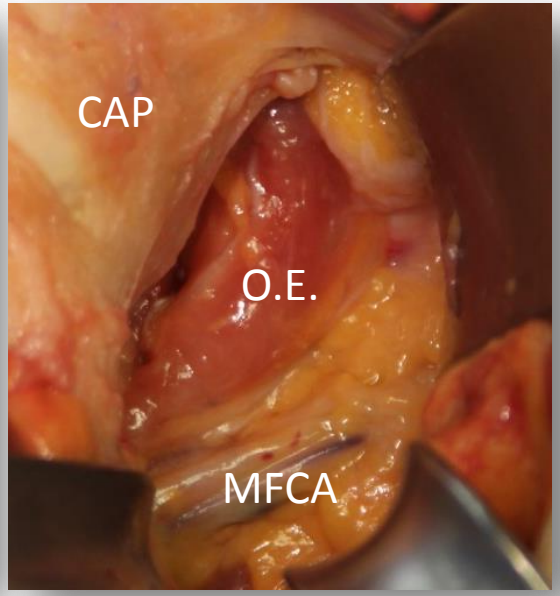




- Curved scissors with rounded ends are pushed along the anteroinferior capsule and, by spreading the scissors, the space is enlarged
- The scissors follow the interval between the capsula and the O.E. in a posterior direction until it contacts the ischial ramus

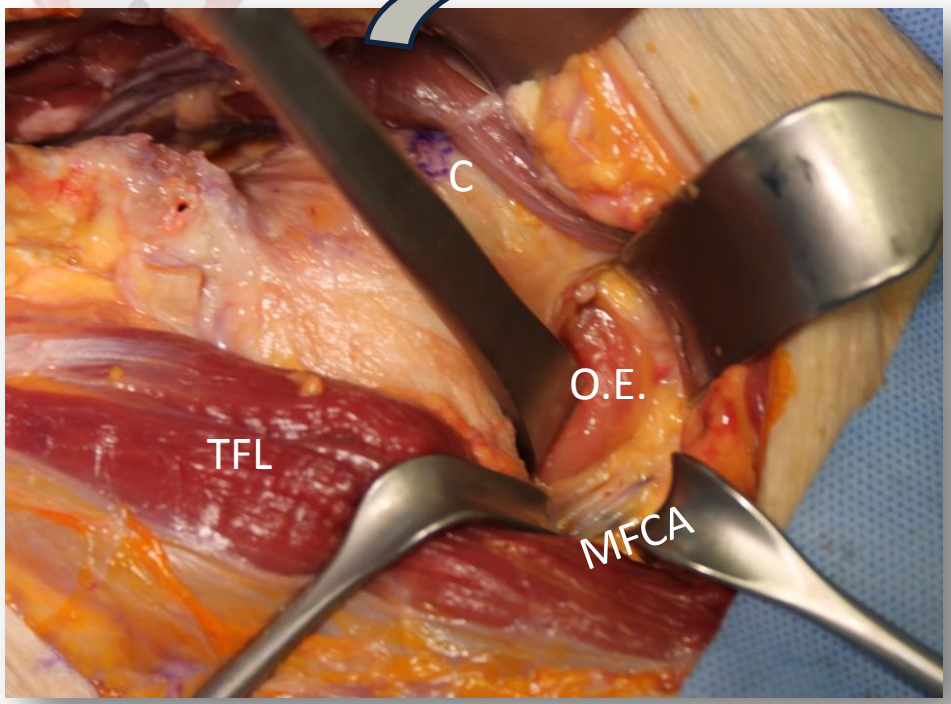
Ischium position and topography

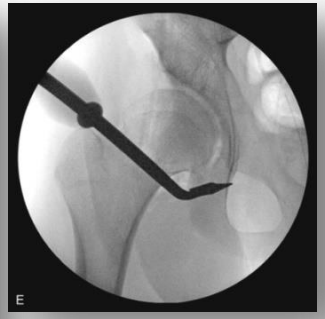


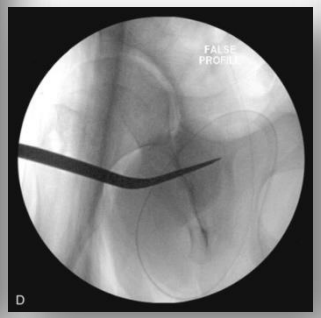


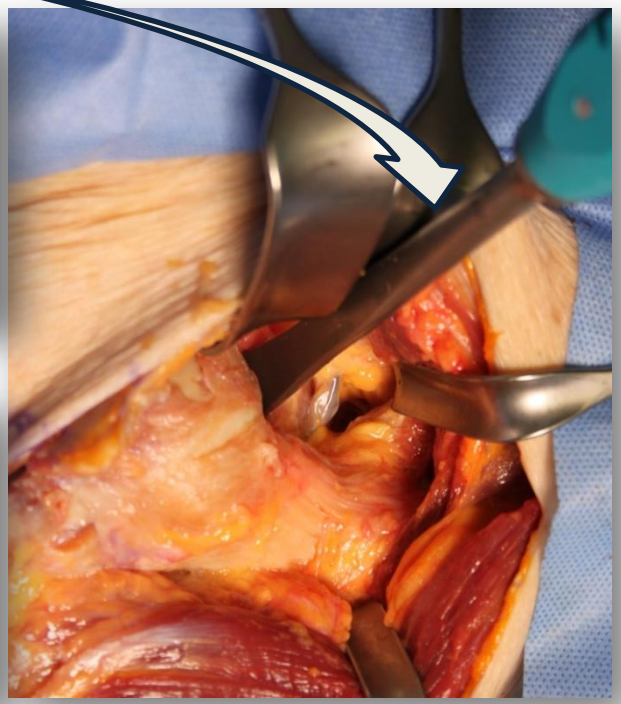
- With the tip of the scissors we can palpate the infracotyloid groove
- Medially, the scissors glide into the obturator foramen
- Laterally, the ischiocrural origins offer a resistance to the instruments to avoid injury to the sciatic nerve
- A Cobb elevator assists the introduction of a 15 mm curved pelvic chiesel in close contact with the capsule and reaches the ischium proximal to the OE muscle

I^ Incomplete ischial osteotomy









- The infracotyloid groove is palpated with the chiesel

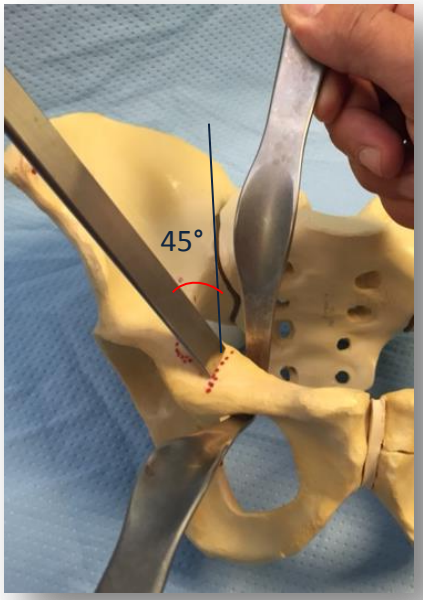
- The handle points in a slightly posteroinferior direction
- It is driven to a depth of 20-25 mm while changing its direction posterosuperiorly

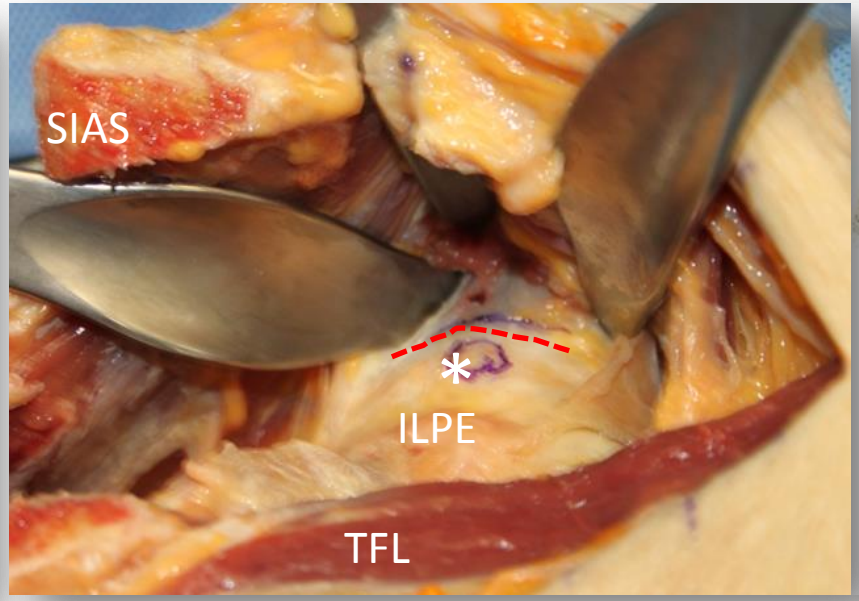
- The chiesel is drawn back till the blade remains in contact with the entry point

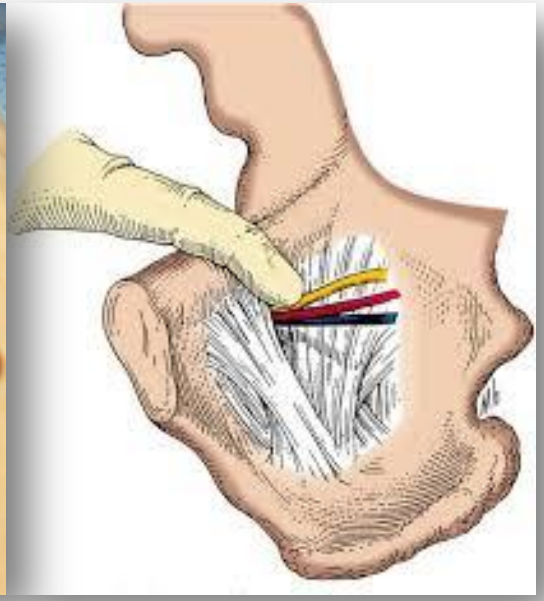
- Medial cortex should be cut
- Lateral cortex should only be notched for protection of sciatic nerve
- Abduction of the flexed hip to relax the sciatic nerve

II^

Pubic osteotomy

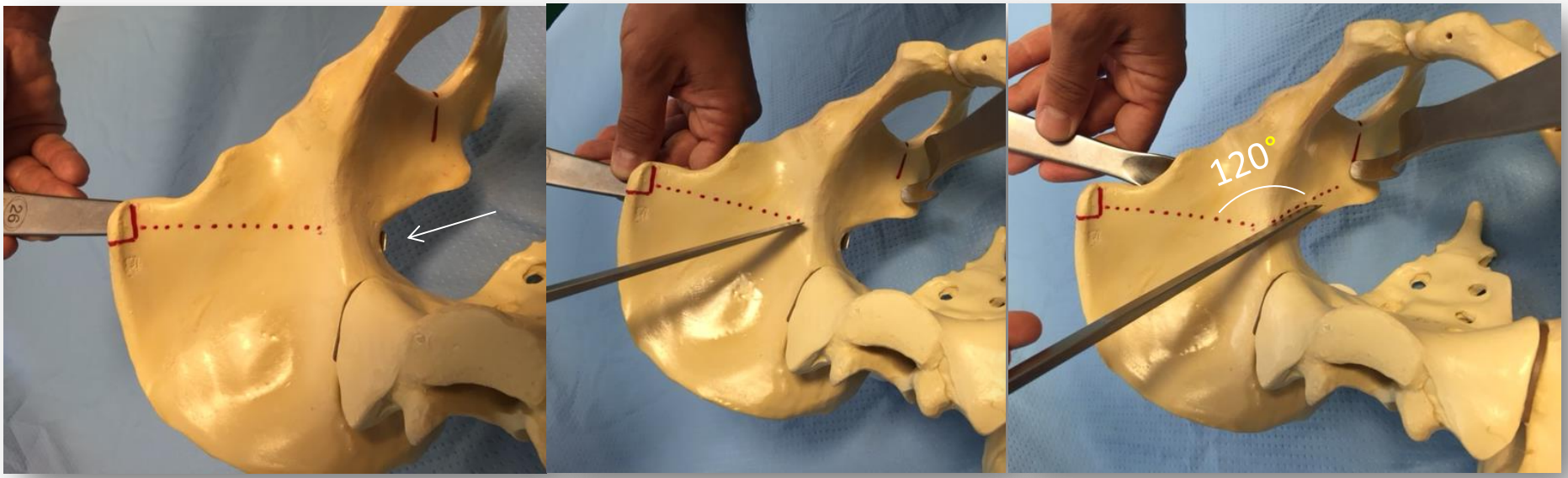






- The base of pubic ramus is exposed subperiostealy
- Two blunt H are inserted around it to protect the obturator nerve and vessel
- A complete osteotomy is made using a 15 mm Lexer chiesel

III^-IV^ Supra-and retroacetabular osteotomies

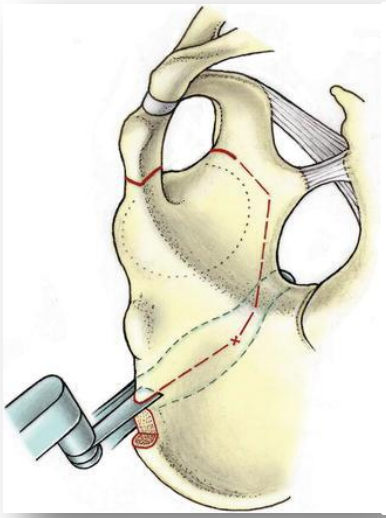


First part

- A subperiosteal tunnel is made at the outer wall of the ilium to insert a retractor hooked to the grater ischiatic foramen to protect muscles and sciatic nerve
- The ileum osteotomy starts from the lower border of SIAS in a posterior direction stopping 1.5 cm proximally to the linea terminalis
- It continues with an angle of 110-120° to the ischial spine

- **The retroacetabular cut is made 1.5 cm away from the grater ischiatic foramen**

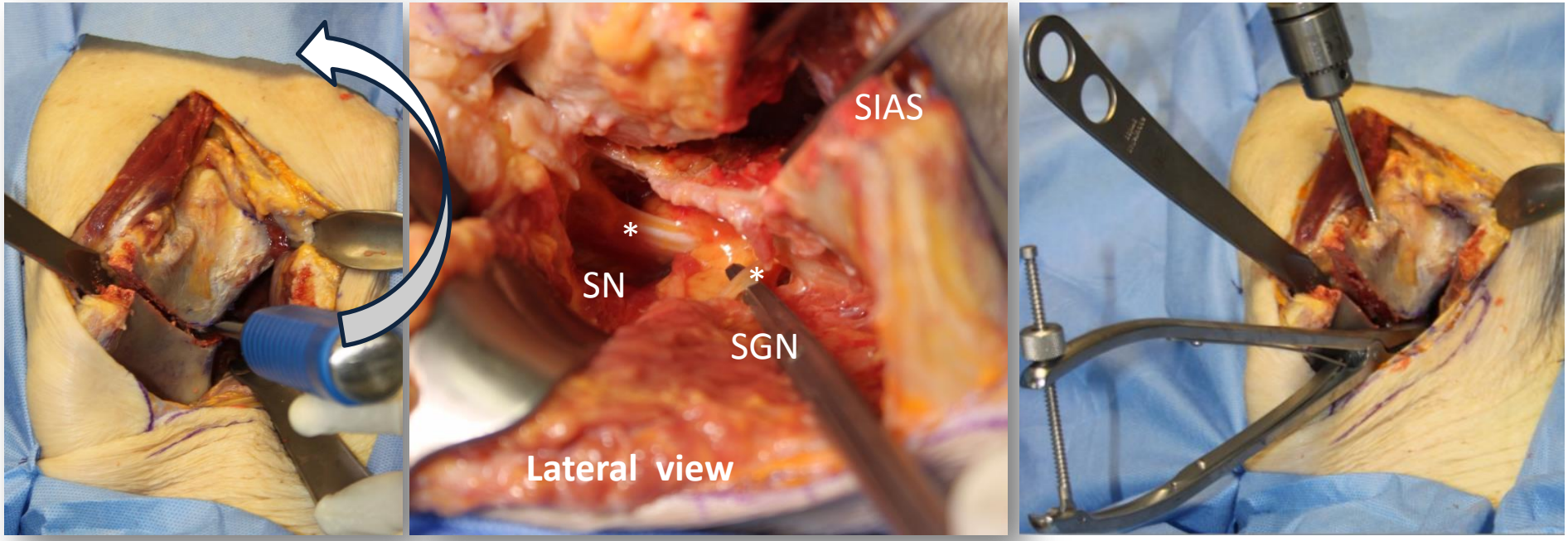
III^ Supra and retro acetabular osteotomy



Second part

- The supra acetabular osteotomy is done with the oscillating saw
- The remaining distance of the pelvic brim is cut with a curved chiesel straight to the opposite cortex (only notched for protection of sciatic nerve)
- The cortical bone of the quadrilateral plate is osteotomized with a straighth 10 mm osteotome for the first 2.5 cm

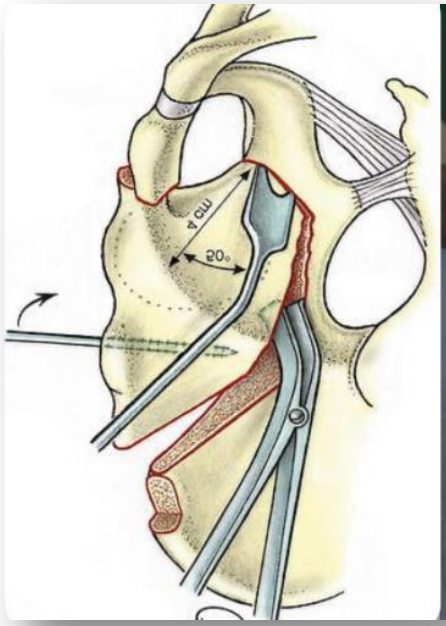
Retroacetabular controlled fracture

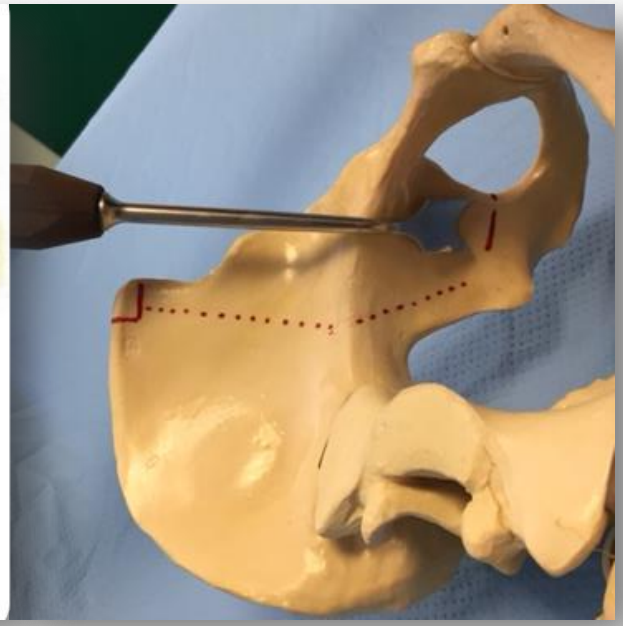


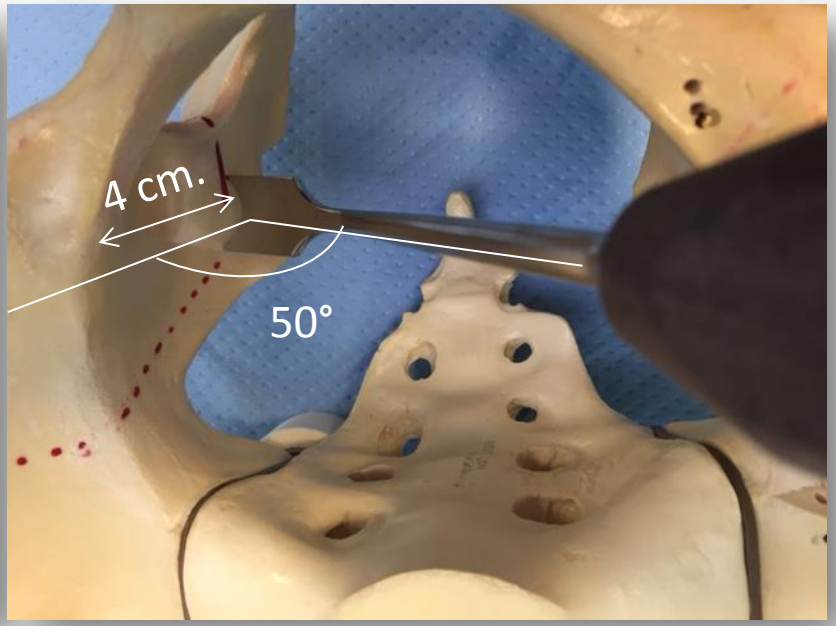
- A Lexer chiesel is introduced into the osteotomy and a **lever movement** against the acetabulum **will propagate the proximal osteotomy** more distally

- One Schantz screw is inserted on AIIS
- Using two laminar spreader the poligonal segment is put under tension

Mobilizing the acetabular fragment



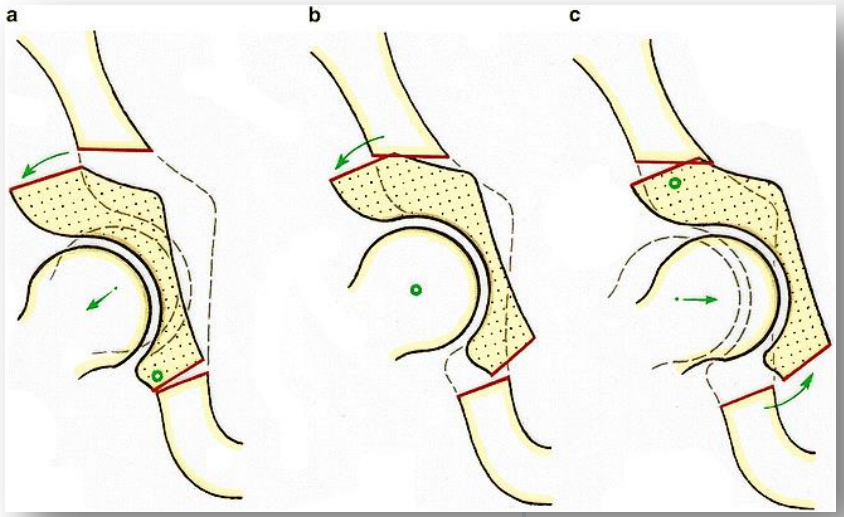


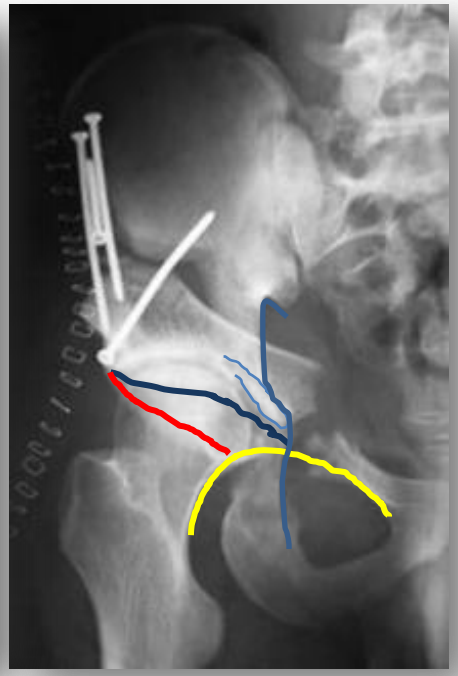


- The **remaining bony bridge** will be cut with 20 mm angled special chisel advanced 4 cm posterior to the quadrilateral area
- The chisel is advanced until no more resistence is felt

Acetabulum reorientation

Intraoperative and post op pelvic radiograph to verify correction





- <u>The correction is obtained rotating the acetabular fragment around the CR</u>
  - The Schanz screw is rotated medially
  - The spreader externally
- The fixation is achieved with three 3.5 mm cortical screws

Conclusion

- The technique is demanding but learnable
- The PAO has become the standard procedure for the surgical therapy of hip dysplasia in adolescents and adults (*Lerch T. et al. 2016*)
- **The key factor is a Mentor !**

REGIONE DEL VENETO

ULSS4 VENETO ORIENTALE

Thank you