Bern Hip Symposium 2026

Bloody Hell

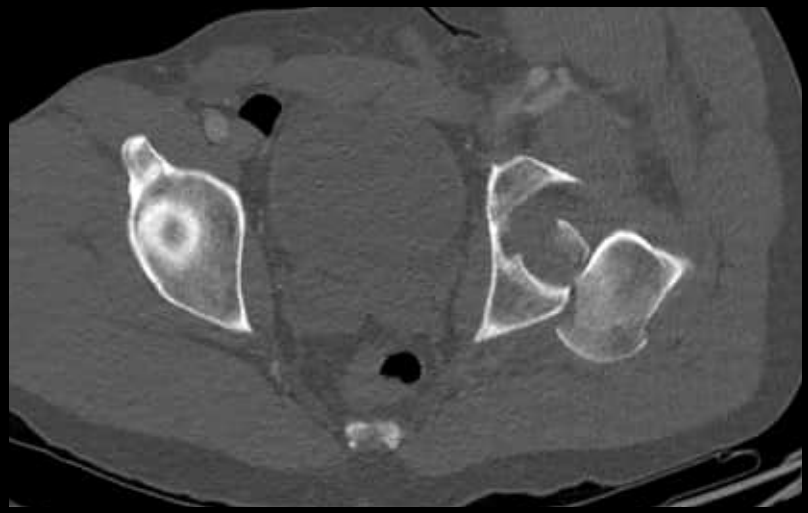
How does the blood supply to the hip work?

Moritz Tannast

Professor and Chairman

Department of Orthopaedic Surgery and Traumatology, Inselspital, University of Bern
Switzerland

Avalanche Victim: Pipkin IV-fracture
Locked Dislocation for 11 Hours



Q1: Who thinks that the femur head is still perfused?

Q2: Who thinks that the Pipkin fragment is still perfused?

Introduction

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**

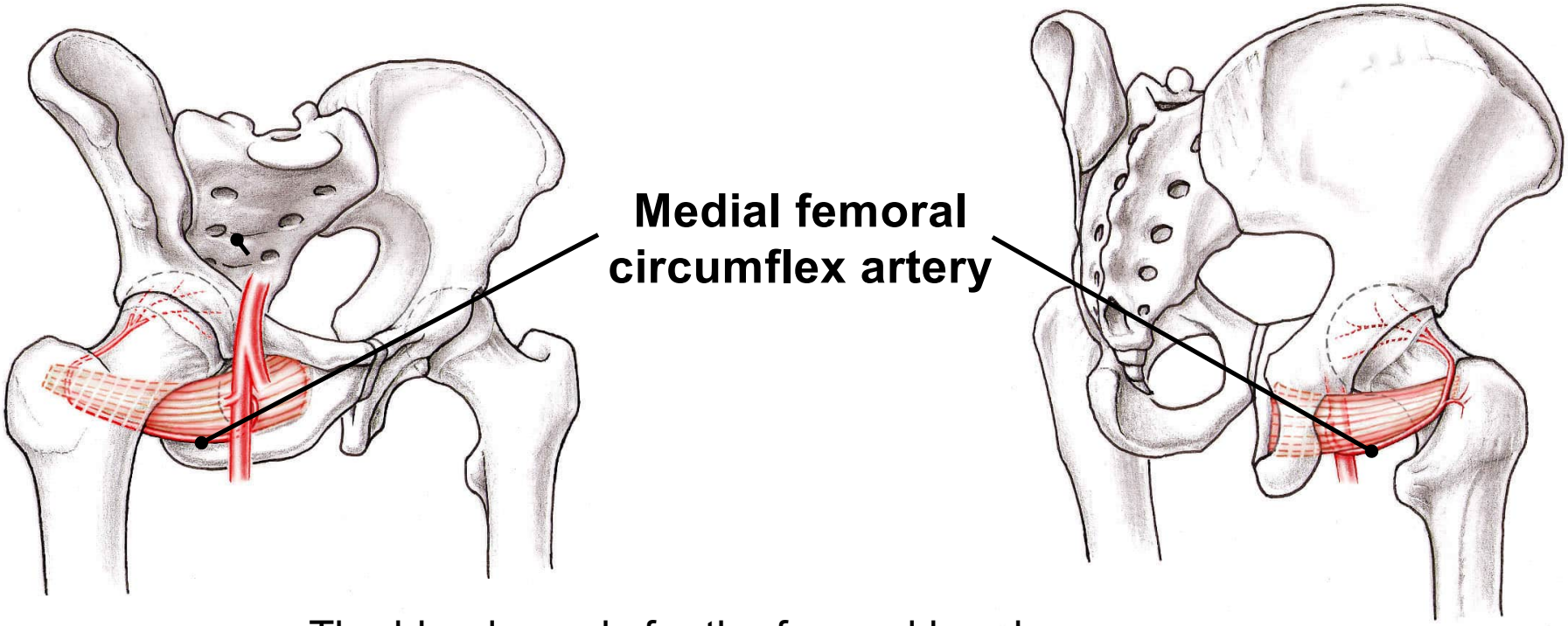
Introduction

The deep branch of the medial femoral circumflex artery (FCA) provides the main and relevant blood supply to the femoral head.

Some additional contribution by the

- Inferior retinacular branch (from medial FCA)
- Anterior retinaculum (from lateral FCA)

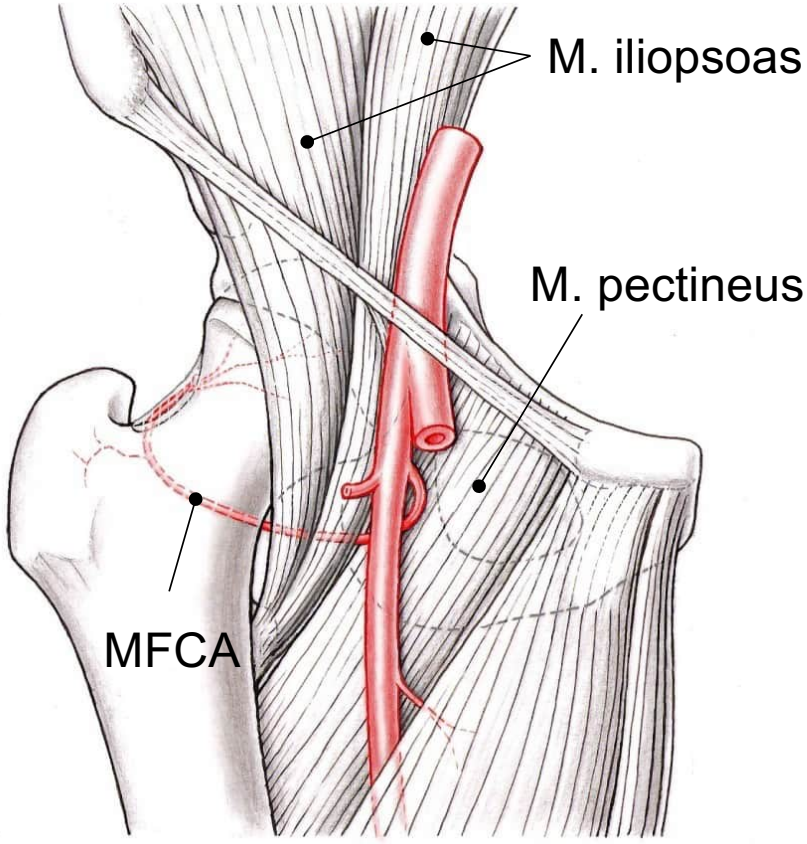
Introduction



The blood supply for the femoral head...

- comes from anterior
- runs between femur and pelvis
- supplies the femoral head from posterior

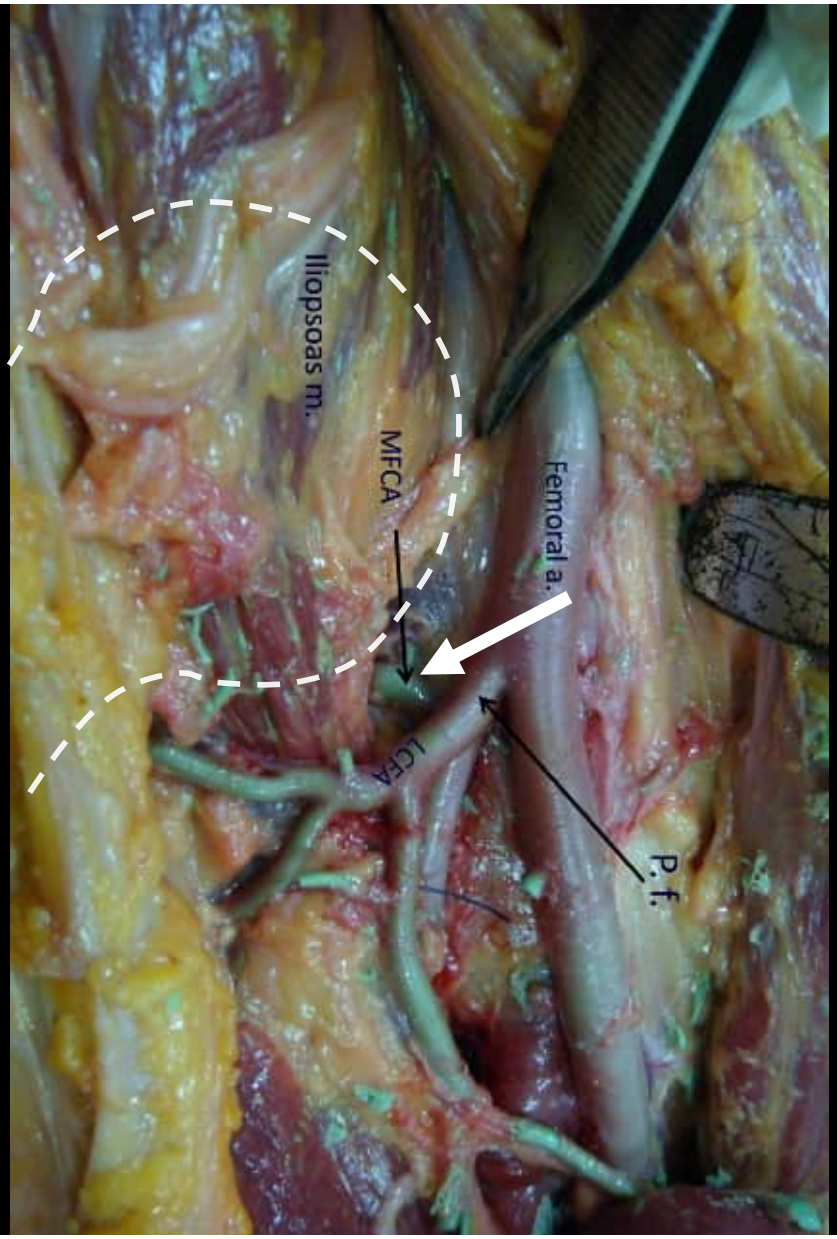
Medial Femoral Circumflex Artery



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

*Gautier et al, J Bone Joint Surg Br. **2000** Jul;82(5):679-83*

Courtesy
M. Kalhor



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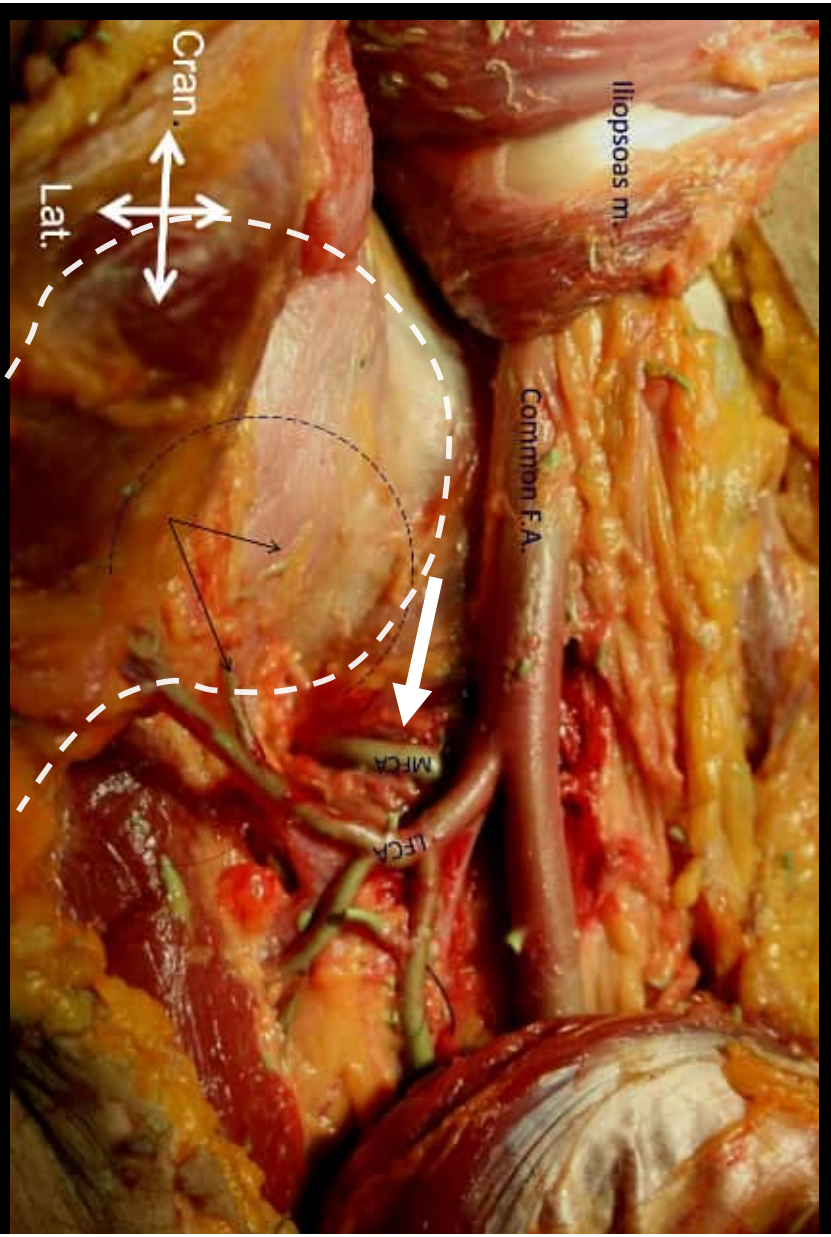
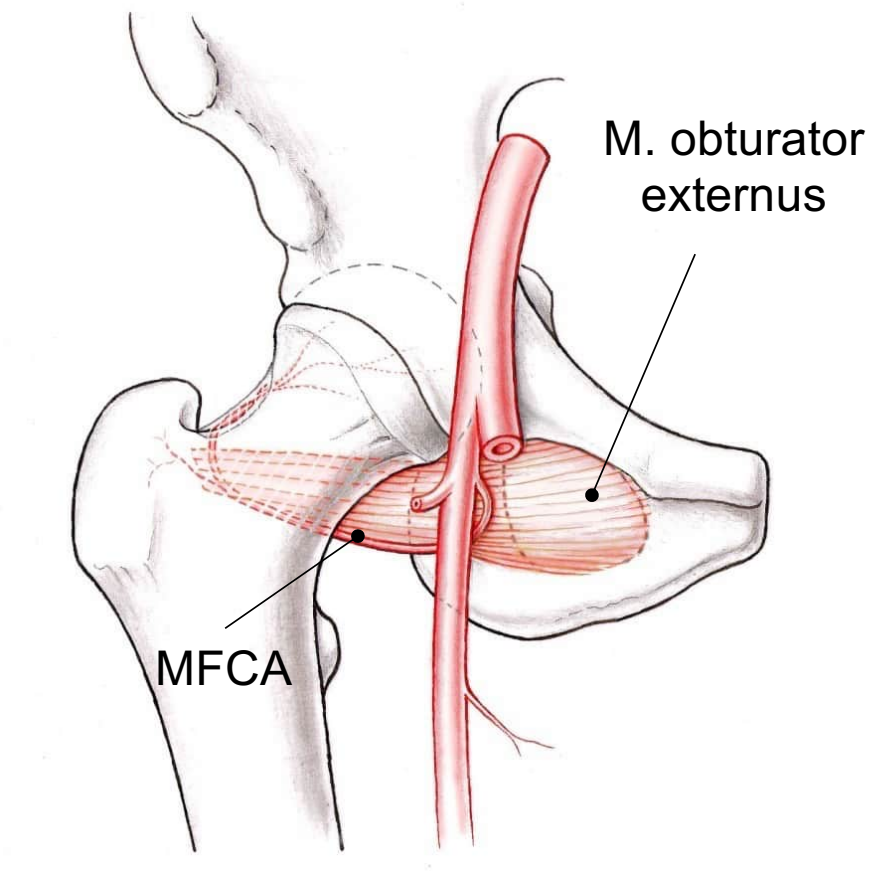


Iliopsoas retracted

Medial Femoral Circumflex Artery



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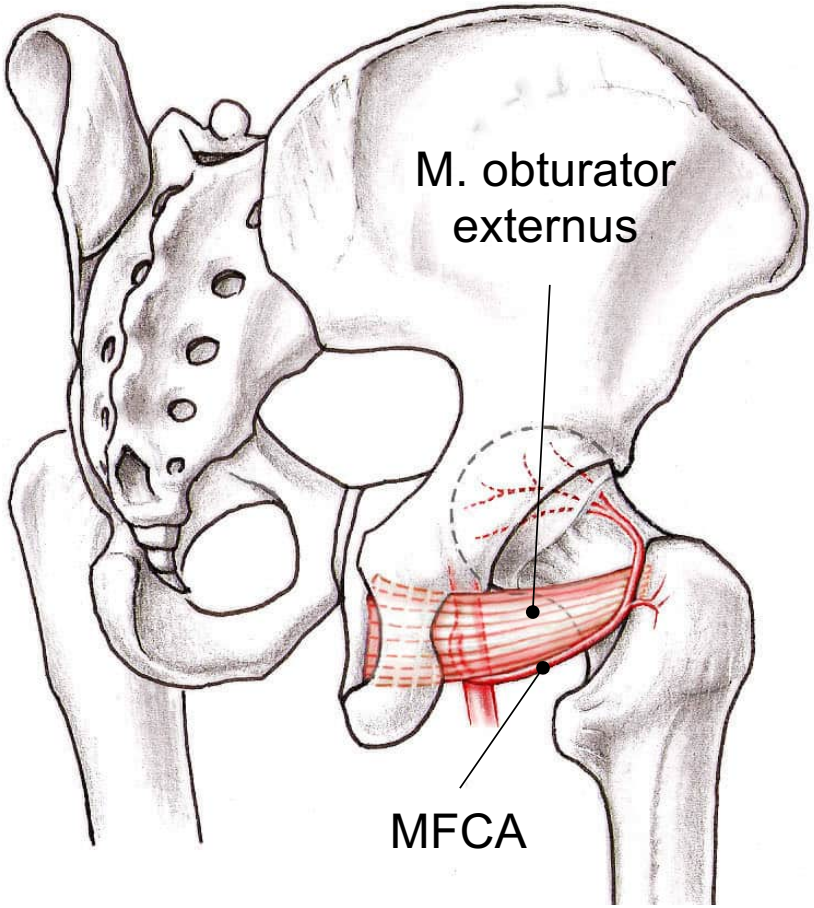
Medial Femoral Circumflex Artery



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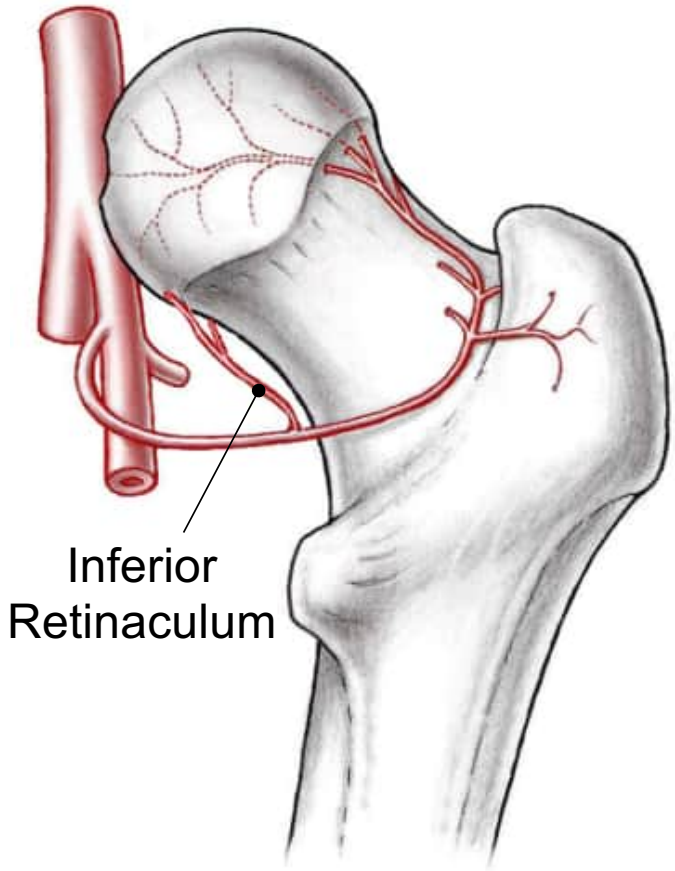

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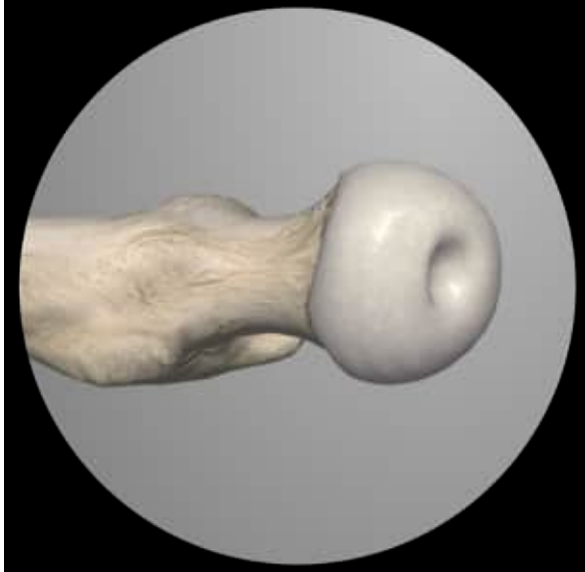
Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*



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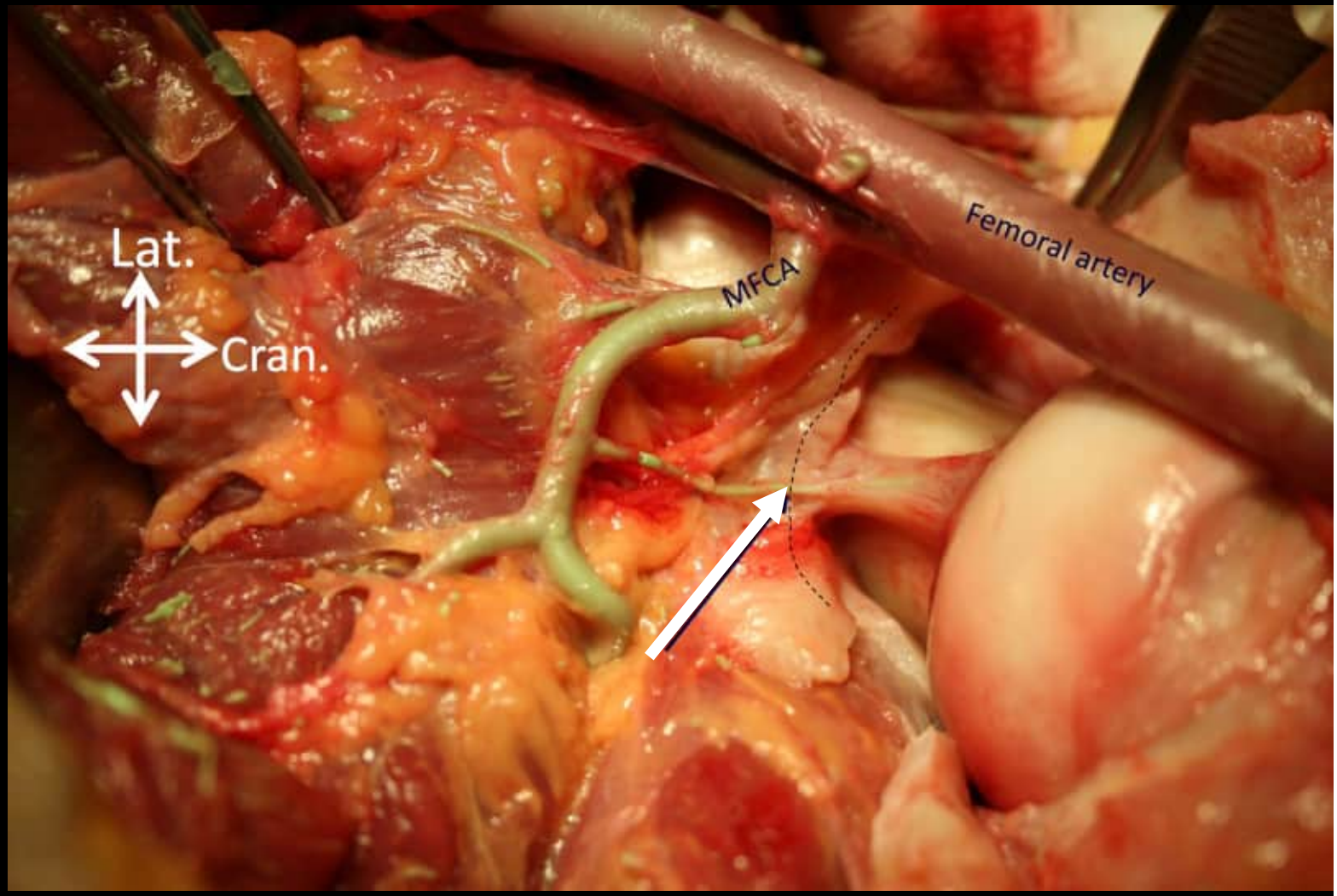

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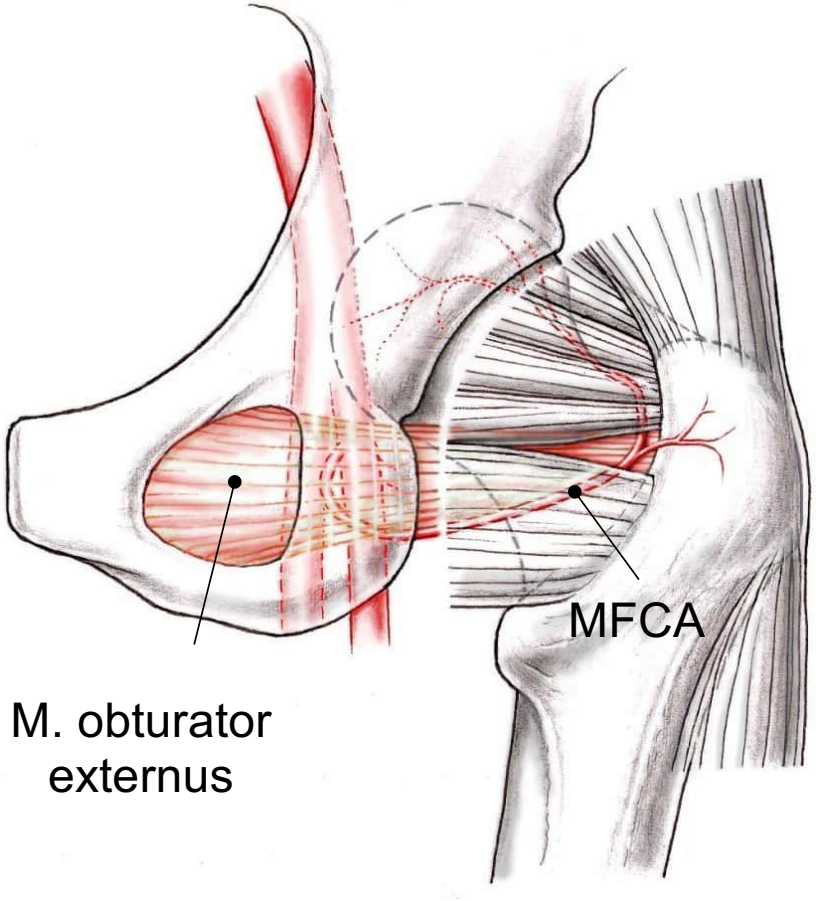

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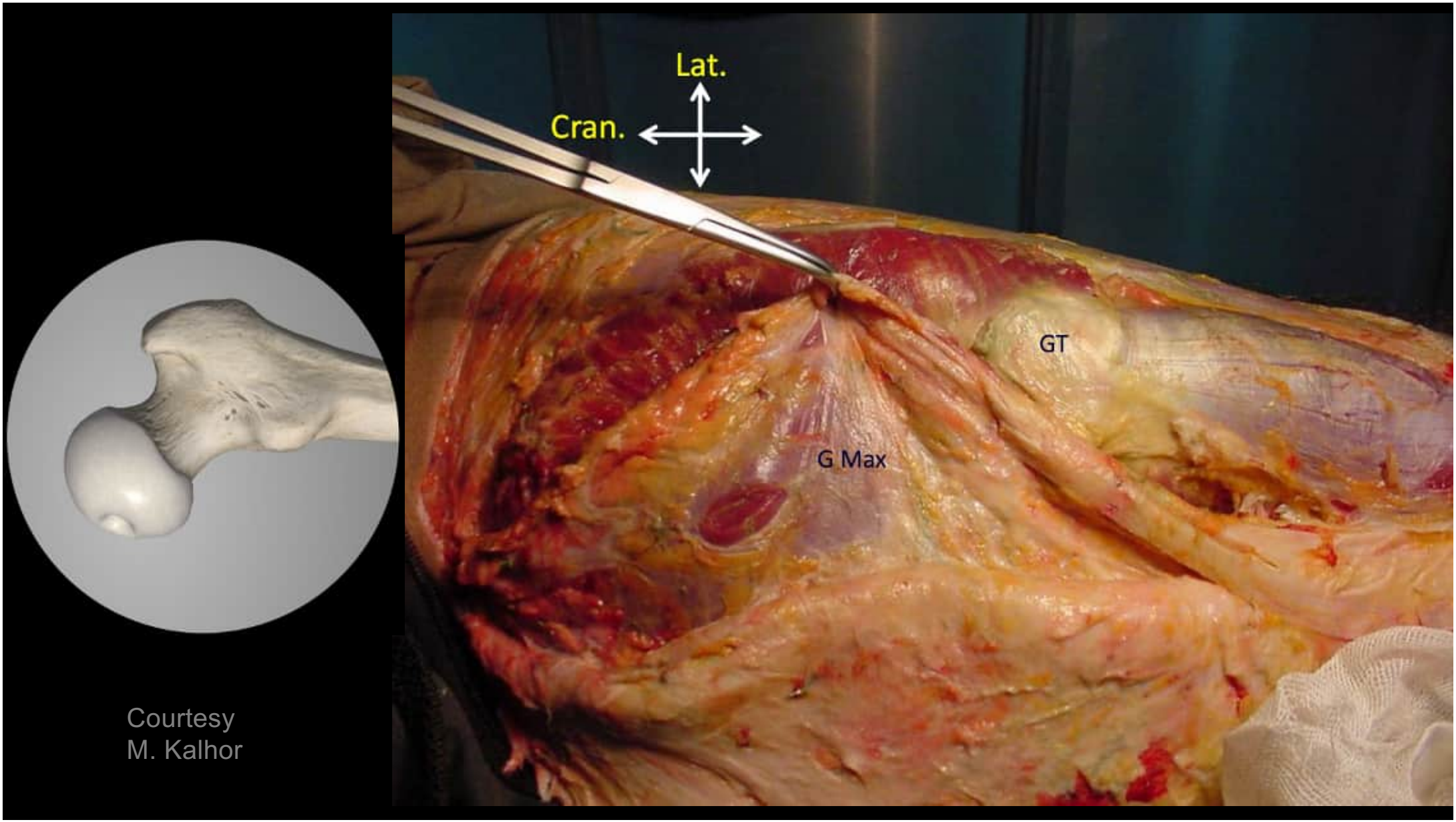
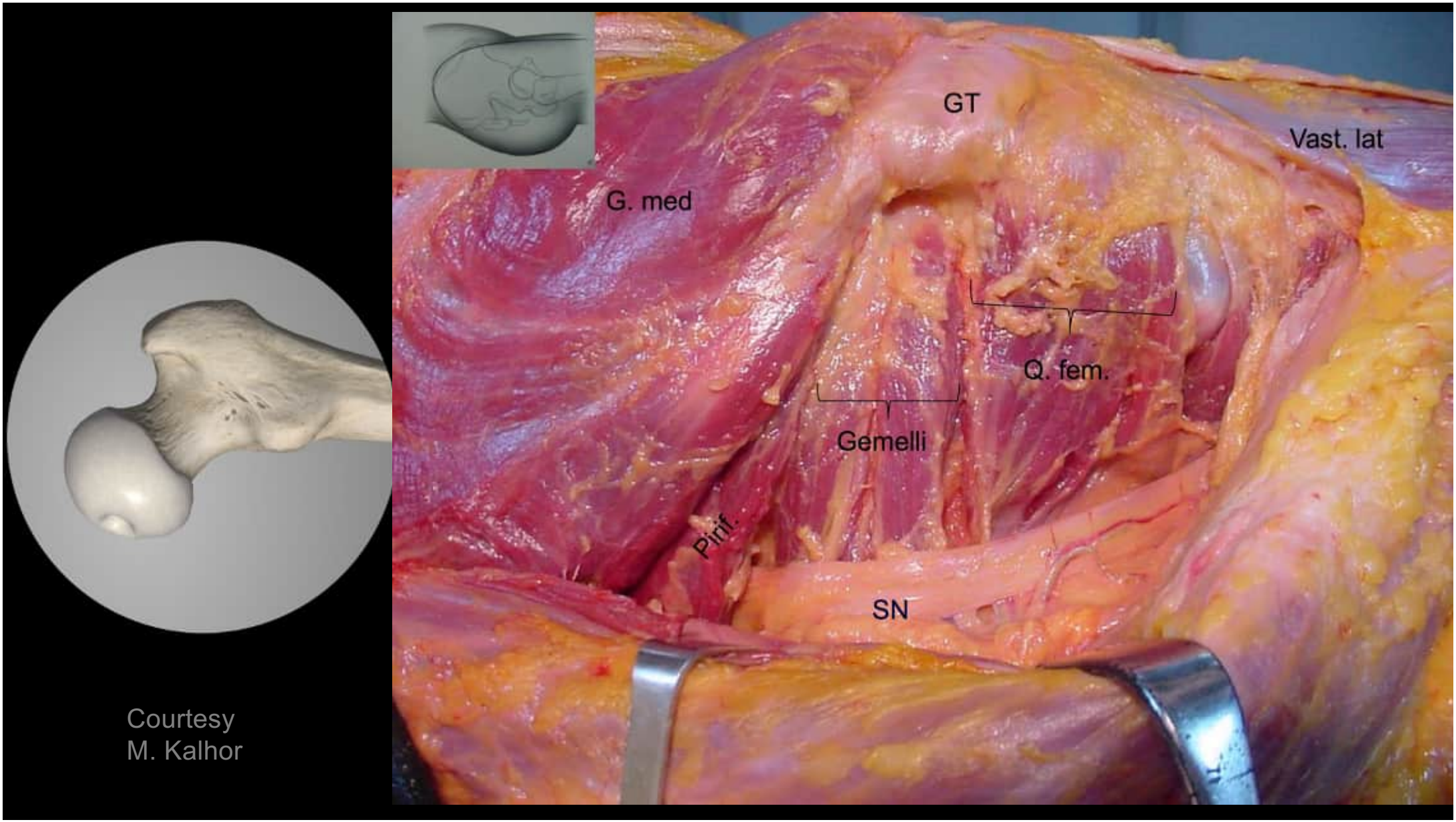
Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*


Lat.
Cran.
GT
G Max
Courtesy
M. Kalhor


GT
Vast. lat
G. med
Q. fem.
Gemelli
Pirif.
SN
Courtesy
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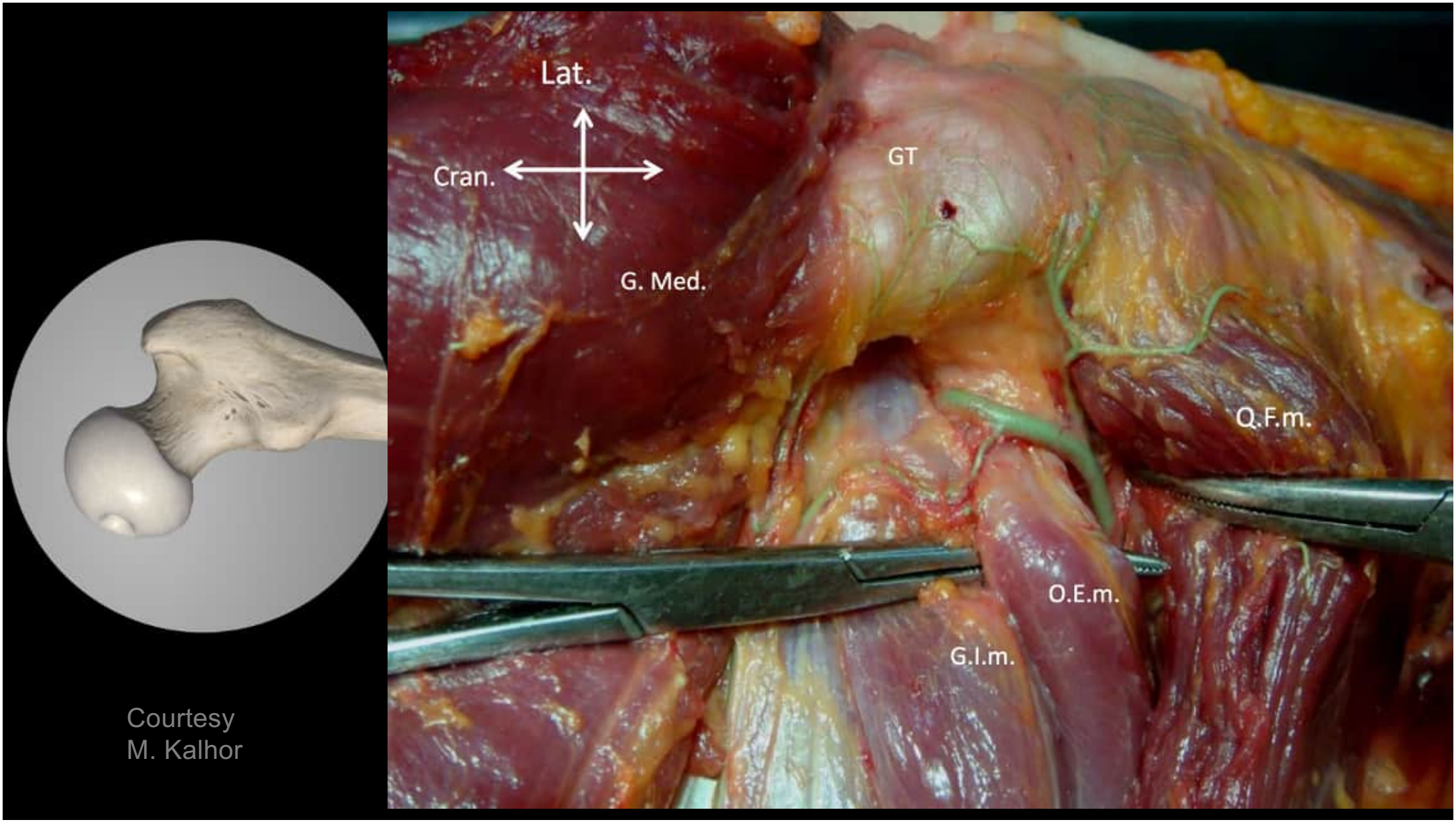

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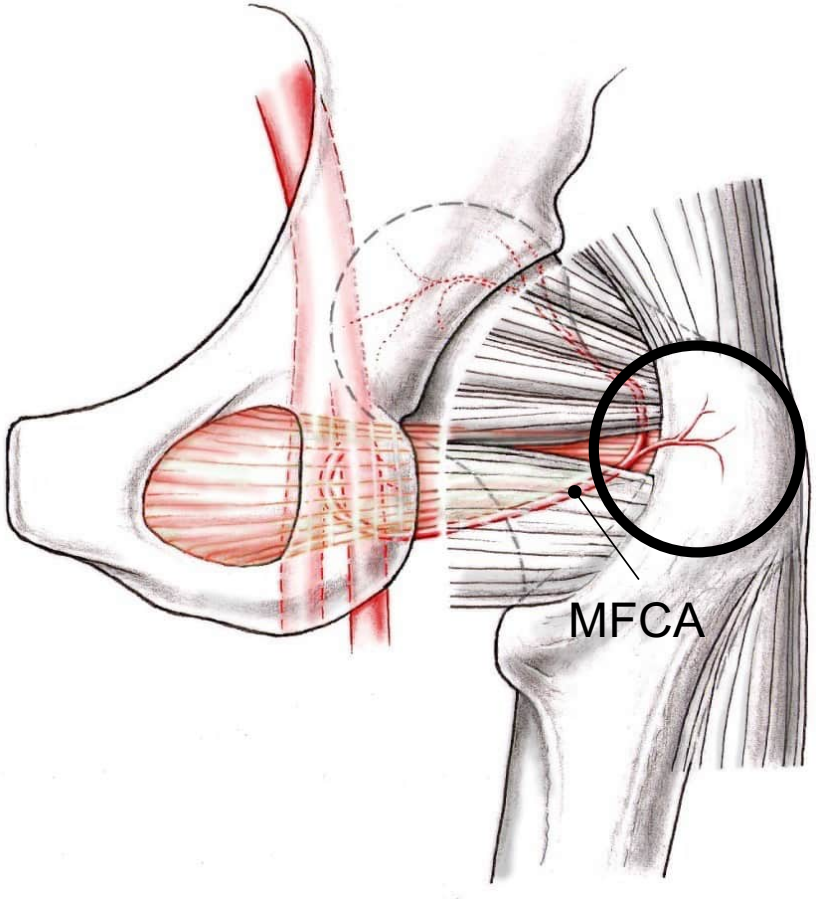

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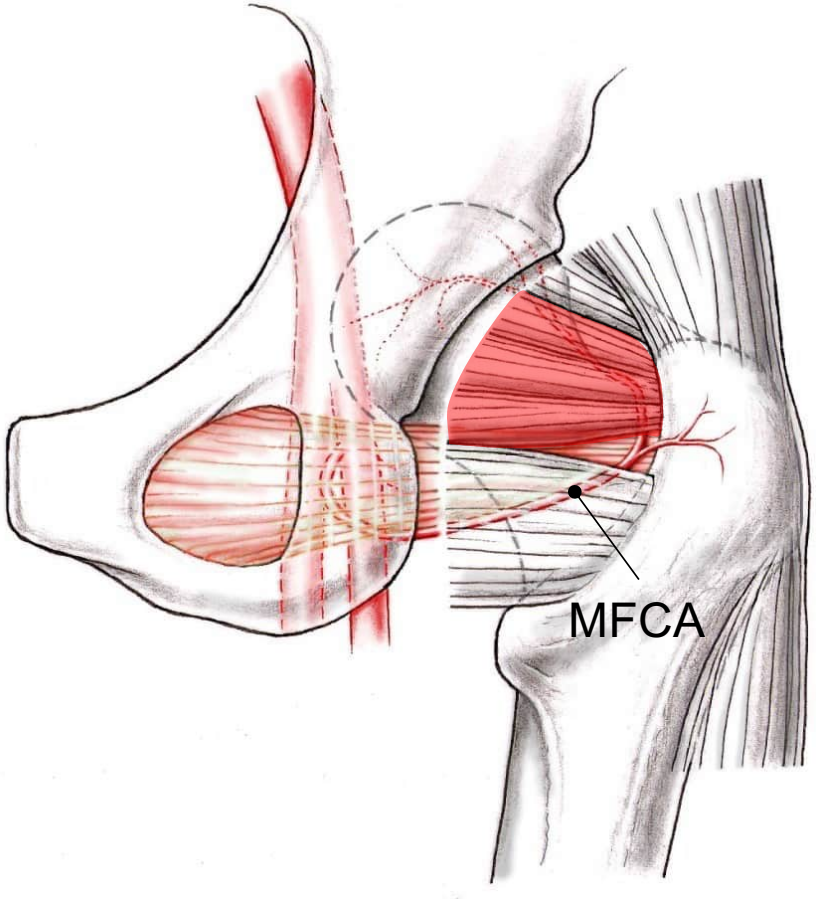

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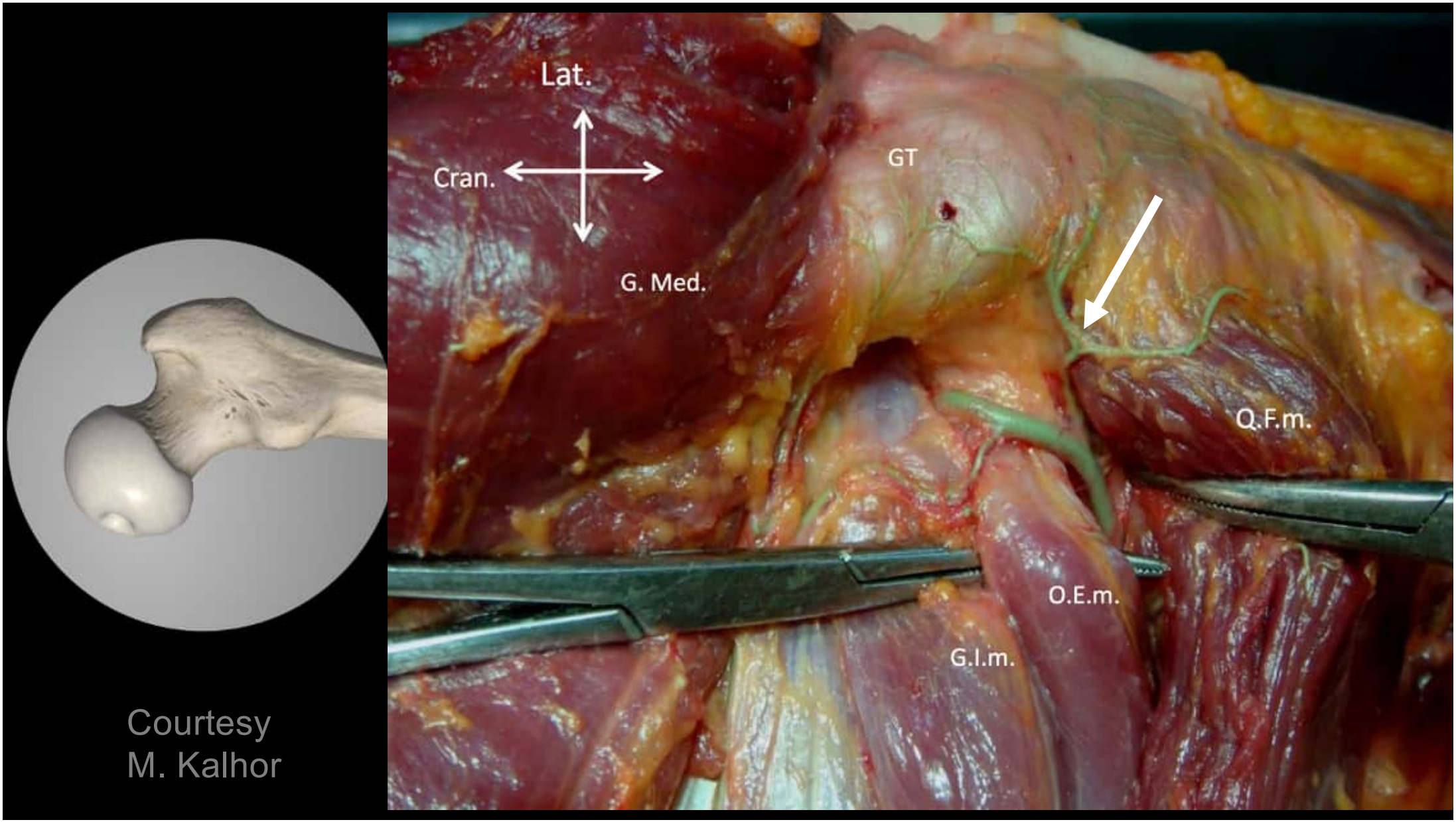
Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*



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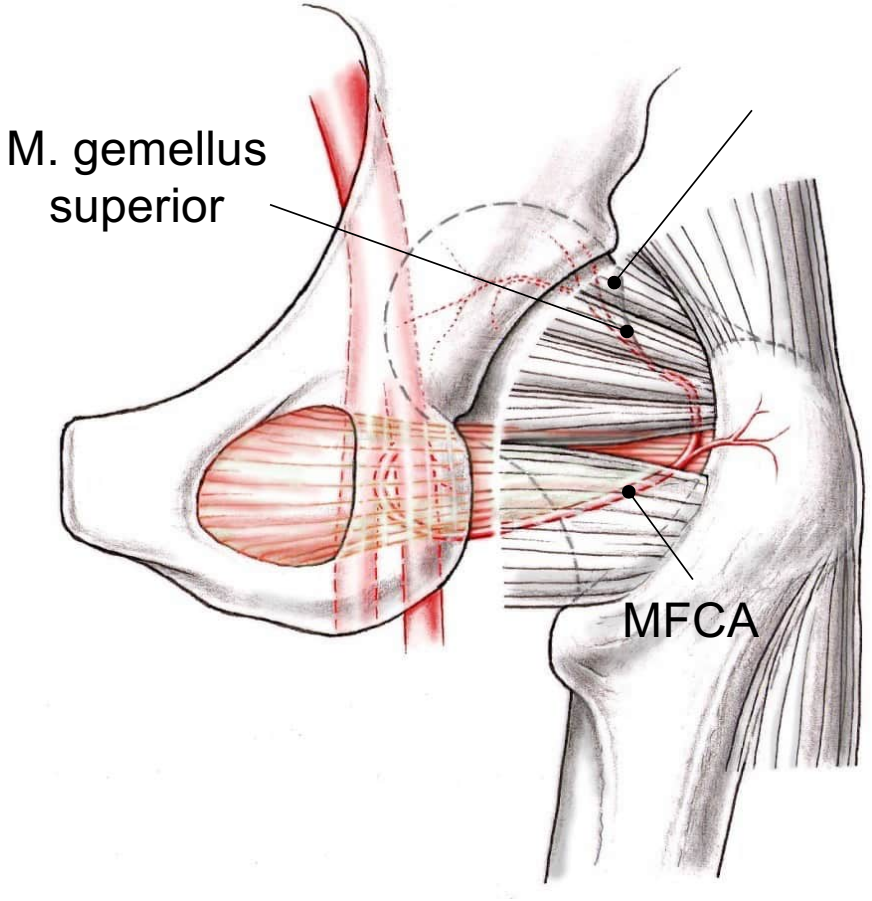
Medial Femoral Circumflex Artery



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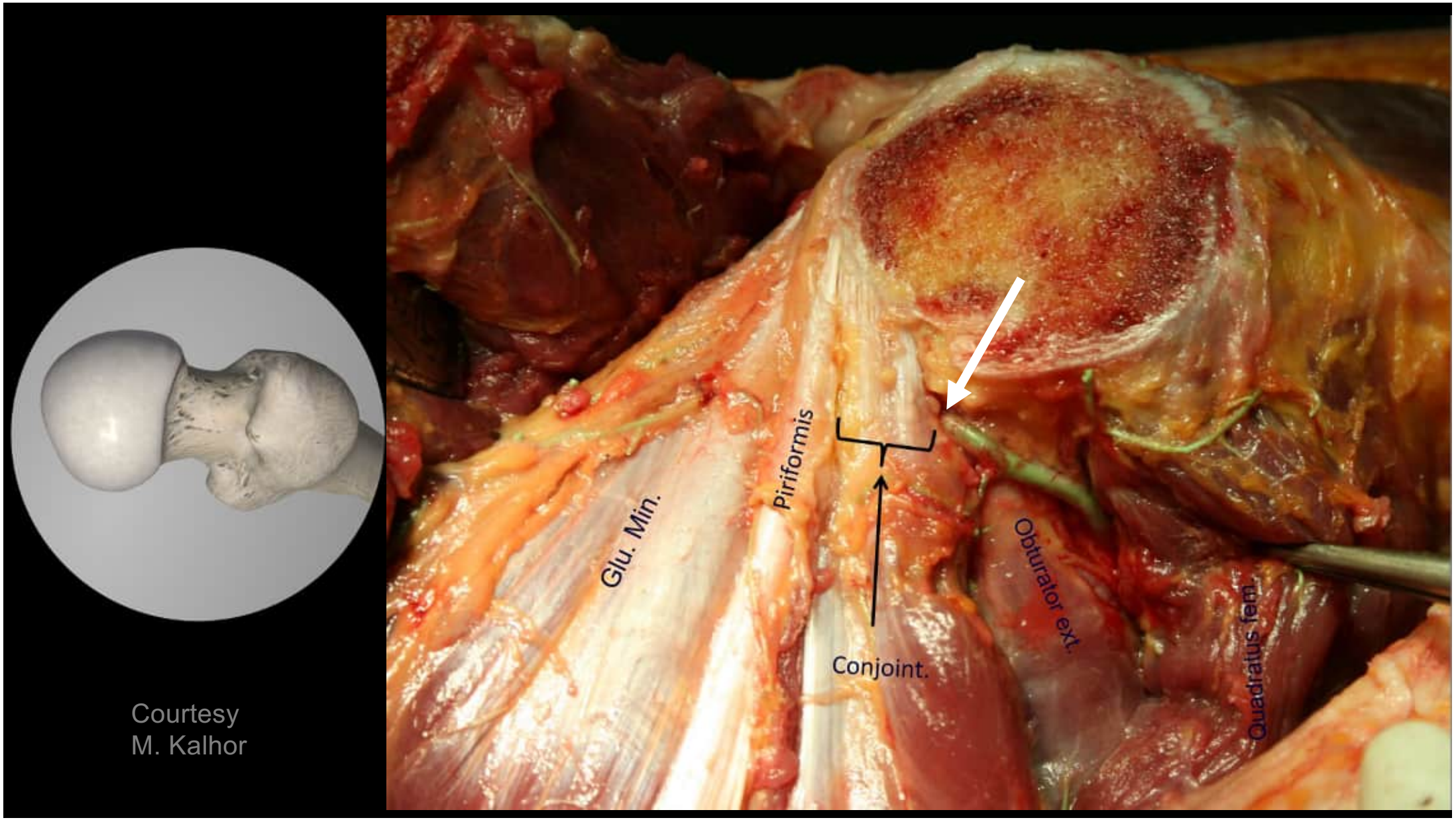
- Perforates the joint capsule between Mm. gemellus sup. and piriformis

Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*



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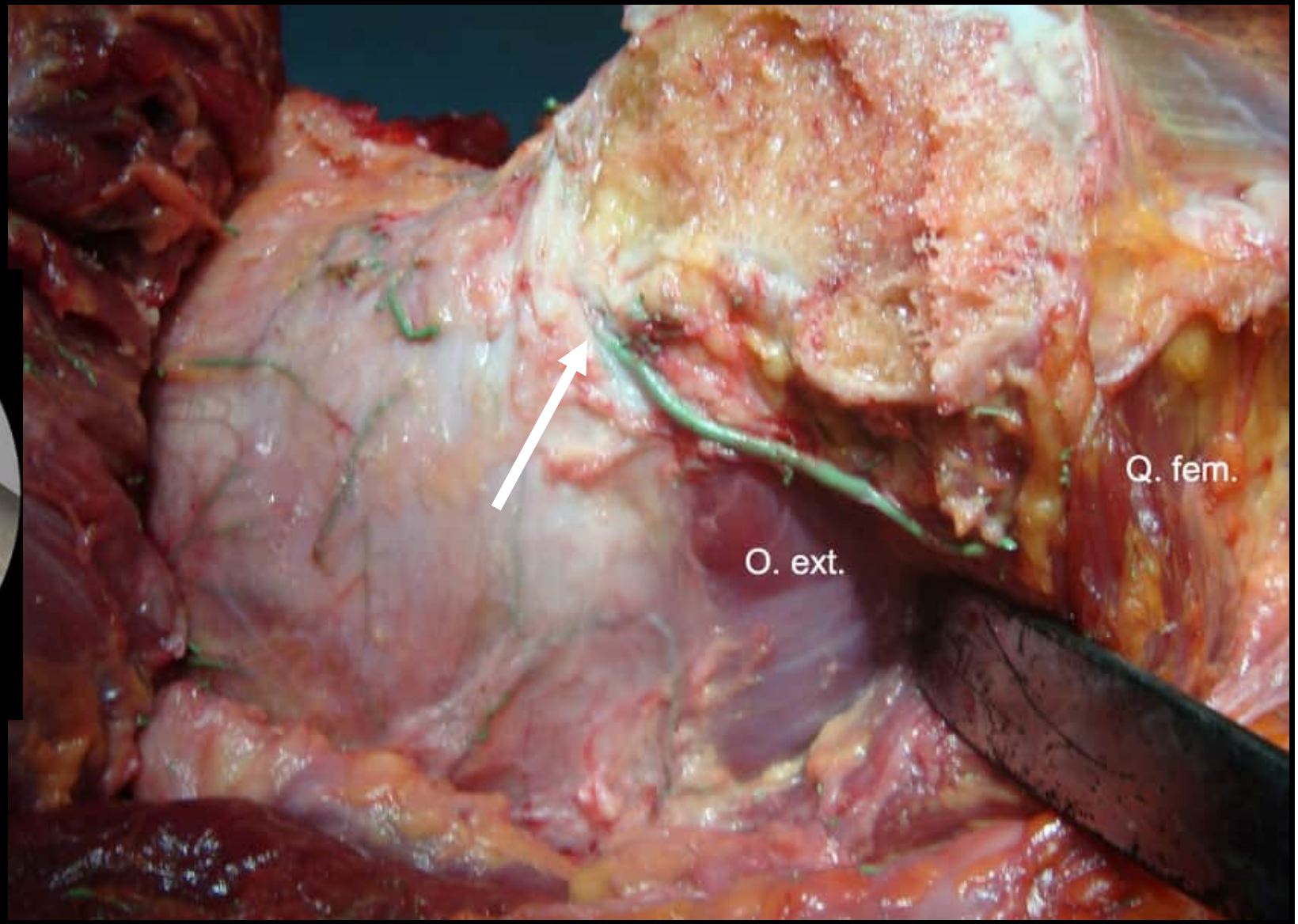
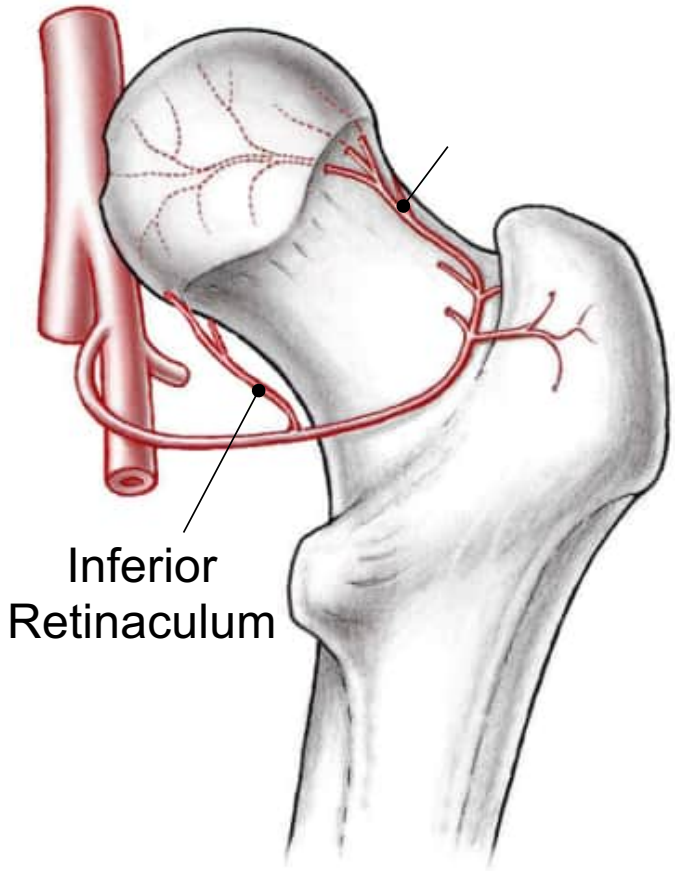


Medial Femoral Circumflex Artery



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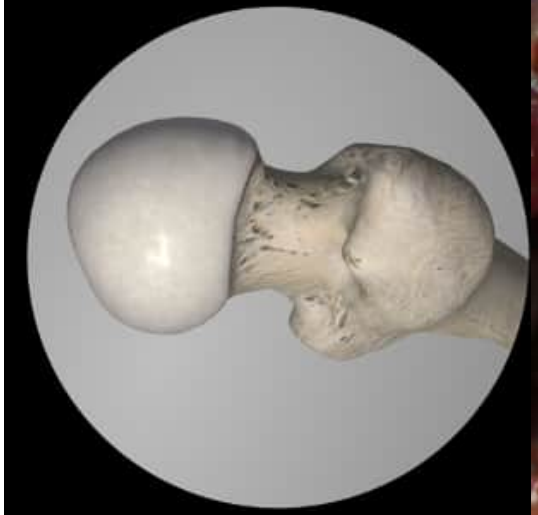
- Undercrosses the triceps coxae
- Perforates the joint capsule between Mm. gemellus sup. and piriformis
- 4-5 superior retinacular vessels

Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*



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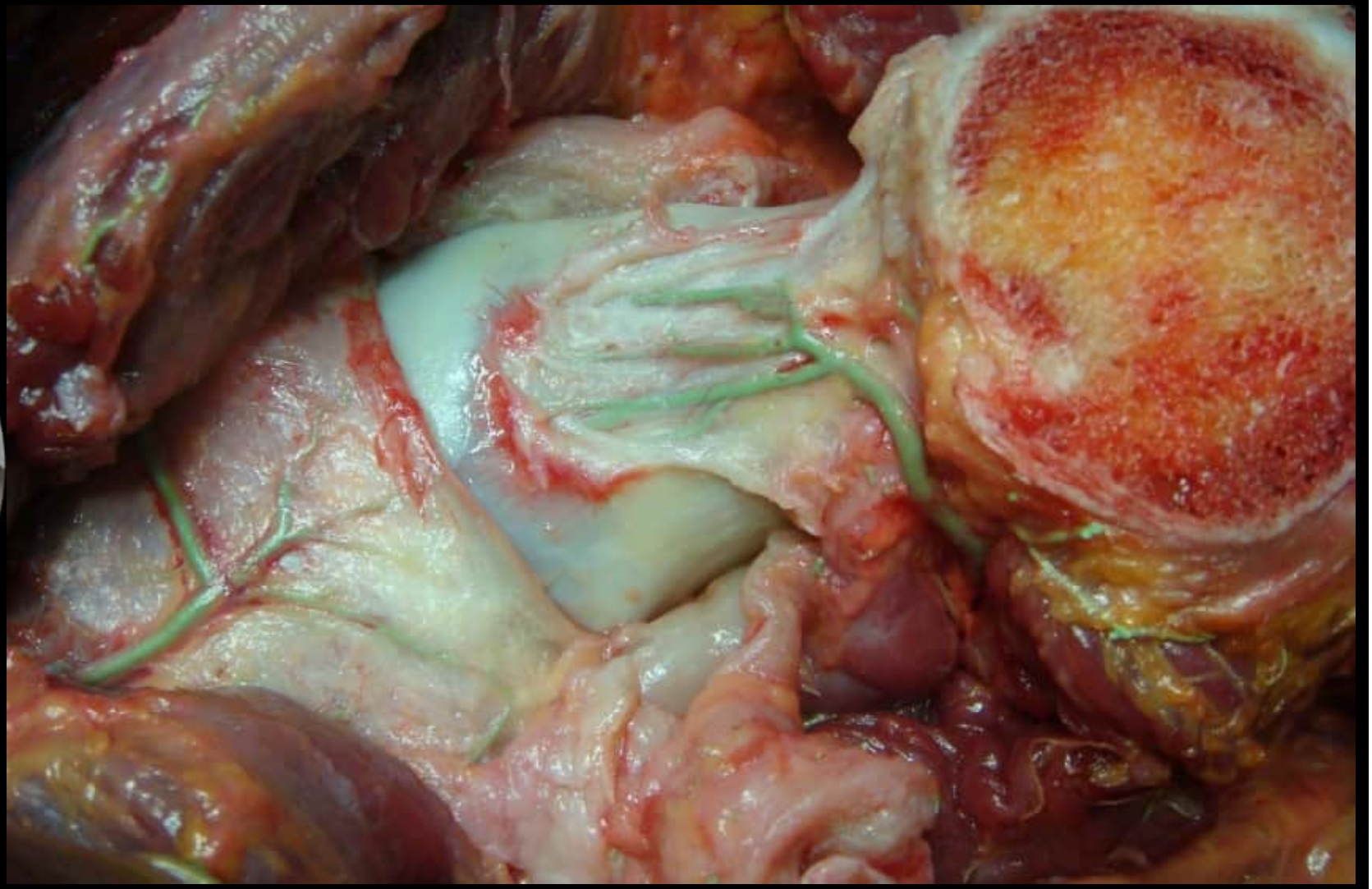
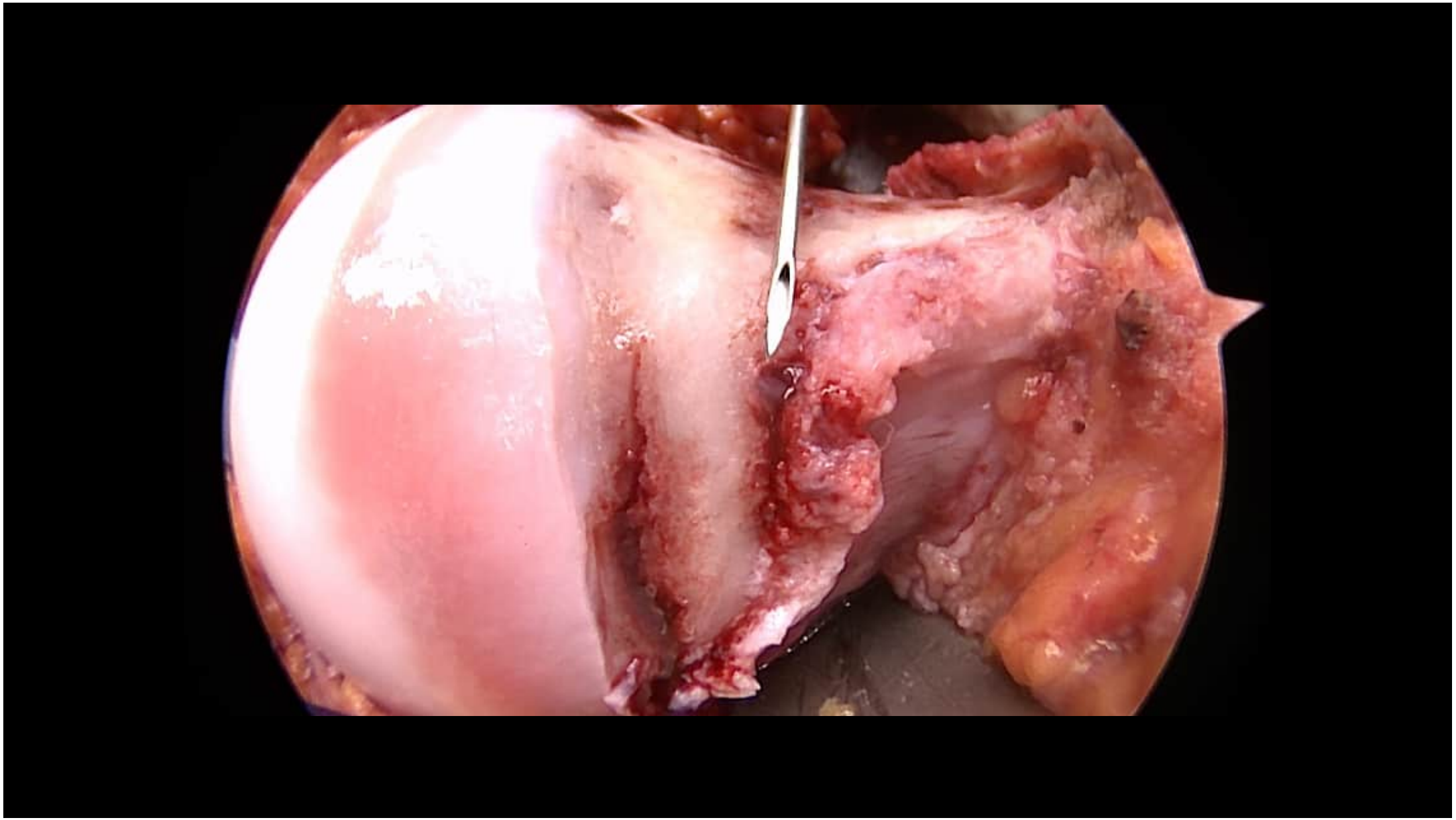
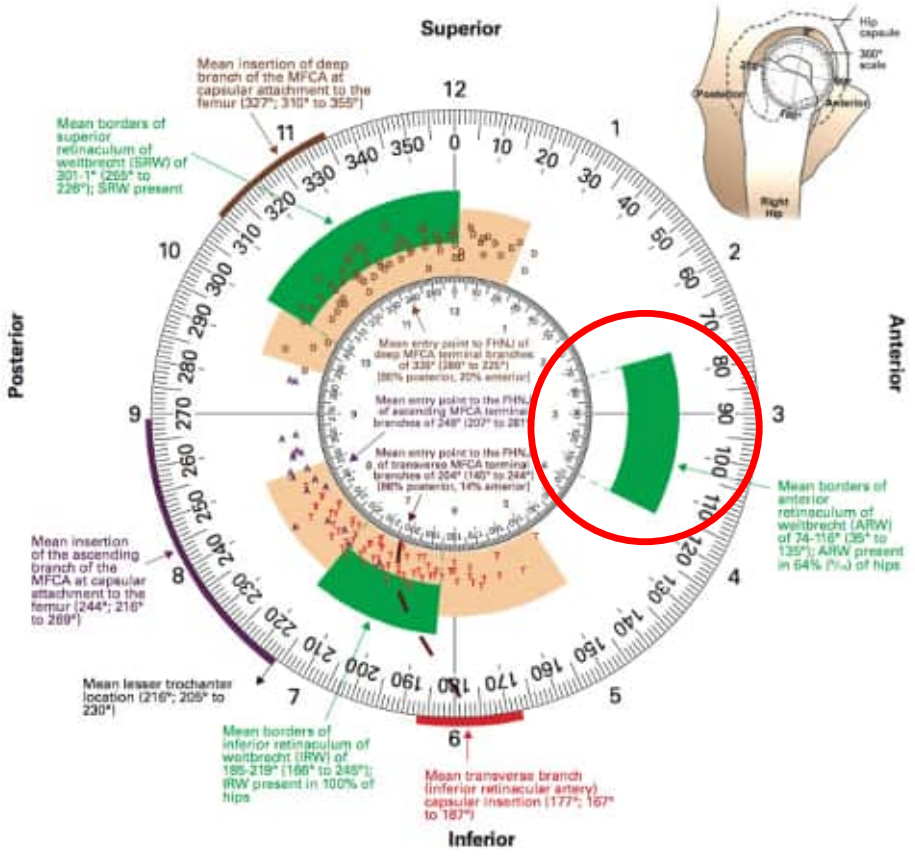
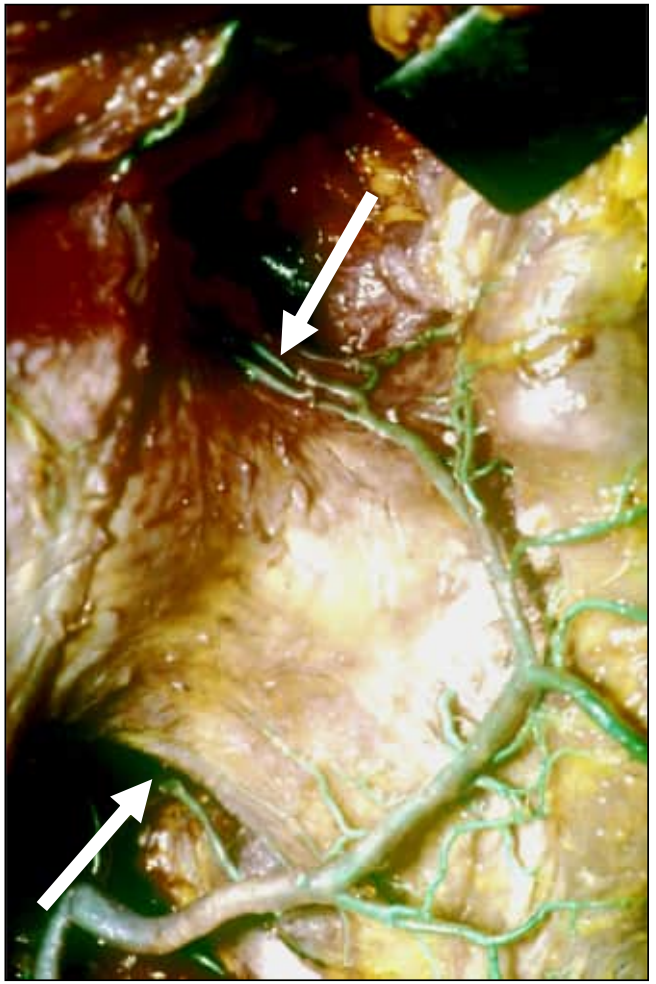




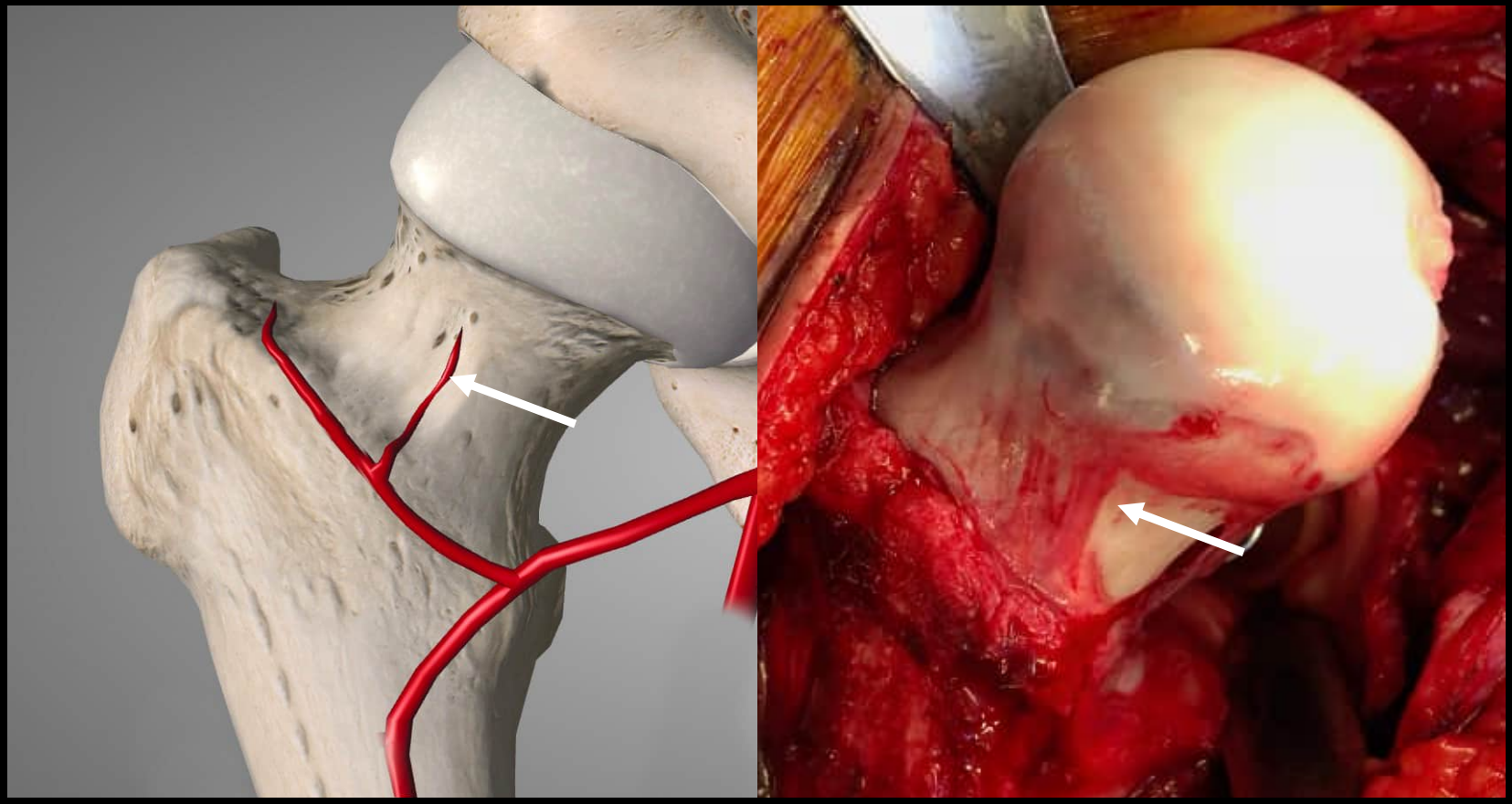
Distribution Retinacular Vessels





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

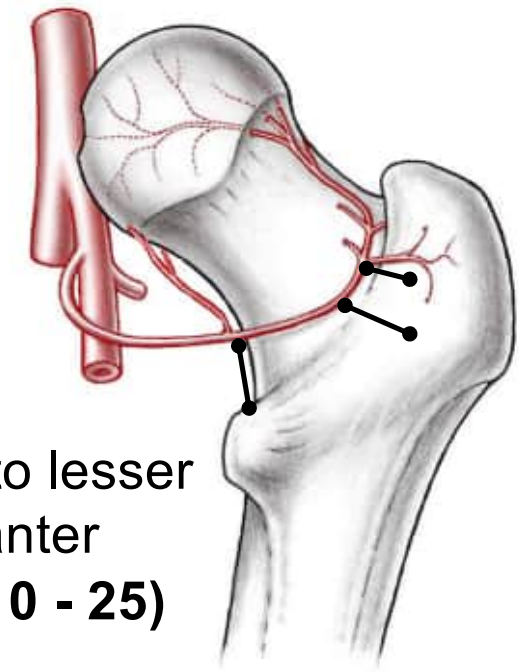
Anteriores Retinaculum (Lateral femoral circumflex artery)



Not relevant for femoral head perfusion

Anastomoses and Topographical Course

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



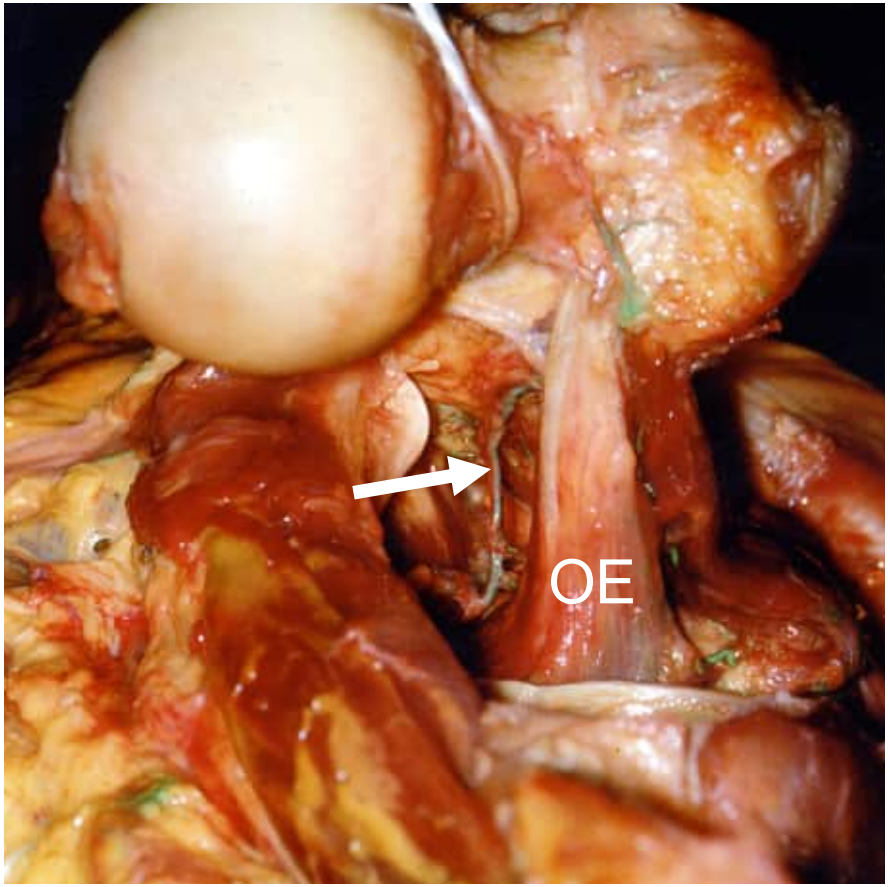
Distance to lesser trochanter
18mm (10 - 25)

Distance to insertion of the obturator externus muscle
9mm (4 - 16)

Distance to insertion of the obturator internus muscle
12mm (8 - 18)

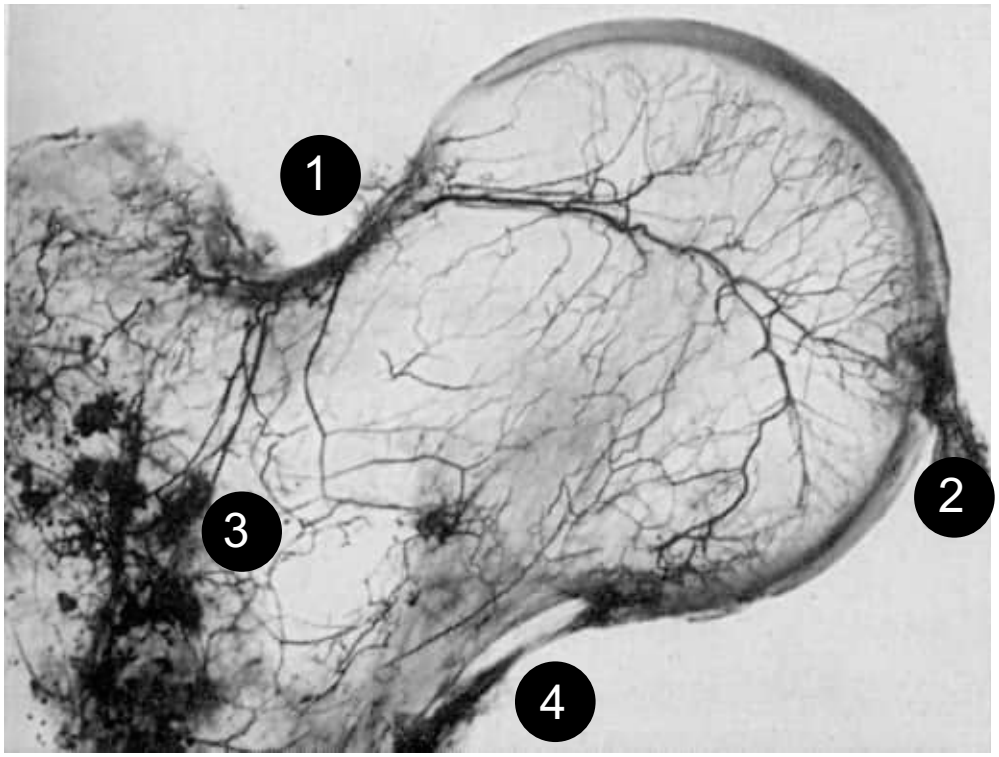
Hip Dislocation

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



Gautier et al, J Bone Joint Surg Br. ***2000*** *Jul;82(5):679-83*

Relevance of the Retinacular Vessels



1: Superior retinaculum

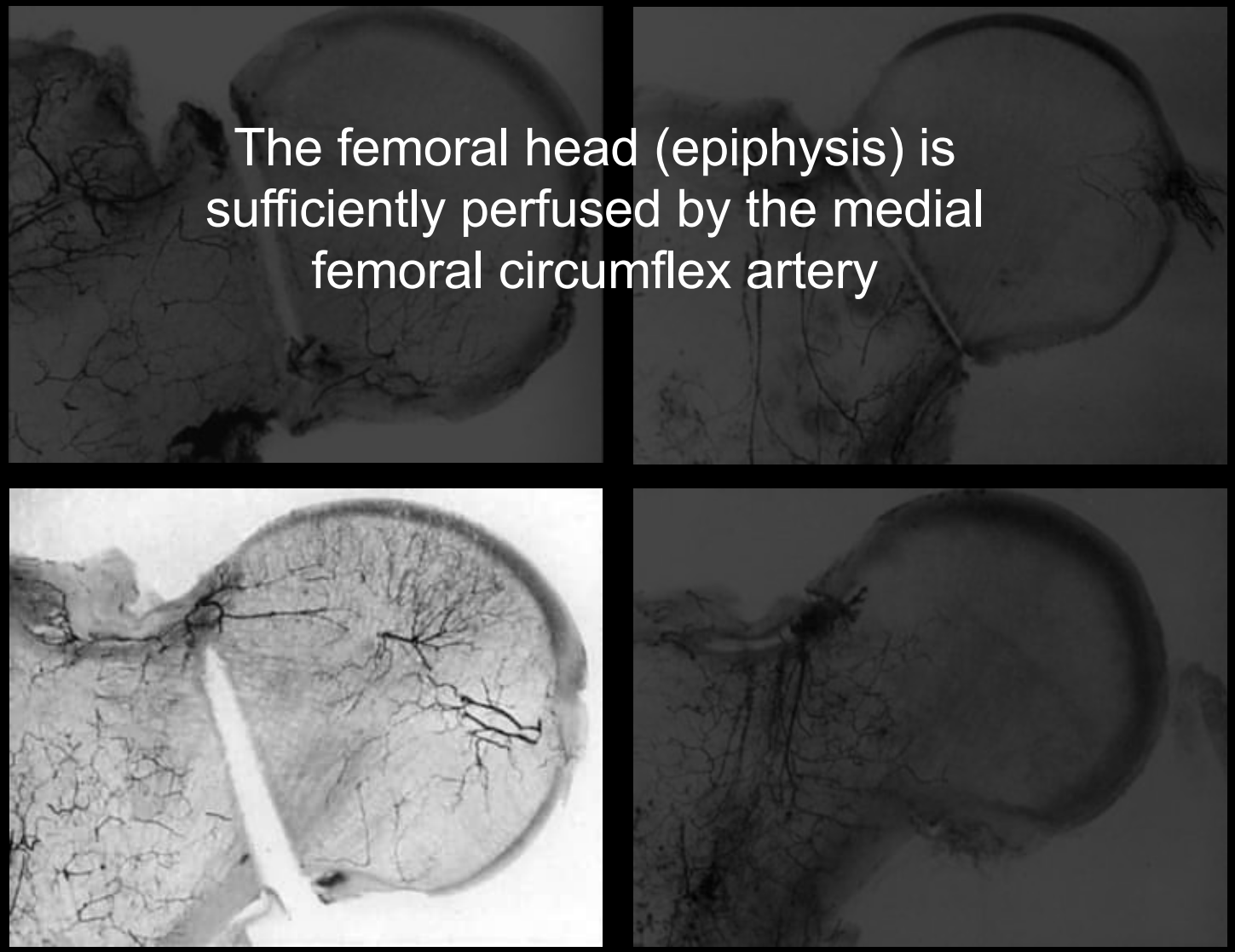
2: Lig. capitis femoris

3: Metaphyseal

4: Inferior retinaculum

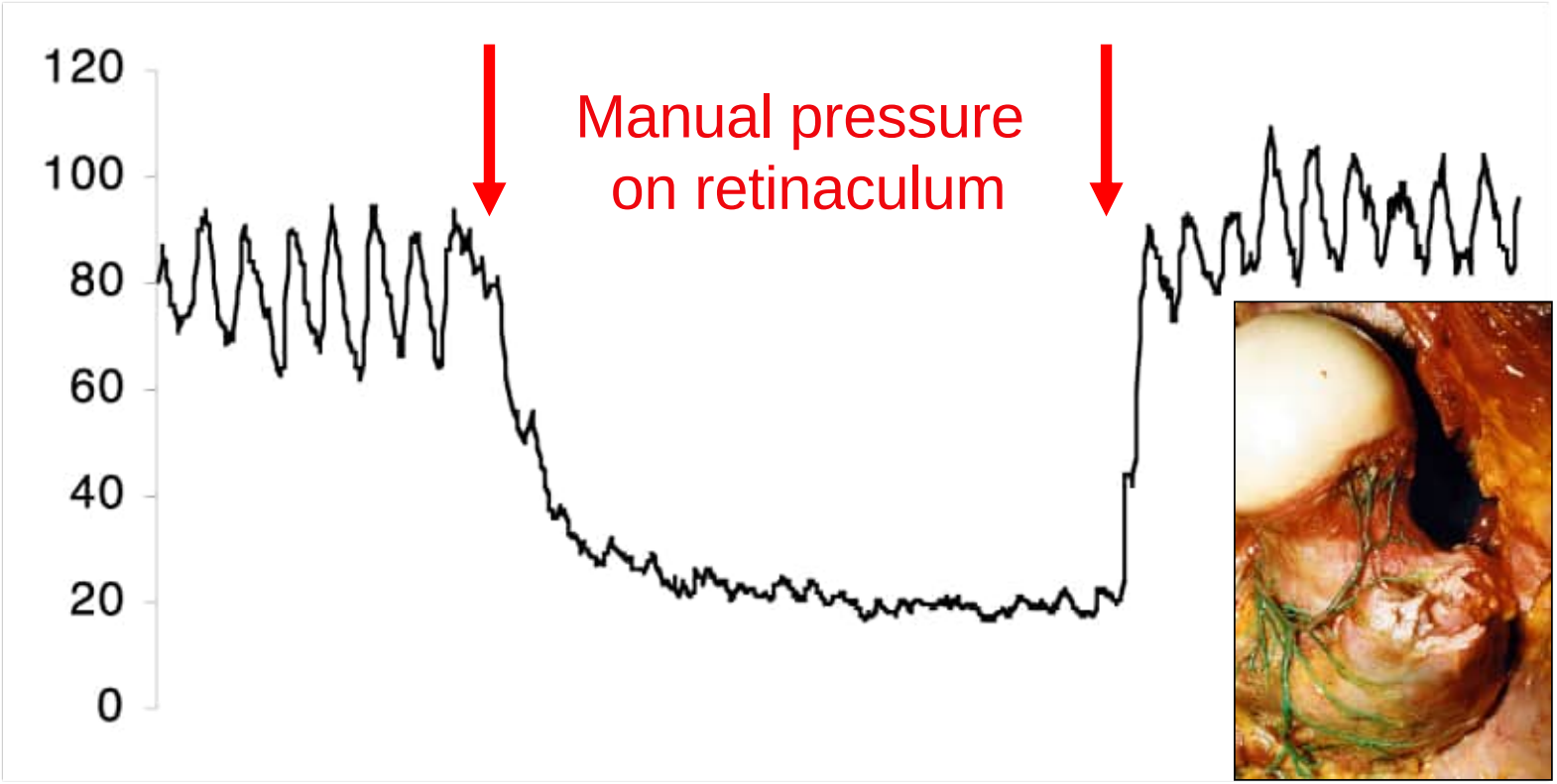
*Sevitt S, Thompson RG. JBJS-B **1965**, 47-B: 560-573*

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



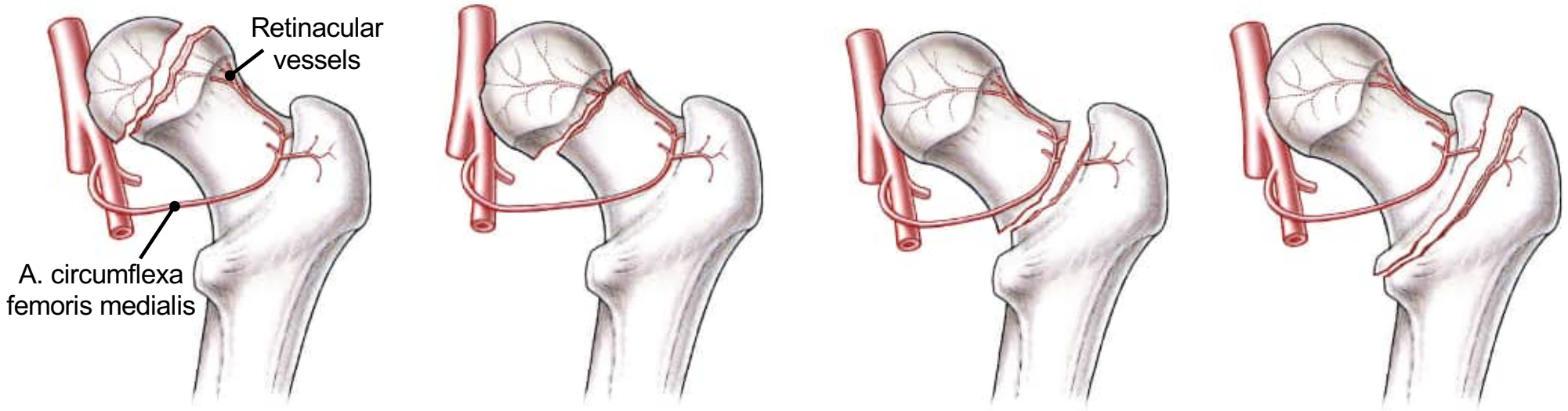
*Sevitt S, Thompson RG. JBJS-B **1965**, 47-B: 560-573*

Intraoperative Assessment of Blood Supply



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

Relevance Proximal Femoral Fractures



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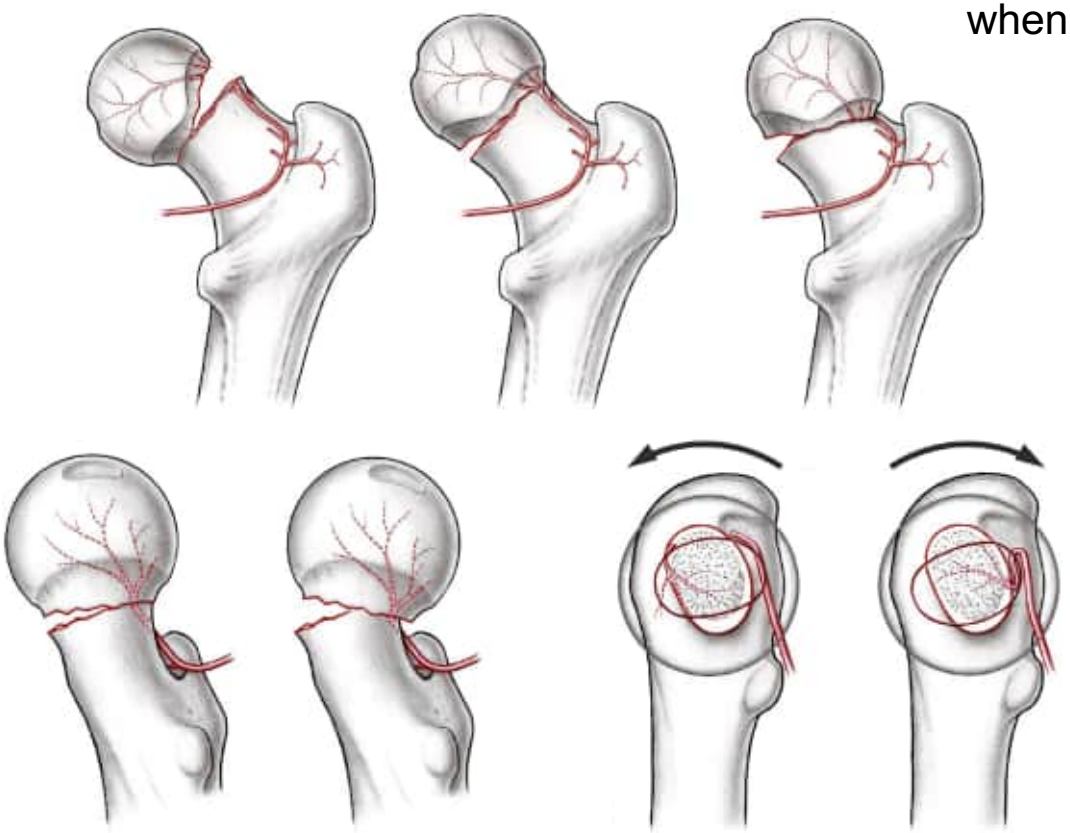


Increased risk
when tilt > 20°

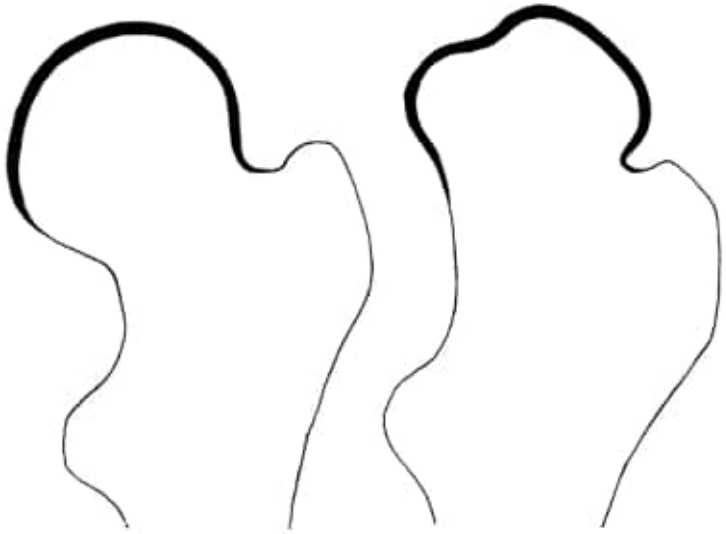


FIG. 11

Orthodiagrams illustrating the shape of the femoral head in the frontal radiograph in undisplaced subcapital fracture (*left*) and subcapital fracture reduced in the extreme valgus position (*right*). Visualisation of the fovea capitis in this view denotes a moderate degree of valgus deformity, but its bitten-out appearance in association with a flattened contour of the articular margin as in the diagram on the right indicates a degree of valgus reposition likely to result in avascular necrosis.

Garden RS et al, JBJS Br. 1961;43-B(4):647-663

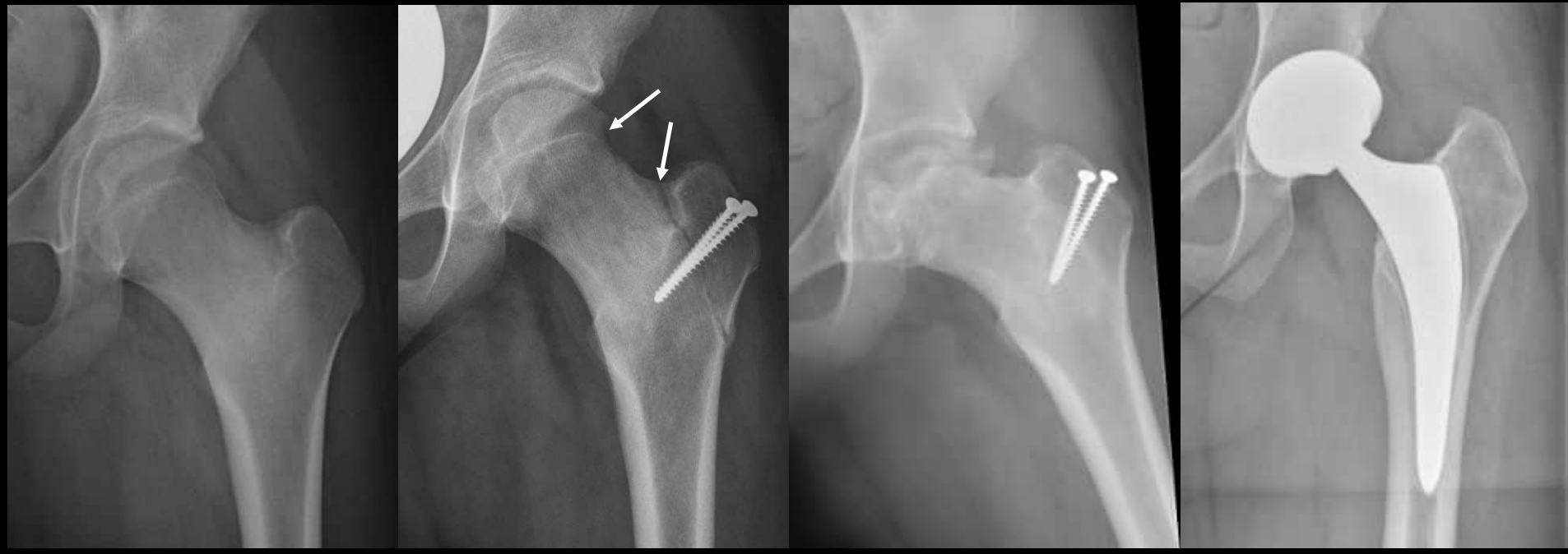
Examples from Clinical Practice

57 year old ♂

preoperatively postoperatively 9 months

Examples from Clinical Practice

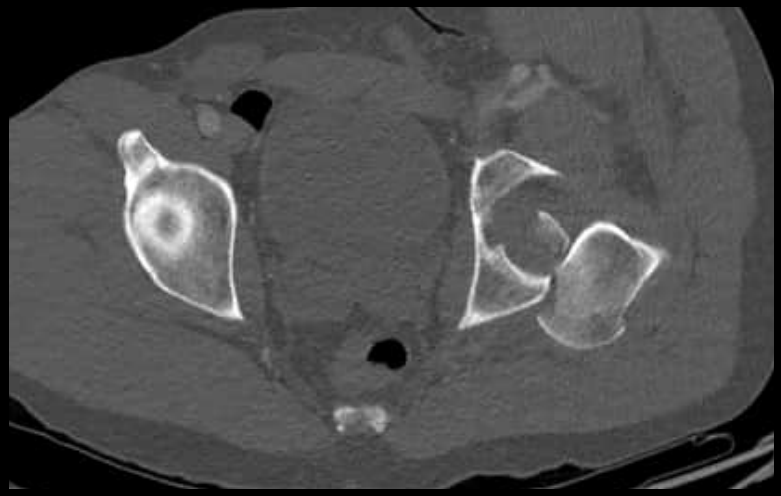
15 year old ♀



Preoperatively | Postoperatively | 10 months | Age 16

Examples from Clinical Practice

42 year old ♂, Avalanche Victim



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