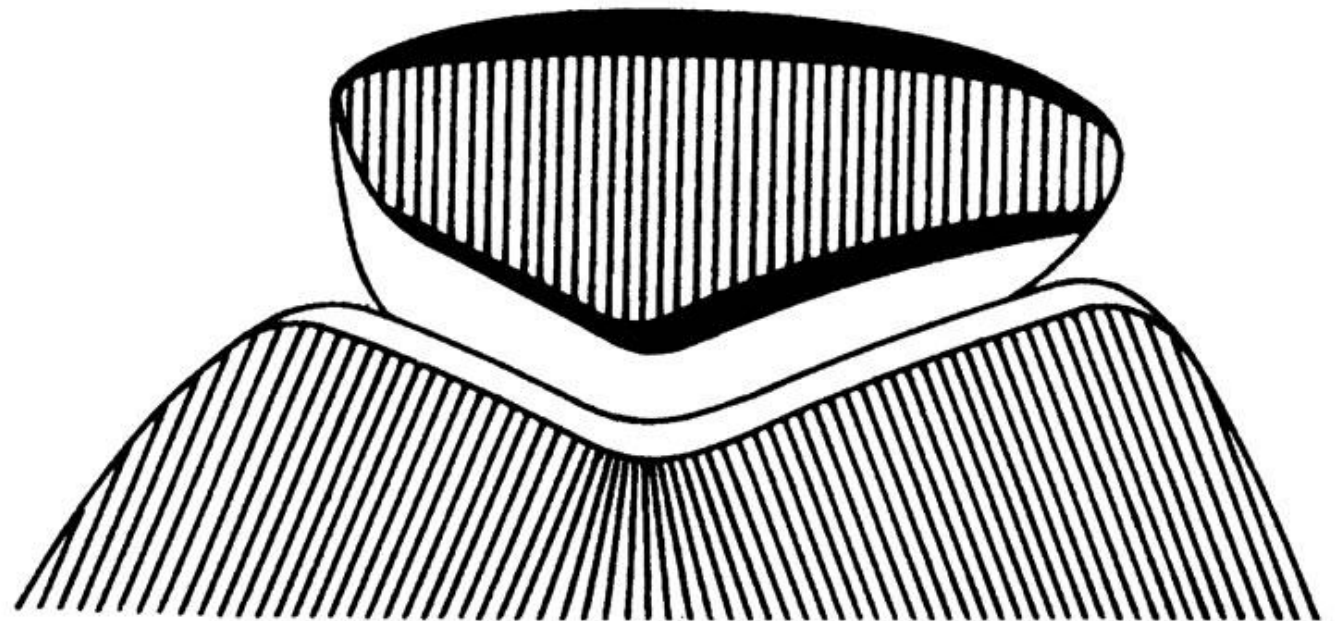


Patellofemoraalliigese anatoomia ja biomehaanika

EASTS praktiline põlvkursus, 23/04/2015 Eivere mõis

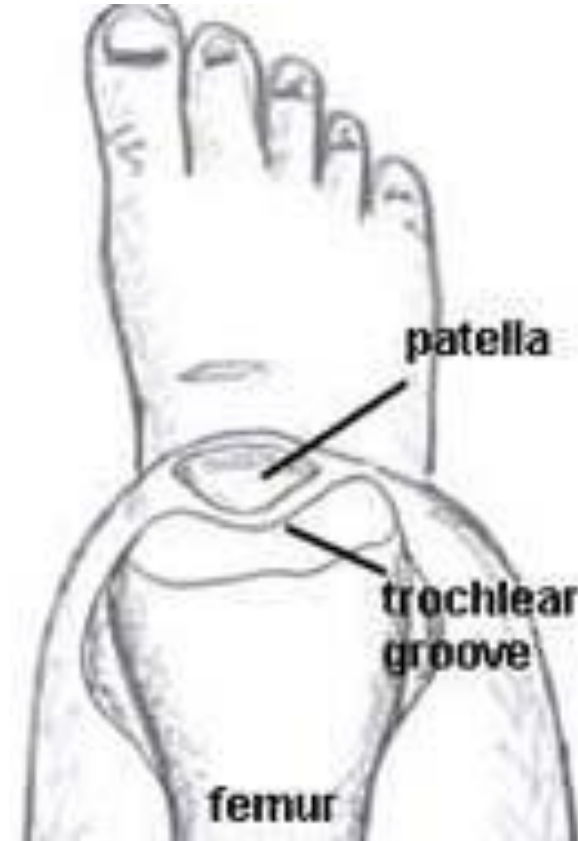
Timo Rahnel
V a ortopeedia resident

Sissejuhatus ...



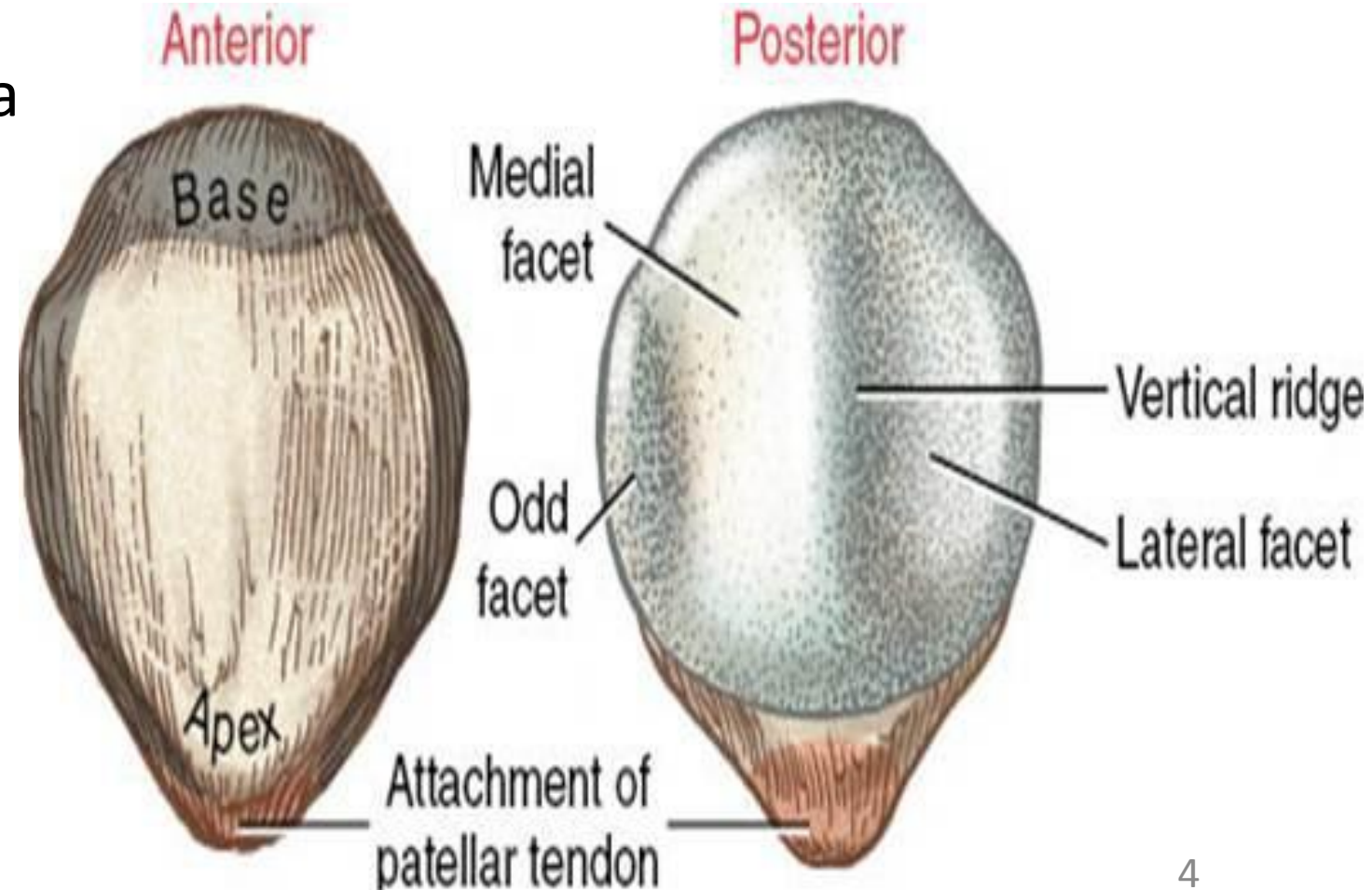
Juttu tuleb:

- Luuline anatoomia:
 - Patella
 - Trohlea
- Pehmekeoline anatoomia
- Radioloogiline hindamine
- Biomehaanika



Anatoomia-põlvekeder

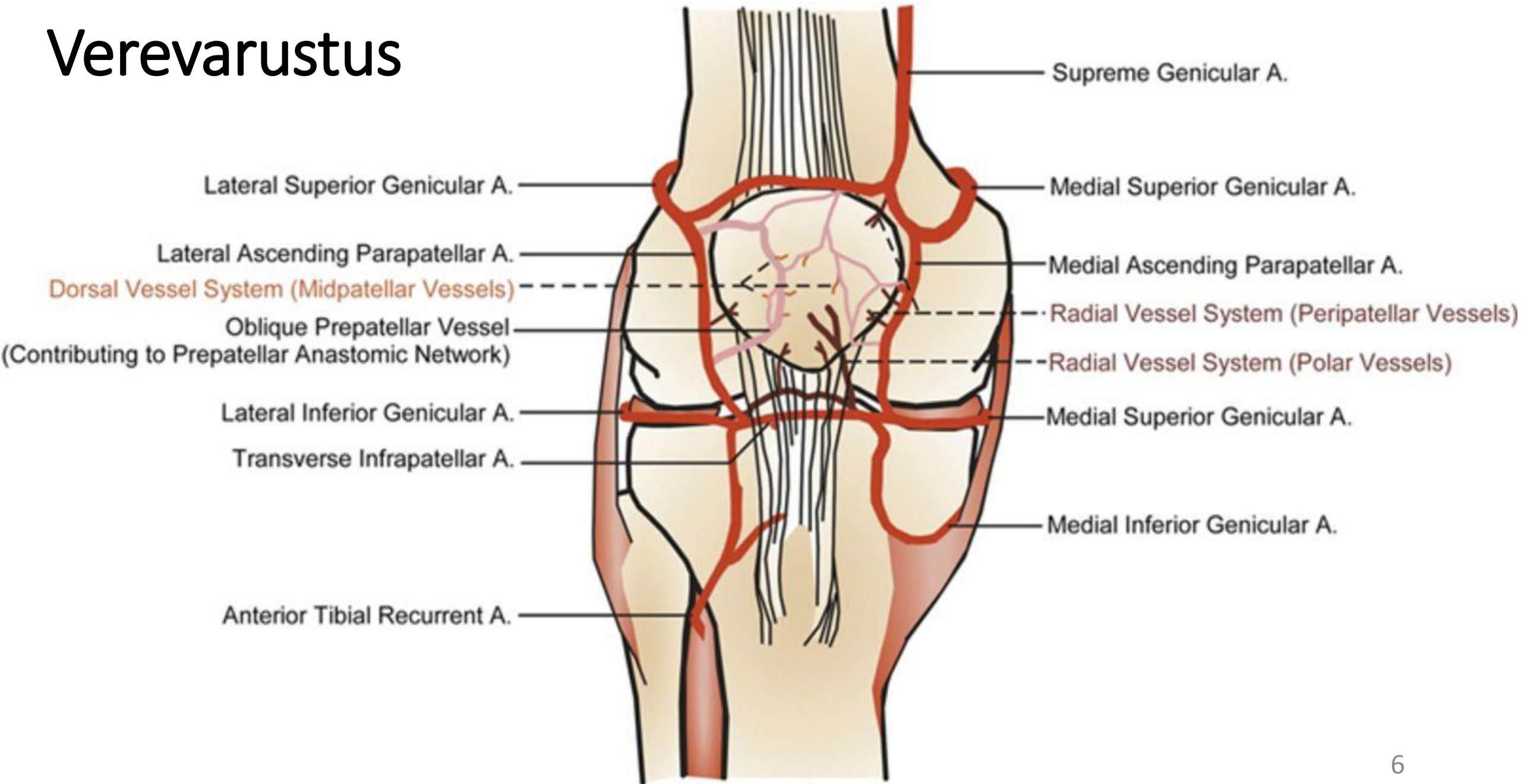
- Suurim seesamluu
- Ekstensoraparaadi ühendaja
- 7 fassetti
- Kuju varieeruv



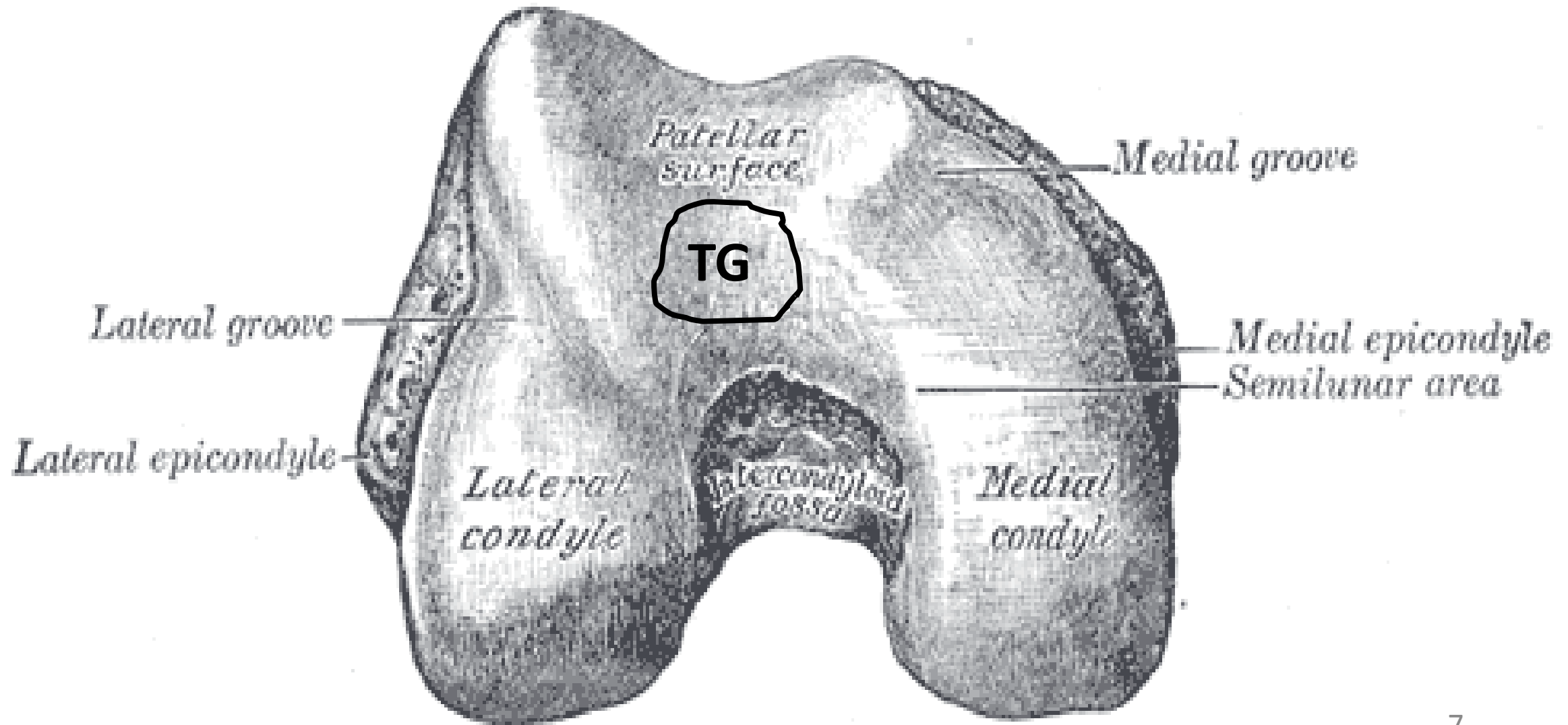
Wibergi klassifikatsioon:



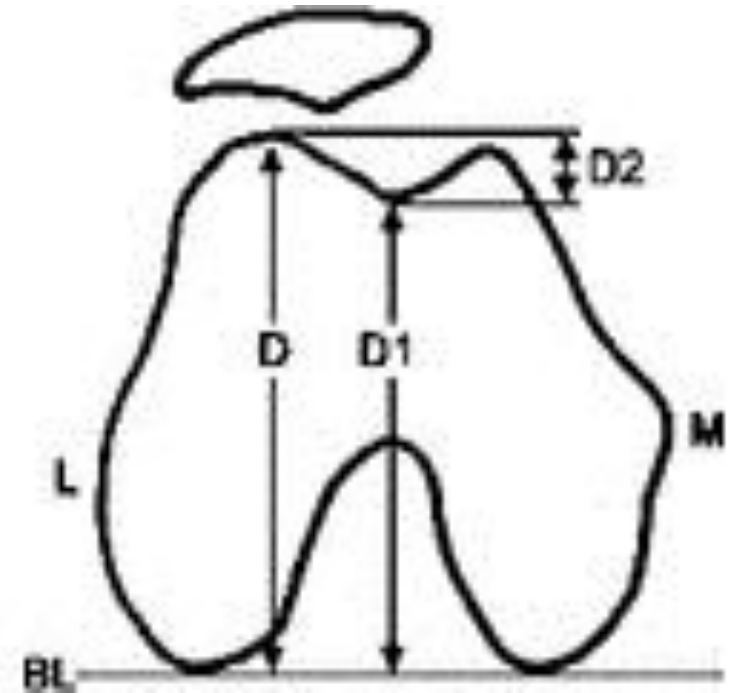
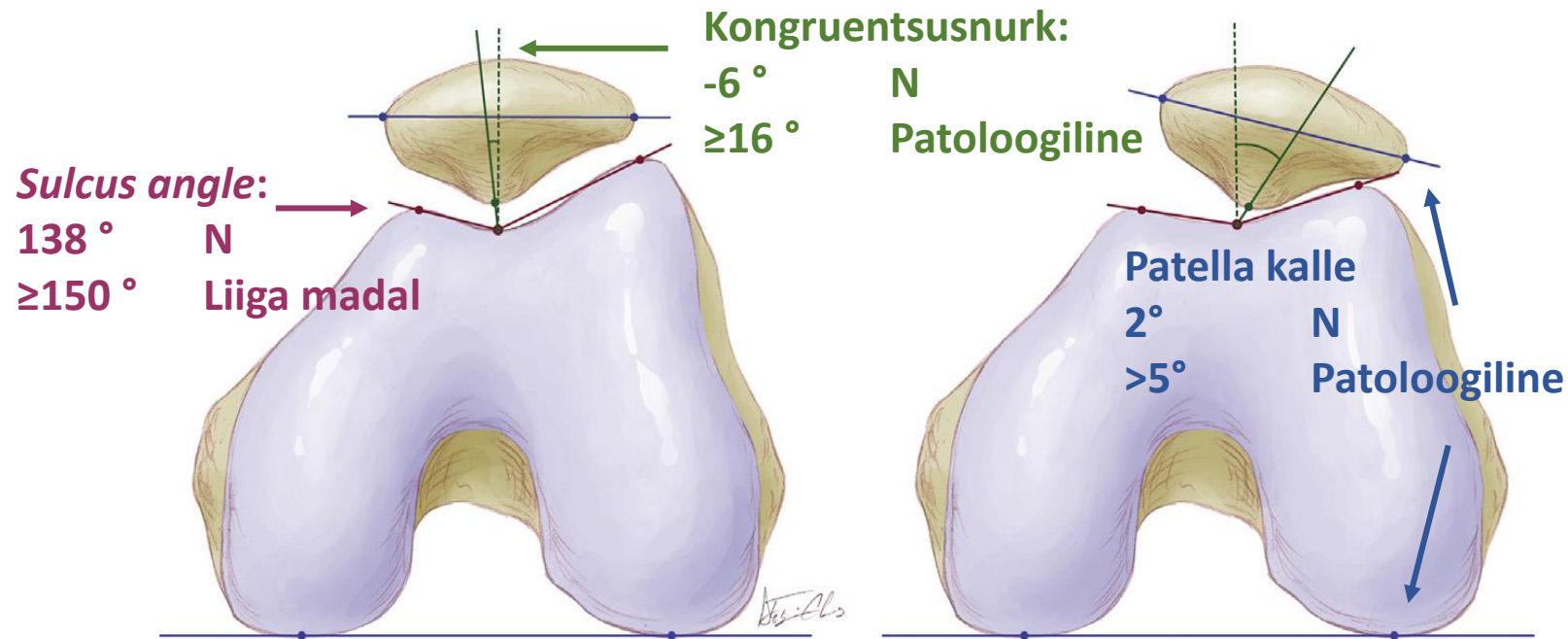
Verevarustus



Anatoomia-trohlea



PF-liigese radioloogiline hindamine

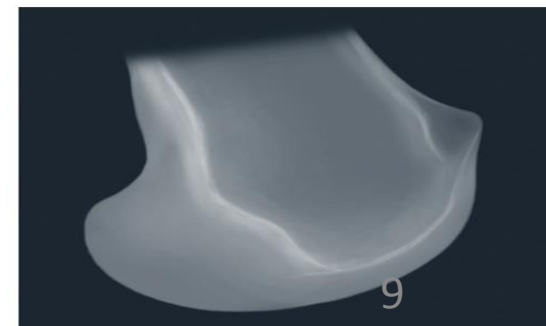
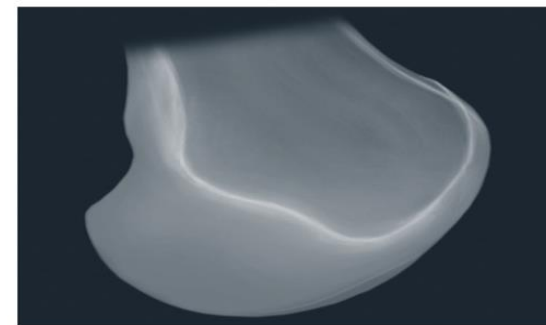
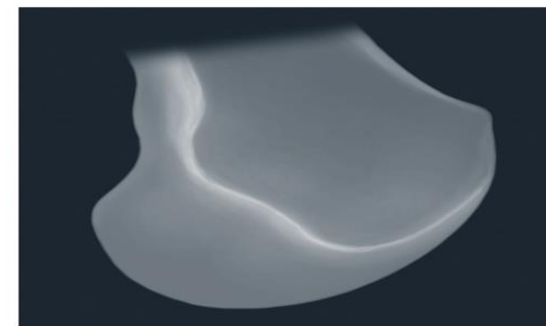
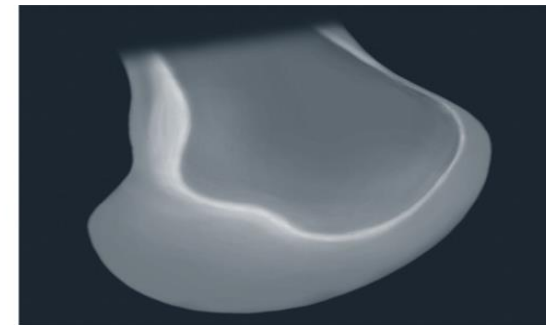
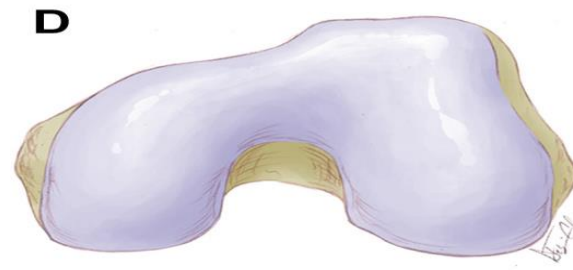
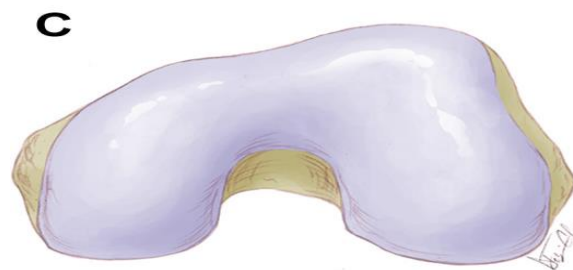
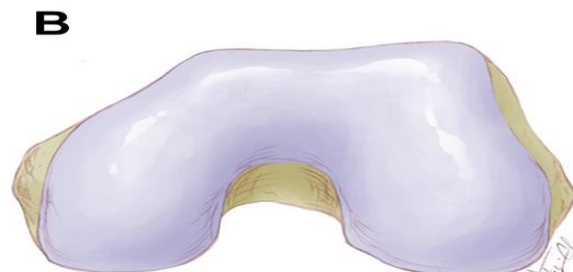


$D2 < 4 \text{ mm}$ patoloogiline

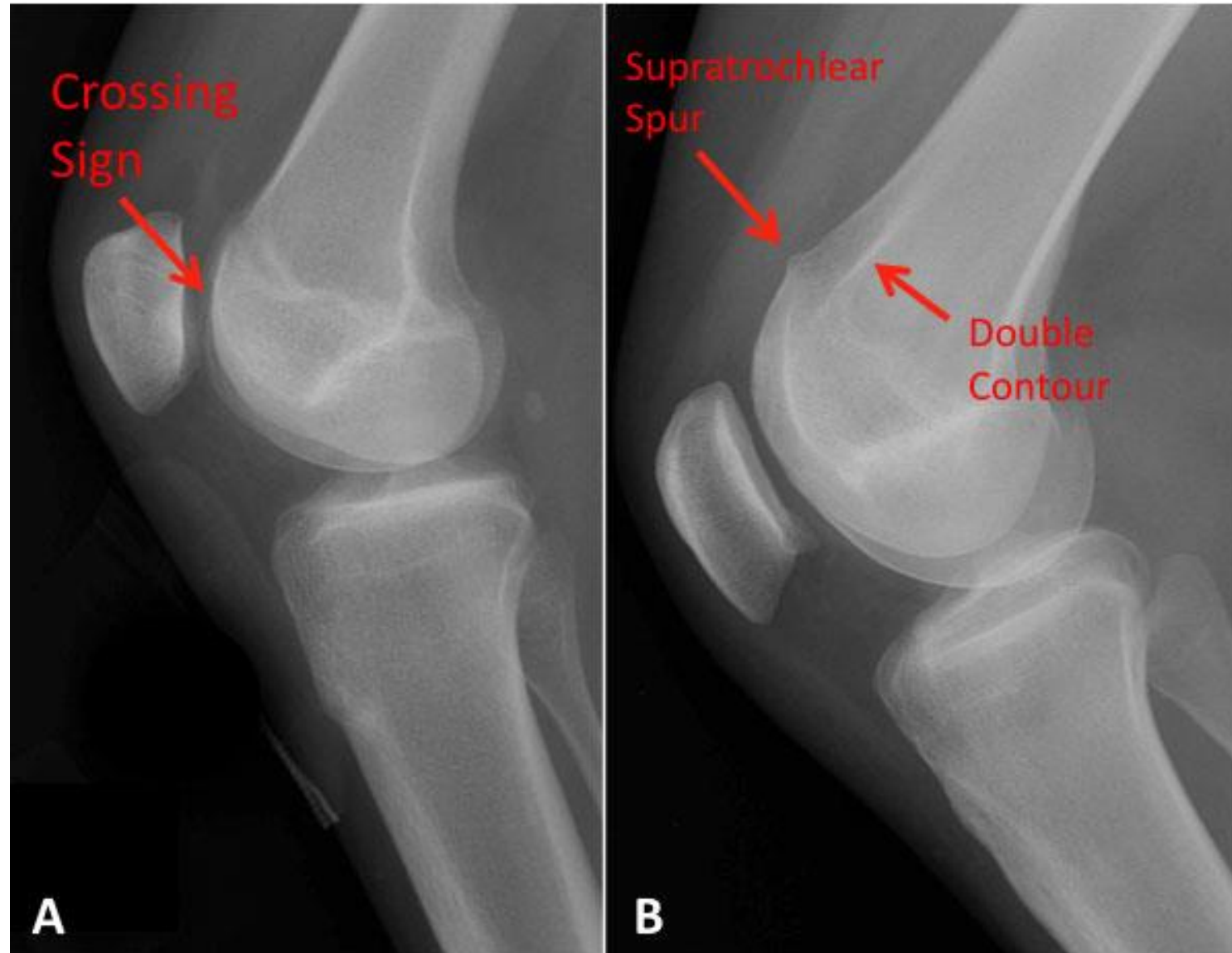
Trohlea düsplaasia

Trohlear bump $N \leq 3$ mm

Dejouri klassifikatsioon

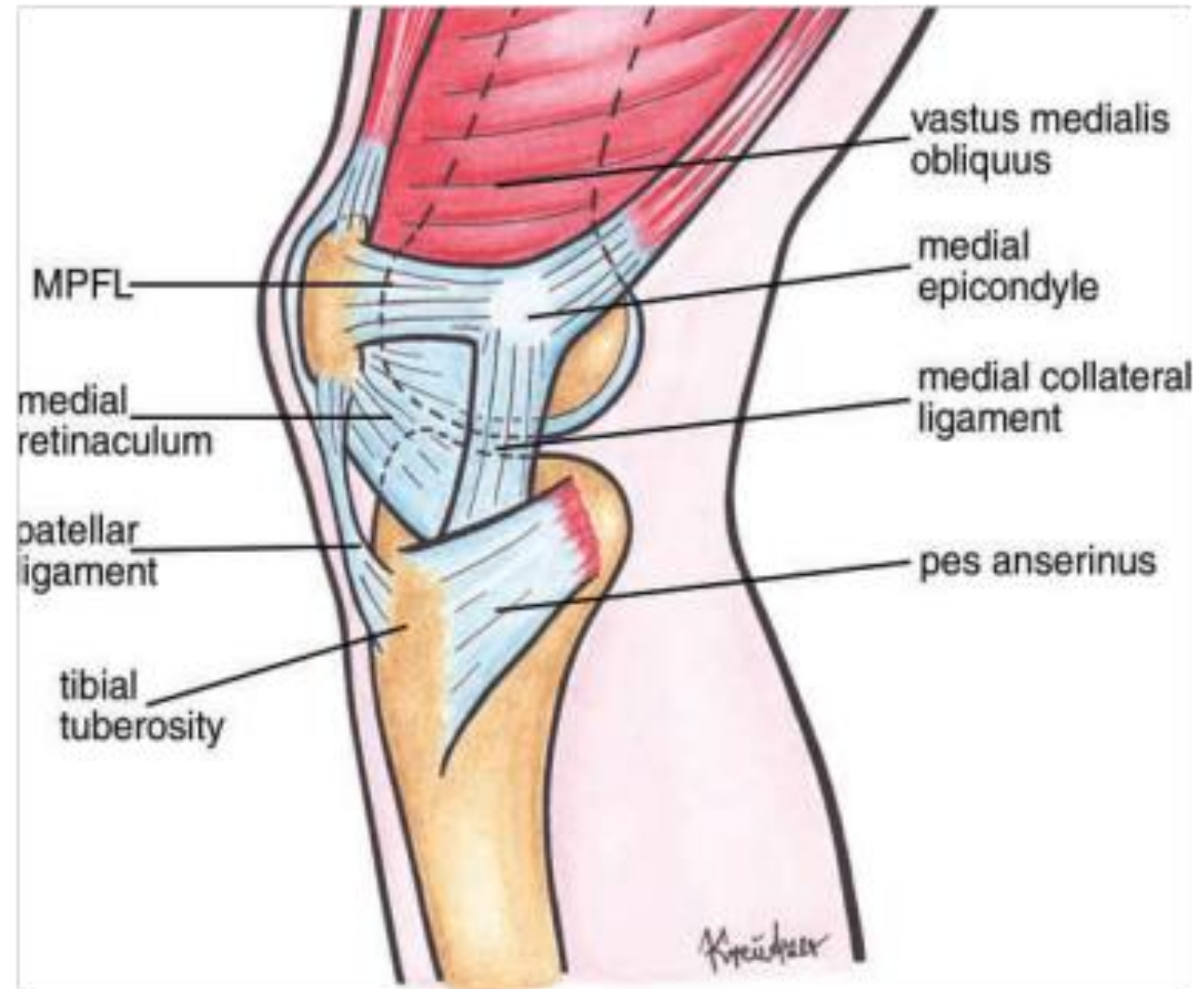


Trohlea düsplaasia

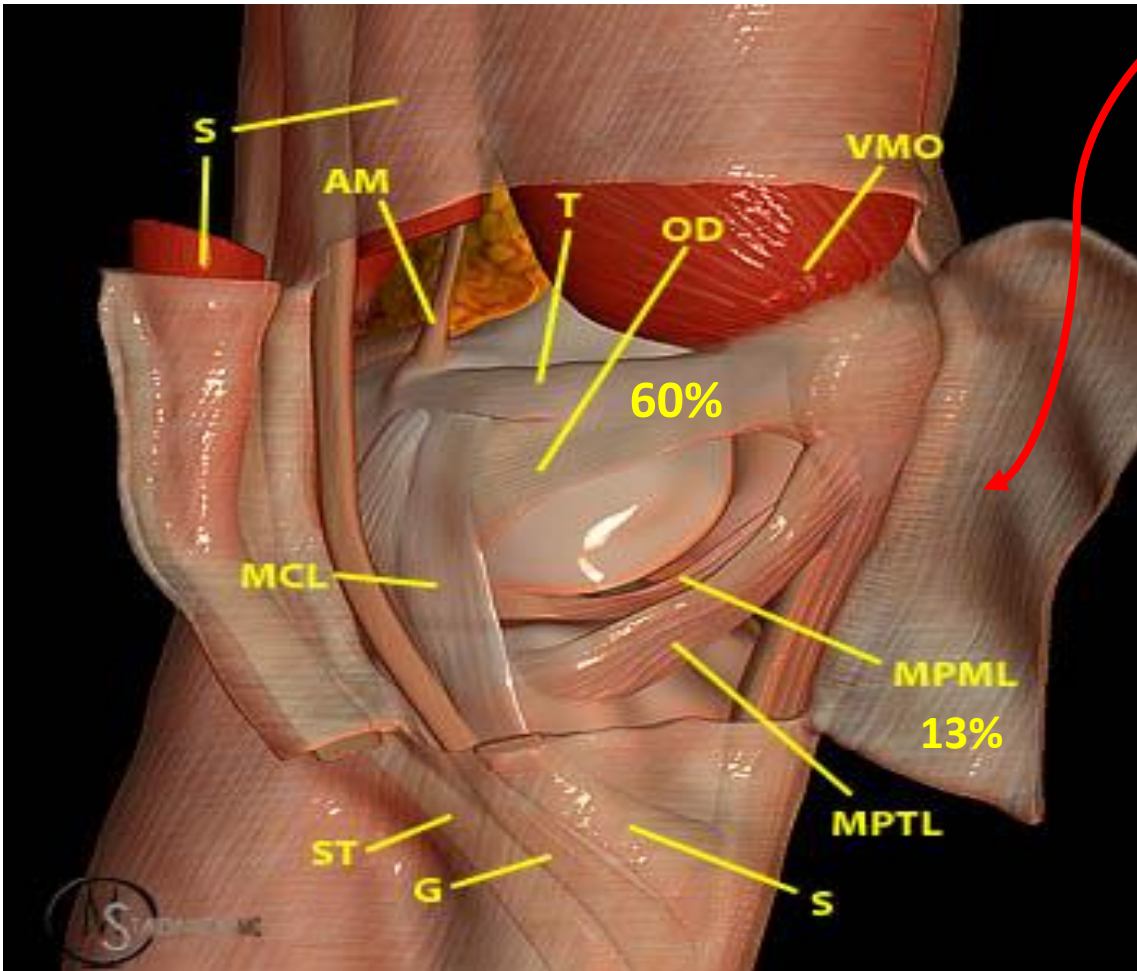


PF-liigese pehmekeoline anatoomia

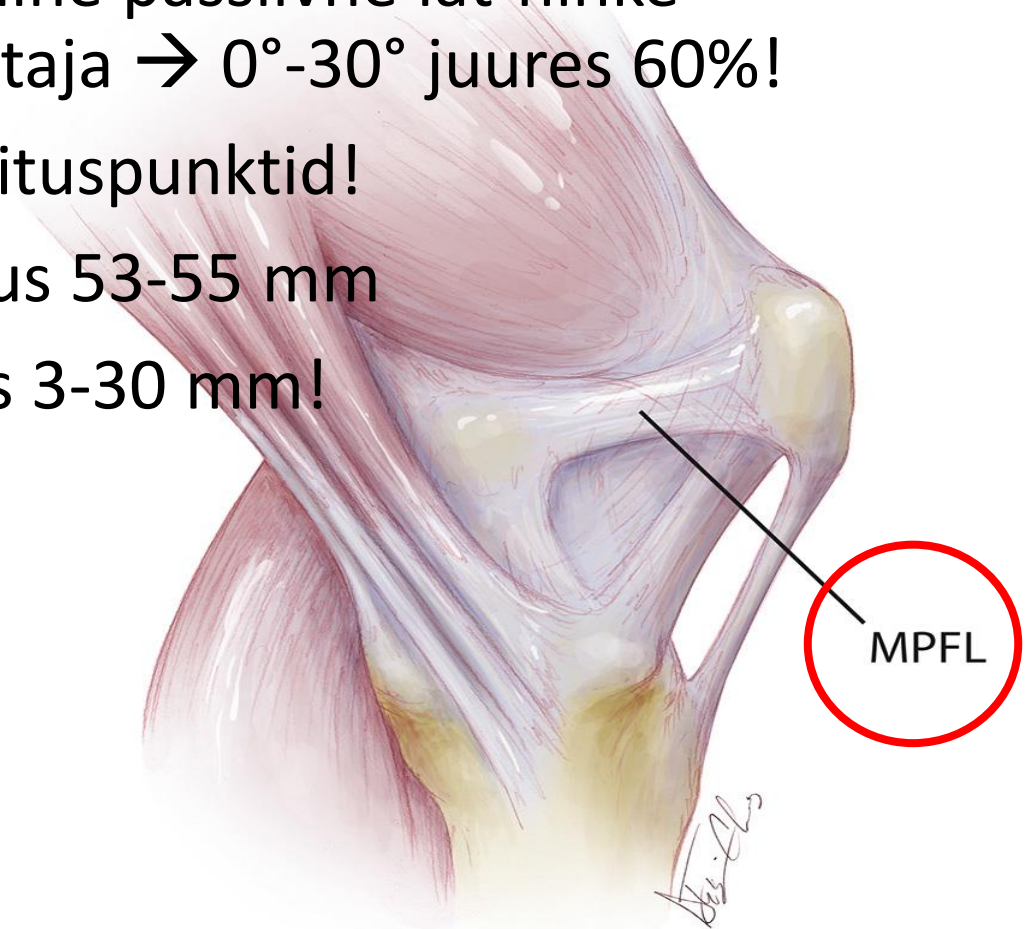
- Reie 4-pealihase mehhanism
- Patella kõõlus
- **Mediaalsed struktuurid**
 - VMO!-oluline dünaamiline stabilisaator
 - MPFL!-oluline passiivne stabilisaator
 - MPTL
 - Mediaalne retinaculum



PF-liigese pehme koeline anatoomia- *MPFL*



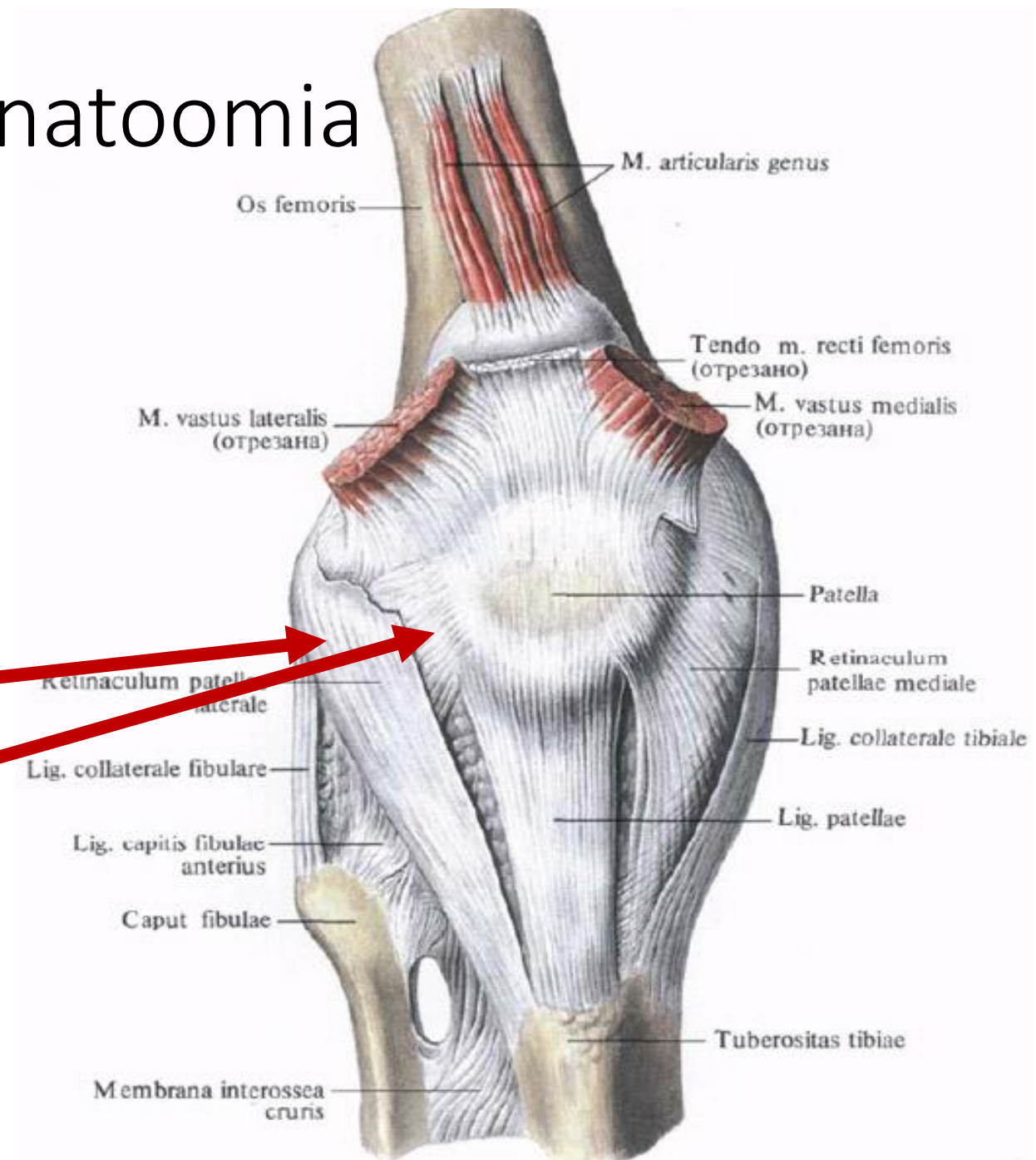
- Põhiline passiivne lat-nihke takistaja → 0°-30° juures 60%!
- Kinnituspunktid!
- Pikkus 53-55 mm
- Laius 3-30 mm!



PF-liigese pehmeoeline anatoomia

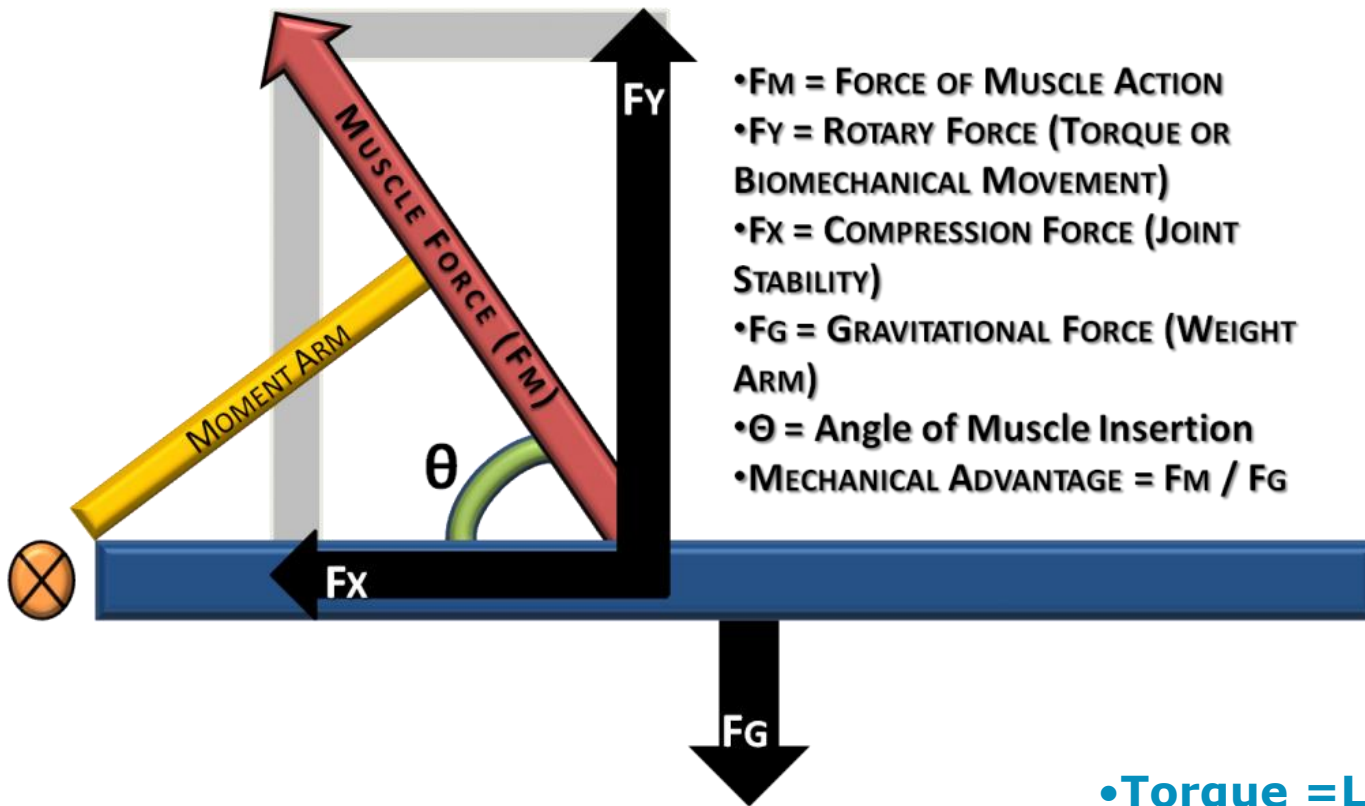
Lateraalne retinaculum-oluline
passiivne lateraalse nihke
stabilisaator

-pindmine-oblique lateral retinaculum
-süva-oblique and transverse fibers
(patellotibial-/epicondylopatellarbands)

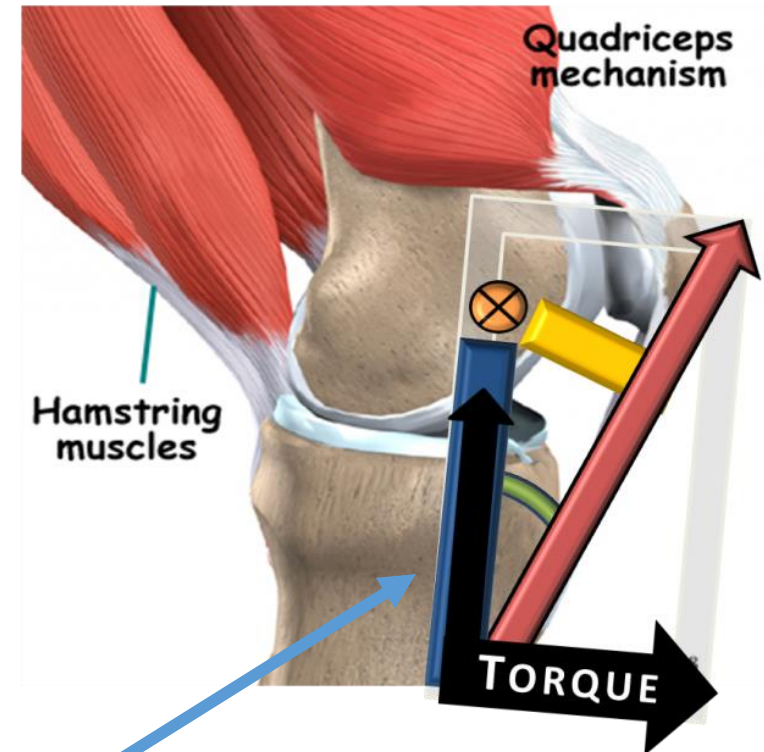


Biomechanika

FORCE SYSTEM



TORQUE OF QUADRICEPS



- Torque = Lever Arm x Fy [or Force $\sin(\theta)$]
- Torque = Force (Fm) x Moment Arm

Biomechanika

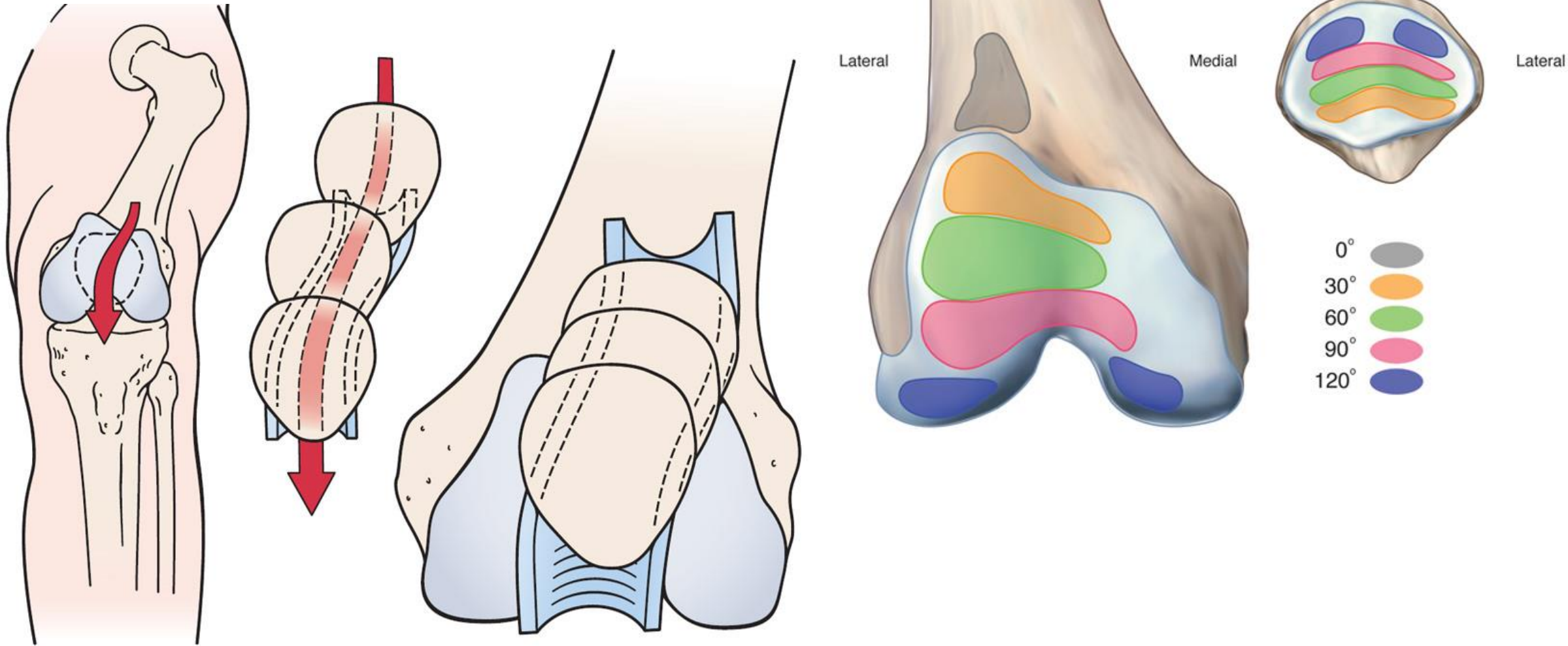
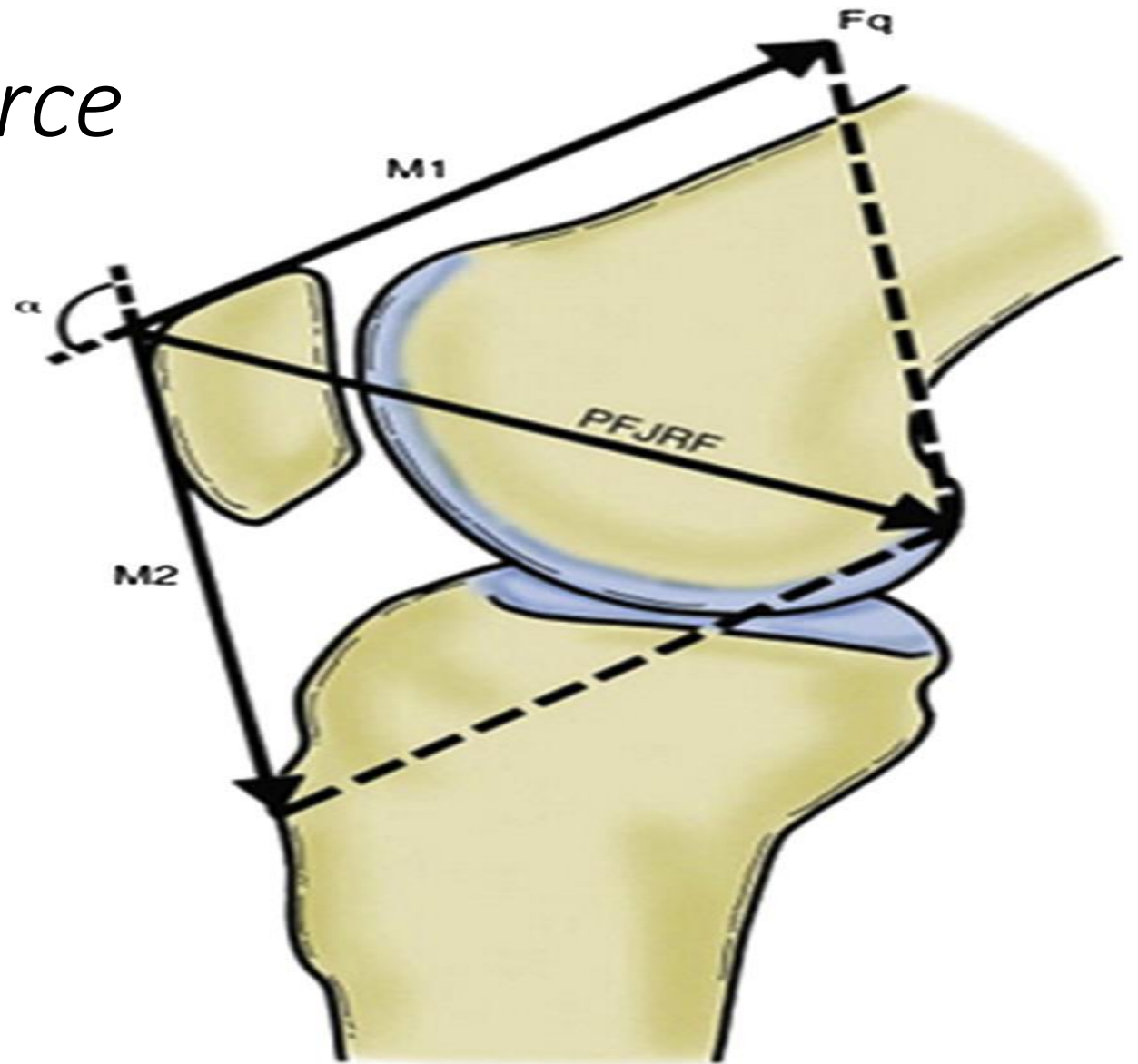


Figure 12-28 Multiplanar patellar path during knee flexion.
(Redrawn from Stanitski CL, DeLee JC, Drez D, editors: Pediatric and adolescent sports medicine, Philadelphia, 1994, WB Saunders, p. 307.)

PF-liigese reaction force -vastujõud



- Newtoni 3. seadus

Kaks keha mõjutavad teineteist jõududega, mis on absoluutväärtuselt võrdsed ja vastassuunalised



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Luuliste stabiliseerivate struktuuride mõõtmine

-Koronaarne ja aksiaalne tasapind

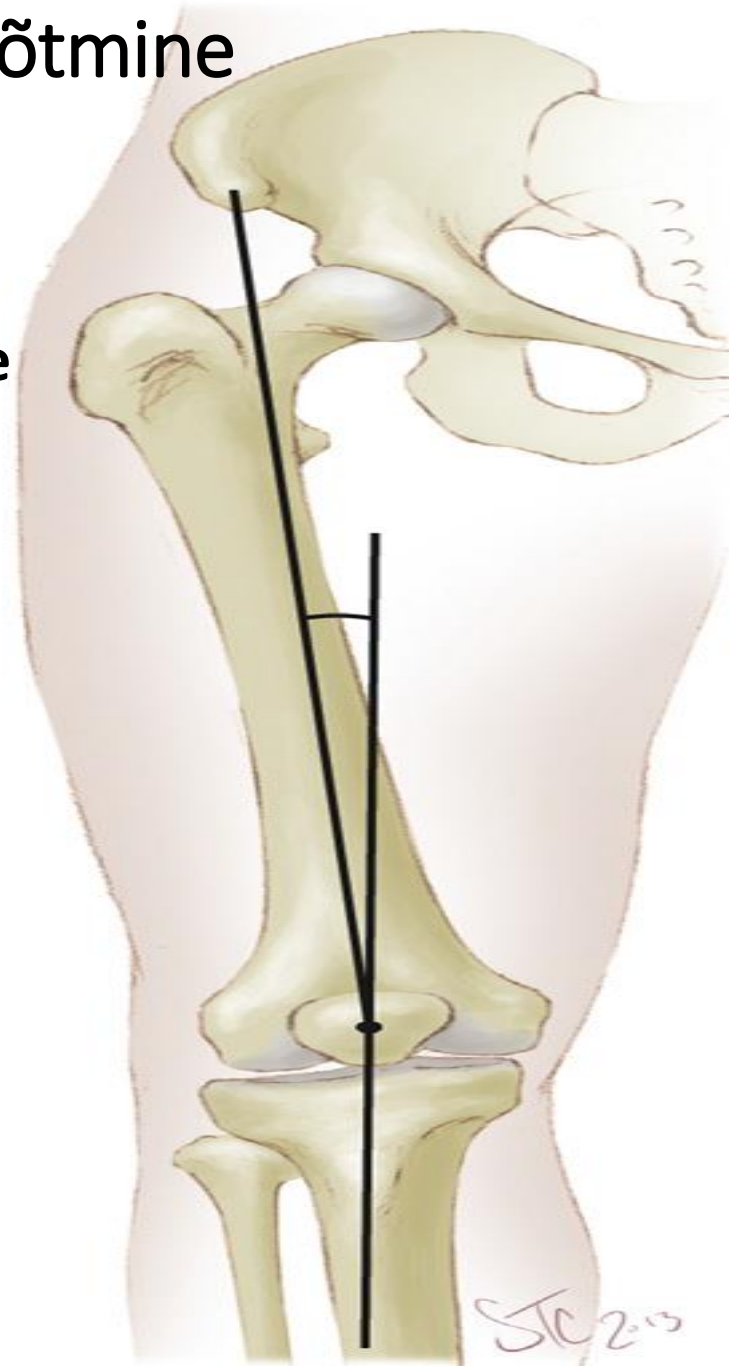
Q-nurga mõõtmine

Q-nurk, keskmiselt:

M 14°

N 17°

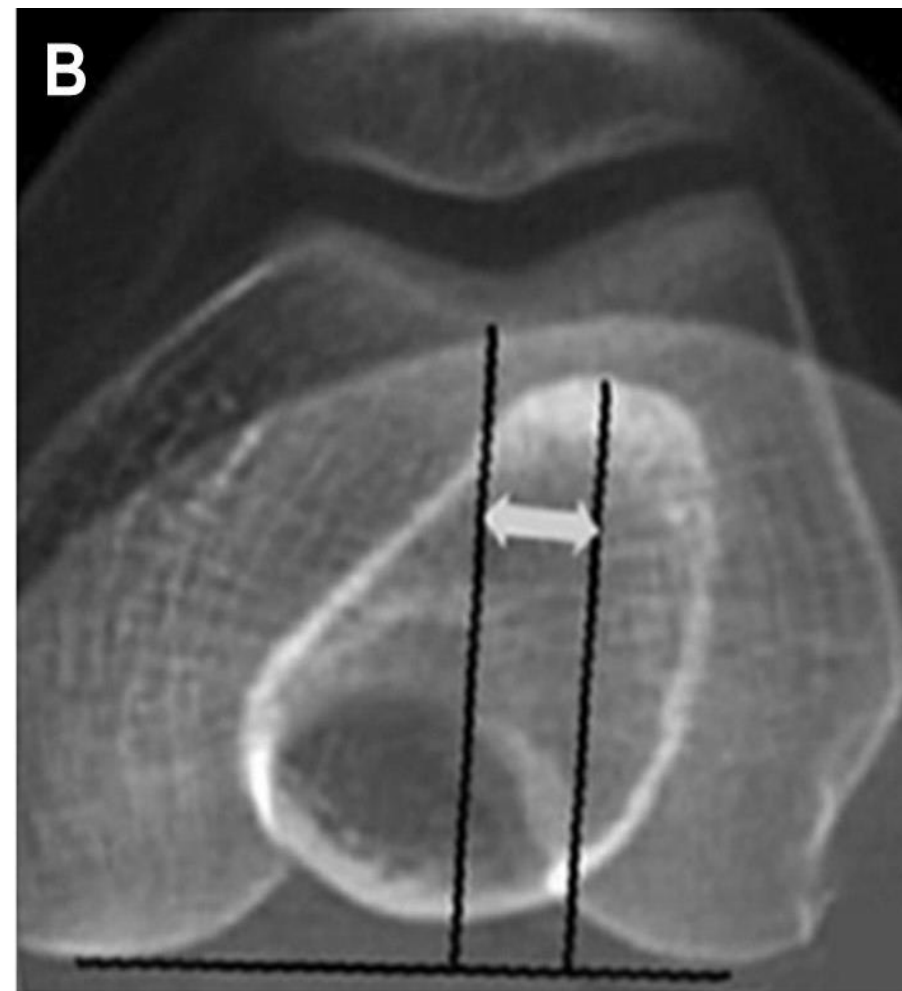
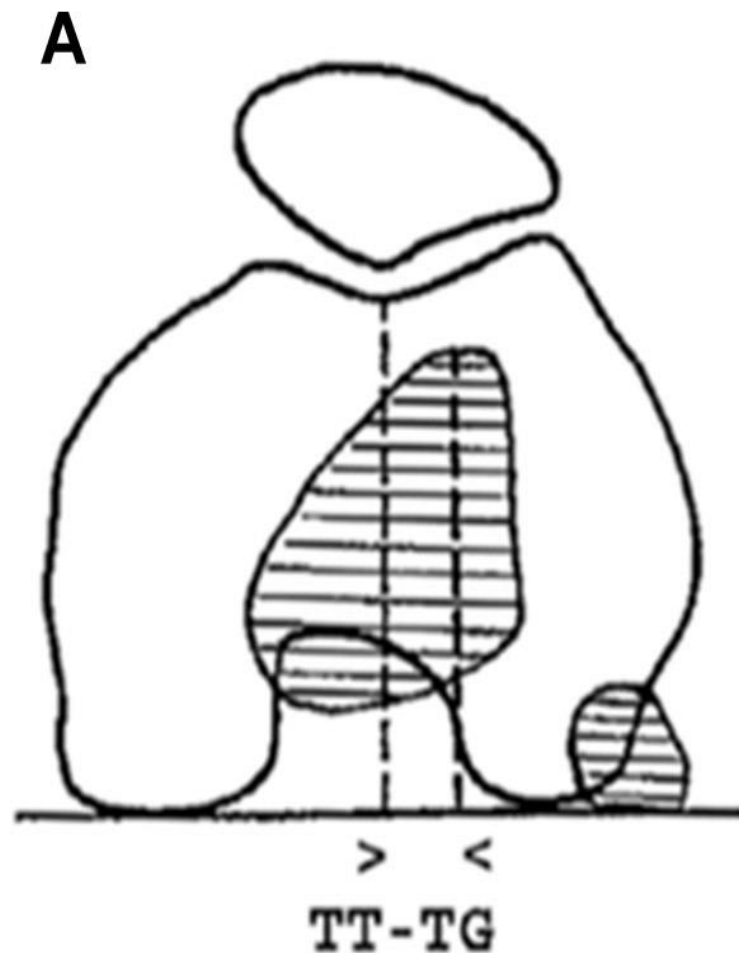
>20 ° patoloogiline



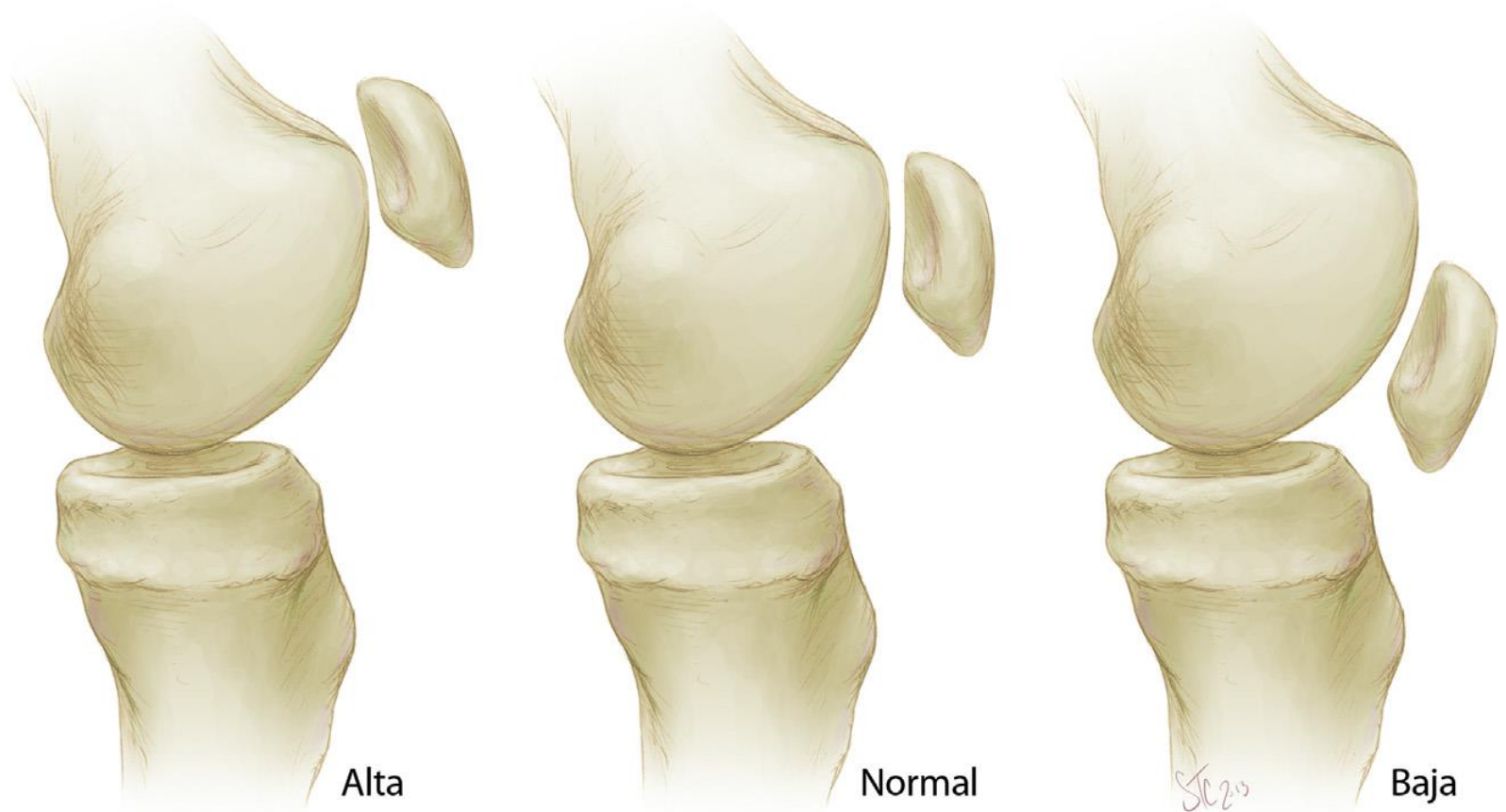
Tibial tuberosity-trochlear groove (TT-TG) distansts

Keskmiselt 10-13 mm

> 15 mm suurenenud
risk patella
ebastabiilsuseks



Luuliste stabiliseerivate struktuuride mõõtmine -sagitaalne tasapind

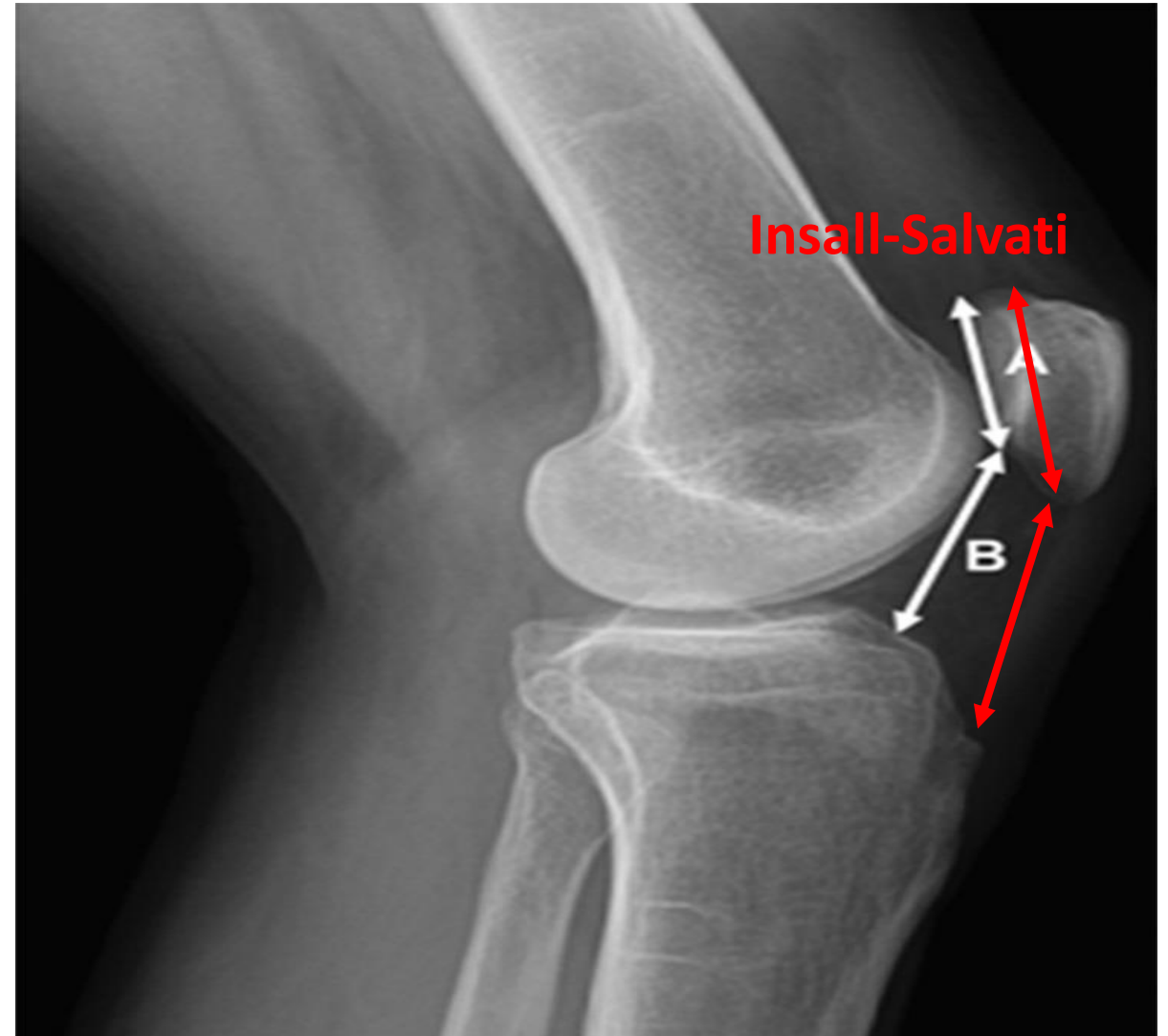


Patella kõrguse hindamine ...

Insall-Salvati, Blackburne-Peel, Caton-Deschamps indeks

- **Caton-Deschamps indeks**

- Ei sõltu fleksioonist
- Normaalne **1**
- Patella alta **>1,3**



Kokkuvõttes:

Normaalseks *PF*-ks liikuvuseks on tarvilik tsentraalne liugumine (*tracking*) normaalses *TG*-s ja igasugune patella kalde puudumine.

PF-maltracking

- Valu
- Ebastabiilsus
- Kõhre patoloogia

Kriitiliselt olulised faktorid:

- VMO hüpoplaasia/nõrkus
- Staatiliste mediaalsete pehmekoeliste stabiliseerivate struktuuride vigastus / puudumine (MPFL)
- Trohlea düsplaasia
- Ebanormaalselt suur Q-nurk ja suurenenud TT-TG (või TT-PCL)
- Patella kalle (tilt) koos pinges lateraalse retinaculumiga
- Patella alta või baja

Kasutatud materjalid

- [Patellofemoral anatomy and biomechanics](#)

Clin Sports Med. 2014 Jul;33(3):389-401. doi: 10.1016/j.csm.2014.03.008.
Epub 2014 May 17. Review

- <http://www.bjj.boneandjoint.org.uk/content/88-B/10/1331.full>
- P.Peltokallio: Tyypilliset Urheiluvammat
- Canale & Beaty: Campbell's Operative Orthopaedics, 11th ed
- <http://radiopaedia.org/articles/patellar-instability>
- <http://radsourc.us/transient-lateral-patellar-dislocation/>
- <http://www.aaronswansonpt.com/basic-biomechanics-moment-arm-torque/>

Tänan!

Anterior Knee Pain

