

Hip Symposium Bern, Pre-course, 2023

Bloody Hell –

How does the blood supply to the hip work?

Moritz Tannast

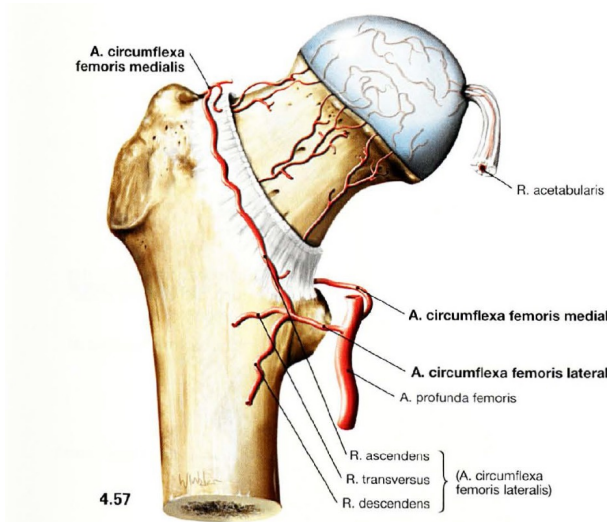
Professor and Chairman, Department of Orthopaedic Surgery and Traumatology

University of Fribourg, HFR Fribourg Hospital

Introduction (1)

- **The most important information** in joint-preserving hip surgery

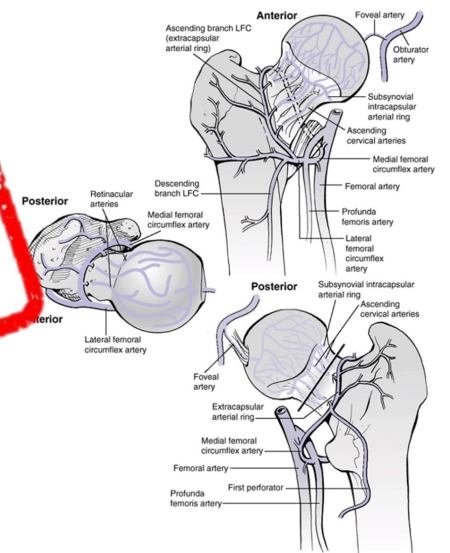
- Knowledge of the exact topographical course of femoral head perfusion was the basis for
 - the technique of **surgical hip dislocation** without the risk of avascular necrosis
 - the discovery of **femoroacetabular impingement**



Sobotta



Internet



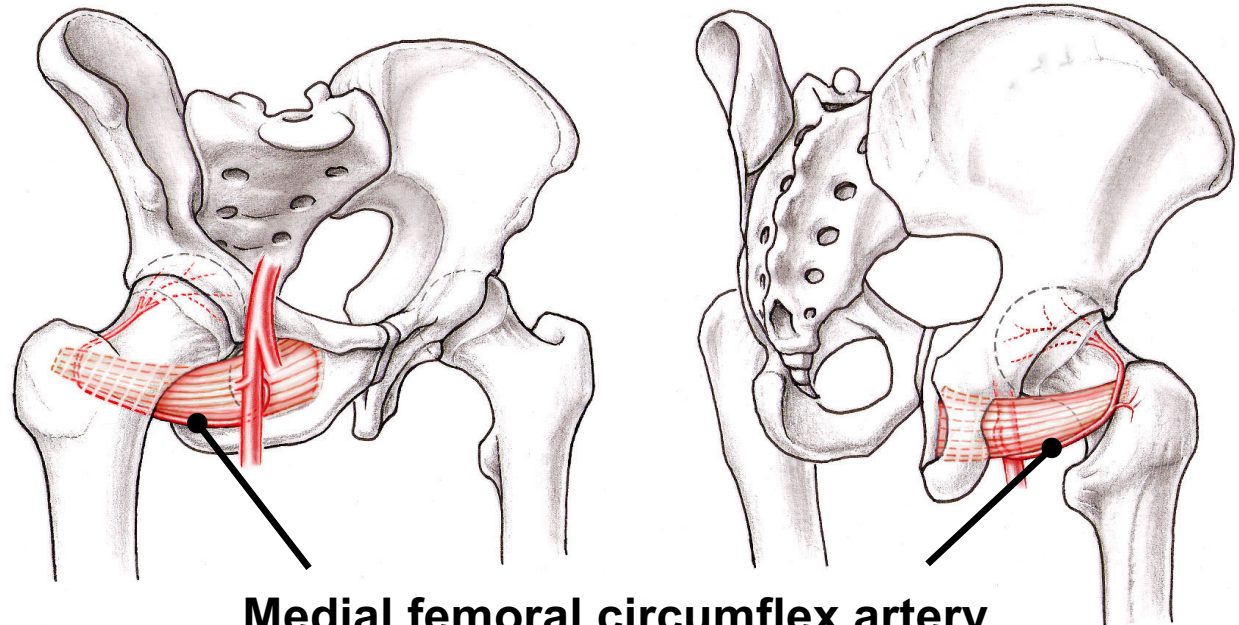
Stollers

Orthobullets

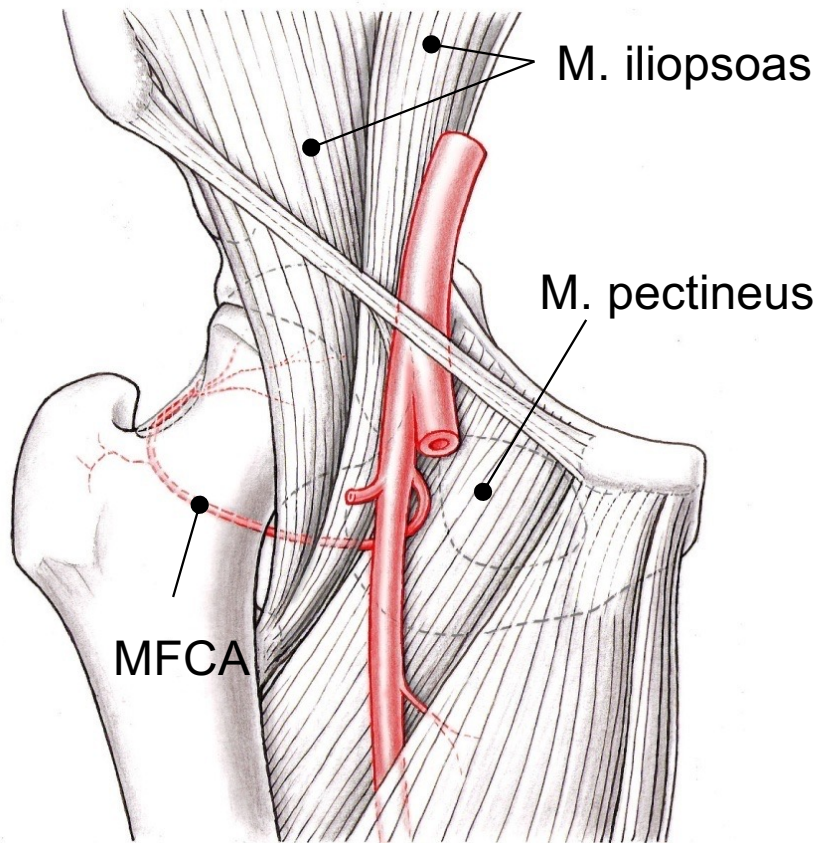
Introduction (2)

The **deep branch of the medial femoral circumflex artery** provides the main and relevant blood supply to the femoral head

- The arterial blood supply
 - originates anteriorly
 - runs between femur and pelvis,
 - supplies the femoral head from posteriorly



Medial femoral circumflex artery (MFCA)

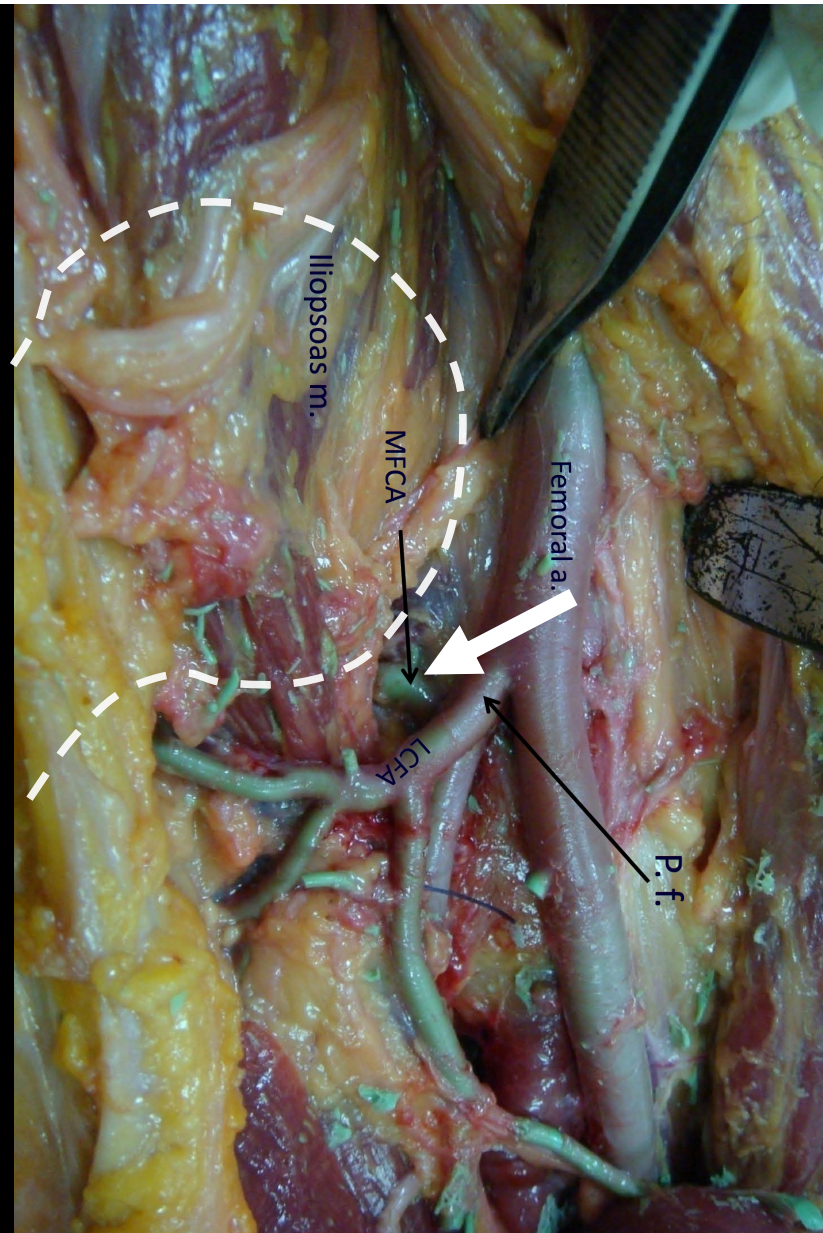


- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus

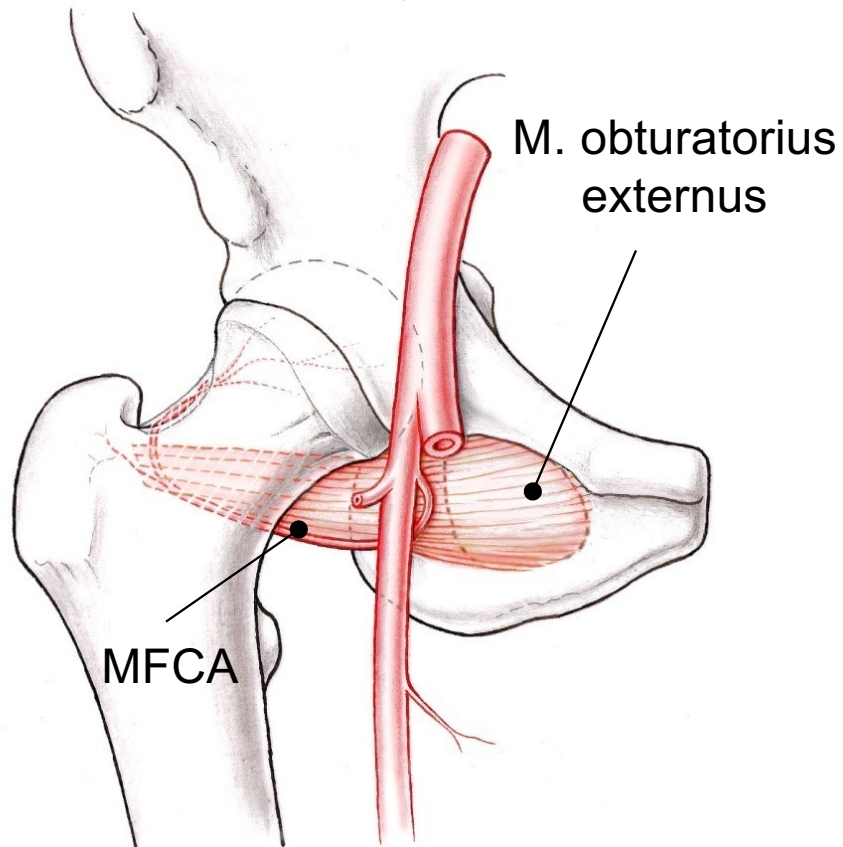
Gautier et al, JBJS Br. 2000 82(5):679-83.



Courtesy
M. Kalhor



Medial femoral circumflex artery (MFCA)

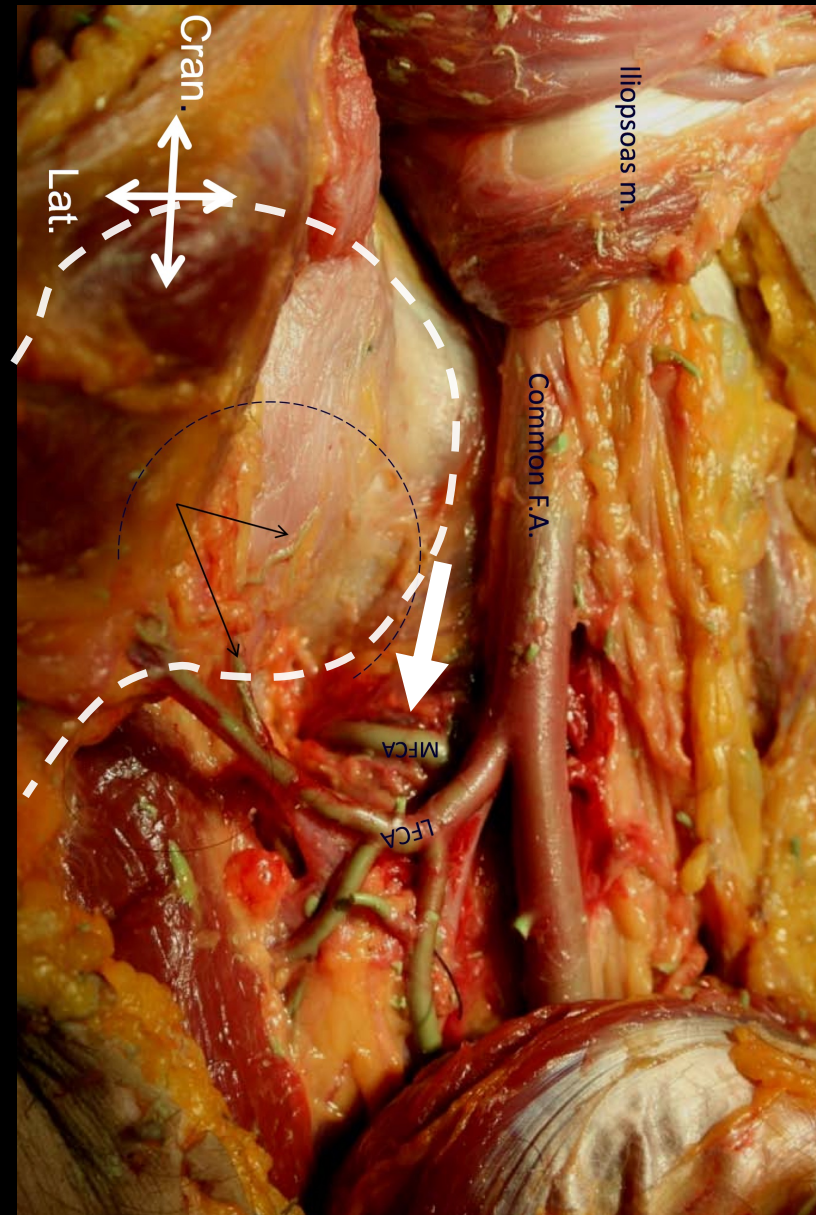


- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus

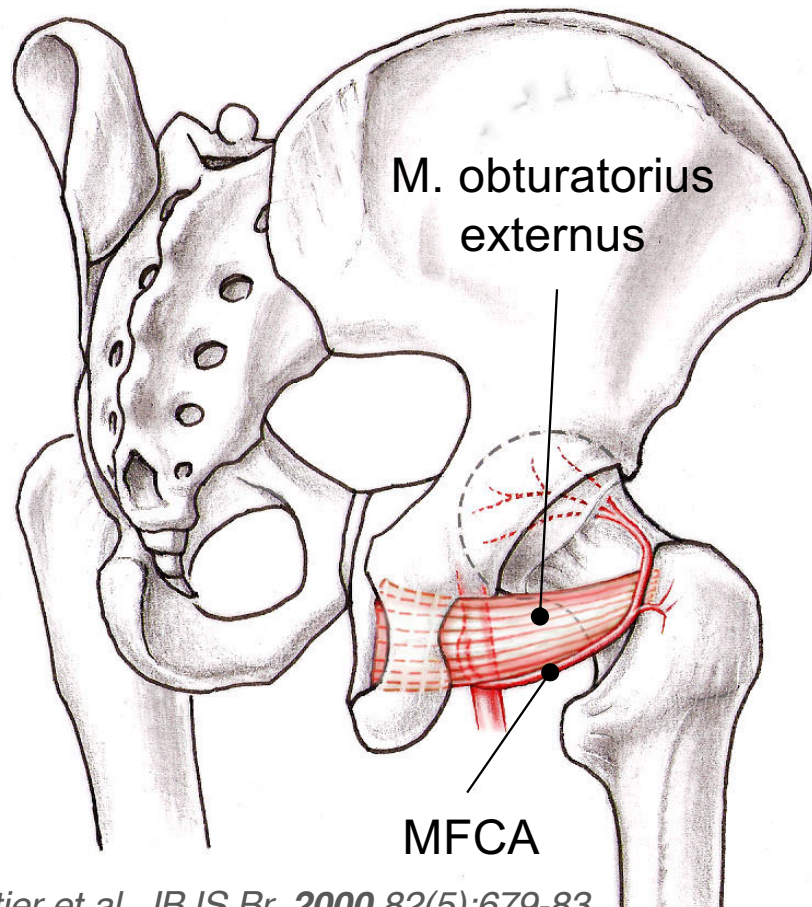
Gautier et al, JBJS Br. 2000 82(5):679-83.



Courtesy
M. Kalhor



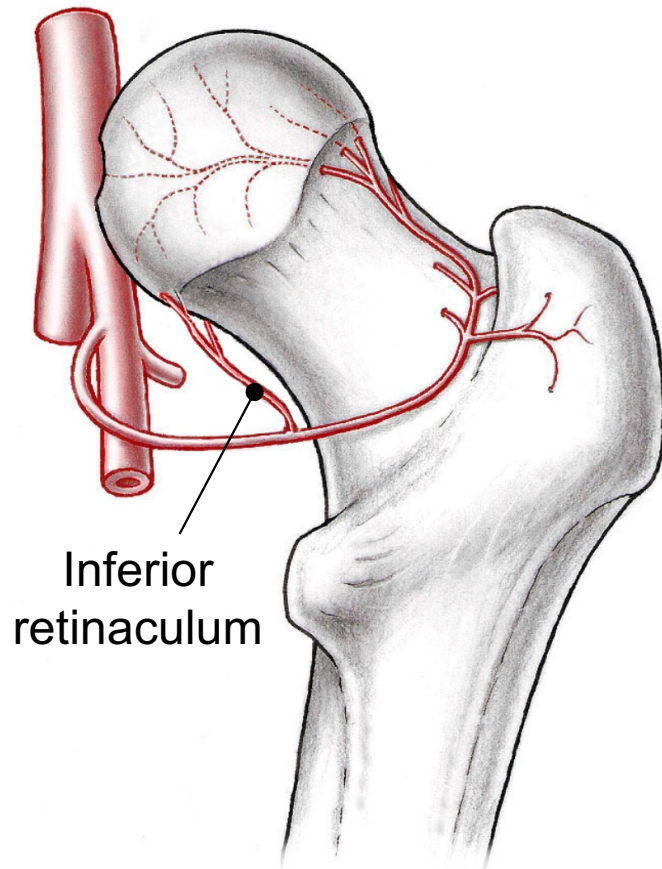
Medial femoral circumflex artery (MFCA)



- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest

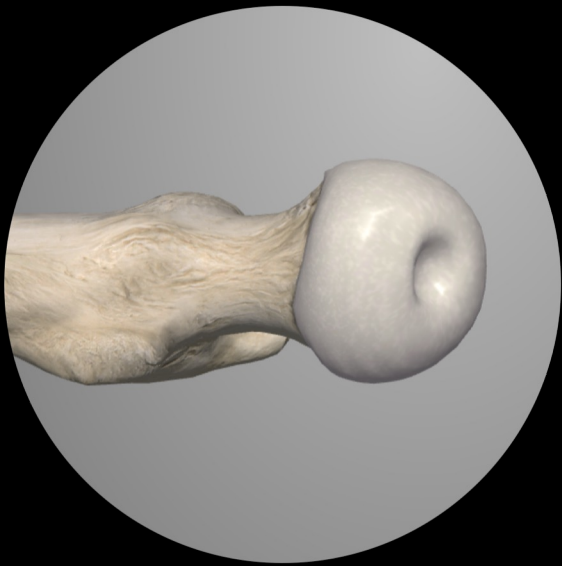
Gautier et al, JBJS Br. 2000 82(5):679-83.

Medial femoral circumflex artery (MFCA)

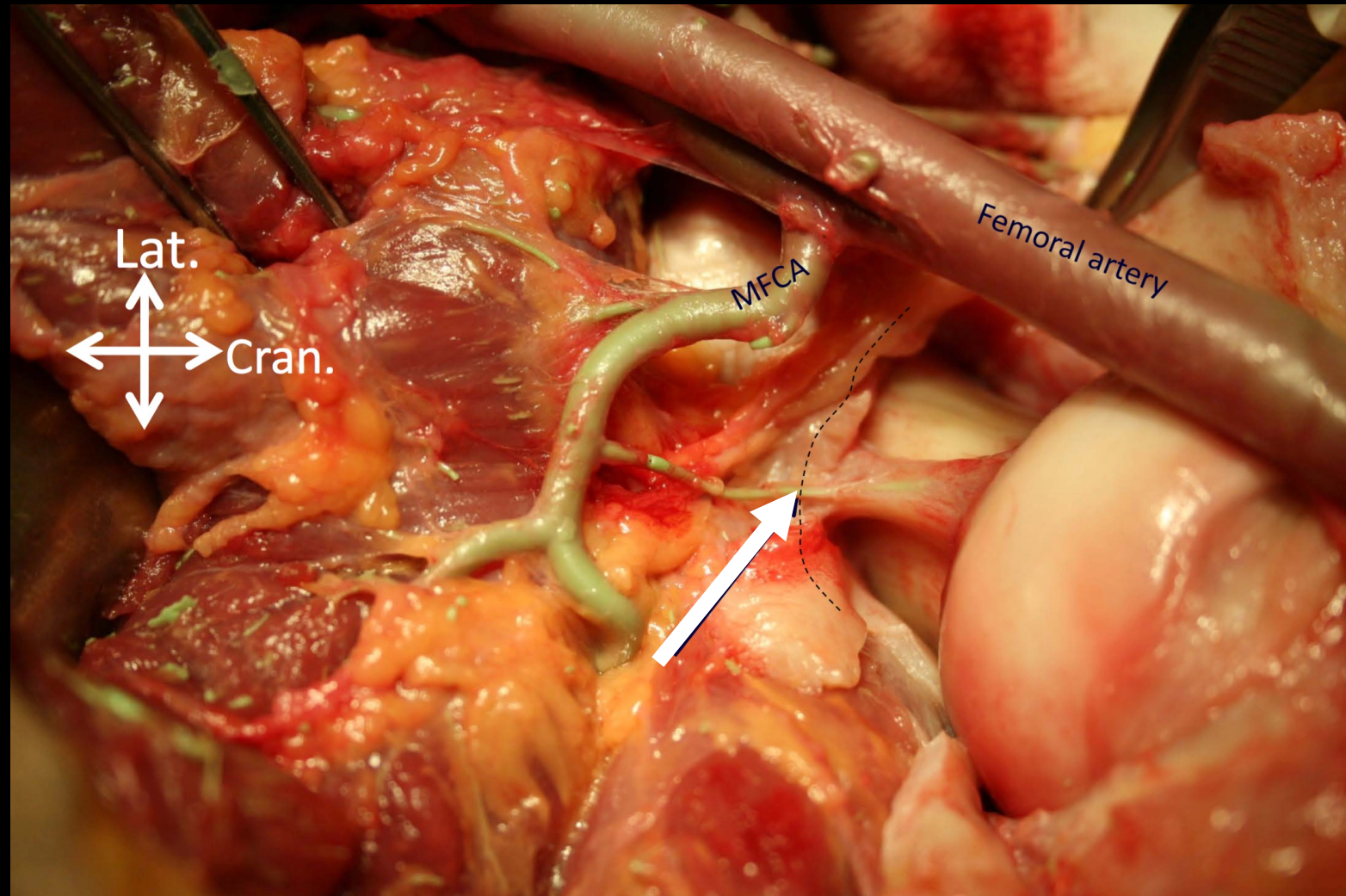


- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Inferior retinaculum

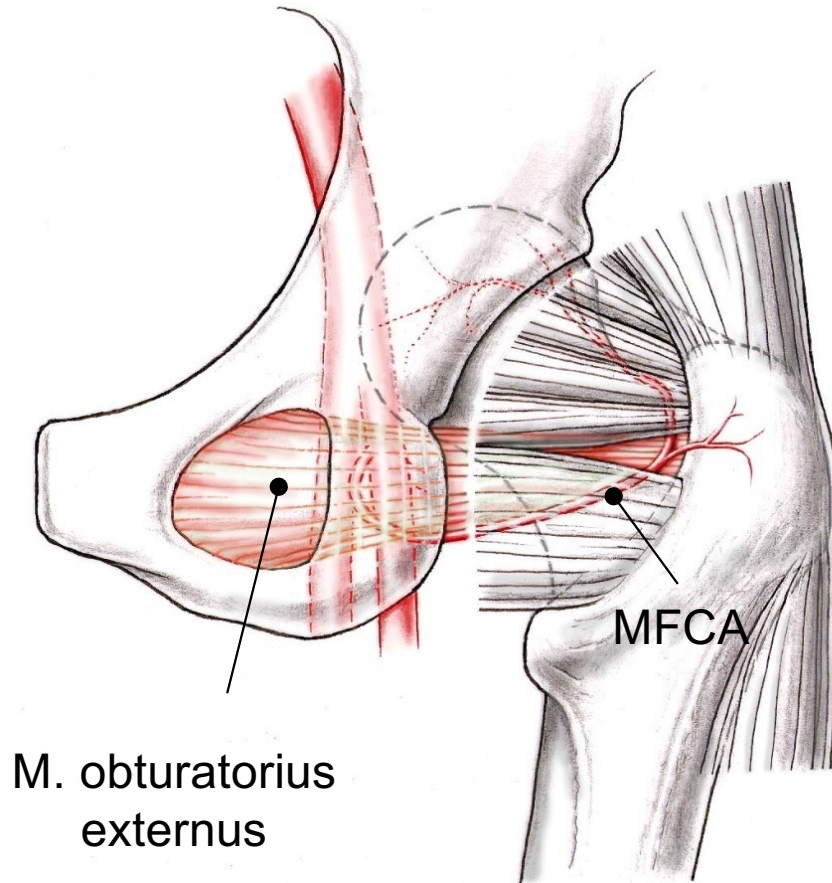
Gautier et al, JBJS Br. 2000 82(5):679-83.



Courtesy
M. Kalhor

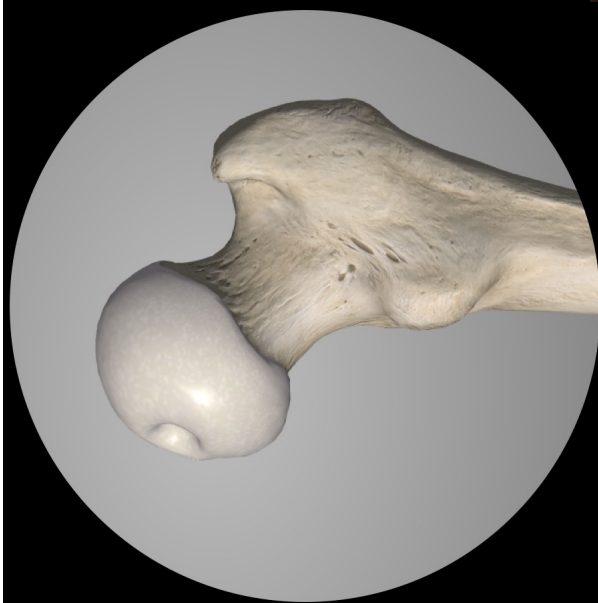


Medial femoral circumflex artery (MFCA)

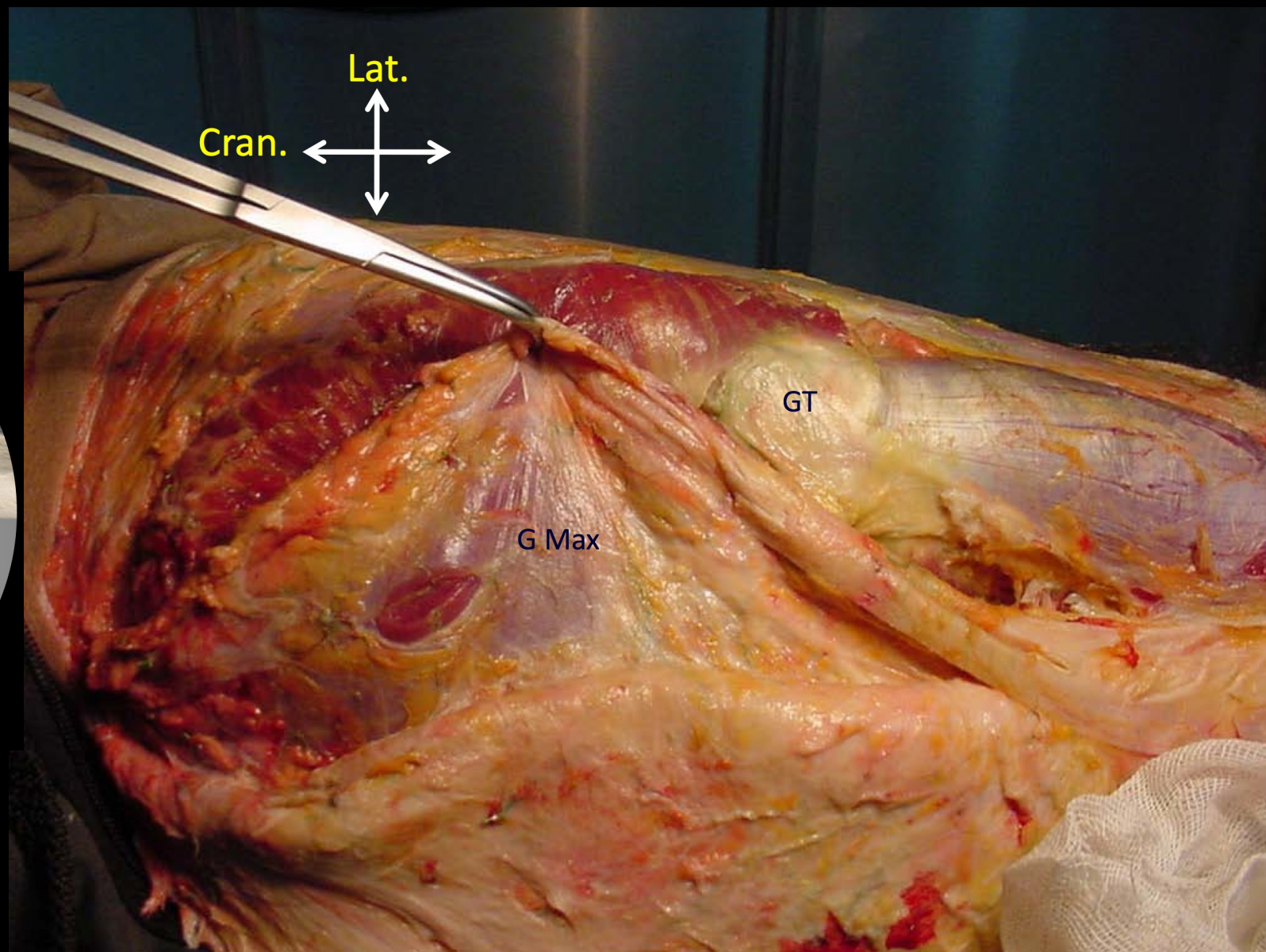


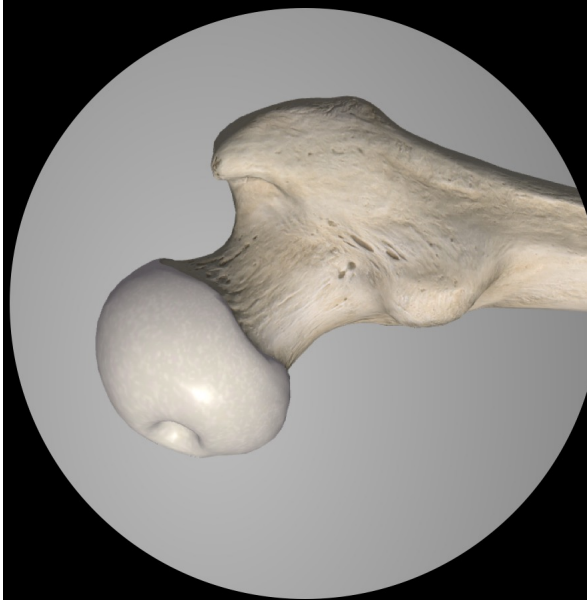
- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Inferior retinaculum
- Crosses over the obturator externus

Gautier et al, JBJS Br. 2000 82(5):679-83.

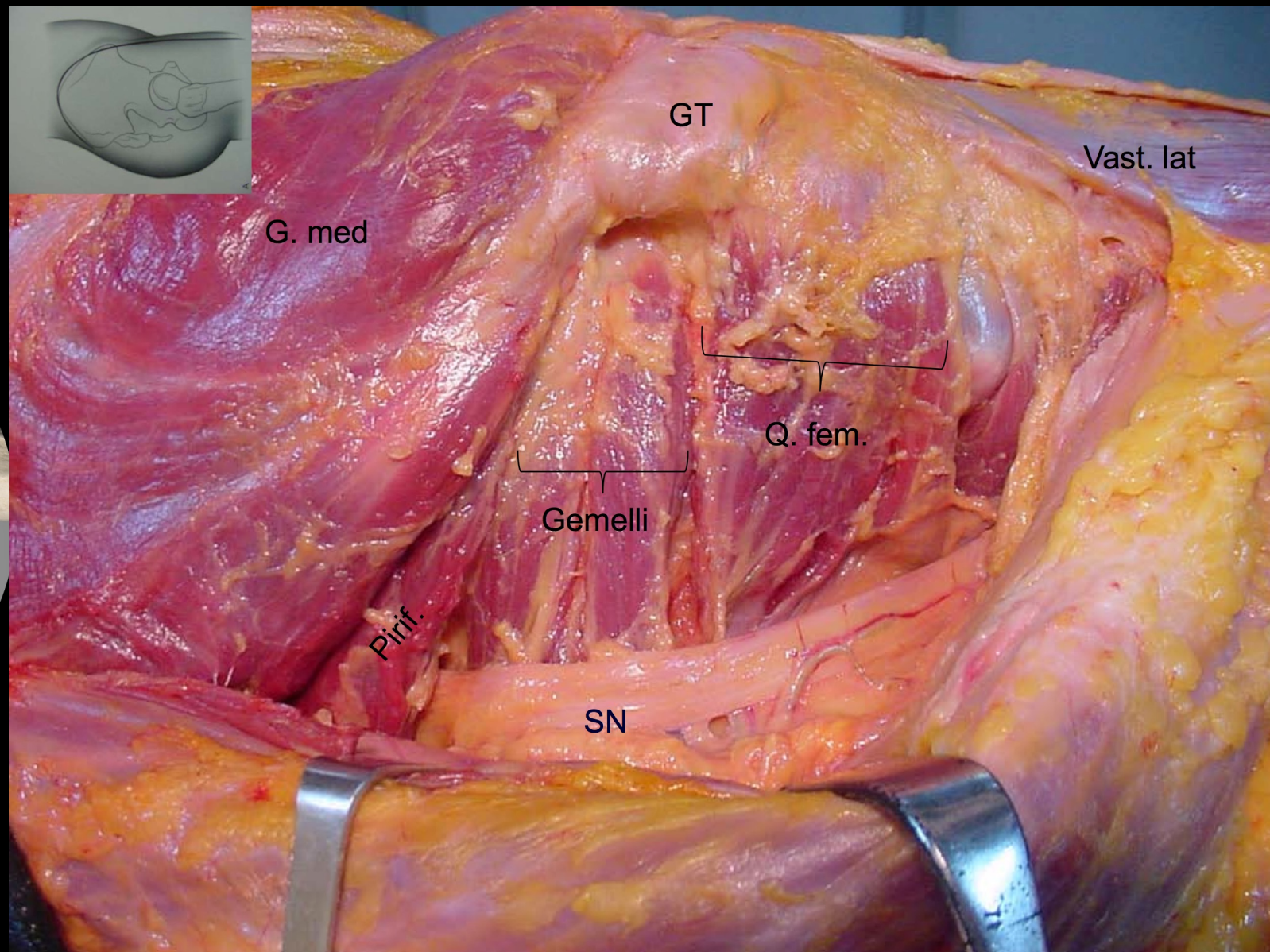
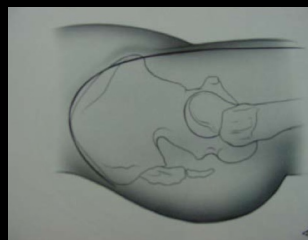


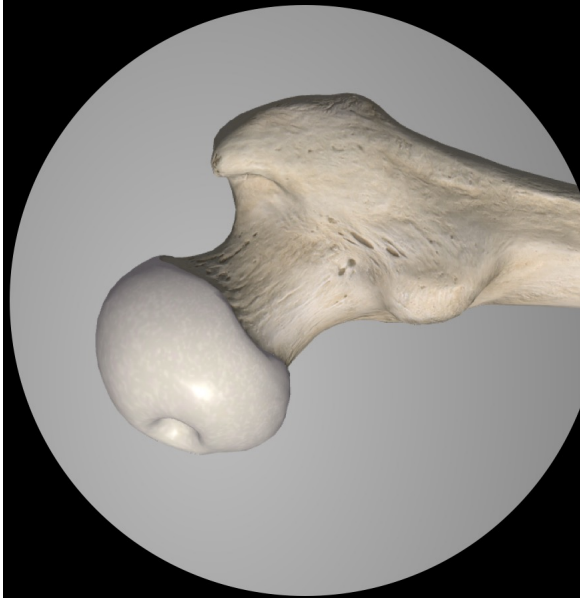
Courtesy
M. Kalhor



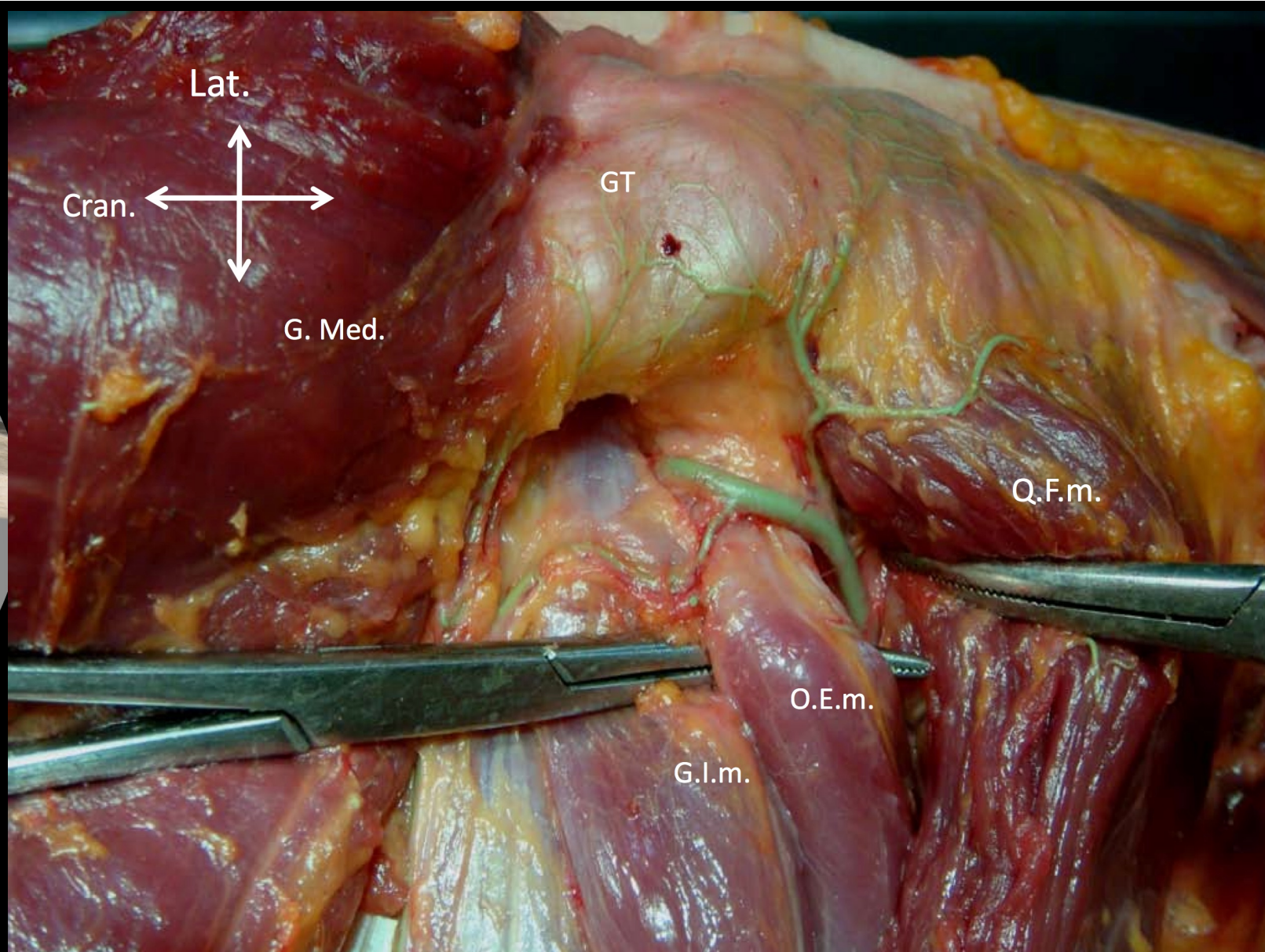


Courtesy
M. Kalhor

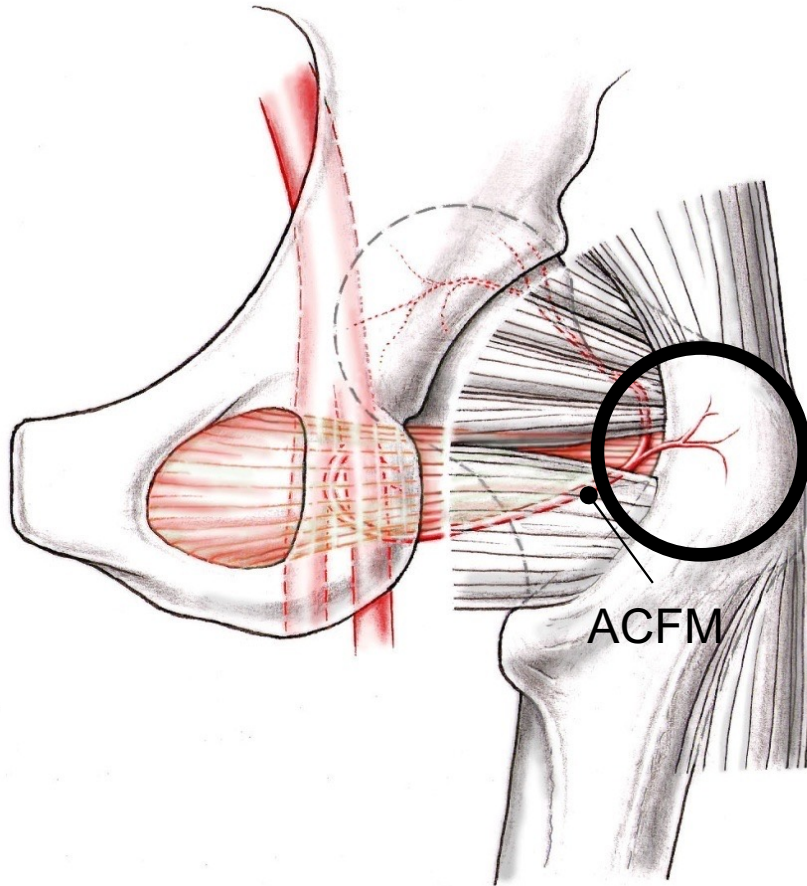




Courtesy
M. Kalhor



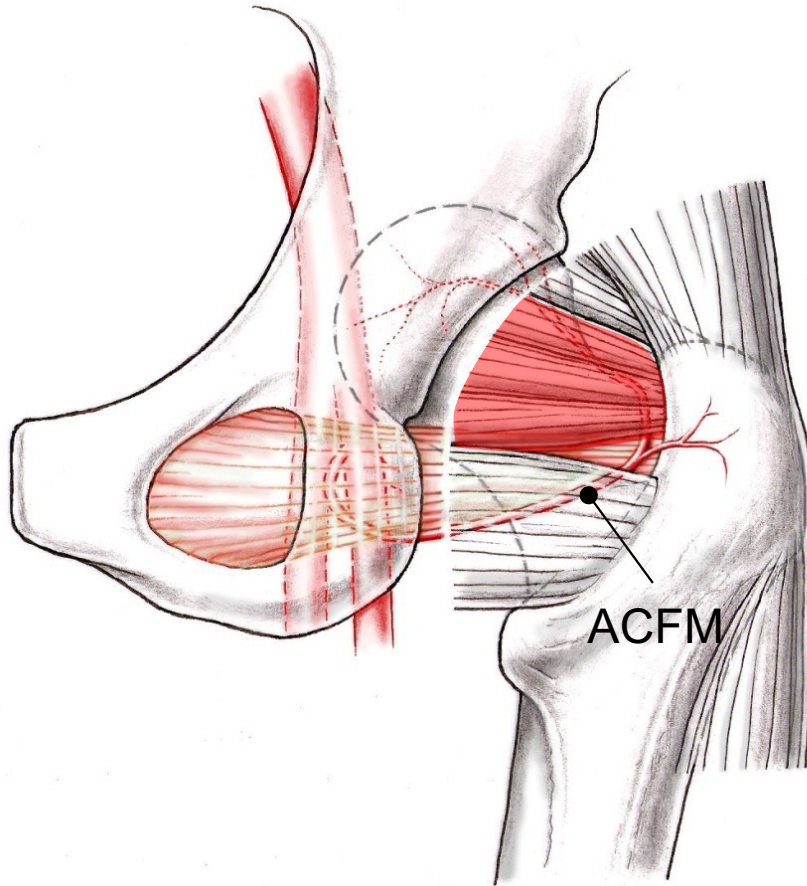
Medial femoral circumflex artery (MFCA)



- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Inferior retinaculum
- Crosses over the obturator externus
- Trochanteric branch

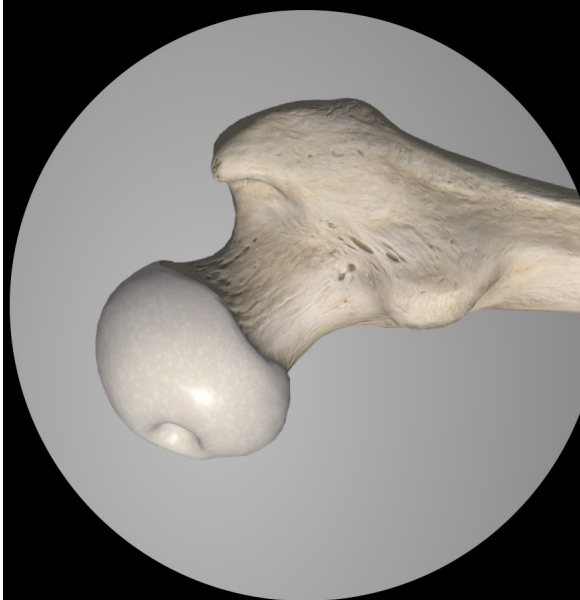
Gautier et al, JBJS Br. 2000 82(5):679-83.

Medial femoral circumflex artery (MFCA)

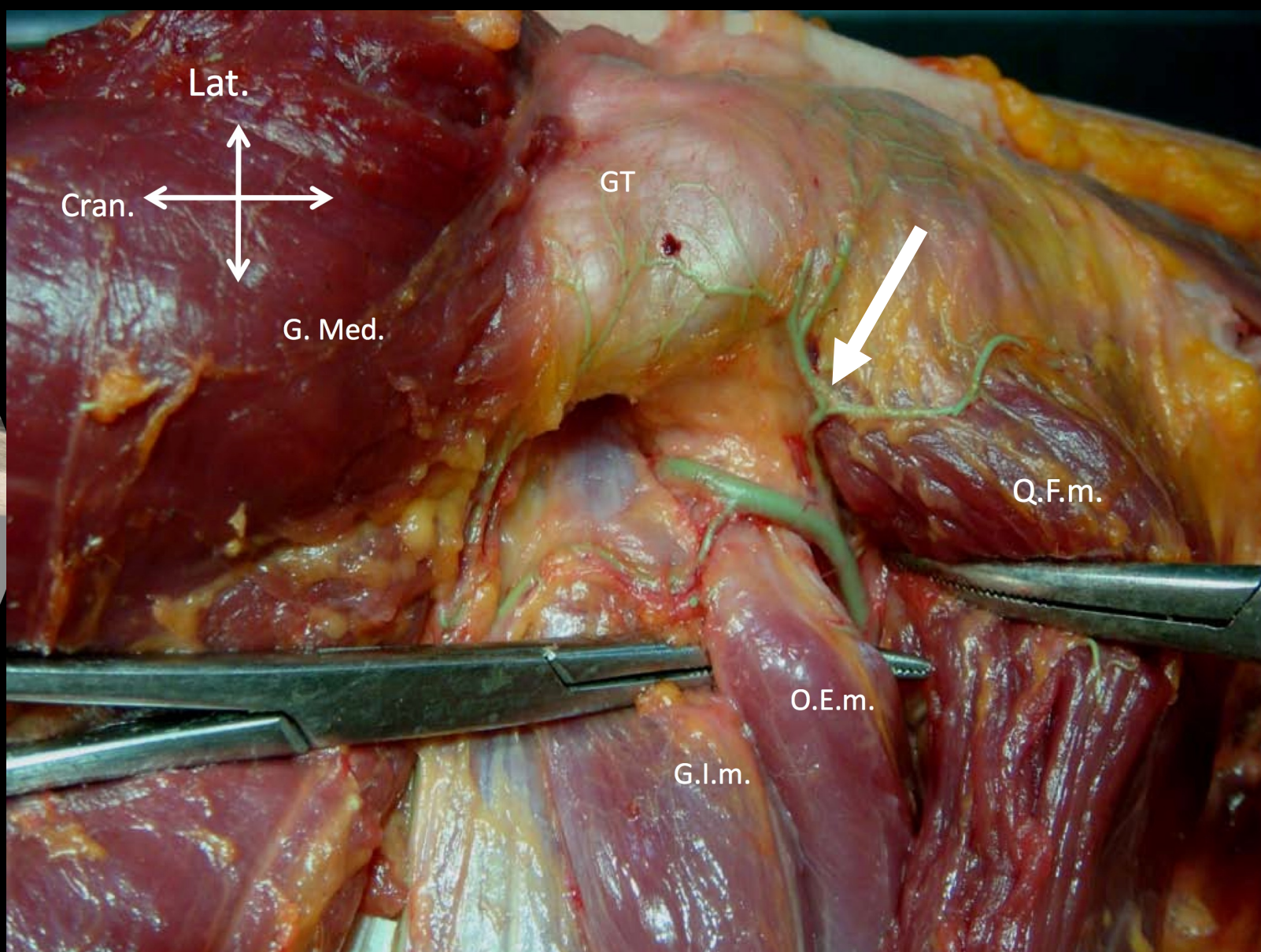


- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Inferior retinaculum
- Crosses over the obturator externus
- Trochanteric branch
- Undercrosses the triceps coxae

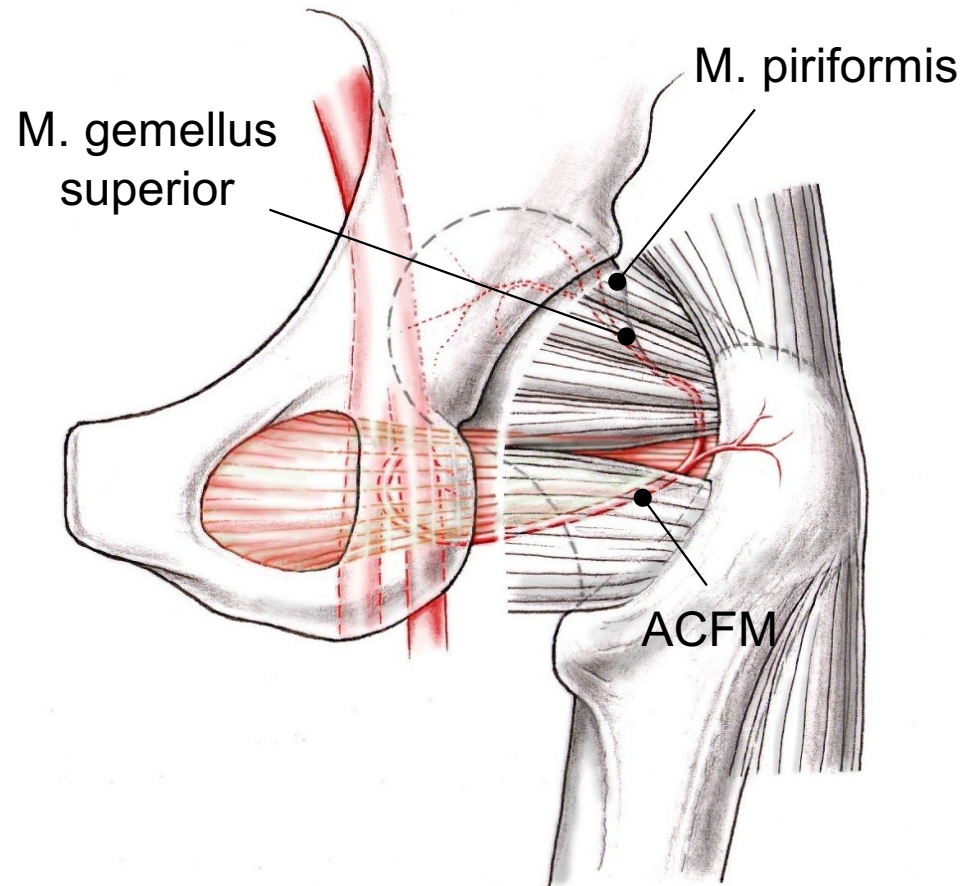
Gautier et al, JBJS Br. 2000 82(5):679-83.



Courtesy
M. Kalhor

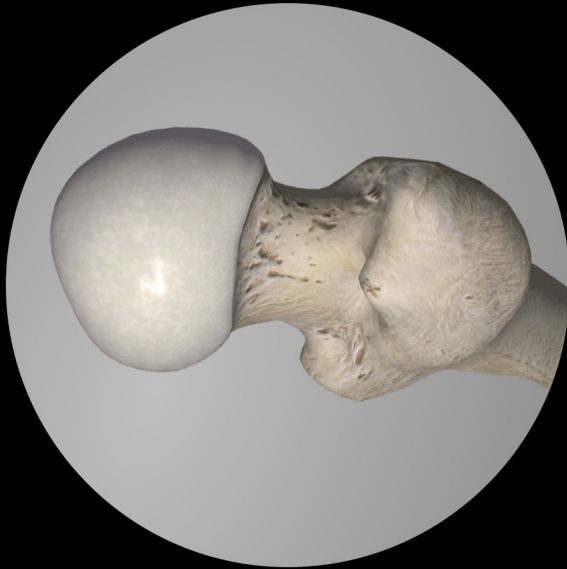


Medial femoral circumflex artery (MFCA)

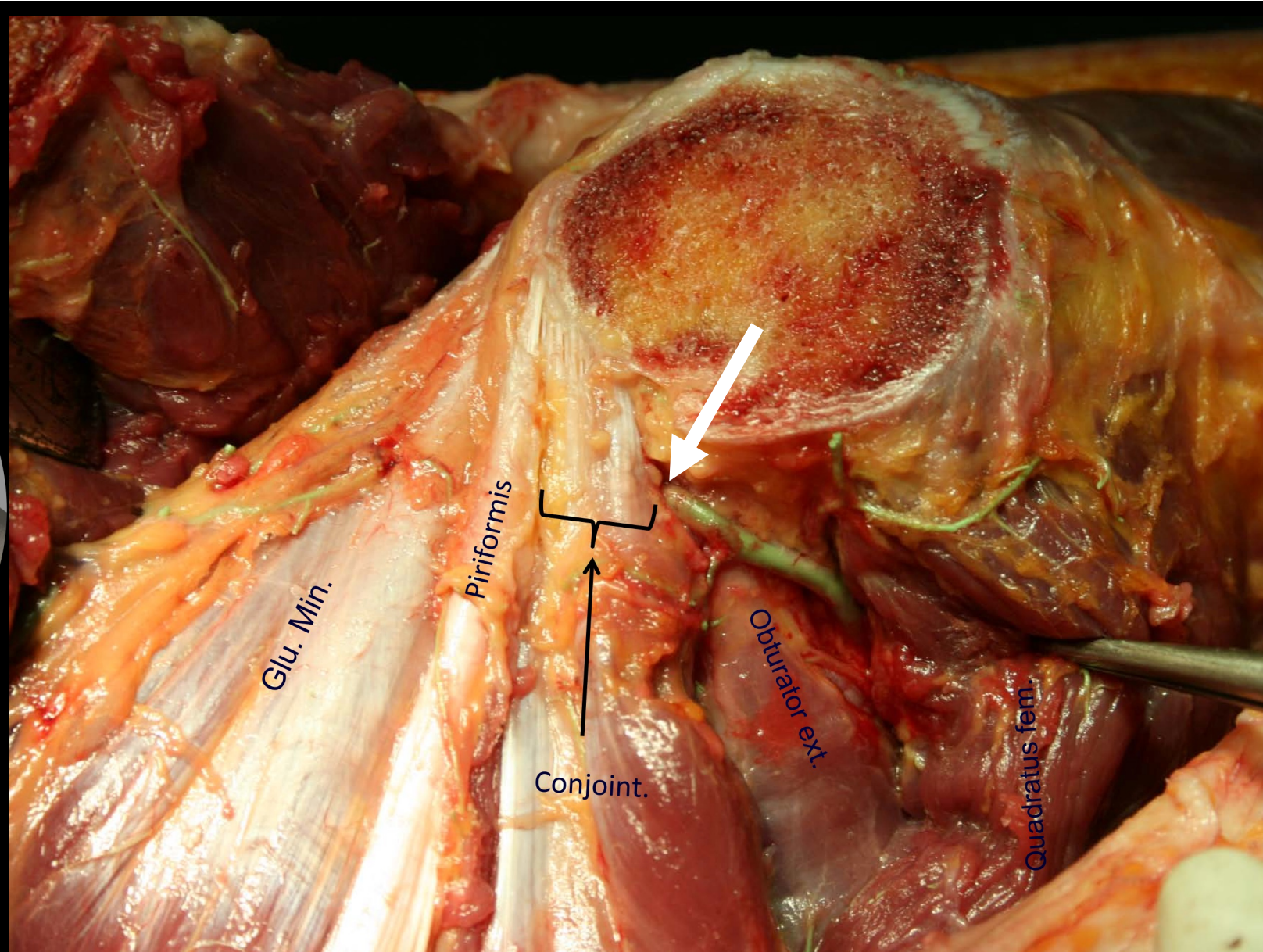


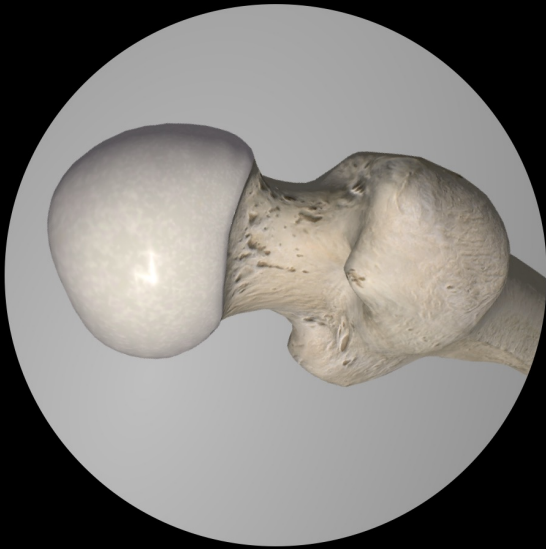
- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Crosses over the obturator externus
- Inferior retinaculum
- Trochanteric branch
- Undercrosses the triceps coxae
- Enters joint capsule between Mm. gemellus sup. and piriformis

Gautier et al, JBJS Br. 2000 82(5):679-83.

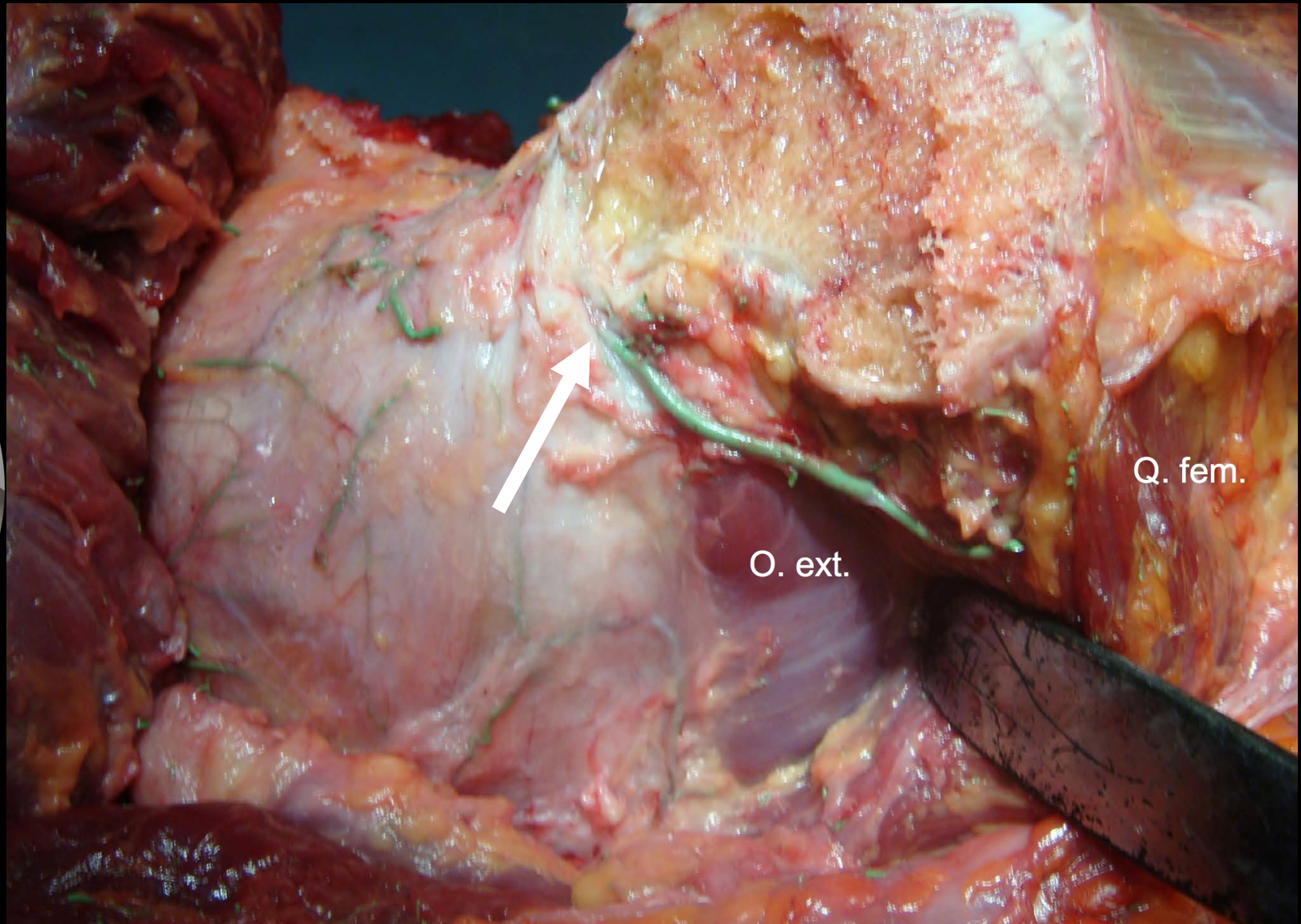


Courtesy
M. Kalhor

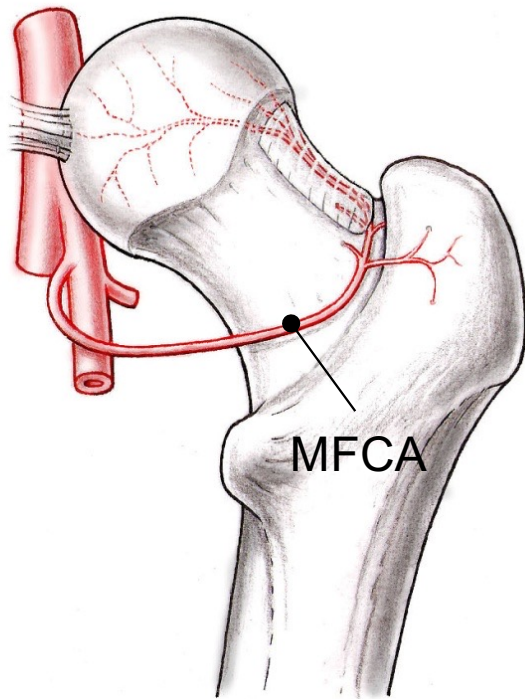




Courtesy
M. Kalhor



Medial femoral circumflex artery (MFCA)

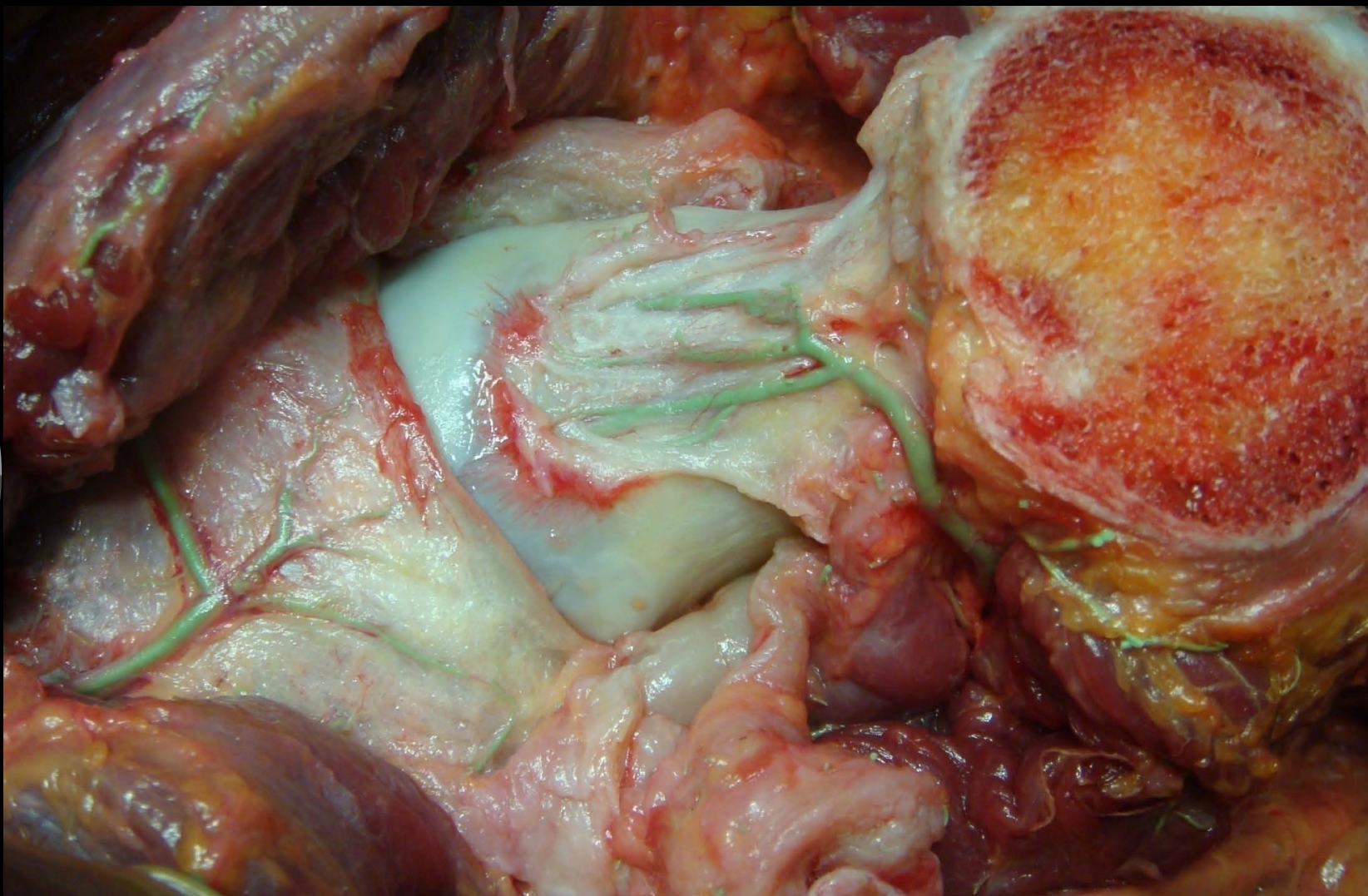


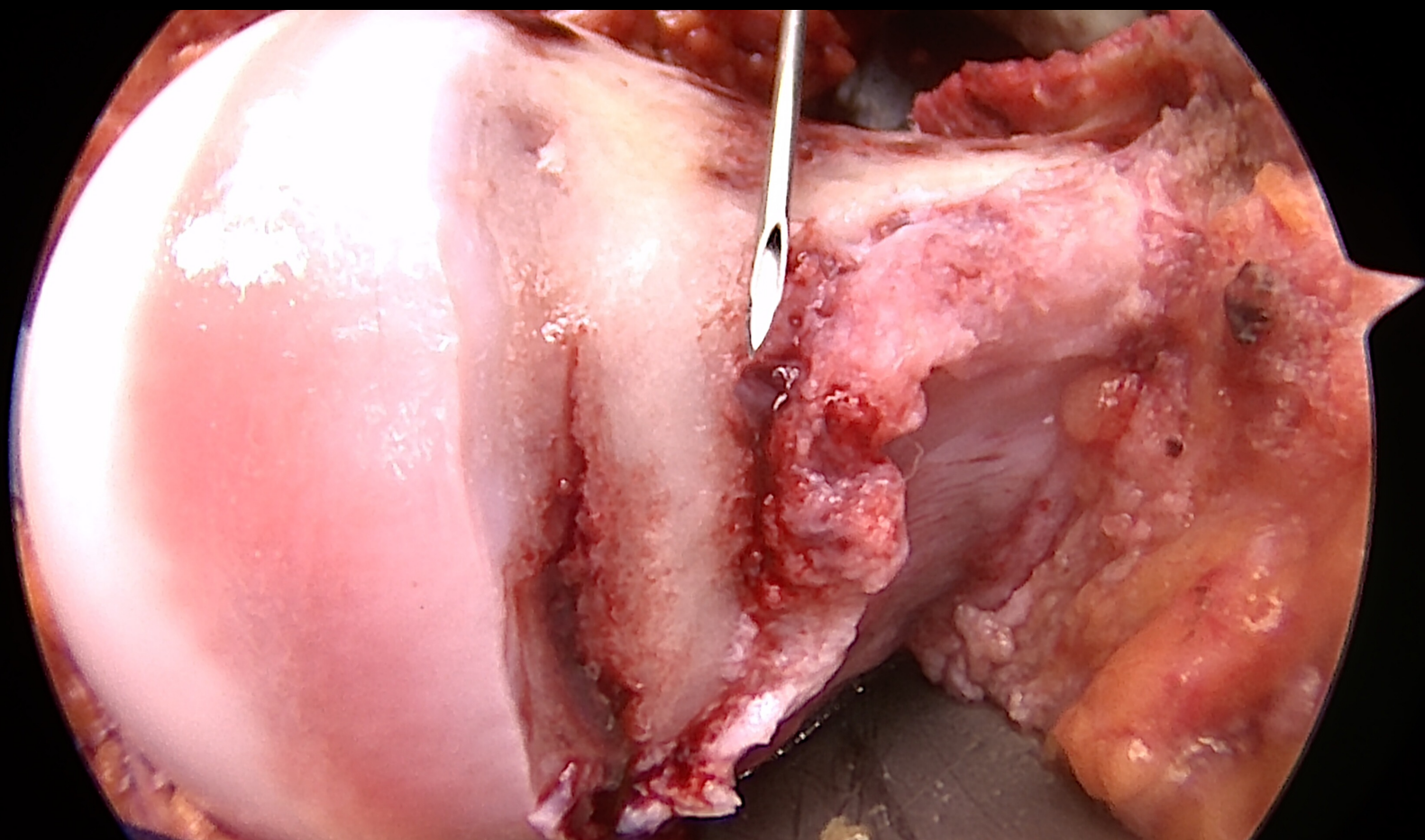
- Origin: deep femoral artery
- Between M. iliopsoas and M. pectineus
- Along inferior border of M. obturator externus
- Posteriorly to the femur towards the intertrochanteric crest
- Inferior retinaculum
- Crosses over the obturator externus
- Trochanteric branch
- Undercrosses the triceps coxae
- Enters joint capsule between Mm. gemellus sup. and piriformis
- 4-5 retinacular vessels

Gautier et al, JBJS Br. 2000 82(5):679-83.

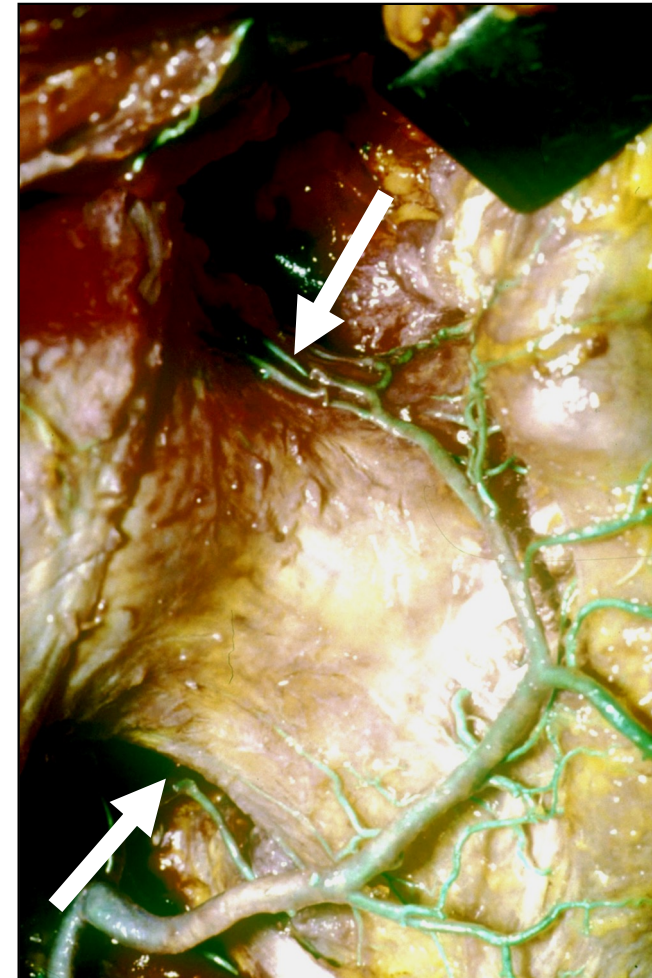
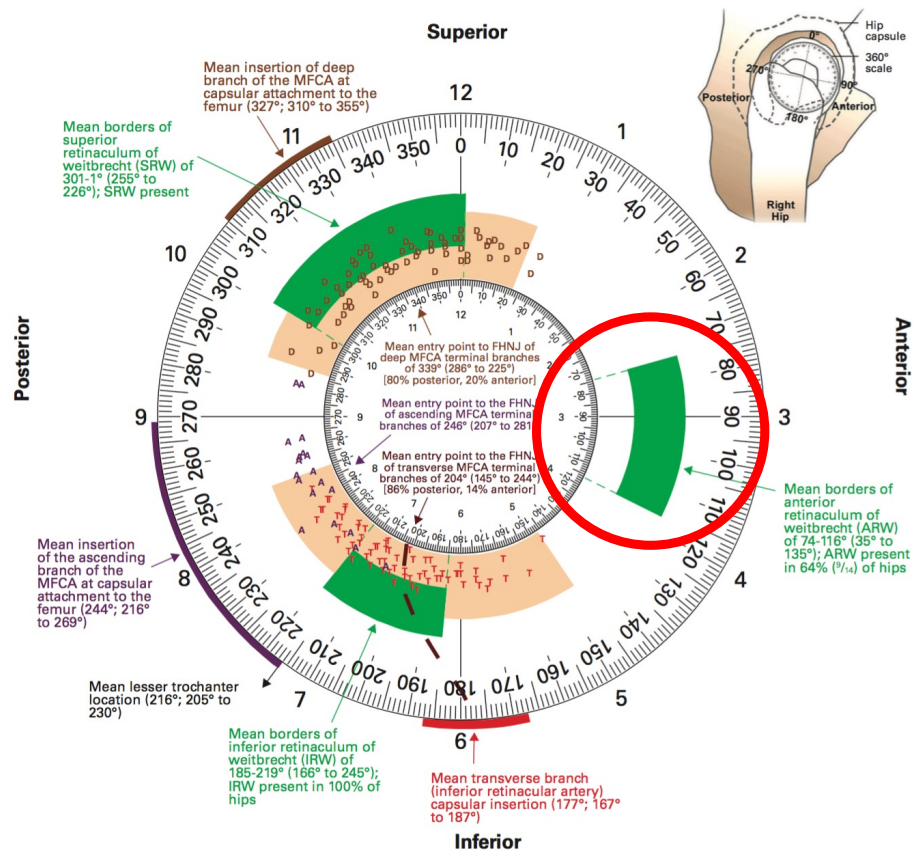


Courtesy
M. Kalhor





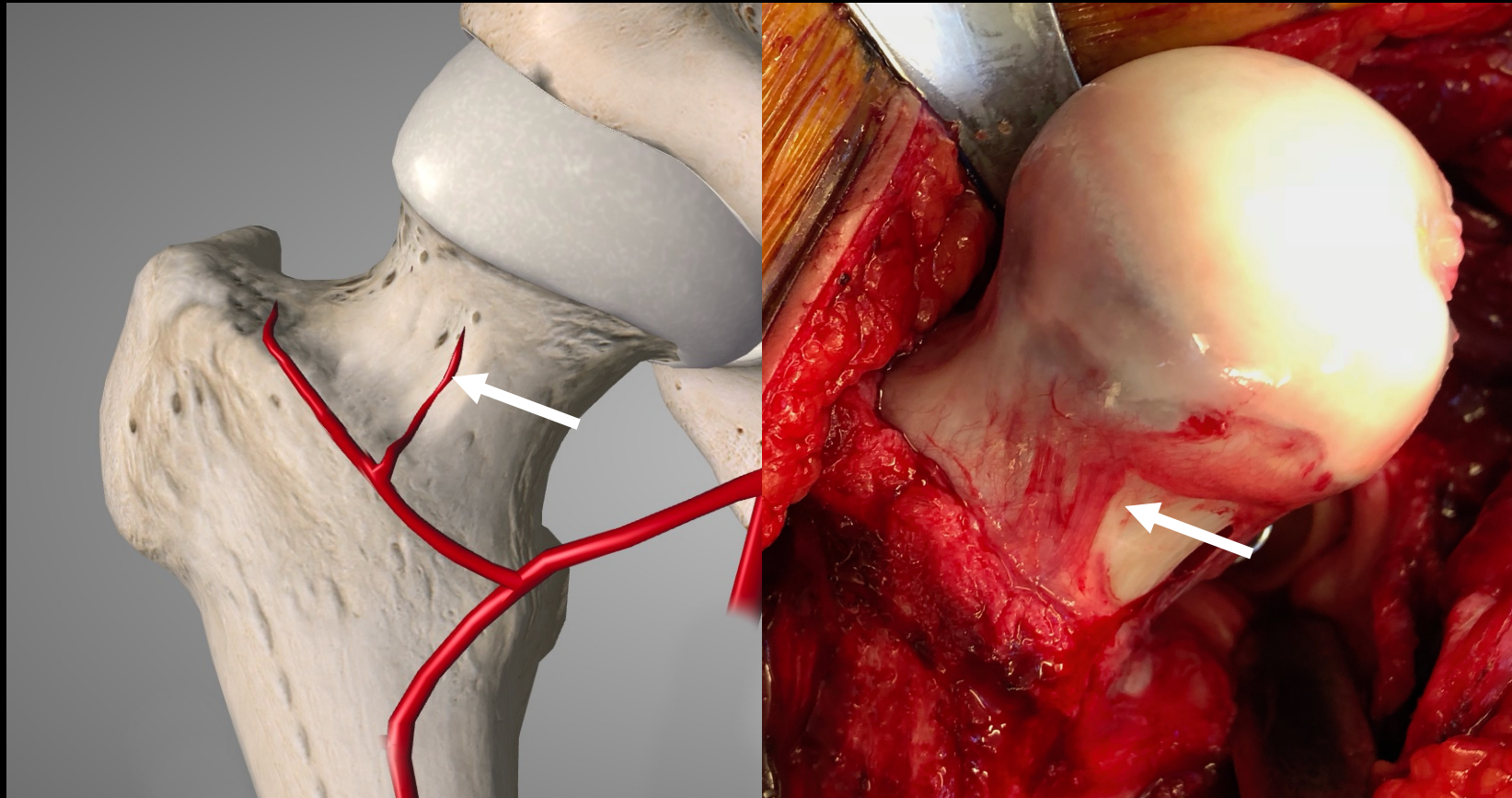
Distribution of Retinacular Vessels



Lazaro et al, JBJS Br. 2015 97-B:1204–13.

UNIVERSITY OF FRIBOURG | DEPARTMENT OF ORTHOPAEDIC SURGERY & TRAUMATOLOGY

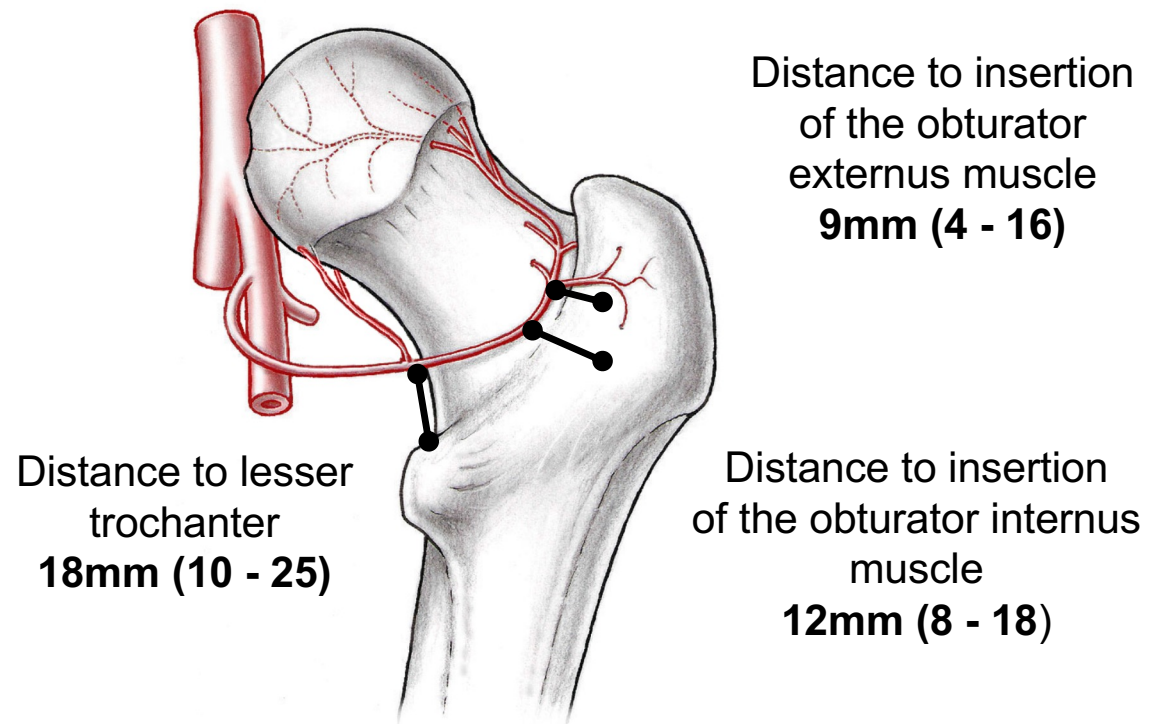
Anteriores Retinaculum (Lateral femoral circumflex artery)



Not relevant for femoral head perfusion

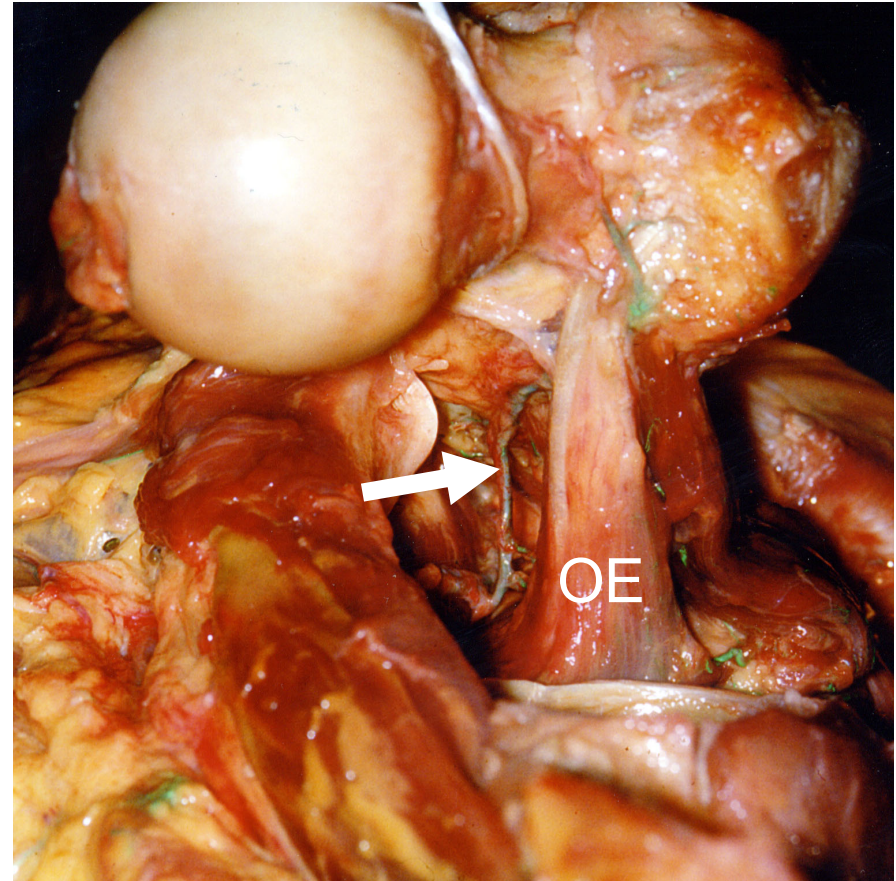
Anastomoses and topographical course

- From the inferior gluteal artery along the piriformis muscle
- In 15% dominant vessel

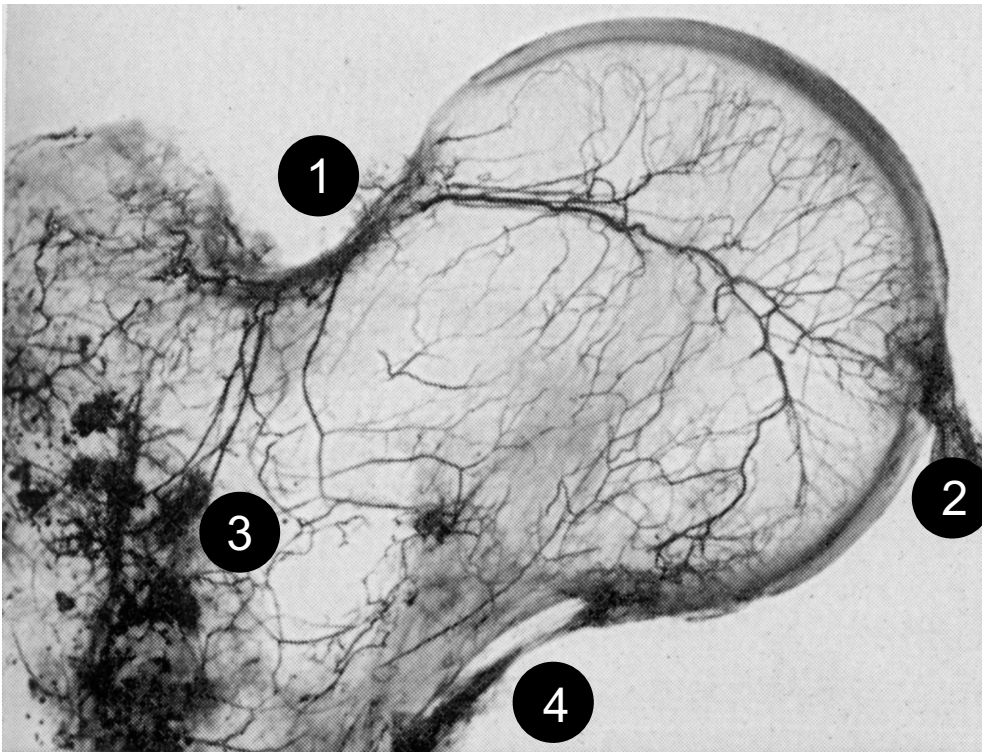


Hip dislocation

- The MFCA is protected by the obturator externus (OE) muscle during dislocation of the hip
- Surgical dislocation
- Traumatic dislocation



Relevance of Retinacular Vessels

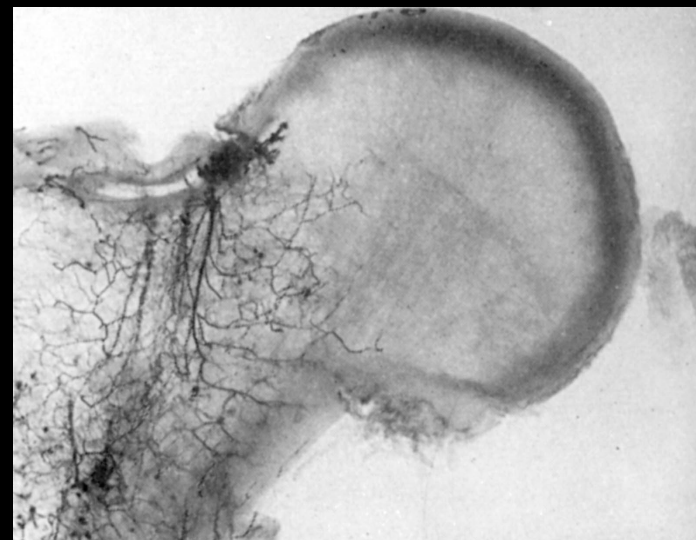
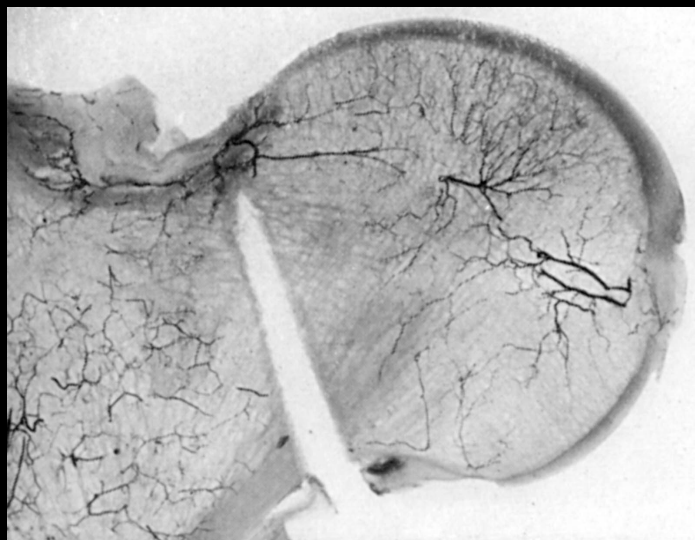
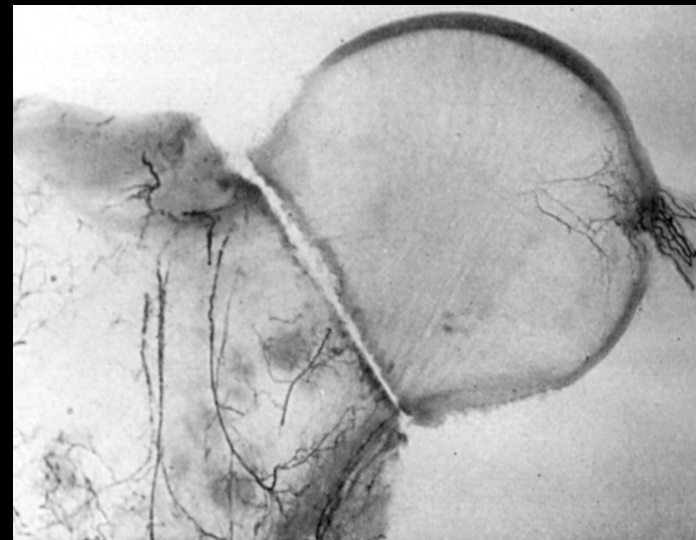


1: Superior retinaculum

2: Lig. capitis femoris

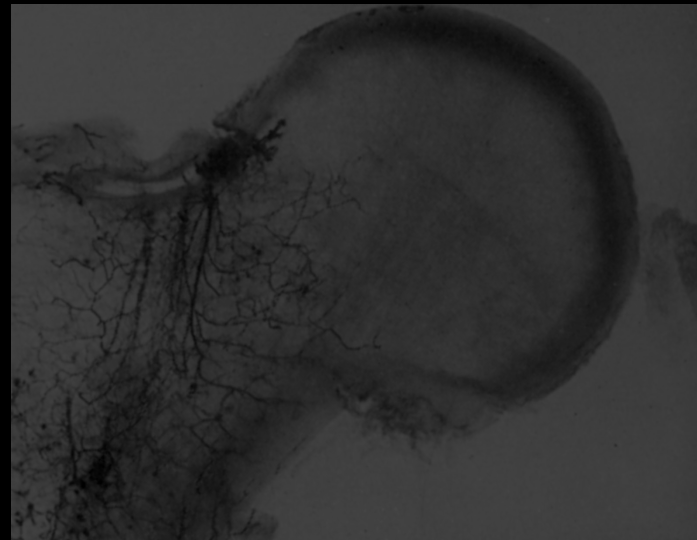
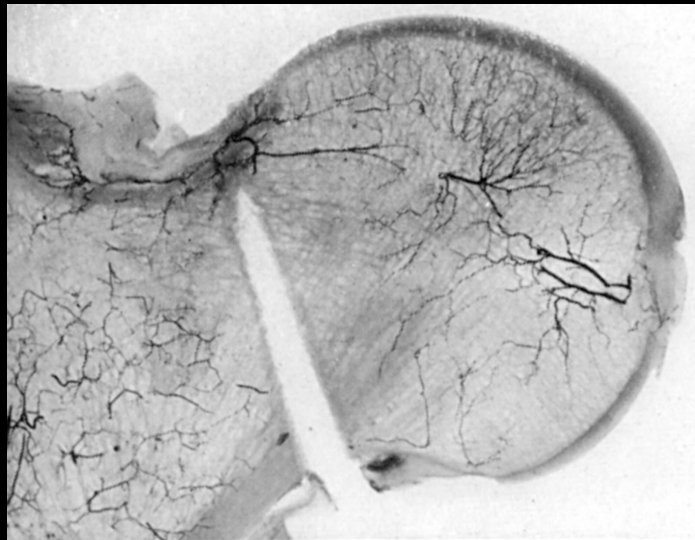
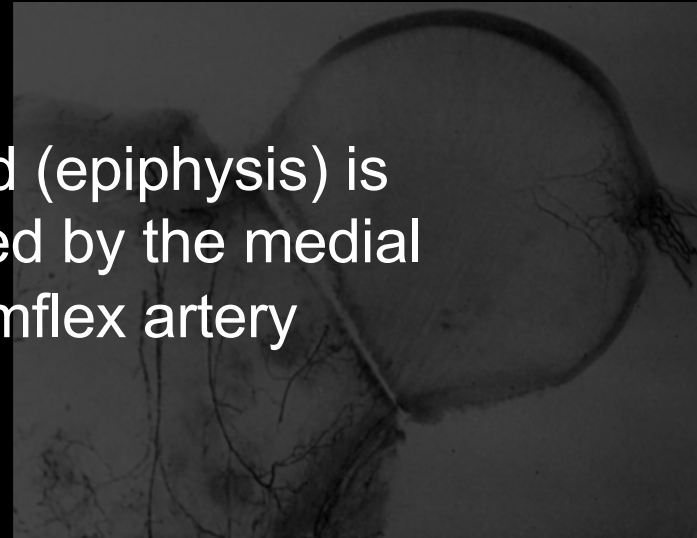
3: Metaphyseal

4: Inferior retinaculum



Sevitt S, Thompson RG. JBJS-B 1965, 47-B: 560-573

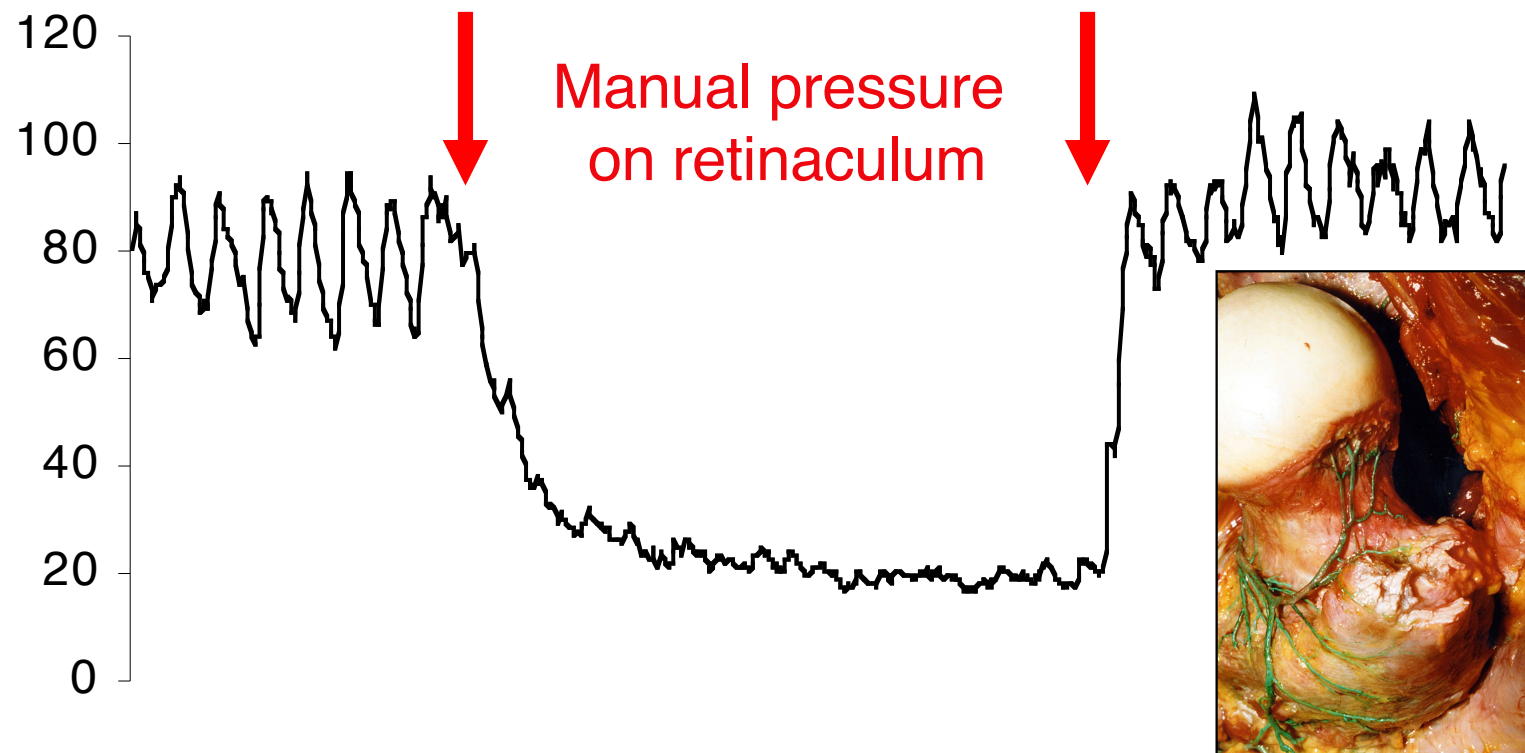
The femoral head (epiphysis) is
sufficiently perfused by the medial
femoral circumflex artery



Sevitt S, Thompson RG. JBJS-B 1965, 47-B: 560-573

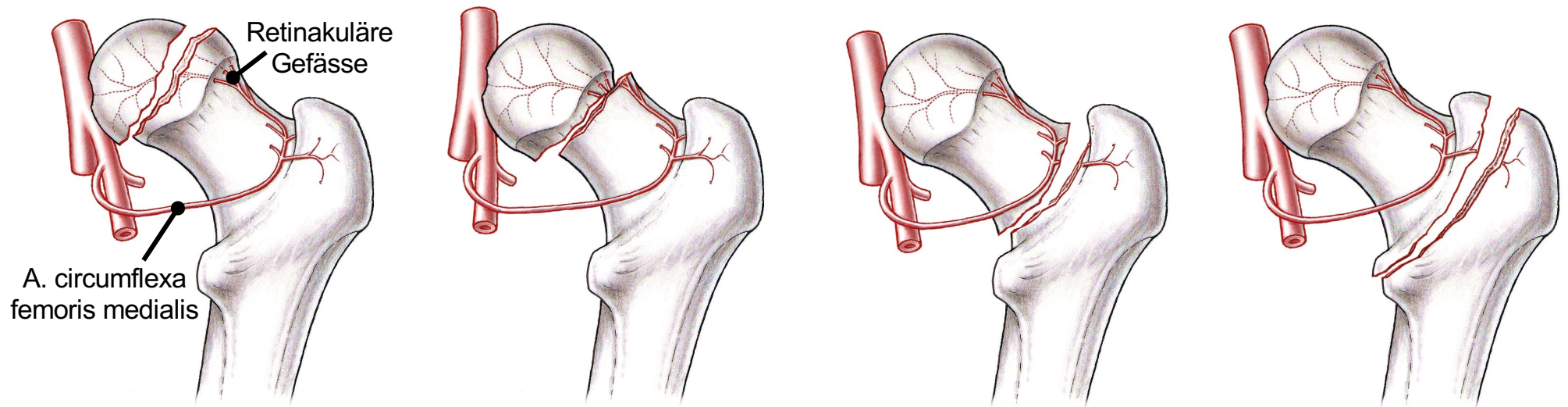


Intraoperative Assessment of Blood Supply

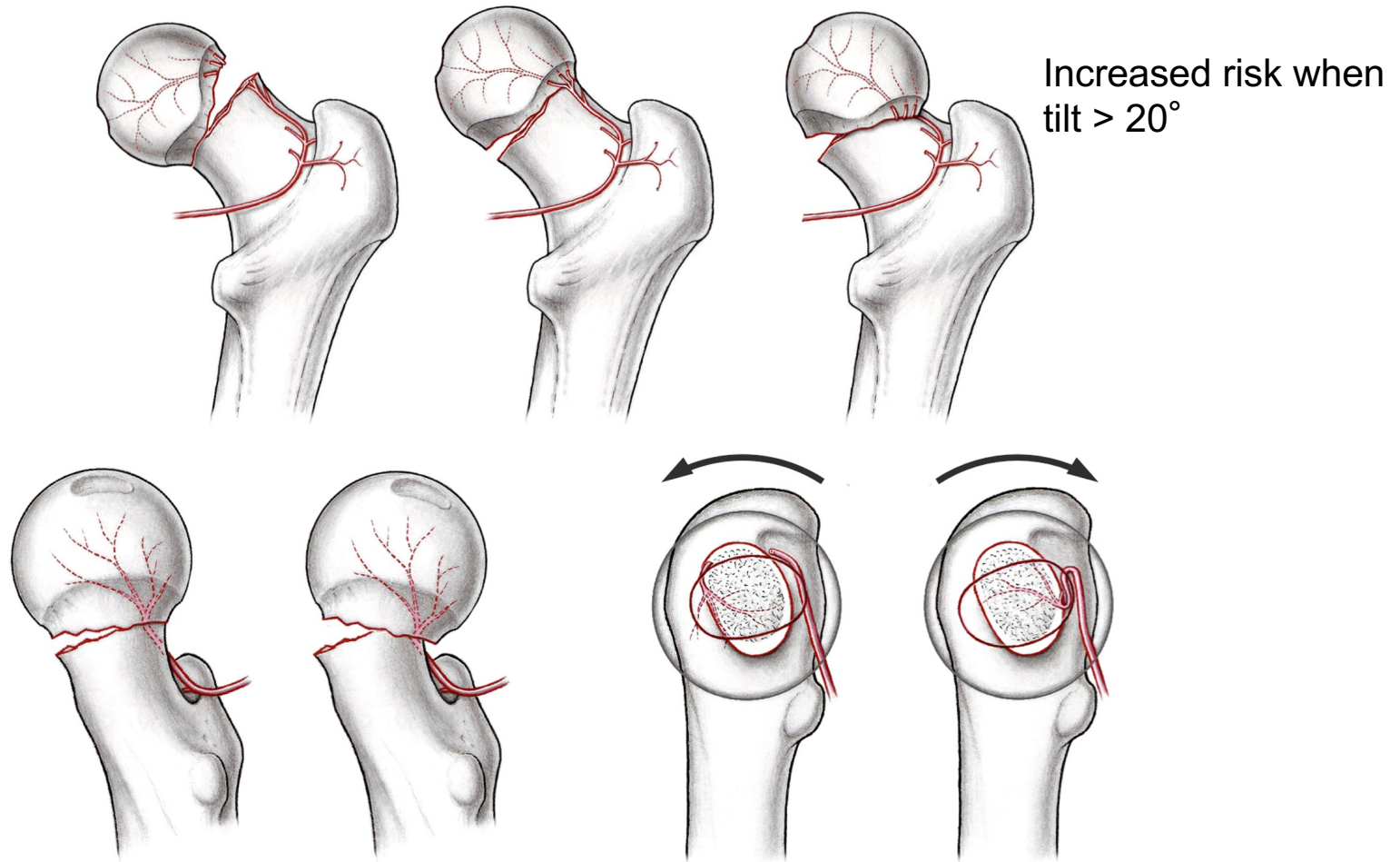


Nötzli et al, JBJS-Br, 2002;84(2):300-4.

Relevance Proximal Femoral Fractures



Relevance Proximal Femoral Fractures





preoperatively



postoperatively

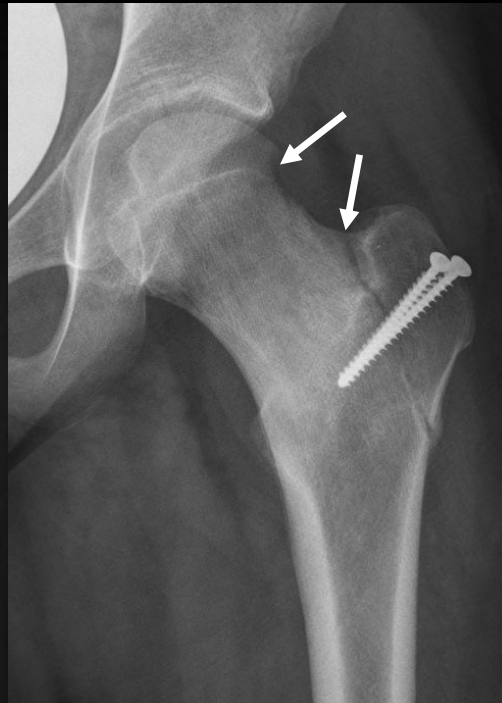


9 months

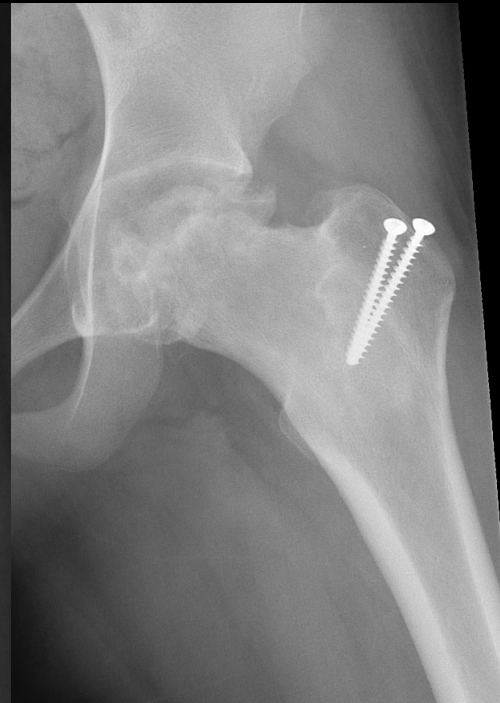
15-year old girl



Preoperatively



Postoperatively



10 months



Age 16

Summary

- **The deep branch of the medical femoral circumflex artery** provides the relevant blood supply to the femoral epiphysis
 - superior retinaculum: main vessels, supplies the majority of the epiphysis
 - inferior retinaculum: supplies the calcar region and the inferior femoral head
- **Lateral femoral circumflex artery**
 - anterior retinaculum: irrelevant

