

ANATOMY OF THE MENISCUS:

UPDATE 2022

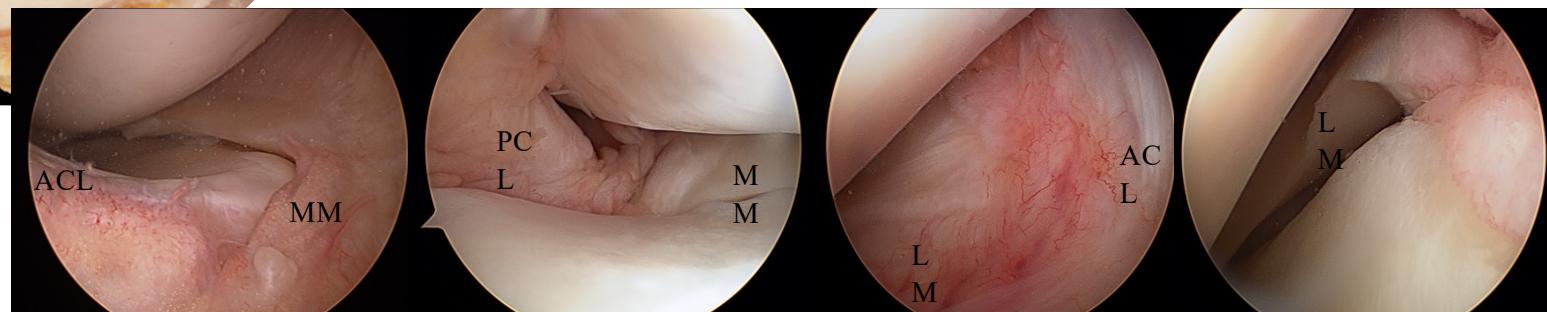
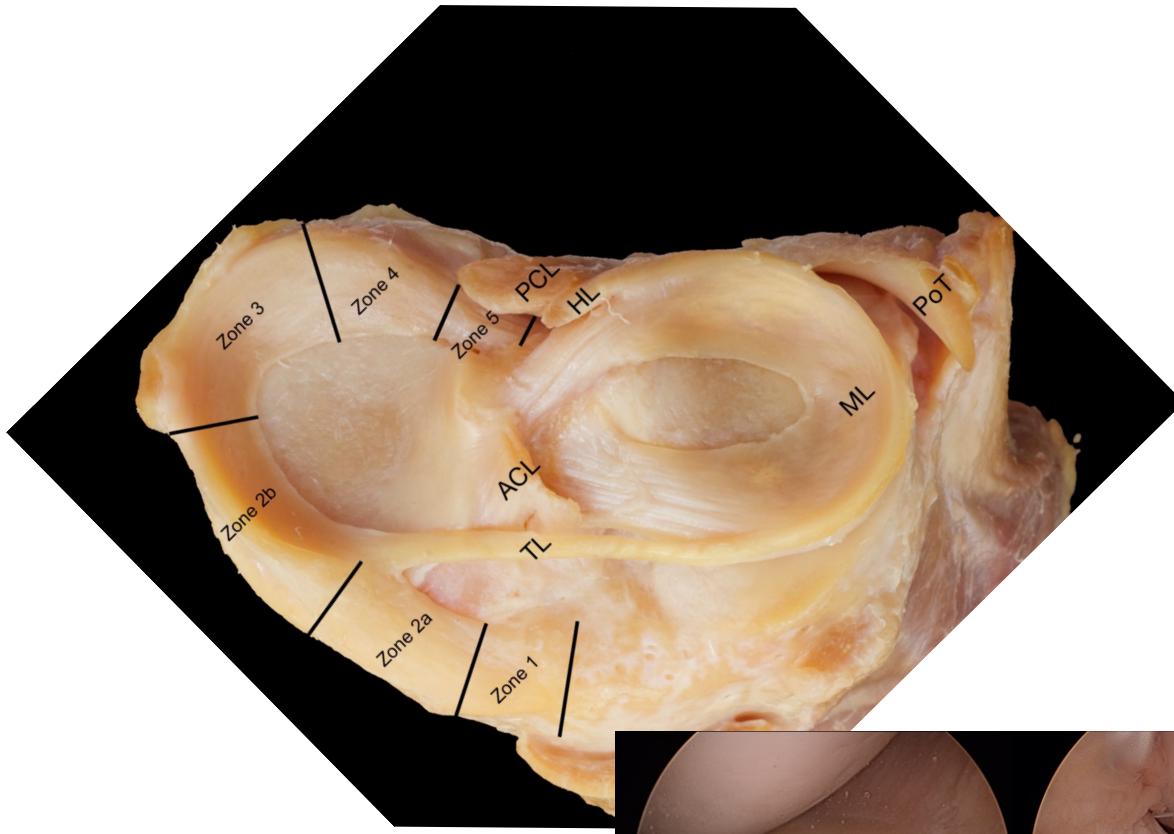


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Macroscopic anatomy



Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-014-3476-5

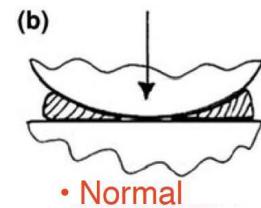
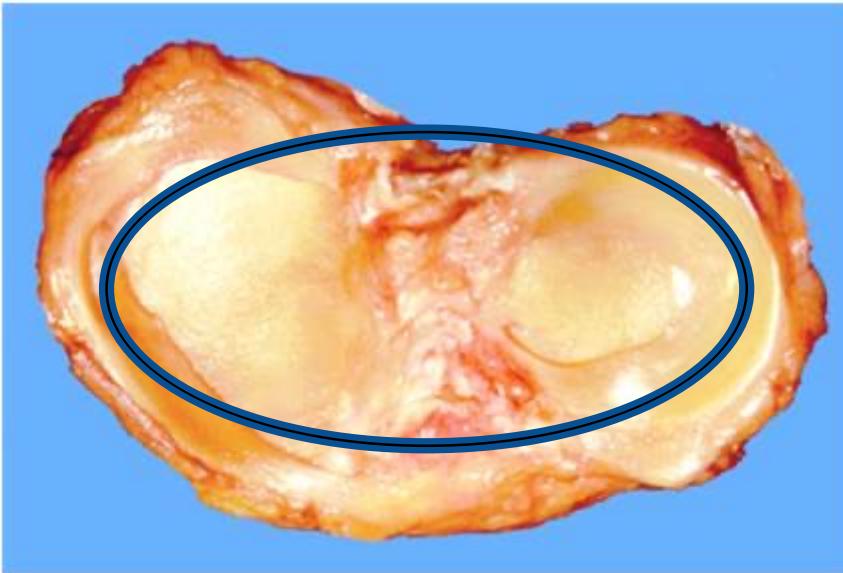
KNEE

Medial meniscus anatomy—from basic science to treatment

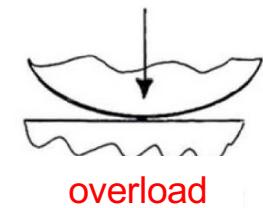
Robert Śmigielski · Roland Becker ·
Urszula Zdanowicz · Bogdan Ciszek

Macroscopic anatomy

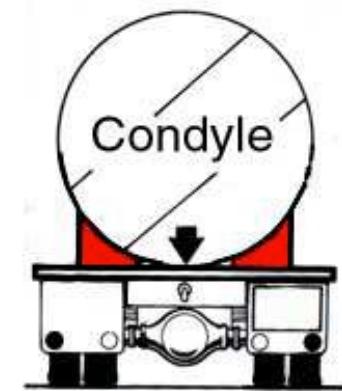
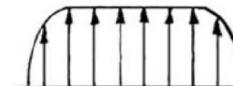
Meniscus belt



• Normal



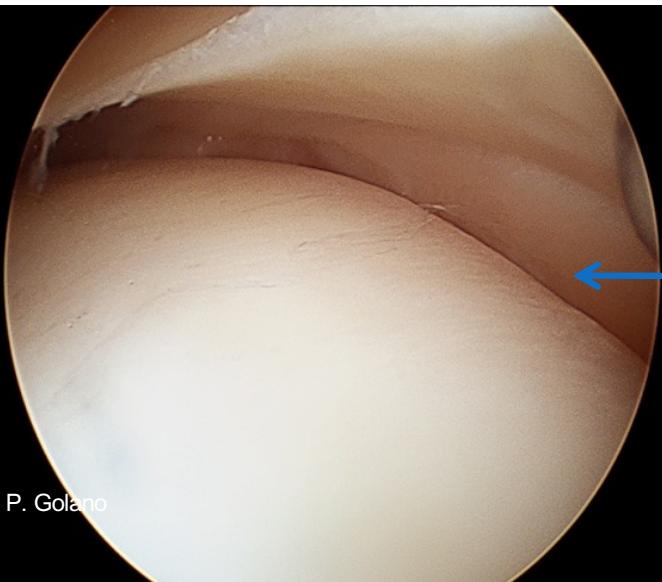
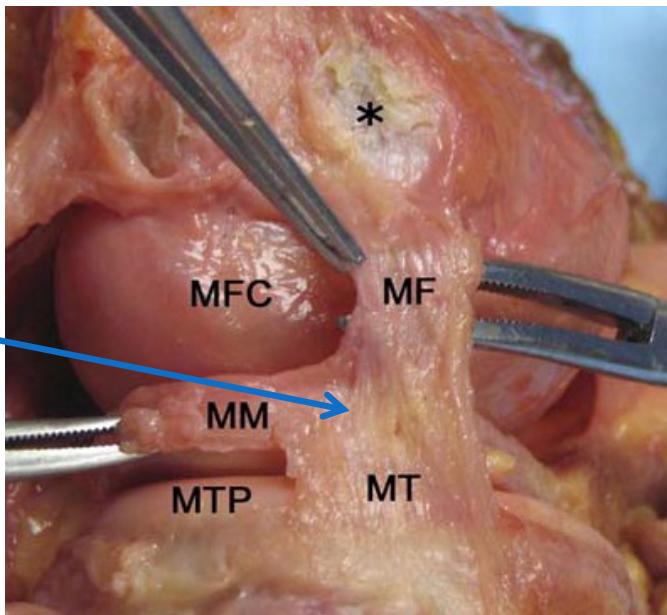
overload



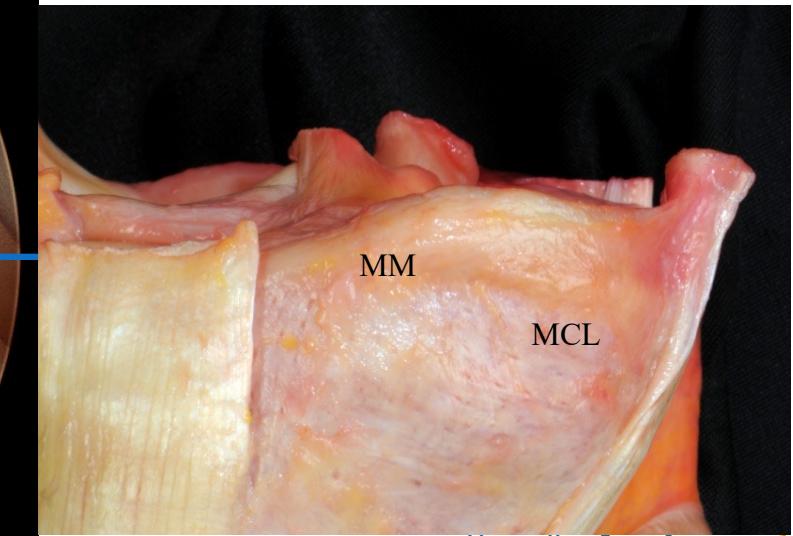
Macroscopic anatomy

Medial meniscus

Strong fixation/relationship between Deep MCL
and Mid-portion of the medial meniscus



P. Golano

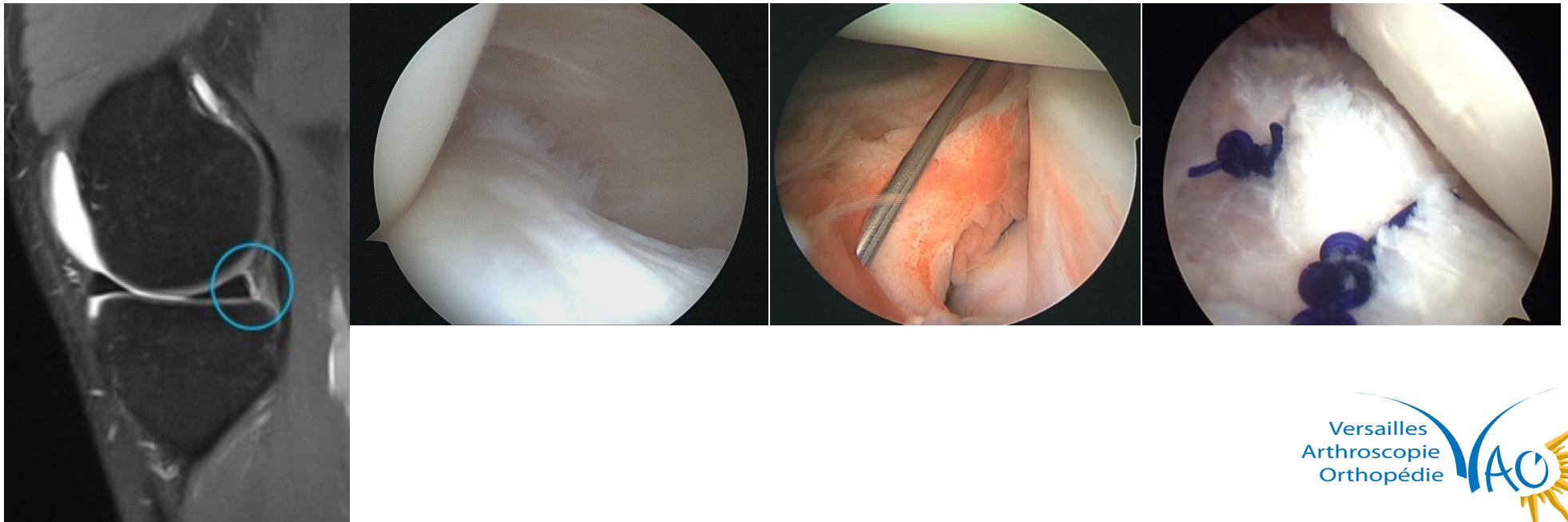


La Prade JBJS Am 2007

Macroscopic anatomy

Medial meniscus

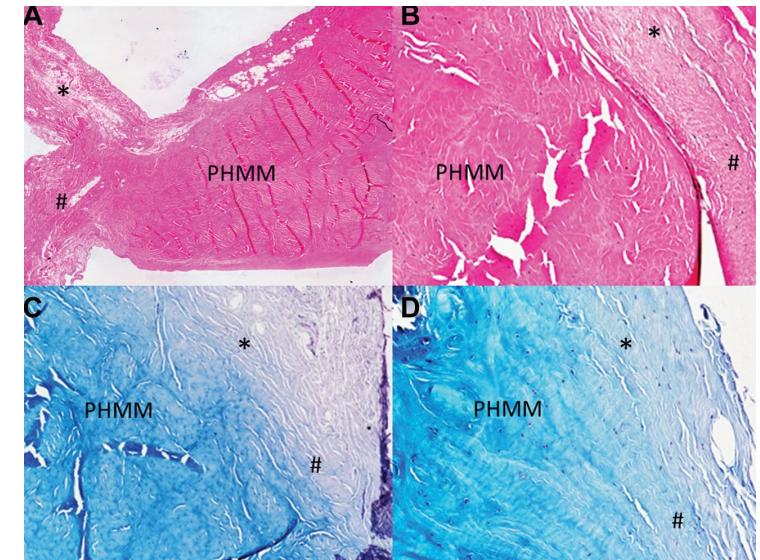
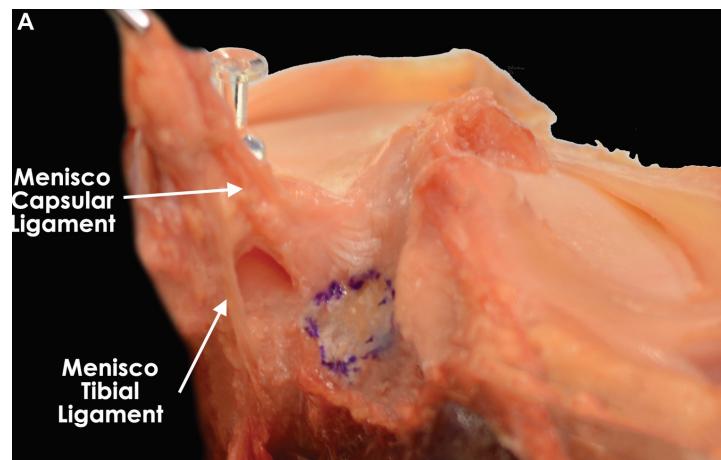
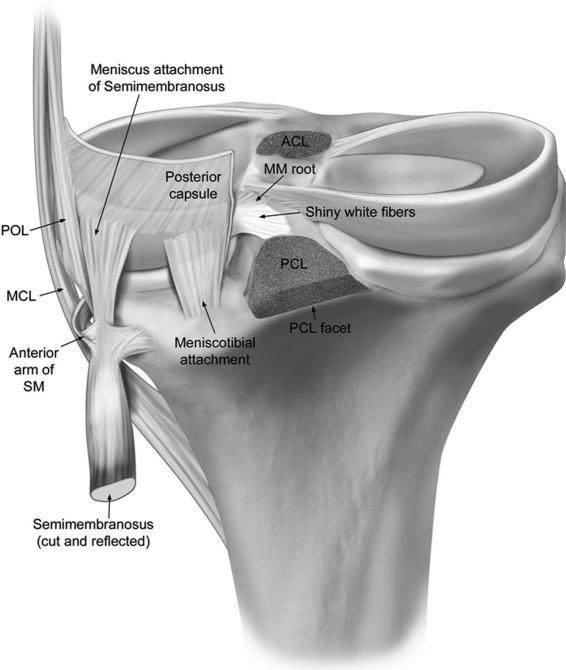
- Capsulomeniscal junction



Macroscopic anatomy

Medial meniscus

- Capsulomeniscal junction

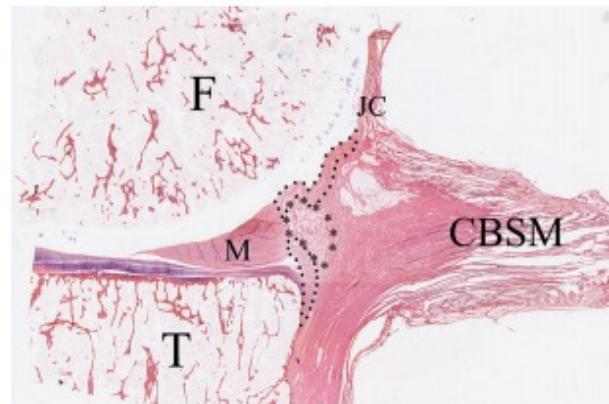
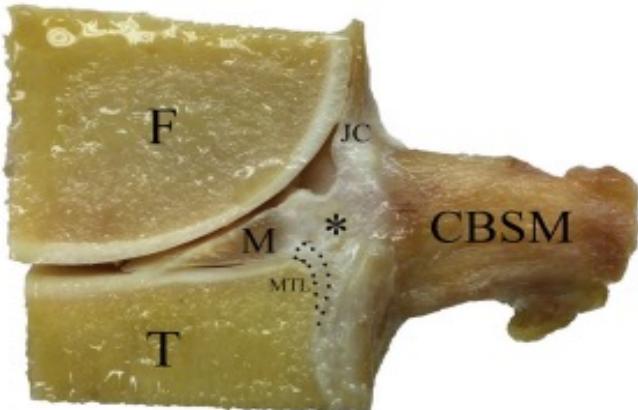


N De Philippo et al. AJSM 2018

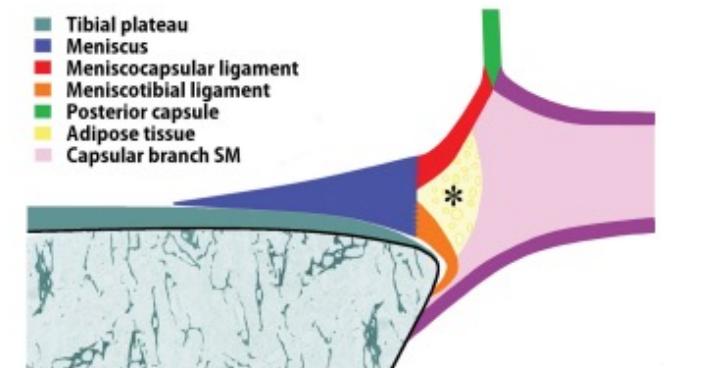
Macroscopic anatomy

Medial meniscus

- Capsulomeniscal junction



- Tibial plateau
- Meniscus
- Meniscocapsular ligament
- Meniscotibial ligament
- Posterior capsule
- Adipose tissue
- Capsular branch SM

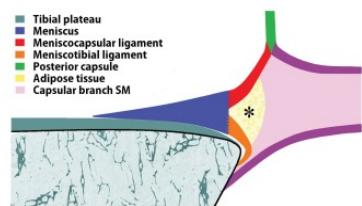
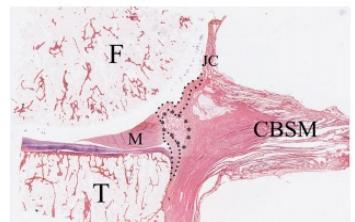
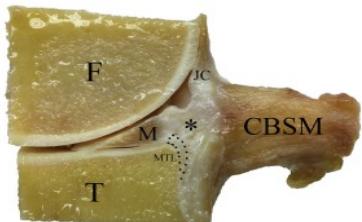


E Cavaignac et al. AJSM 2020

Macroscopic anatomy

Medial meniscus

- Capsulomeniscal junction



E Cavaignac et al. AJSM 2020



Macroscopic anatomy

- Meniscotibial ligaments disruption

Knee Surg Sports Traumatol Arthrosc (2015) 23:2967–2973
DOI 10.1007/s00167-015-3751-0

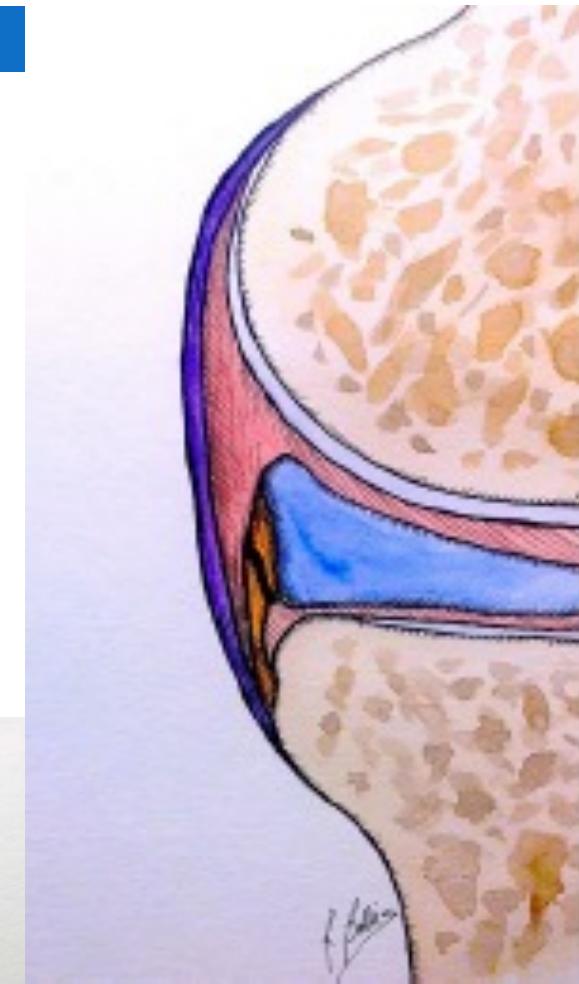
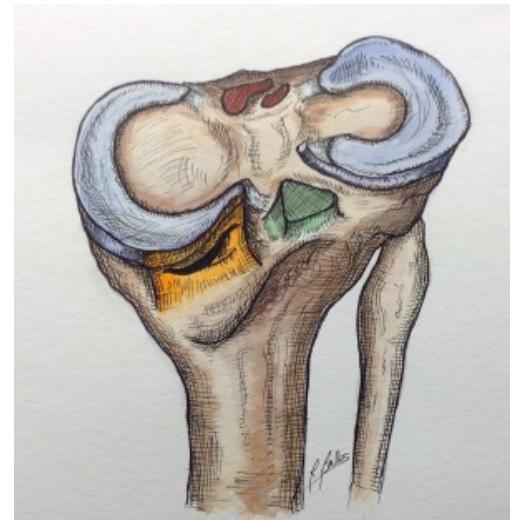
KNEE



The role of the meniscotibial ligament in posteromedial rotational knee stability

A. Peltier¹ · T. Lording² · L. Maubisson³ · R. Ballis¹ · P. Neyret¹ · S. Lustig¹

Increased anterior tibial translation
 $6.8+/-1.3$ mm

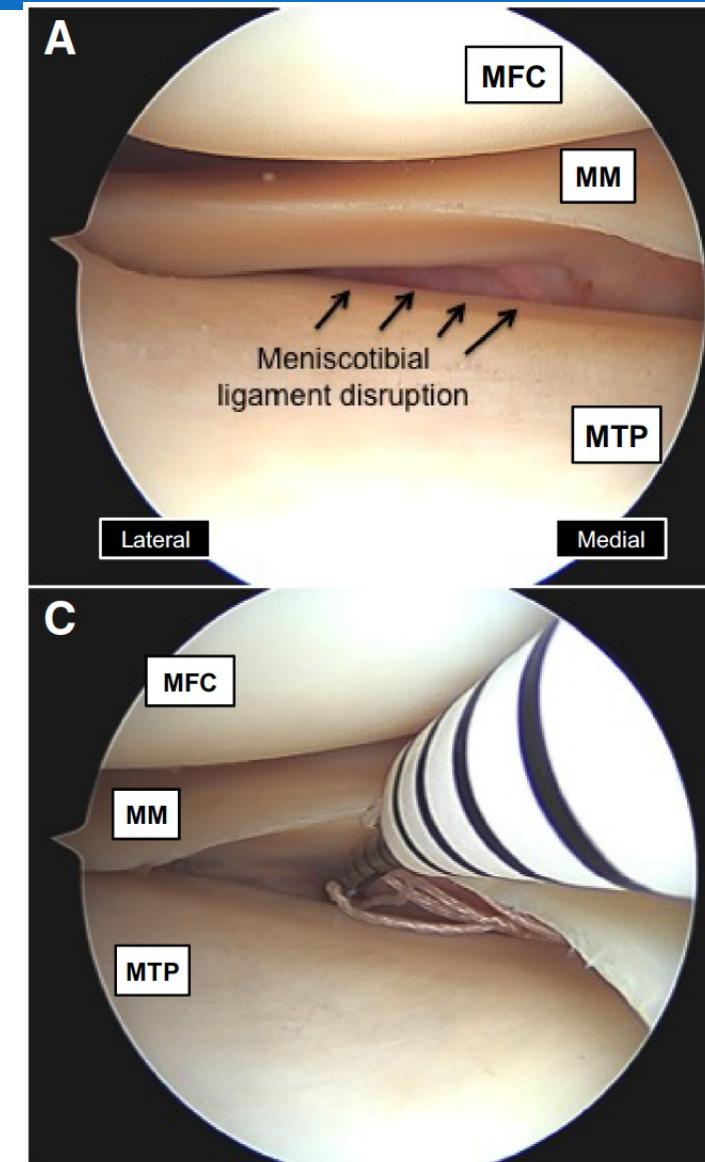
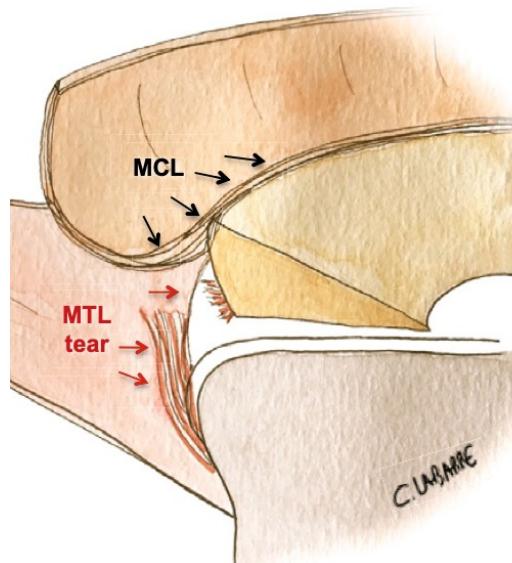


Macroscopic anatomy

- Meniscotibial ligaments disruption

Meniscal Ramp Lesions Repair: An Under-Meniscus All-Inside Suture in Cases of Isolated Meniscotibial Ligament Tears

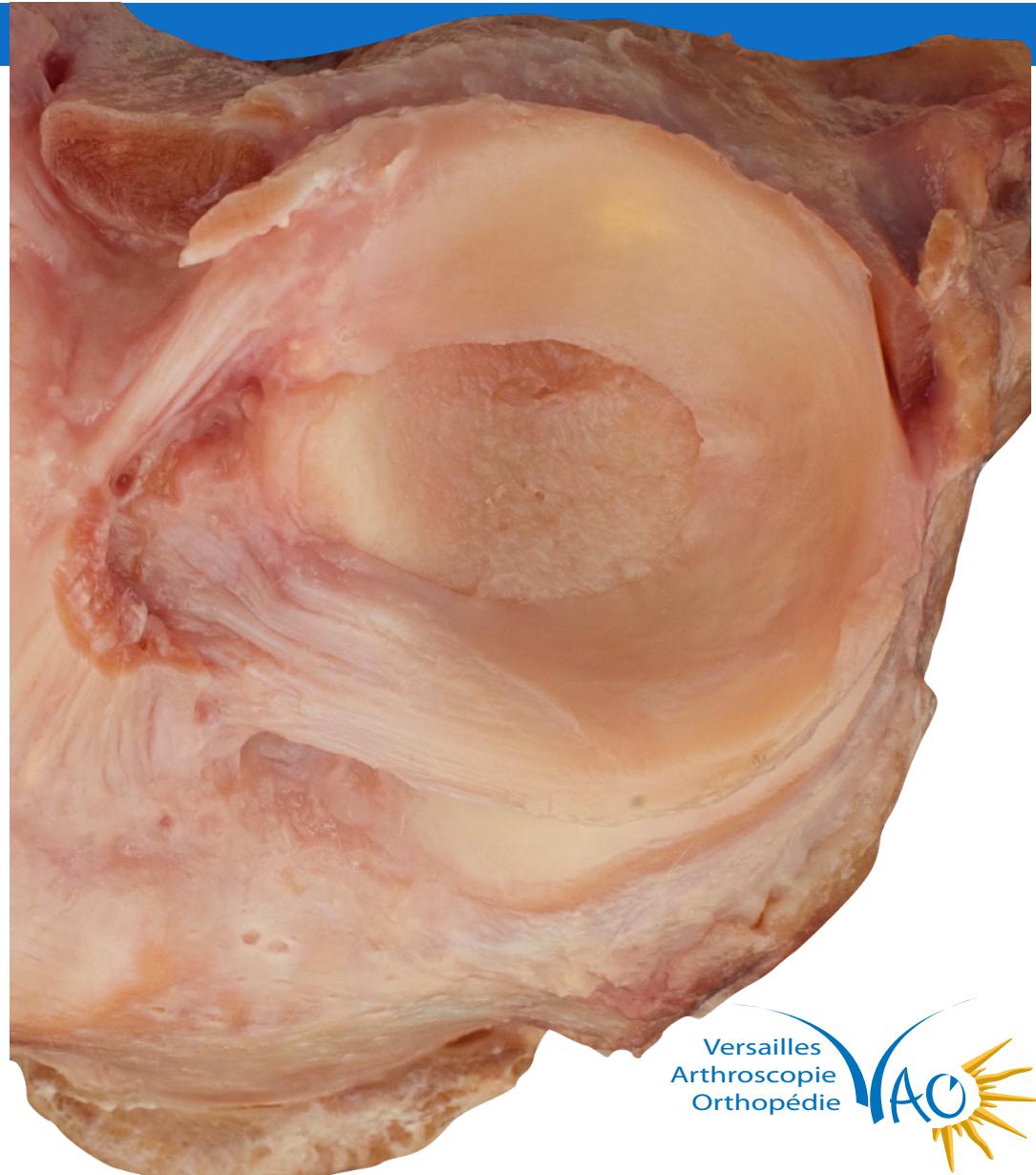
Chloé Labarre, M.D., Nicolas Gravaleau, M.D., and Nicolas Bouguennec, M.D.



Macroscopic anatomy

Lateral meniscus

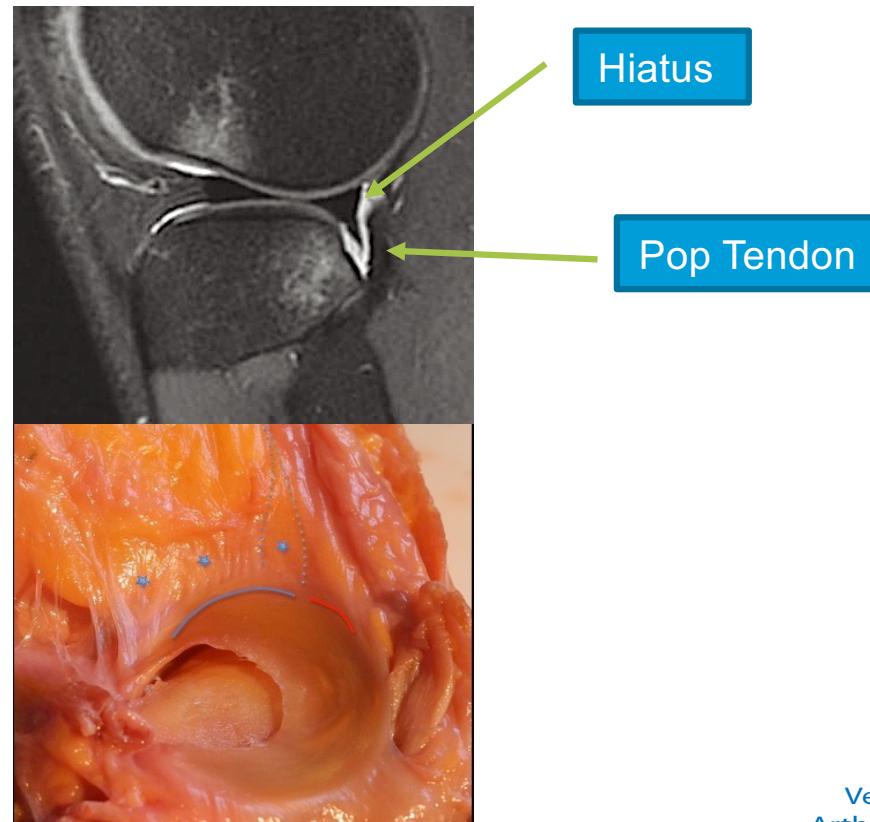
- O shape
- Same thickness



Macroscopic anatomy

Lateral meniscus

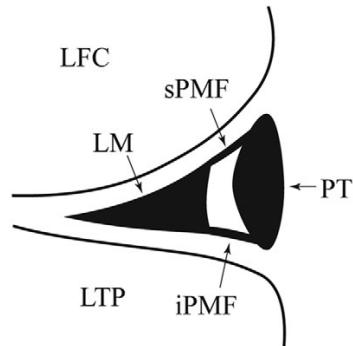
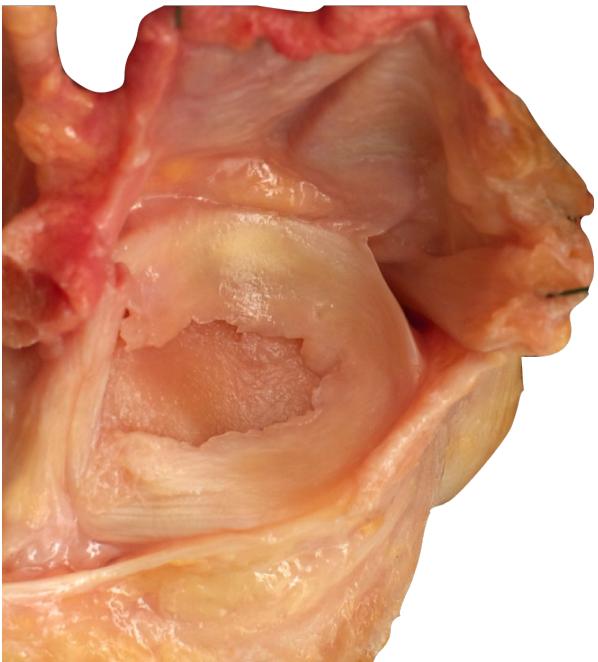
- Popliteomeniscal hiatus
- No capsular insertion at the anterior portion



Macroscopic anatomy (LM)

Popliteomeniscal fascicles (2)

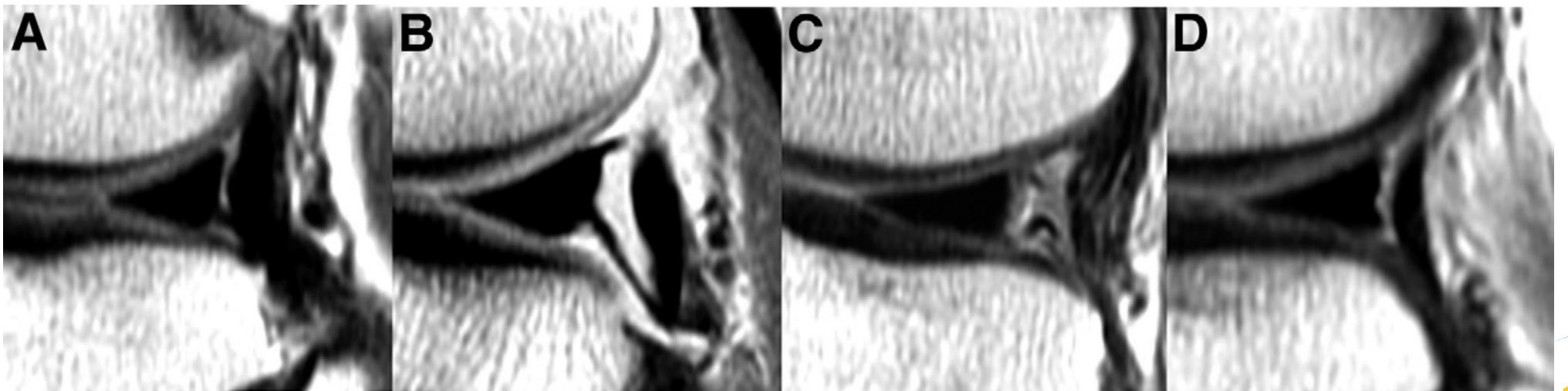
- Anteroinferior and posteroinferior
- Some PMF lesions to repair: **hyper mobility of the meniscus**



Macroscopic anatomy (LM)

Popliteomeniscal fascicles (2)

- Anteroinferior and posteroinferior
- Anteroinferior PF lesion could induce instability
- Some of them to repair

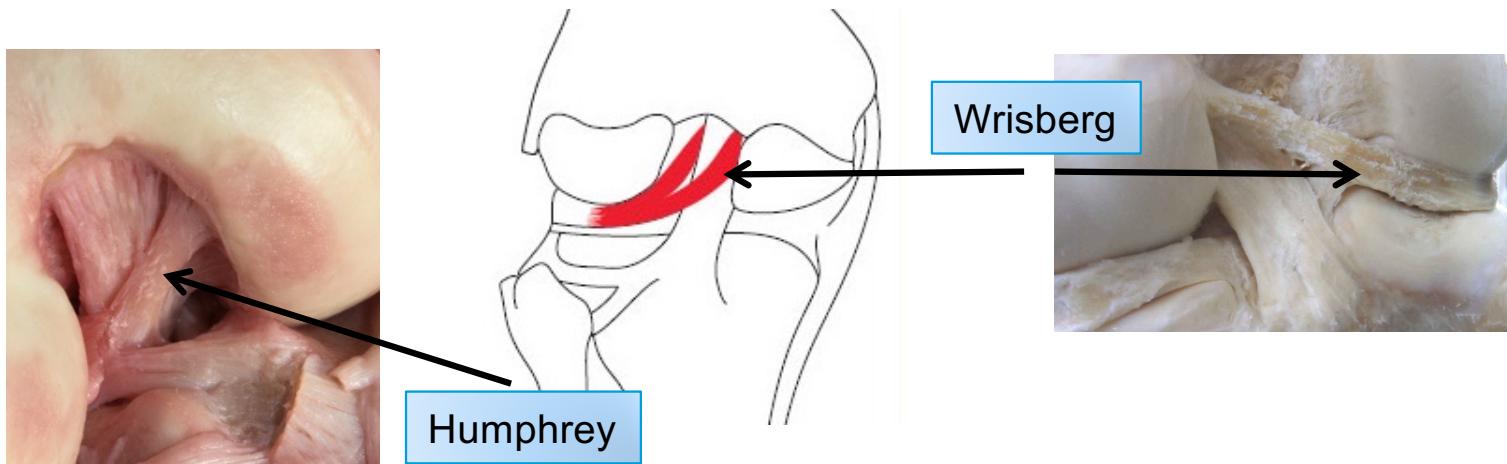


Suganuma et al 2012

Macroscopic anatomy (LM)

- Meniscofemoral ligaments
- 71% cases

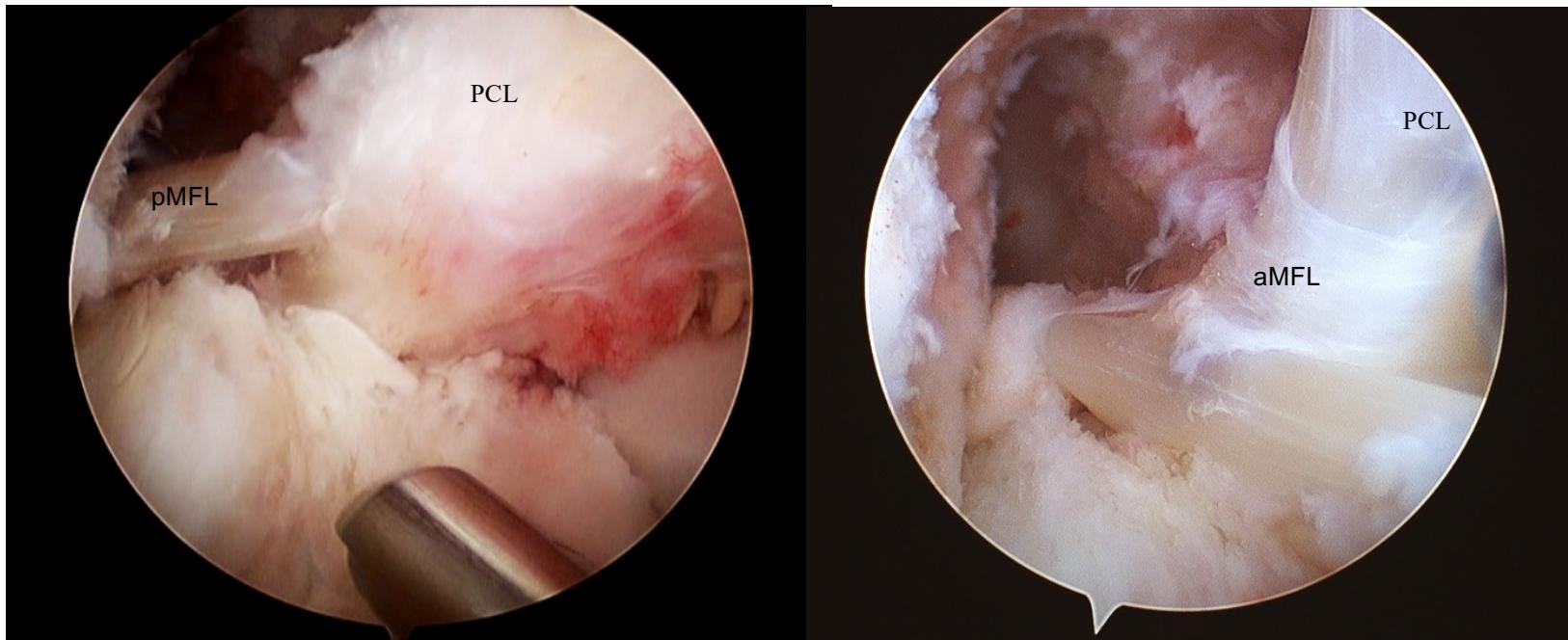
- Humphrey anterior to the PCL
- Wrisberg posterior to the PCL



Anatomy (LM)

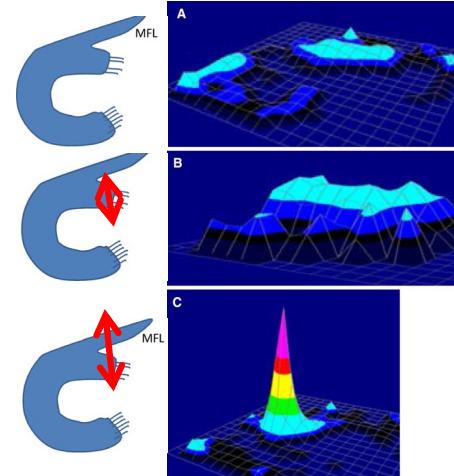
Meniscofemoral ligaments :

- Control AP translation
- Control meniscus extrusion



Partial traumatic root lesions (Type 1) = stable if MFL intact

- Role ++
- Underestimated
- Stable if PMFL intact
- Possibility to leave Type 1 lesions alone



Forkel Arch Orthop trauma surg 2013

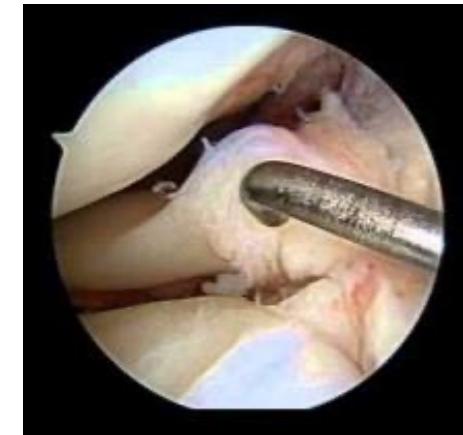
Long-term Evaluation of Posterior Lateral Meniscus Root Tears Left In Situ at the Time of Anterior Cruciate Ligament Reconstruction

K. Donald Shelbourne, Troy A. Roberson and Tinker Gray
Am J Sports Med 2011;39:1439 originally published online March 14, 2011
DOI: 10.1177/0363546511398212

> *Am J Sports Med.* 2014 Feb;42(2):327-35. doi: 10.1177/0363546513508374. Epub 2013 Dec 4.

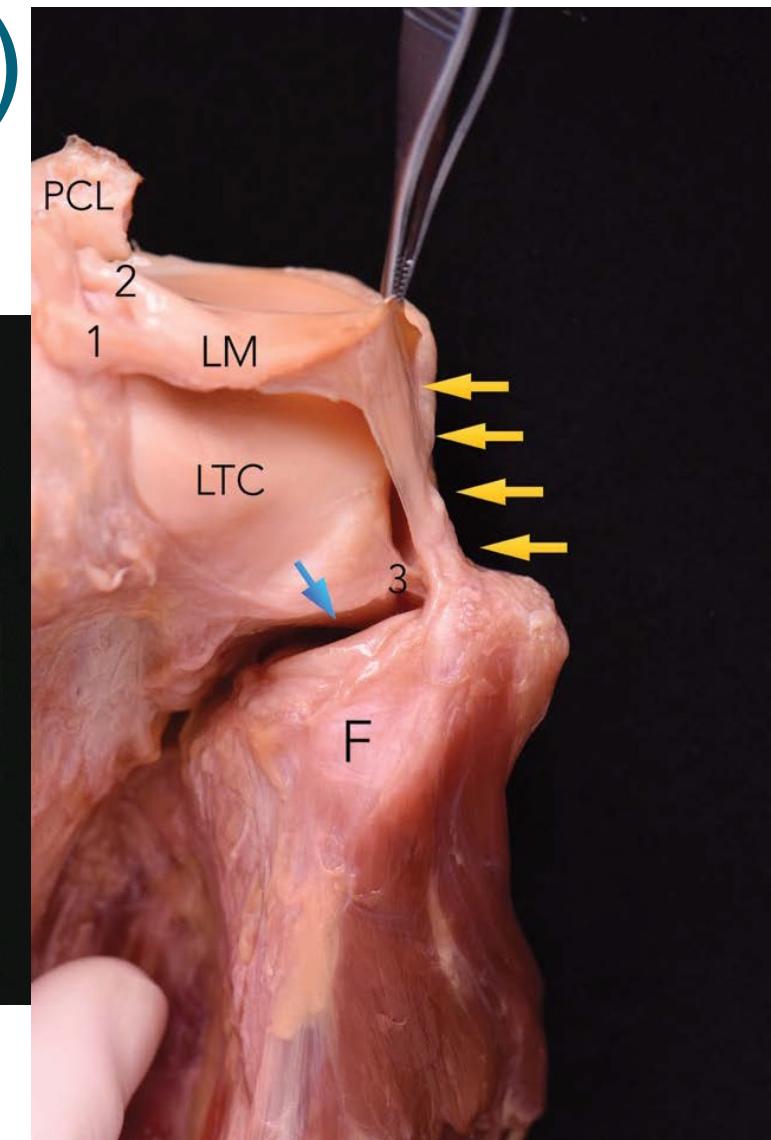
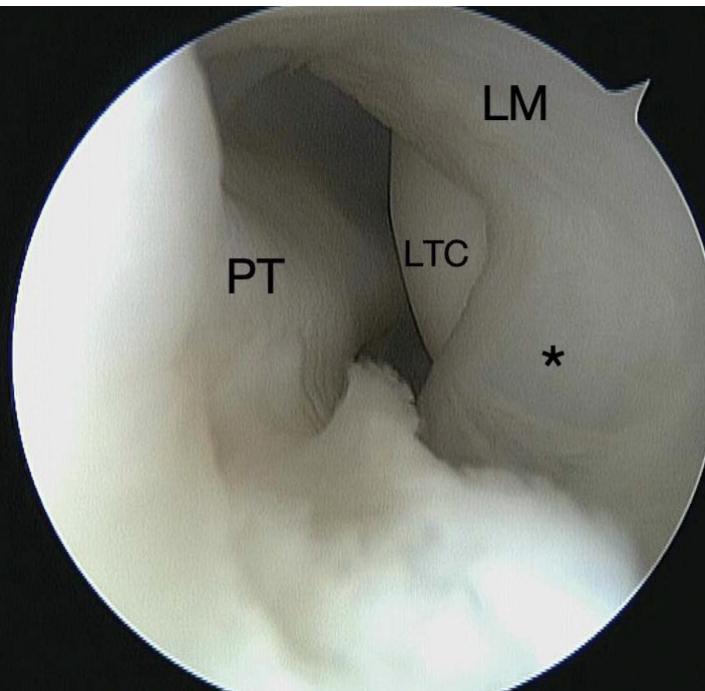
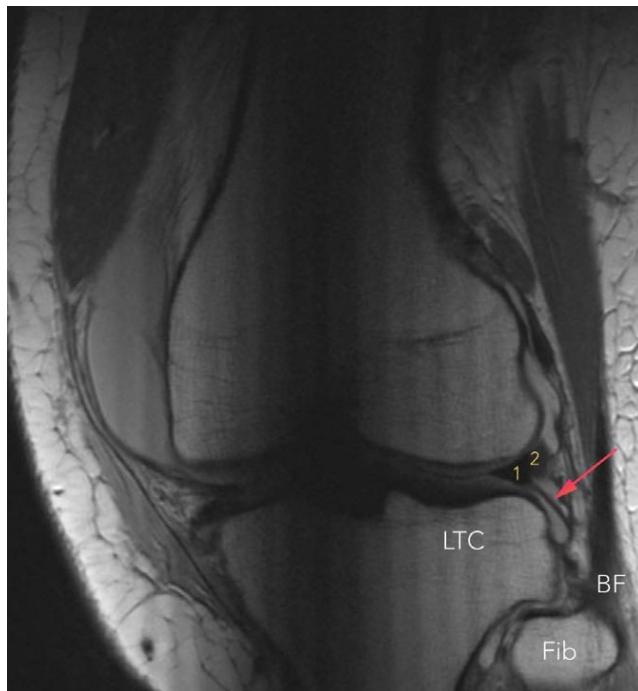
Clinical, Radiological, and Morphological Evaluations of Posterior Horn Tears of the Lateral Meniscus Left in Situ During Anterior Cruciate Ligament Reconstruction

Dhong Won Lee ¹, Hyoung Won Jang, Sung Rak Lee, Jung Ho Park, Jeong Ku Ha, Jin Goo Kim



Macroscopic anatomy (LM)

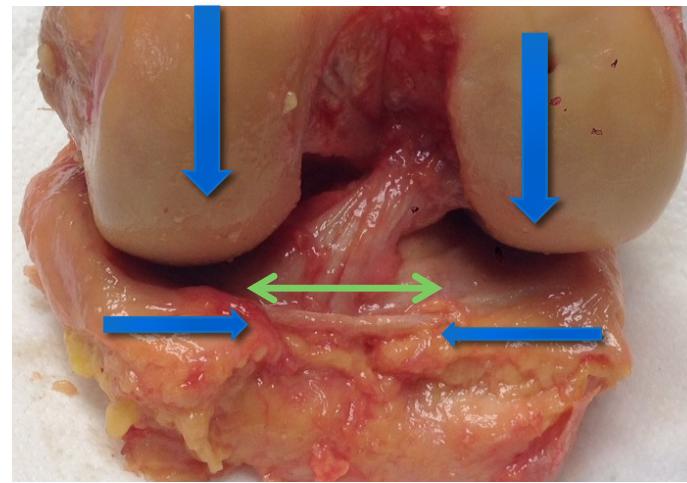
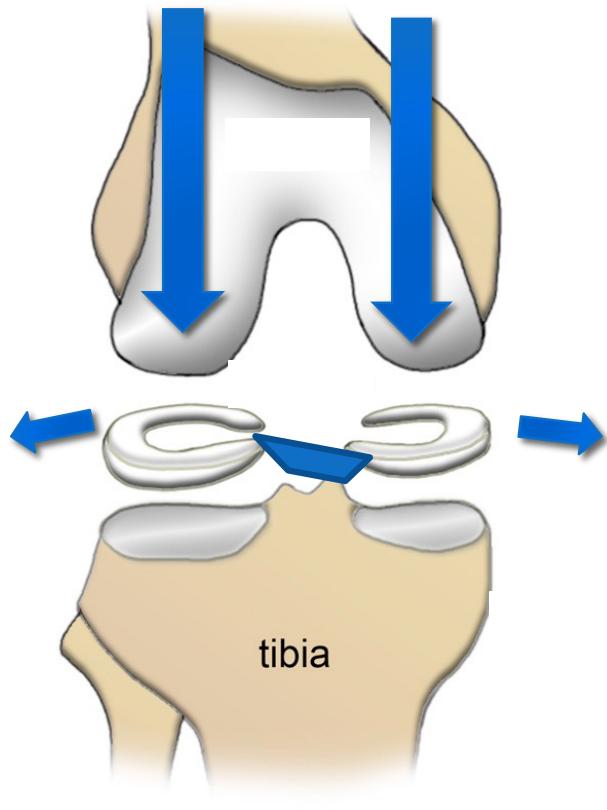
Menisco fibular ligaments: Control PL laxity



Zdanovicz et al. 2020

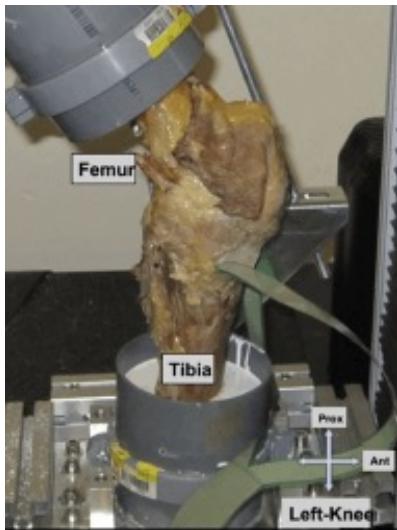
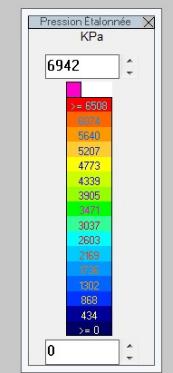
Macroscopic Anatomy (LM)

INTERMENISCAL LIGAMENT:

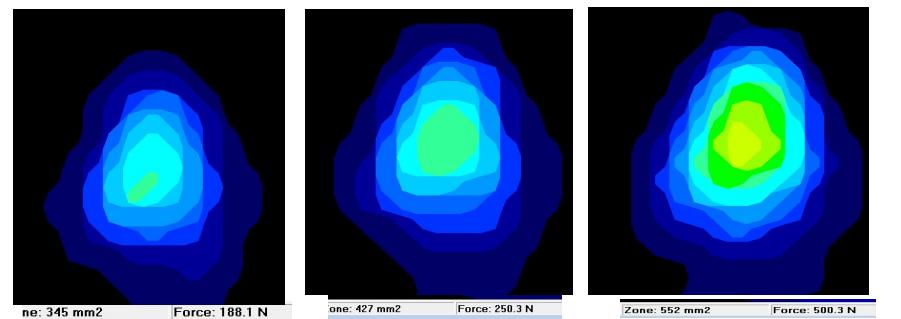




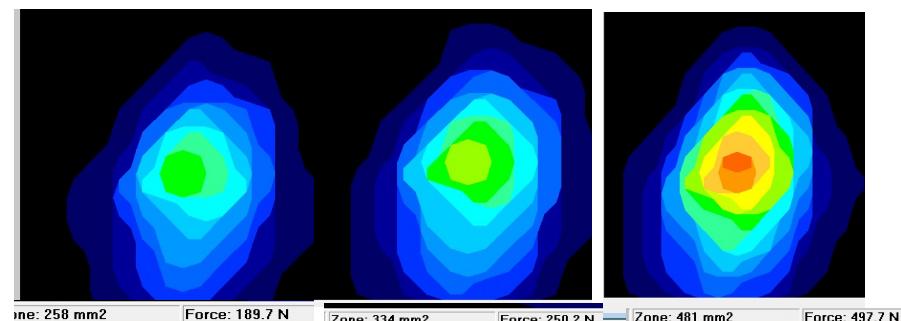
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and the American Society of
Arthroscopy, Knee Surgery,
and Orthopaedic Sports Medicine



With
IML



Without
IML

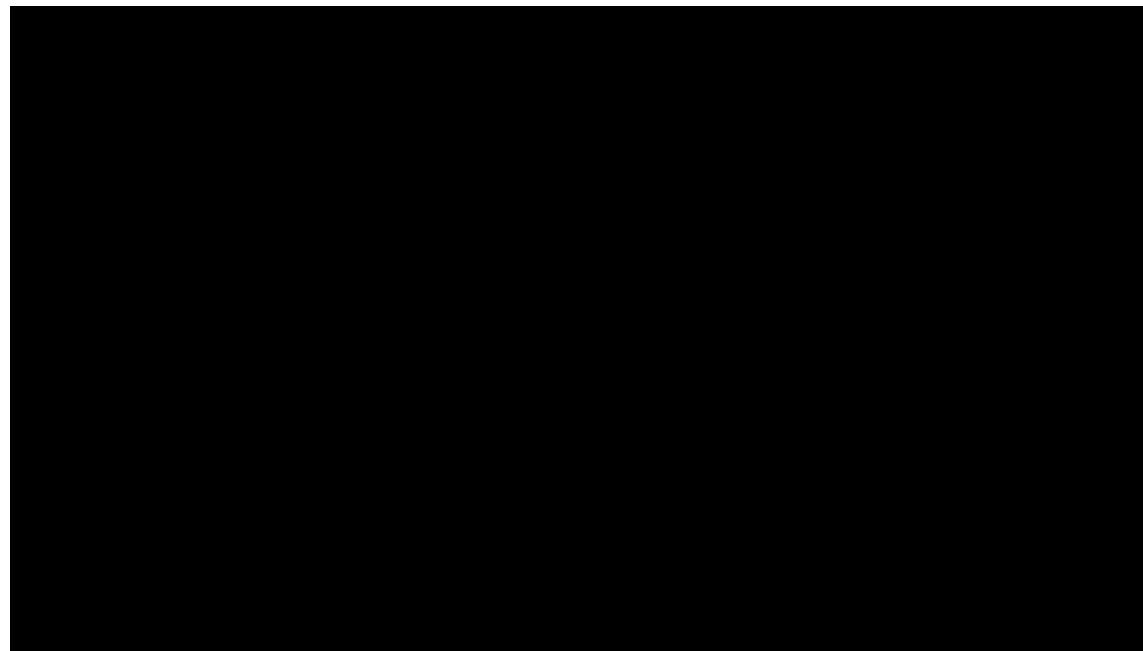
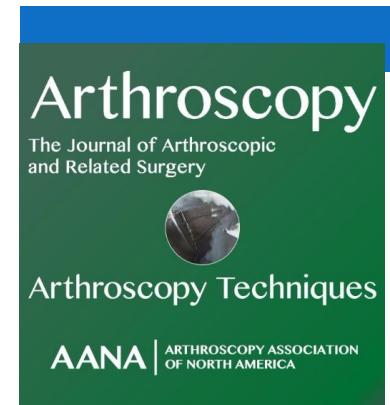


Increased contact pressure

Meniscal Allograft Transplantation With Soft-Tissue Fixation Including the Anterior Intermeniscal Ligament

Seong Hwan Kim, M.D., Lukasz Lipinski, M.D., and Nicolas Pujol, M.D.

Arthroscopy Techniques, Vol 9, No 1 (January), 2020: pp e137-e142

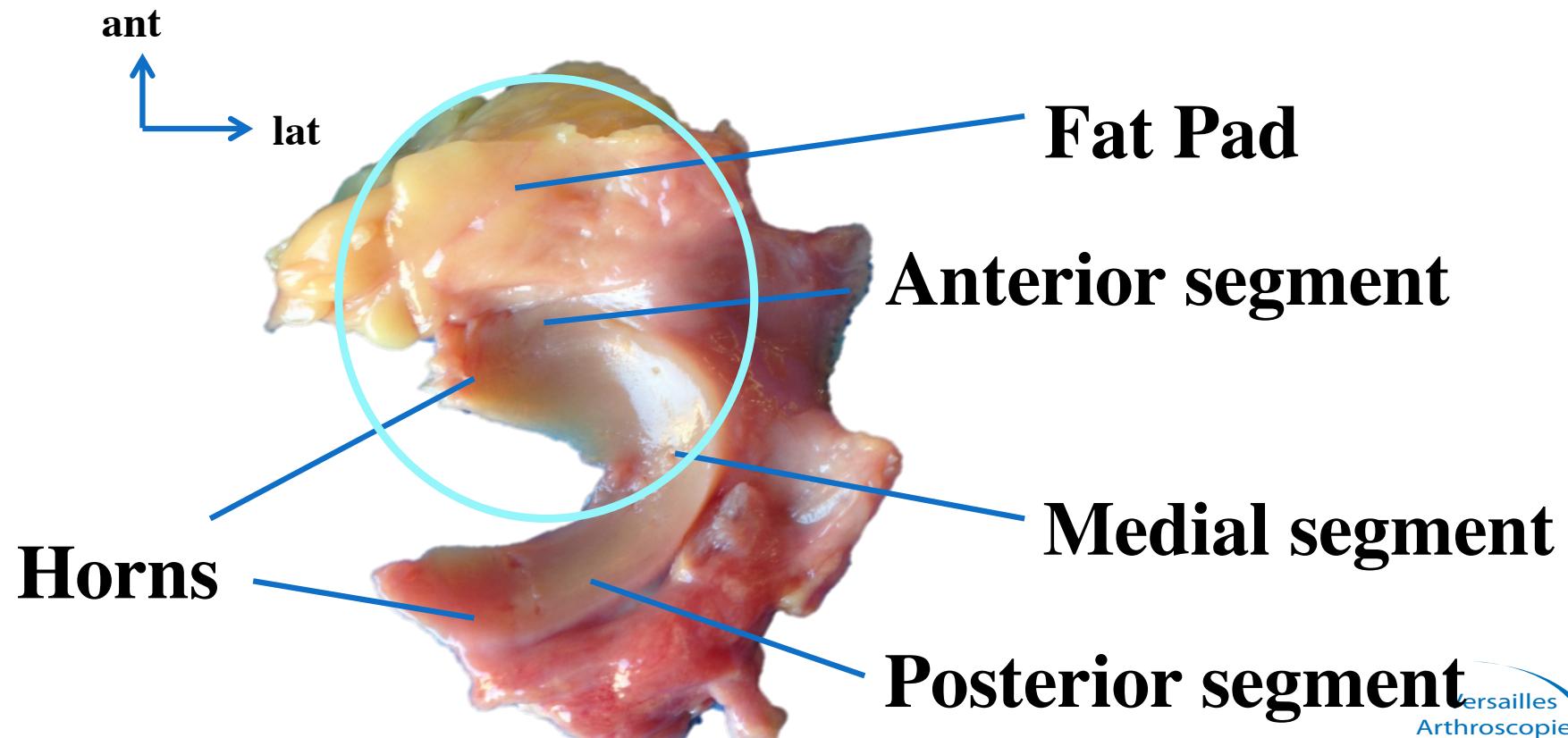


Limit extrusion



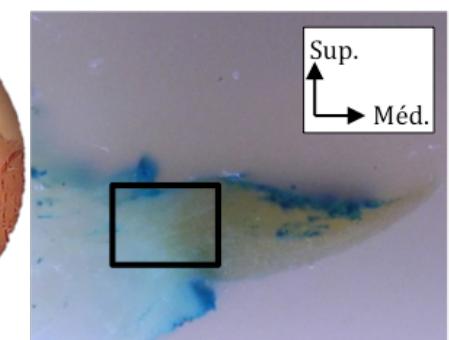
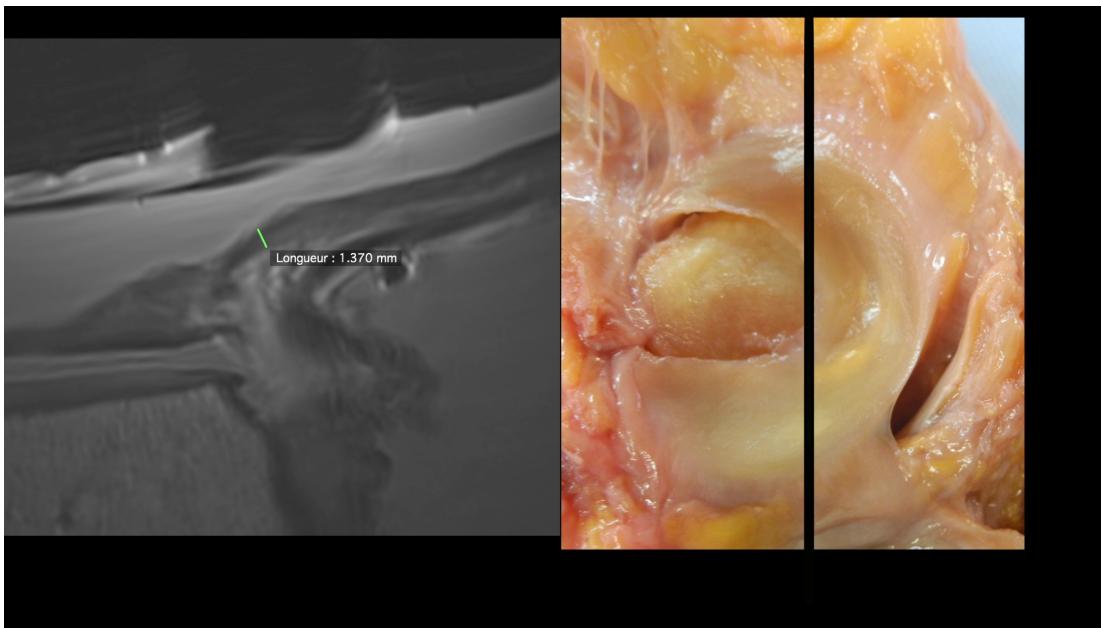
Macroscopic Anatomy (LM)

Anterior part of the lateral meniscus



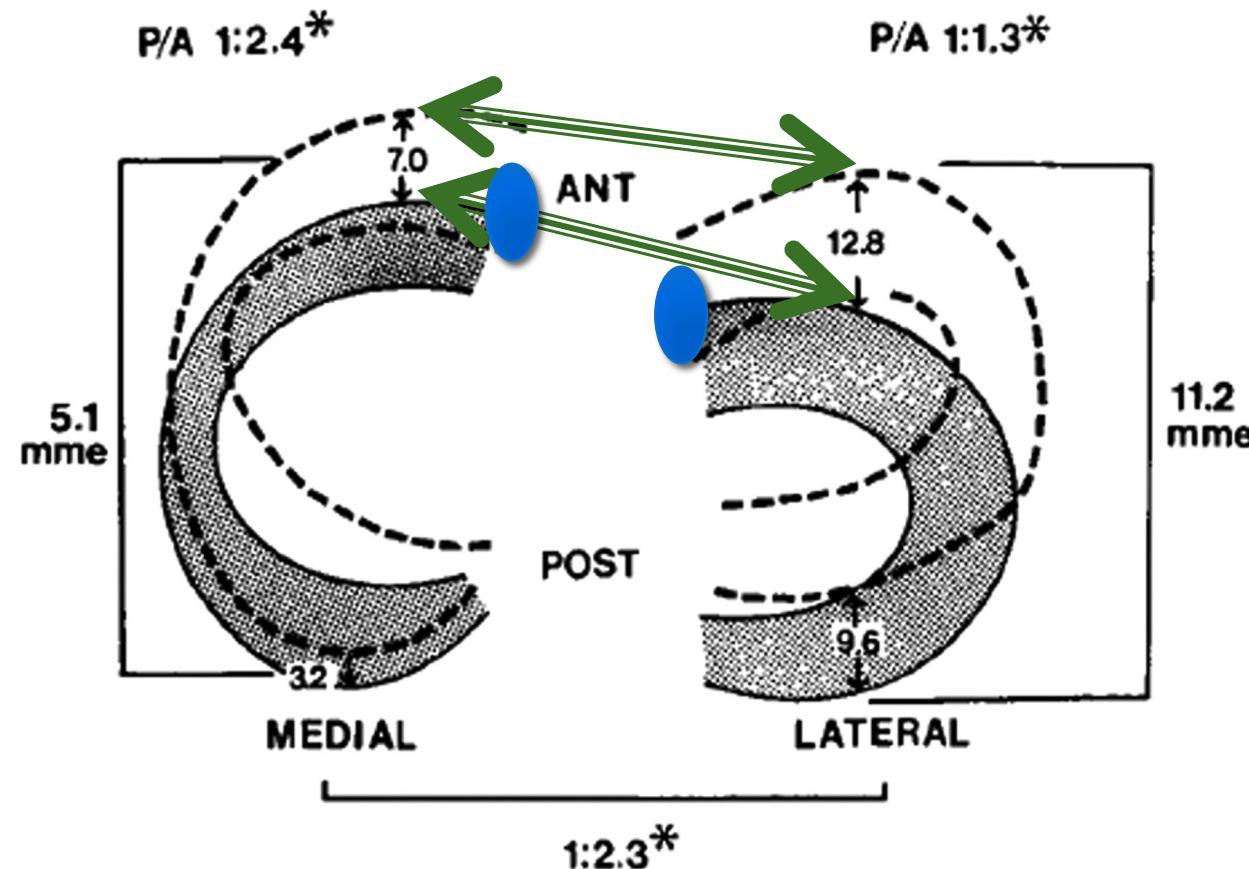
Macroscopic Anatomy (LM)

Anterior segment of the lateral meniscus



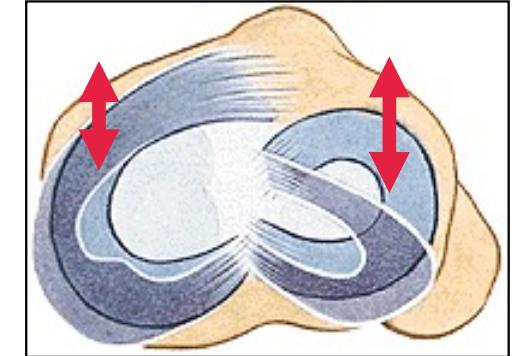
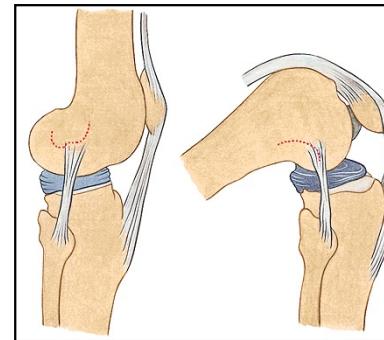
Pujol et al 2022 in press

Macroscopic anatomy: Lateral Meniscus mobility



Consequences?

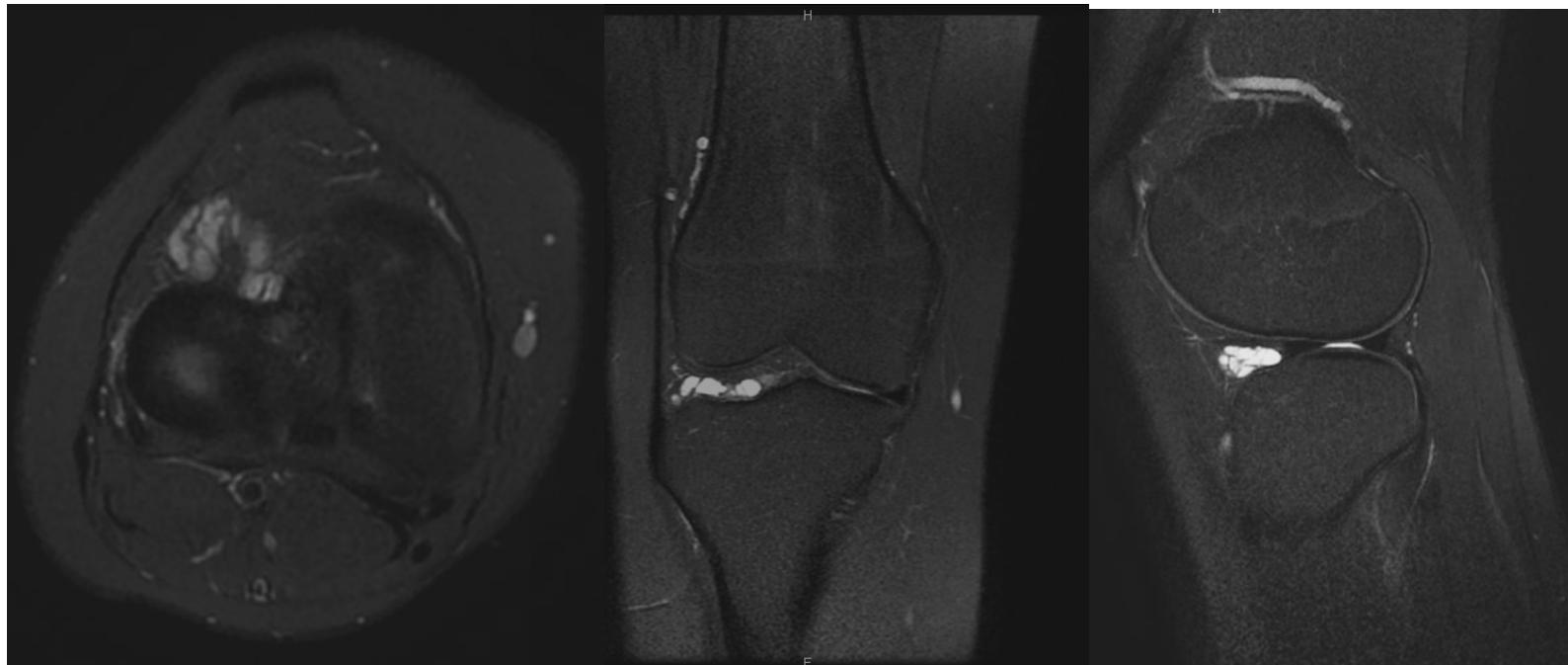
Need of mobility
No strong attachment



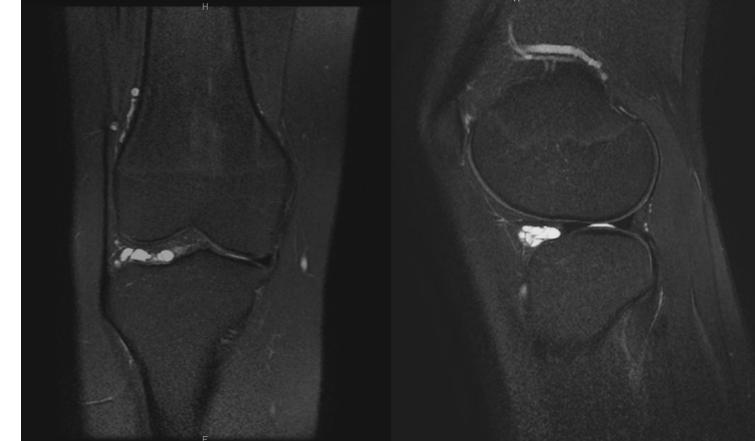
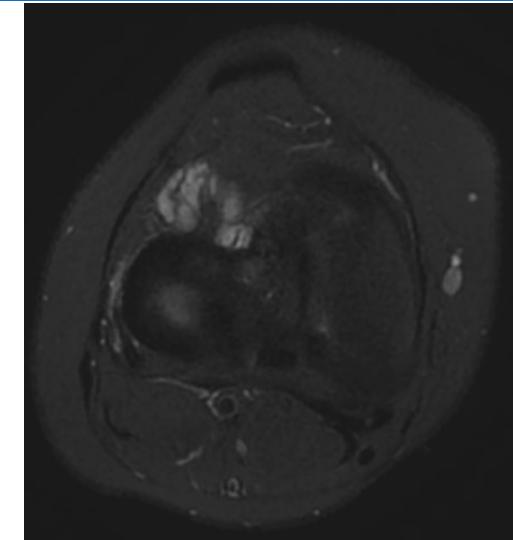
No need to repair/suture LM at the anterior part for :

Reconstruction
Anterior Lesions

Example

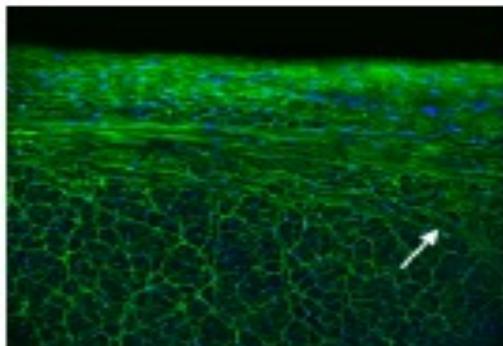


Example

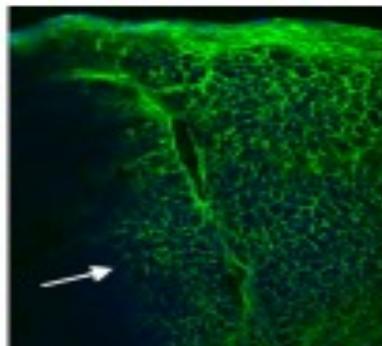


Microscopic anatomy

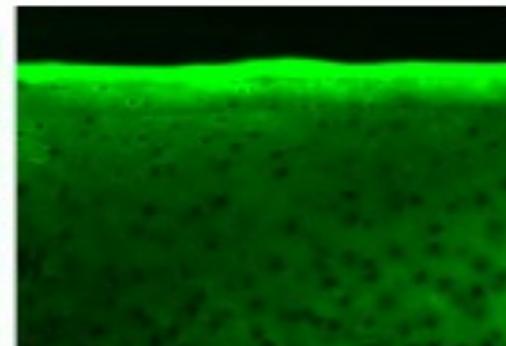
- Water 75%
- Collagen 20%
- 3% proteoglycans, non collagenic proteins, lipids
- 2% cells
- Elastic fibers: 0,6%



Meniscus, type I collagen



Meniscus, type II collagen



Articular cartilage, type II collagen

Microscopic anatomy

- Vessels:

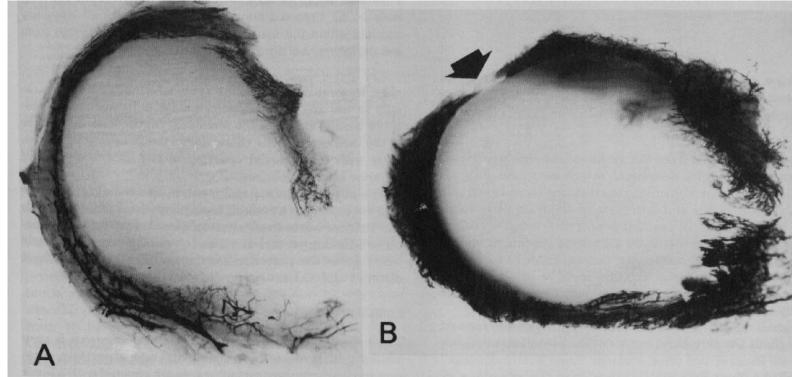


Figure 1. Superior aspect of the medial (A) and lateral (B) meniscus following vascular perfusion with India ink and tissue clearing using a modified Spalteholz technique. Note the vascularity at the periphery of the menisci as well as at the anterior and posterior horn attachments. The absence of peripheral vasculature at the posterior lateral corner of the lateral meniscus (arrow) represents the area of passage of the popliteal tendon.

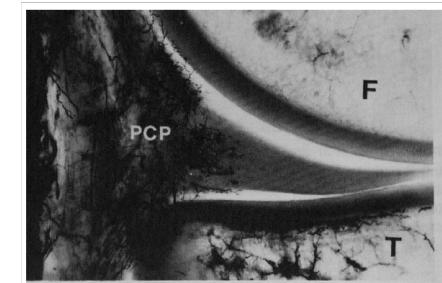
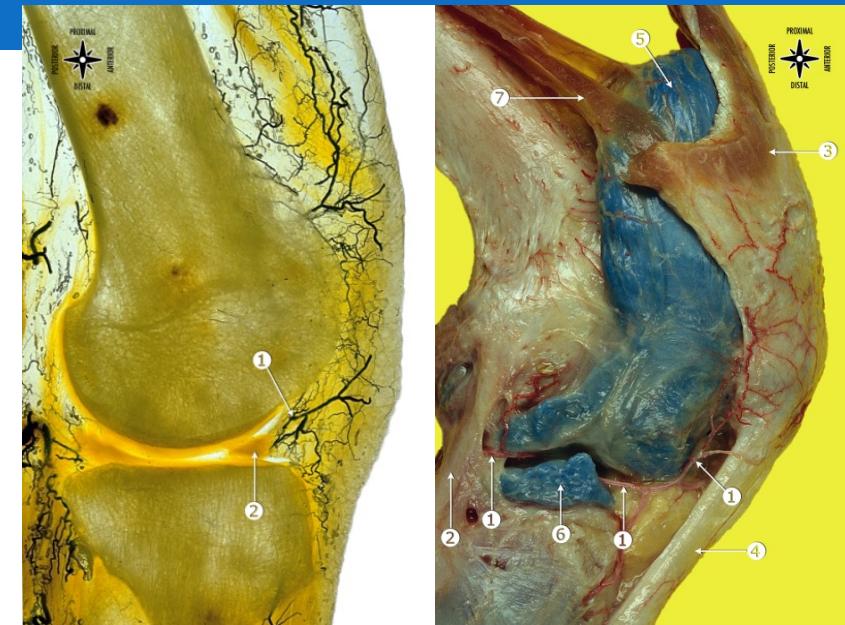


Figure 2. Five-millimeter thick frontal section of the medial compartment of the knee (Spalteholz X 3). Branching radial vessels from the perimeniscal capillary plexus (PCP) can be seen penetrating the peripheral border of the medial meniscus. (F) Femur, (T) Tibia.

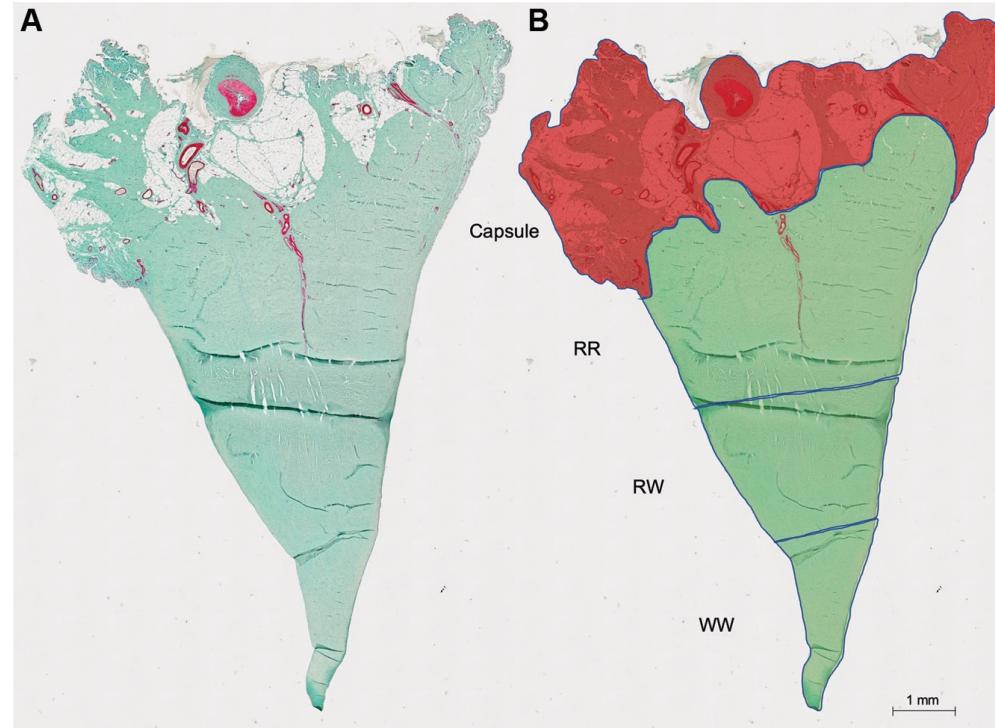
Microvasculature of the human meniscus

STEVEN P. ARNOCKSY,* DVM, DIPLO., ACVS, AND
RUSSELL F. WARREN, MD, FACS

From the Laboratory of Comparative Orthopedics and Sports Medicine Research, The Hospital for Special Surgery, Affiliated with The New York Hospital, Cornell Medical College, New York, New York

Microscopic anatomy

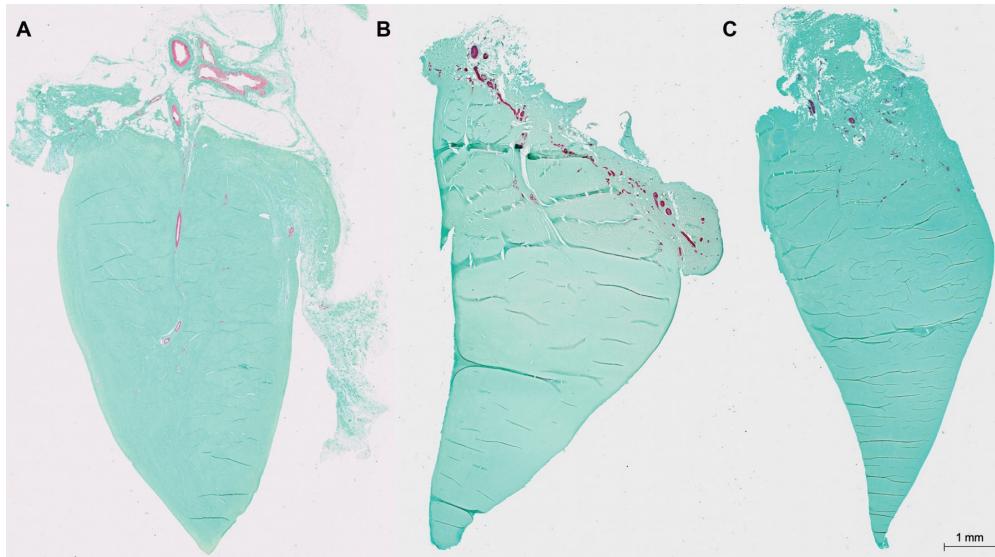
- Vessels:
- IN A CHILD



- 95% of the vessels are located in the capsule

Microscopic anatomy

- Vessels:
- Decreasing with age



Age-Related Changes in the Microvascular Density of the Human Meniscus

Philip A. Michel,^{†‡} MD, Christoph J. Domnick,[‡] MD, Michael J. Raschke,[†] MD, Anna Hoffmann,[†] MD, Christoph Kittl,[†] MD, Elmar Herbst,[†] MD, PhD, Johannes Glasbrenner,[†] MD, Jendrik Hardes,[§] MD, Arne Streitbürger,[§] MD, Georg Gosheger,[¶] MD, and Mirco Herbort,[¶] MD

Investigation performed at the Department of Trauma, Hand and Reconstructive Surgery, University Hospital Muenster, Muenster, Germany

2021



NO VESSELS AT ALL AFTER ADOLESCENCE IN “RR OR RW” ZONE

Versailles
Arthroscopie
Orthopédie



Conclusion



- Understand anatomy
 - Of the meniscus
 - AND
 - Around the meniscus
-
- Determine appropriate treatments

LIROMS
Luxembourg Institute of Research in
Orthopedics, Sports Medicine and Science

2022

JULY

The Meniscus

Home

