INTRODUCTION:

• Knee extensor mechanism is a complex anatomical structure.
• Gross anatomy is well described in classical anatomy textbook.
• But fine anatomical details are also important to understand some of modern procedure.
• But it’s a real trap, because anatomical description could be too compact for a young fellow or resident or not so precise for a knee specialist, so I will try.

THE CLASSICS: QUADRICEPS MUSCLE

- Well known: Nothing new…
- Four distinct muscle bellies:
  - One bi-articular muscle:
    - Rectus femoris: Innervation: roots L2, L3, L4
  - Three monoarticular muscles:
    - Vastus medialis: Innervation: roots L2, L3, L4
    - Vastus lateralis: Innervation: roots L3, L2, L4
    - Vastus intermedius: Innervation: roots L3, L2, L4
  - Vascularisation: Profunda Femoris artery

QUADRICEPS TENDON

- More complex than in classics books.
- The quadriceps tendon was normally trilaminar,
  - anterior layer = rectus femoris, directly on patella
  - intermediate layer = VM and VL
  - VL blended with the lateral patellar retinaculum: direct tibial insertion
  - VM: more distal muscle fibers
  - VL: blended with the lateral patellar retinaculum: direct tibial insertion
- Vascularisation: Profunda Femoris artery


PREPATELLAR FIBROUS SOFT TISSUES

- Three layers:
  - superficial fascial layer
  - Intermediate layers: (VM/VL/ Rectus femoris superficial fibers)
  - Deep layer: rectus femoris
QUADRICEPS TENDON ANATOMICAL VARIATIONS

Two layers: 30%
Three layers: 56%
Four layers: 5%
One layer: 7%

QUADRICEPS TENDON : CLINICAL RELEVANCE

• Two or three layered quadriceps tendon:
  • Partial quadriceps tendon harvesting is possible:

MEDIAL PATELLAR RETINACULUM: LAYER I-II

• I: Crural fascia, Medial retinaculum
  • Fibers coming from
    • the crural fascia
    • the VMO tendon
    • and Quadriceps
  • which can only be identified independently in front of the MCL.

MEDIAL PATELLAR RETINACULUM: MPFL +

• Between layer II and III
• Mediapatellotibial ligament (66.7 to 100%)
  • band of retinacular tissue
  • connected the femoral medial epicondyle
  • proximal two-thirds of the medial edge of the patella
  • StOPS: superior and inferior
  • Contribution to medial patellar stabilization: 59%.

MEDIAL PATELLAR RETINACULUM: LAYER III

• Mediapatellomeniscal ligament:
  • connected the patella
  • to the anterior horn of the medial meniscus
• Mediapatellotibial ligament: very thin
• Accessory patellar stabilizers
• Their contribution to static patellar stabilization was found to be
  • 24% for the patellomeniscal ligament
  • 13% for the medial patelloligament

FUNCTIONNAL ANATOMY

• During knee flexion:
  • the MPFL, actively shortened by VMO pulls the patella into the patellofemoral groove at the initial (20°–30°) of flexion.
LATERAL PATELLAR RETINACULUM

- Two layers:
  - superficial oblique retinaculum
  - deep transverse retinaculum: three structures:
    - transverse patellofemoral ligament (epicondylotibial band)
    - transverse retinaculum (coursed directly from the IF to the midpatella)
    - the patellar band
- VASCULAR DANGER:
  - LATERAL SUPERIOR GENCULAR ARTERY

CONCLUSIONS:
- Learning anatomy should not concern only students;
- We must read not only biomechanical, clinical or surgical studies; but also anatomical studies in the same journals
- Thank You!