

# Patho-anatomy of the MPFL. Acute or chronic repair ?

Christos K. Yiannakopoulos, MD, MS, PhD

Head, Orthopaedic Department

IASO General Hospital, Athens, GR

General Secretary

Hellenic Arthroscopic Association

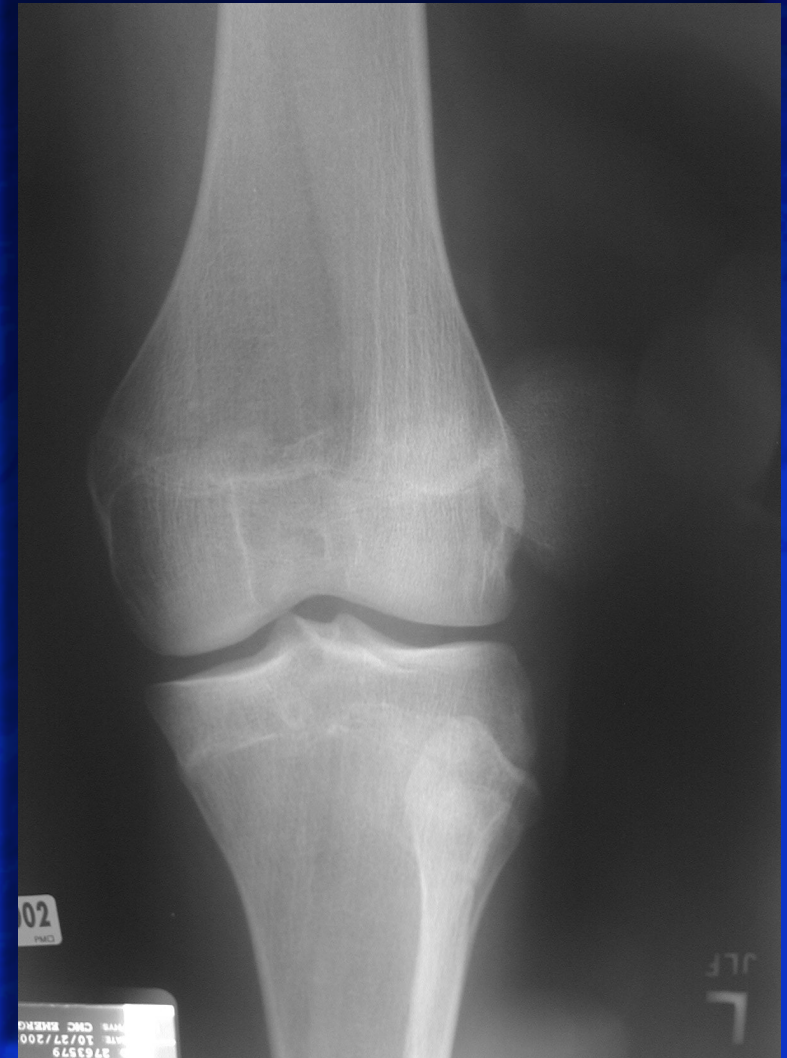


# Declaration of Conflicts of Interest

There are no conflicts of interest  
in relation to this study.

# Acute Patellar Dislocation (APD)

- 2% to 3% of all knee injuries
- the second most common cause of traumatic knee hemarthrosis



# Acute Patellar Dislocation

- Who are these patients
- What happens to them
- What should we do to / for them



## The Typical Patient with Acute Patellar Dislocation



# Acute patellar dislocation Mechanism of Injury

Sports 72%



## The classic mechanism of injury



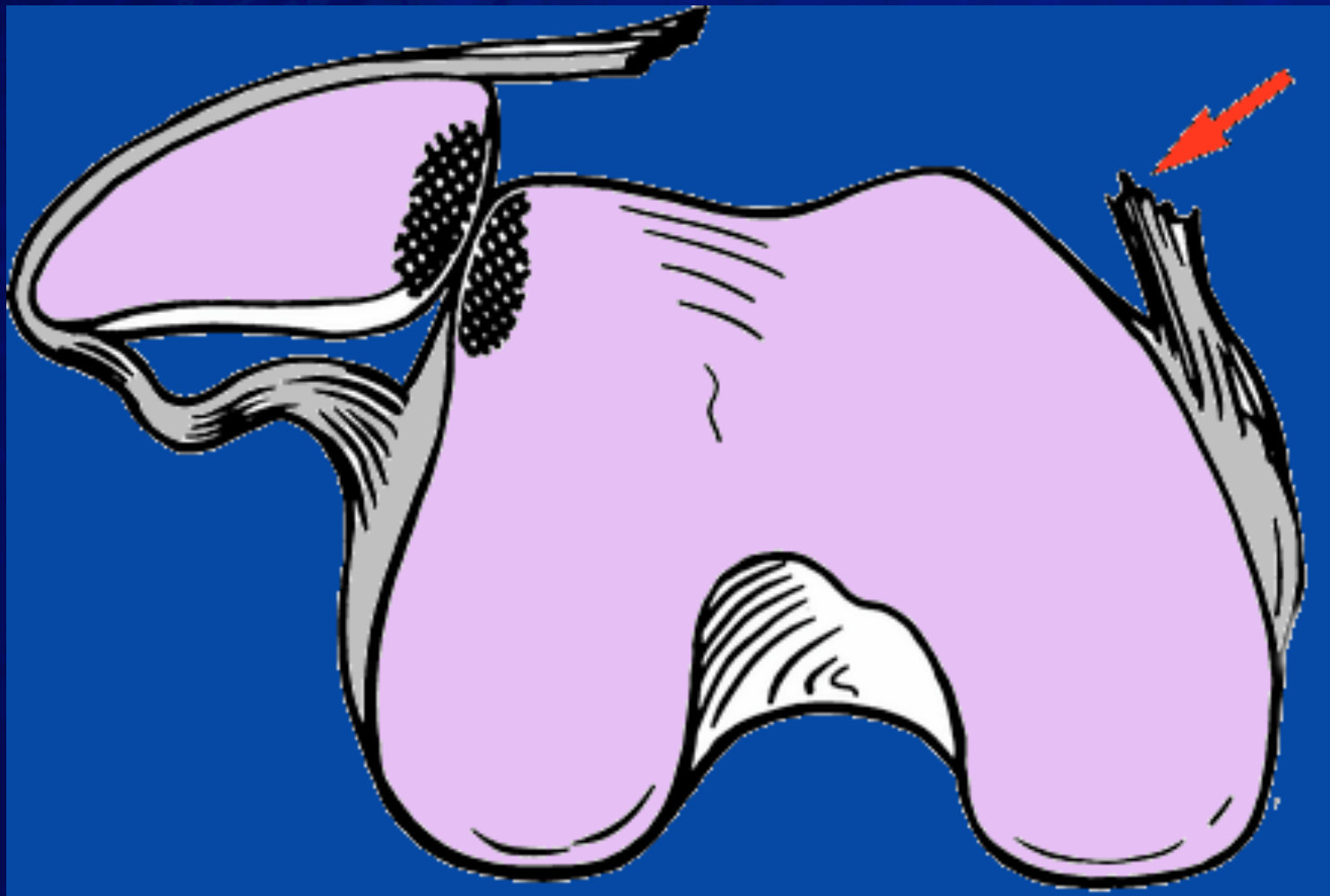
- fixed tibia
- internal femoral rotation
- quadriceps contraction

What happens to the patients with APD?

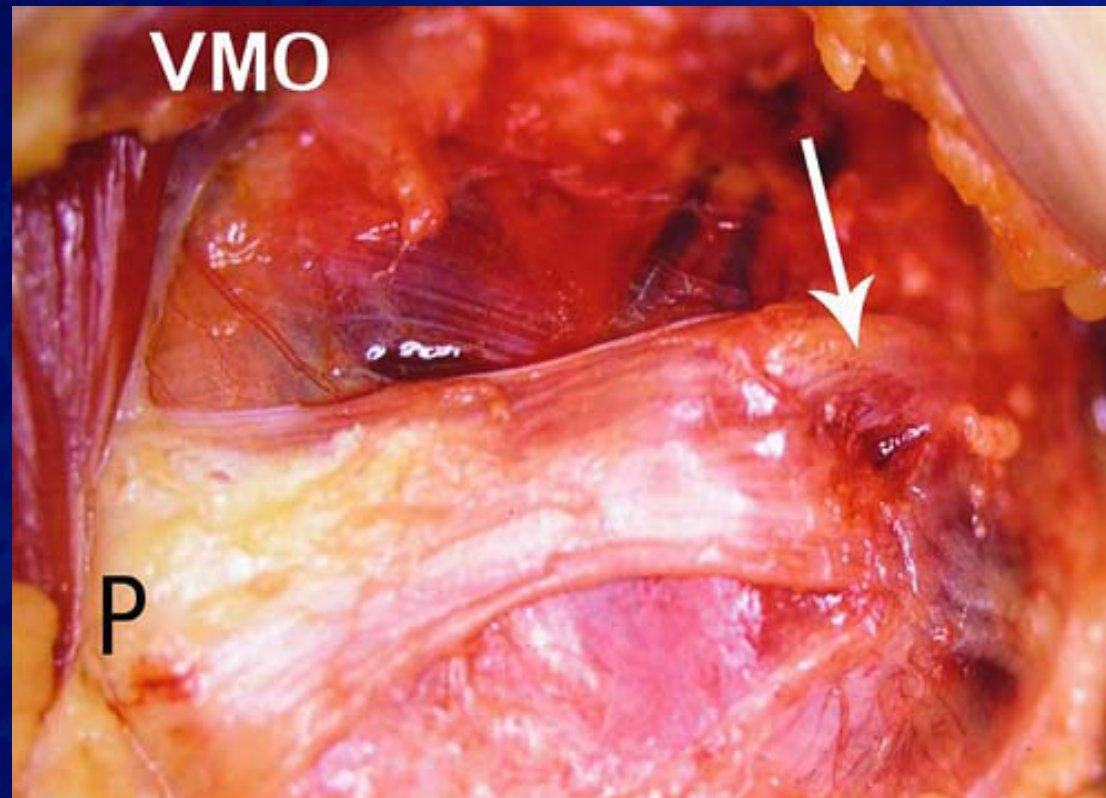




# Acute Primary Lateral Patellar Dislocation



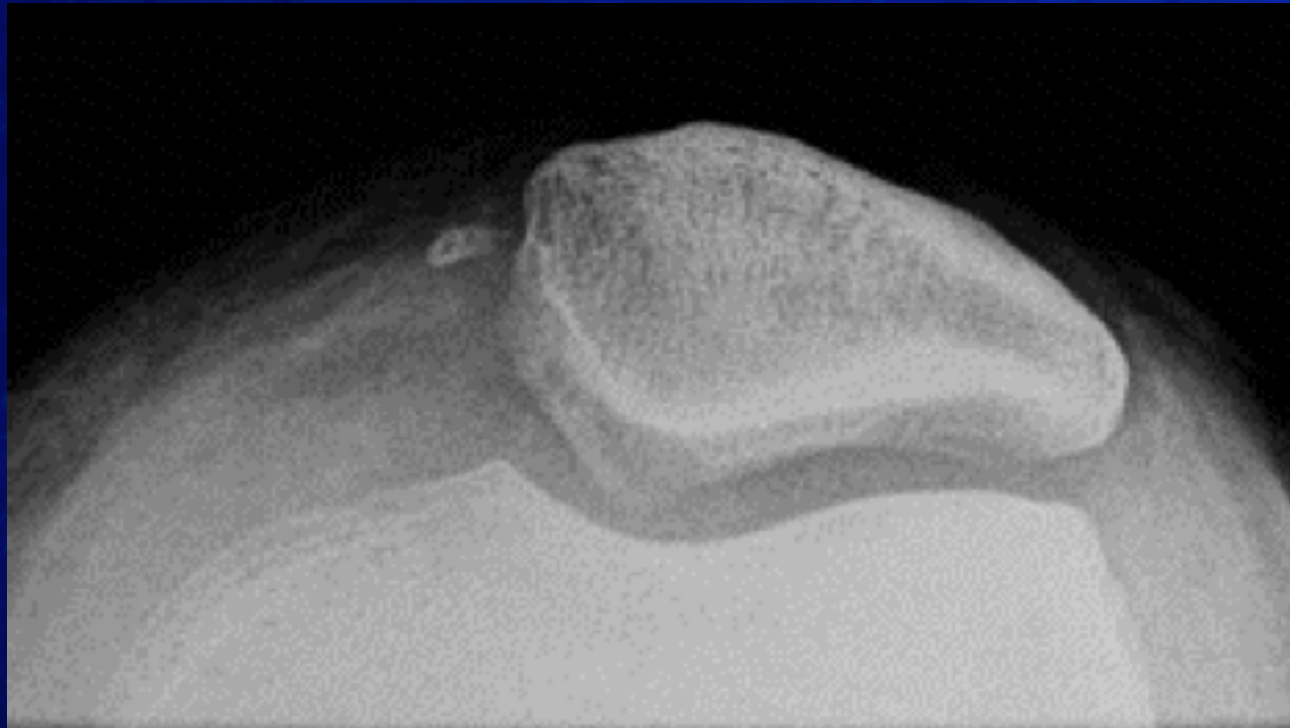
# Acute Primary Lateral Patellar Dislocation



Prevalence of MPFL injury 49%-100%

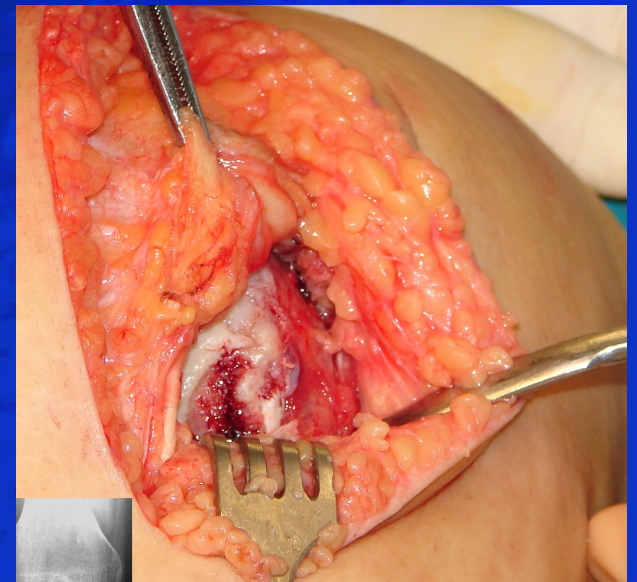
# Acute Patellar Dislocation

small avulsed bone fragment



# Osteochondral # after APD

- 28-39%
- Missed in 30-40%

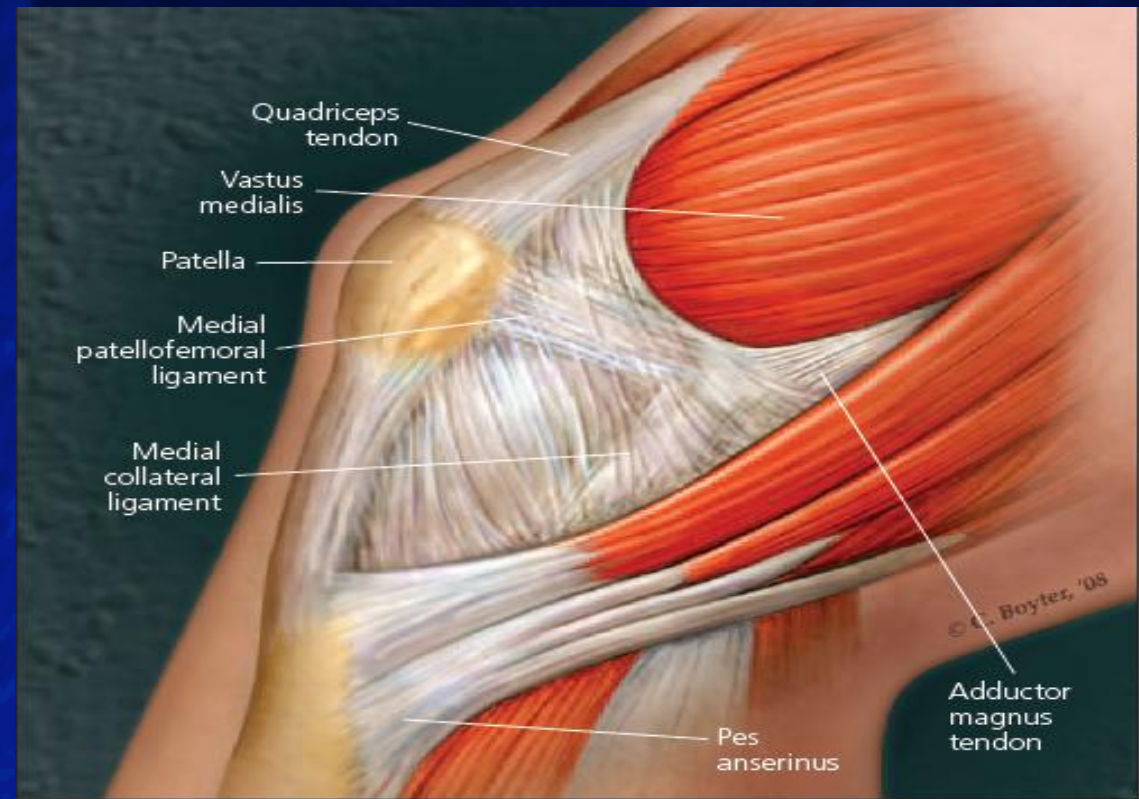


# Bipartite Patella

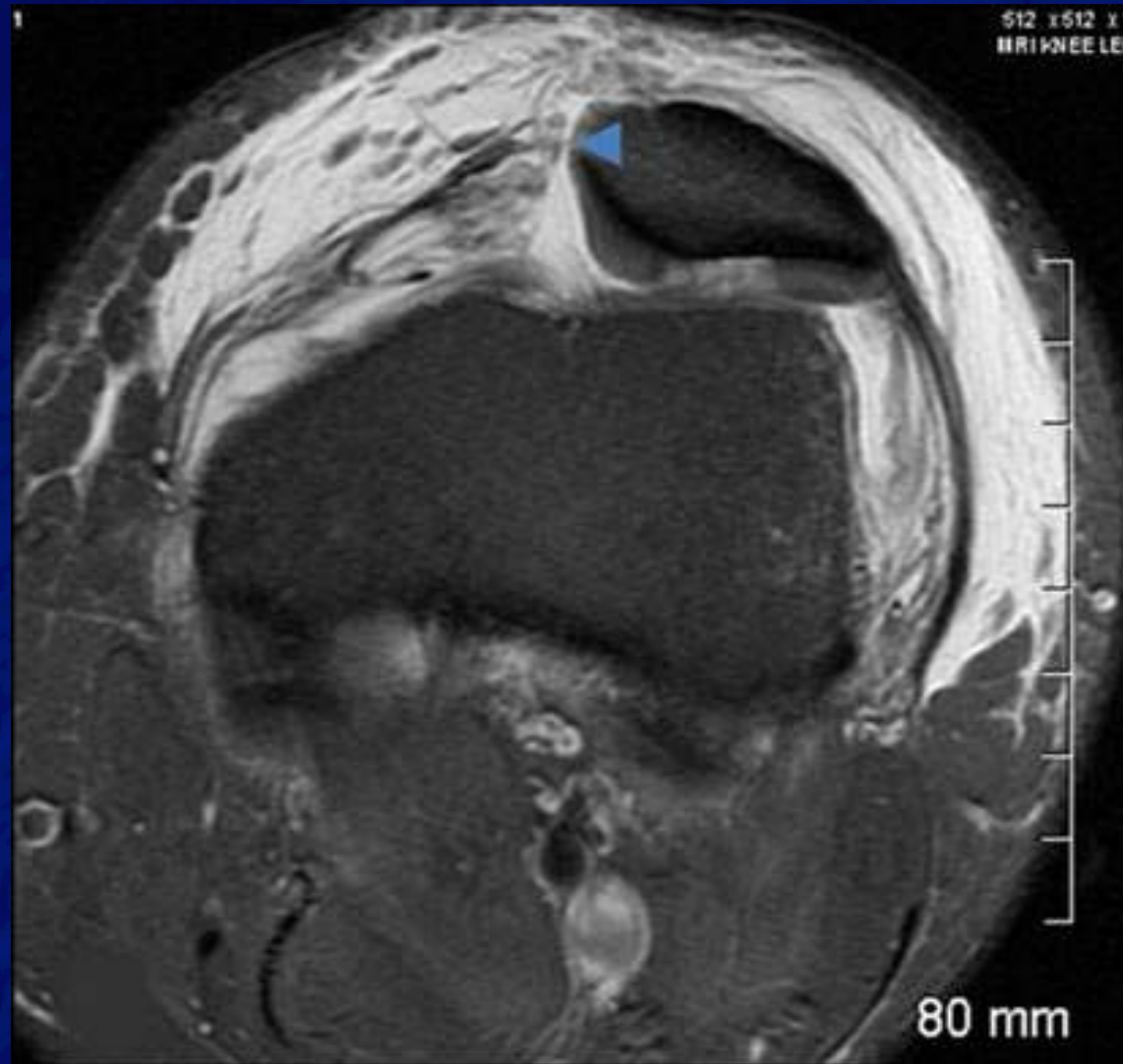


# MPFL Injury Patterns

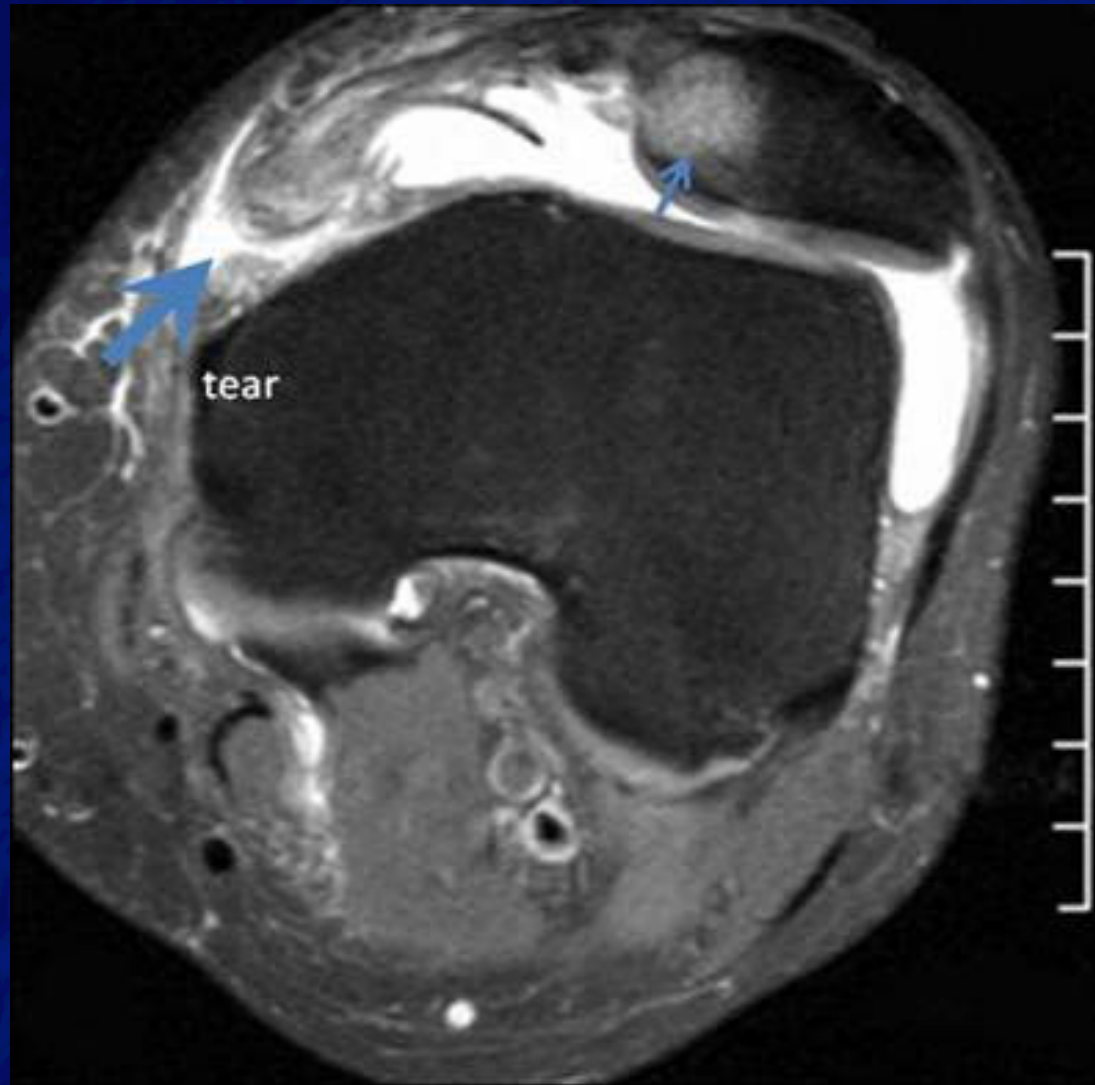
- patellar site 47%
- femoral site 26%
- both sites 13%
- attenuation 13%



# MPFL avulsion at the patella

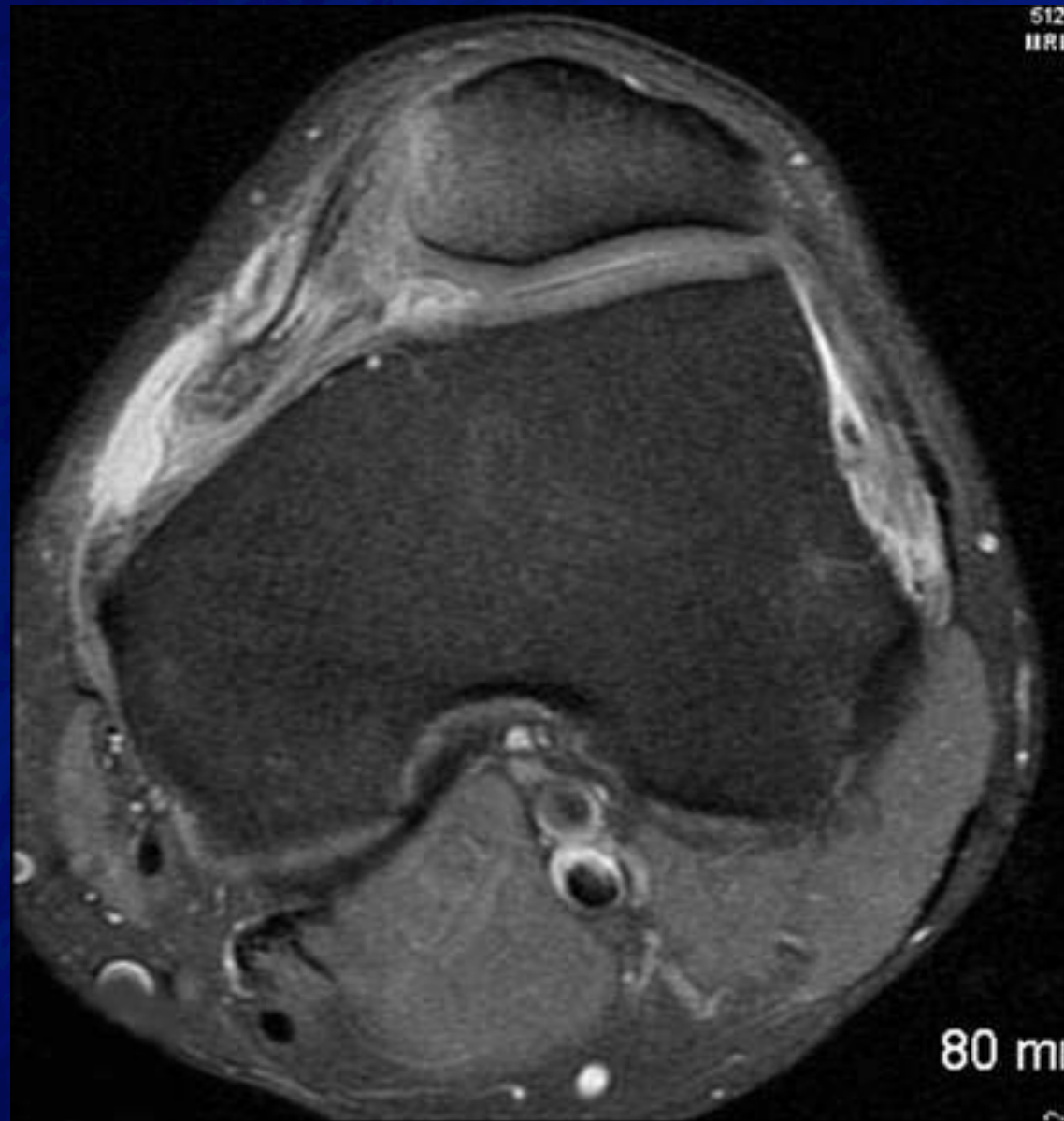


## MPFL avulsion at Adductor Tubercle

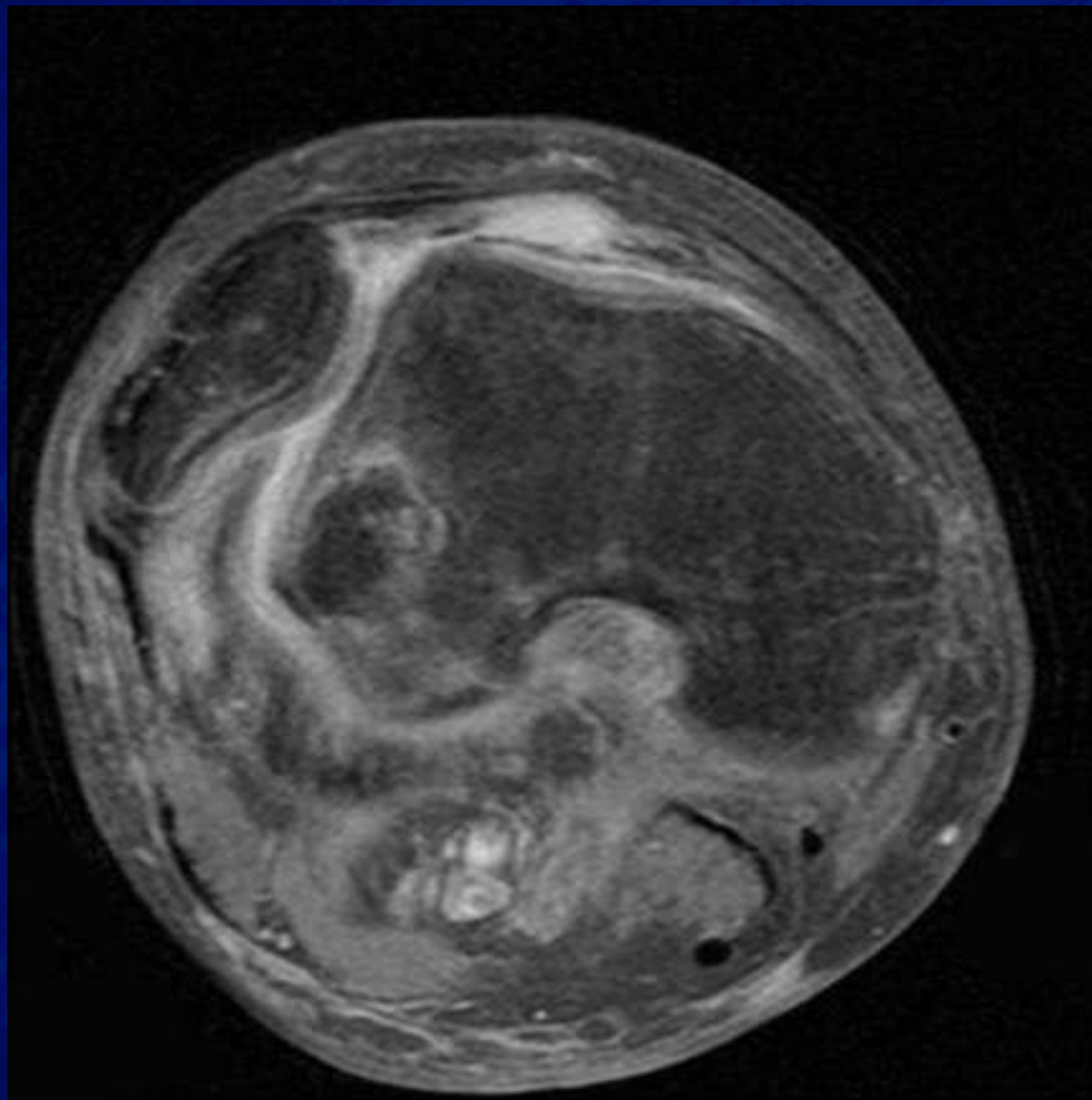




Avulsion of the MPFL at the femoral attachment and a tear at the patellar attachment



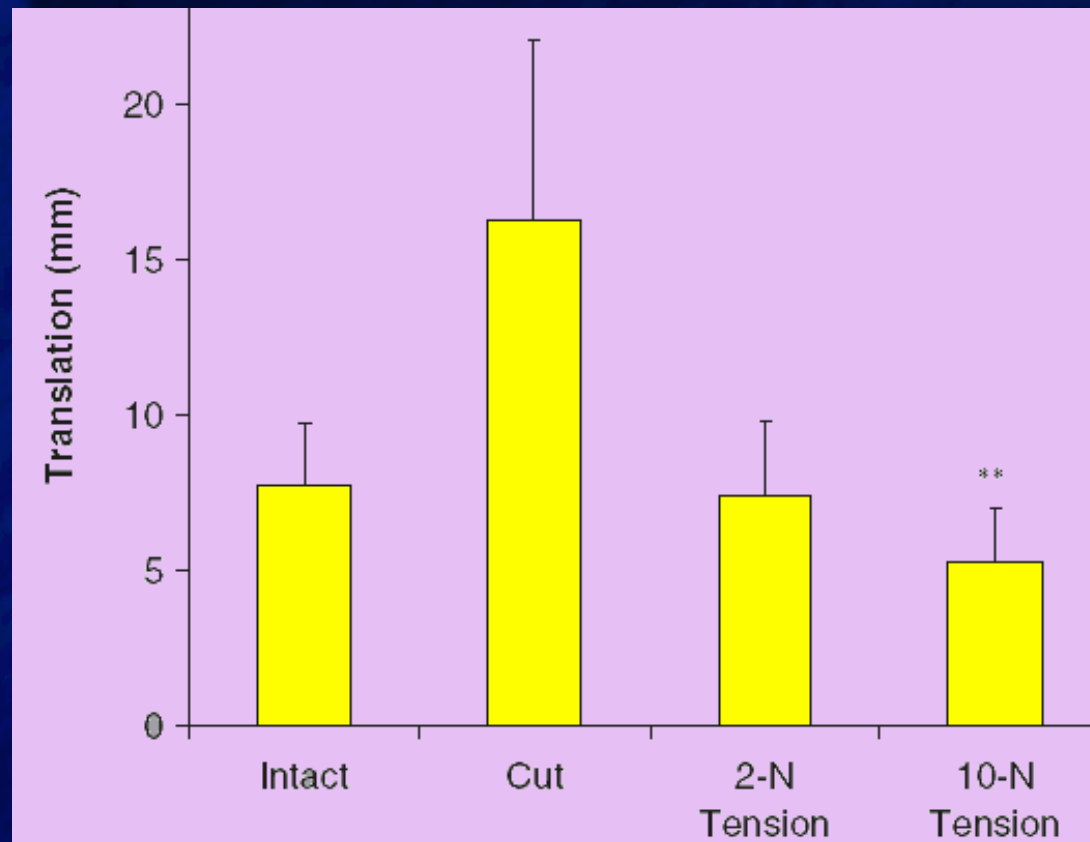
## MPFL attenuation



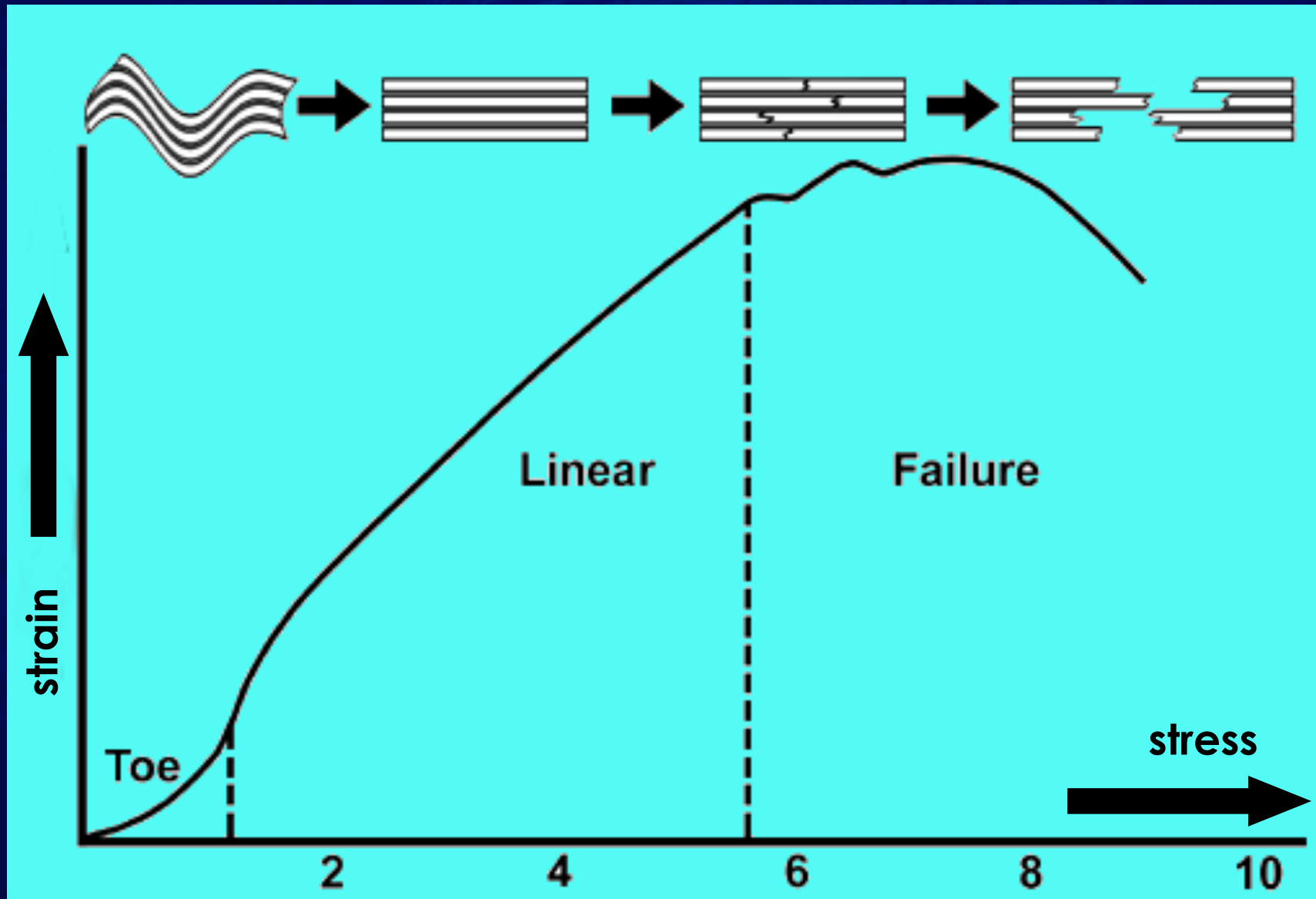
# Injury Biomechanics

# Medial Patellofemoral Ligament (MPFL)

- primary passive soft-tissue restraint to lateral patellar displacement
- provides 50% to 60% restraint at 0° - 30° flexion

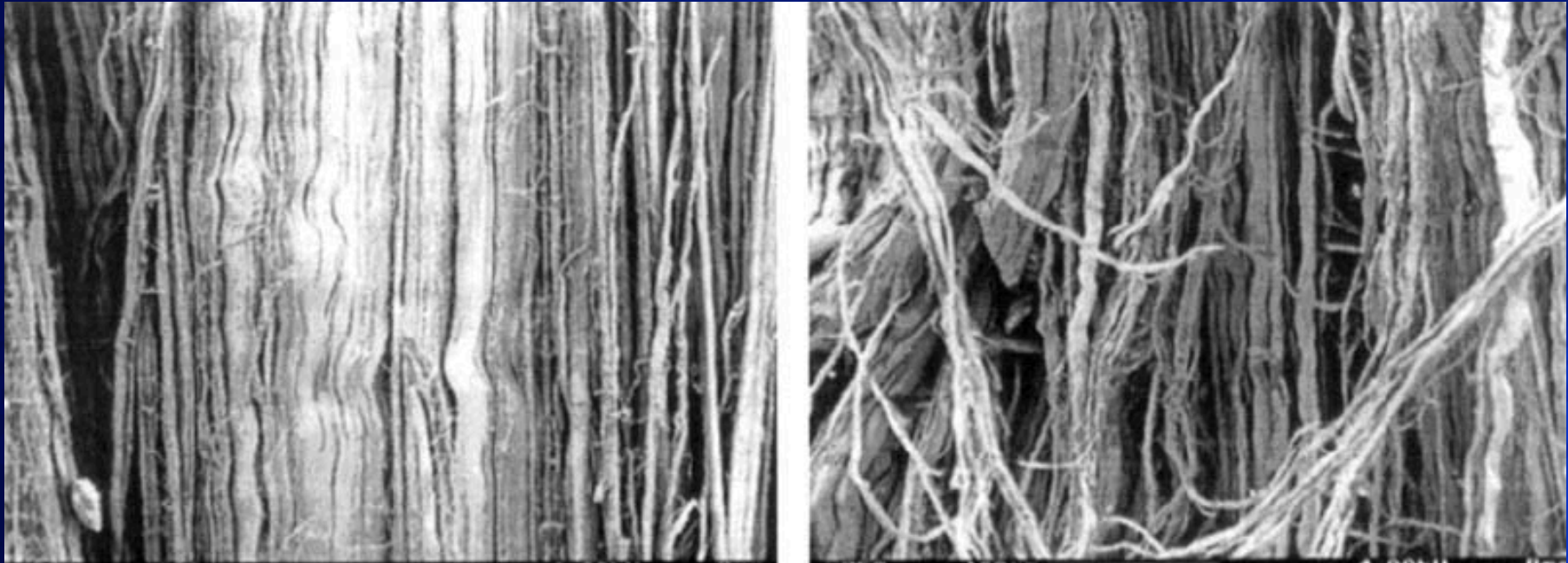


# Structural changes



- tensile strength 208 N
- 25 mm of elongation

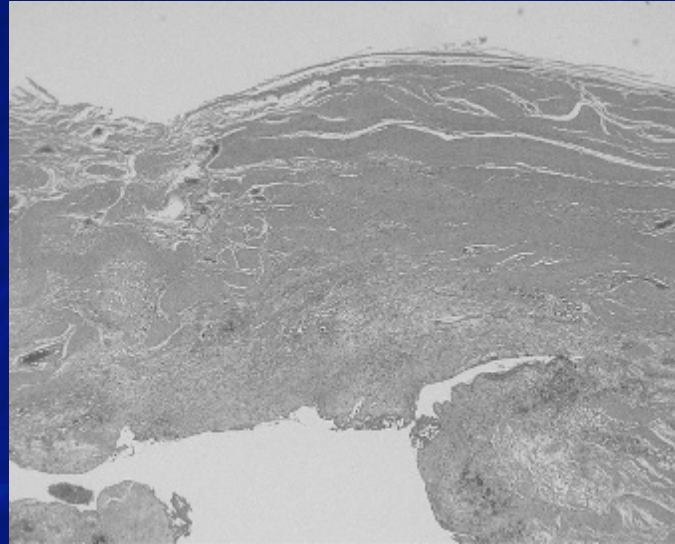
# Subfailure Ligament Injury Collagen fibre morphology



Normal

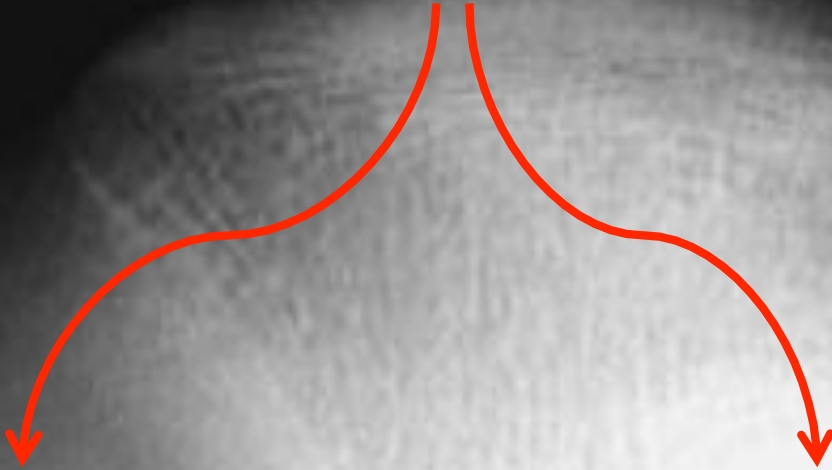
Damaged

# Histological findings of avulsion tear-type MPFL injury in acute patellar dislocation Inoue, J Clin Path, 2005



- Intact superficial layer
- Haemorrhage and granulation tissue formation in the deep layer

# Consequences of acute patellar dislocation



Short-term

Long-term



# Acute Patellar Dislocation

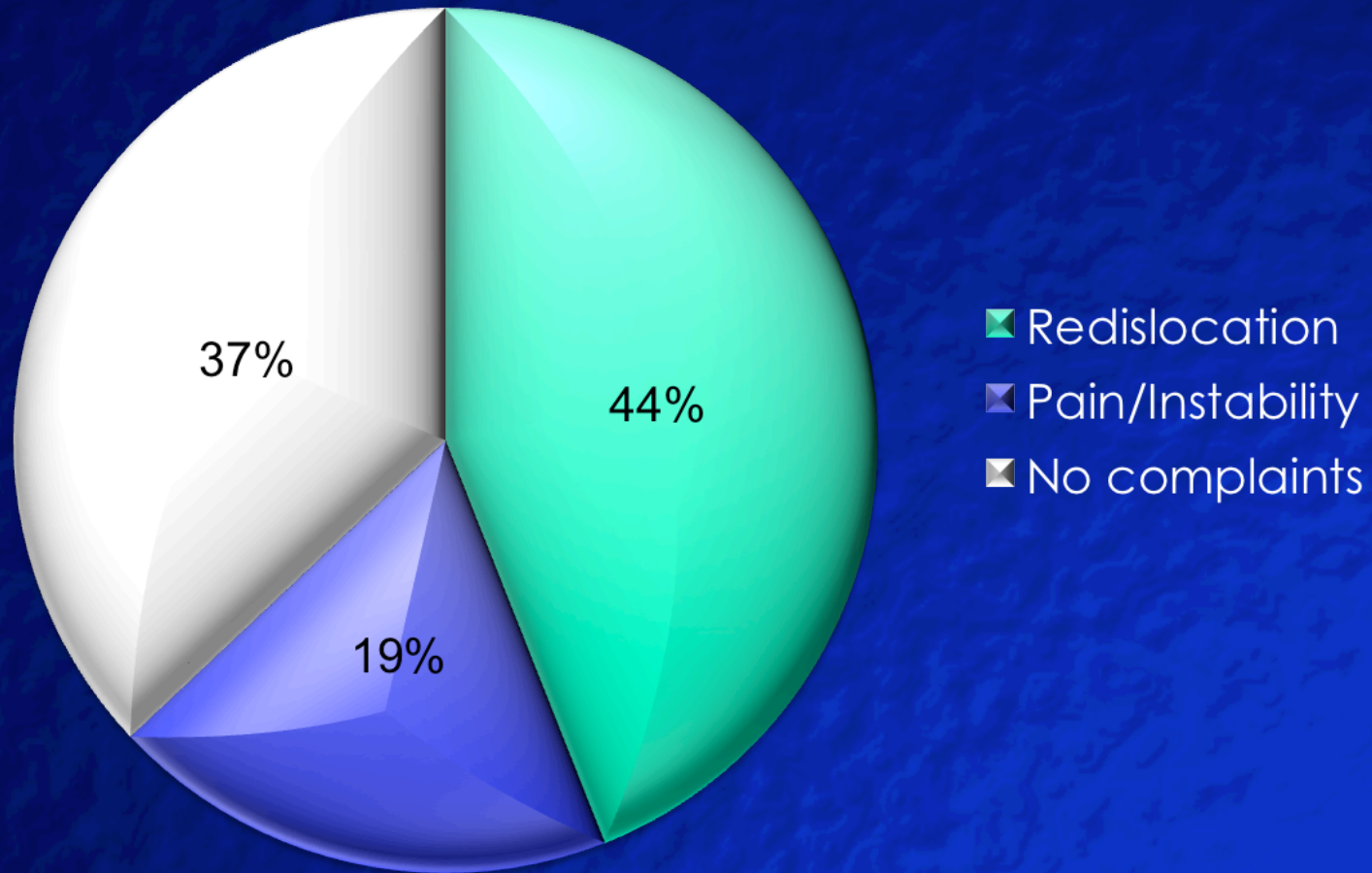
## Short-term Consequences (6 months)

- 74 pts
- Av. Age 19.9 yrs
- Patella alta 50%
- Patella overhang 100%
- Laurin angle 44% (normal 28%)
- Abnl. Sulcus angle 29%

# Acute Patellar Dislocation Short-term Consequences (6 months)

- ROM 6 wks
- Sport participation reduced (kneeling, squatting)
- Limitation in strenuous activities 58%
- Pain 56%
- Limitation in running 42%
- Pain with running 39%

# Outcome following APD



Mäenpää H, Lehto MU. Patellar dislocation. The long-term results of nonoperative management in 100 patients. *Am J Sports Med.* 1997 Mar-Apr;25(2):213-7

# What to / not to do



# Controversies

- Non-operative vs. operative treatment
- Type of Nonoperative treatment
- Type of Operative treatment



7-year-old boy with  
nail-patella syndrome



# Non Surgical Treatment

- redislocation rate of up to 44%
- recurrent instability symptoms > 50%

# Results of APD Surgical Treatment

- recurrent instability in 0% to 30%
- many patients with continued postoperative pain





# Methodological Issues

## Surgical Tx studies

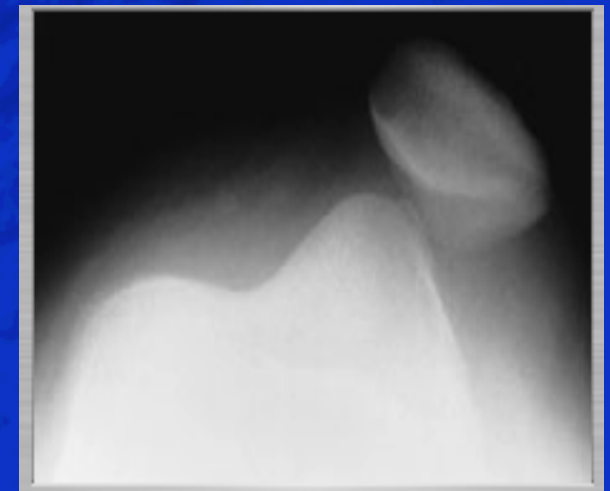
- retrospective
- small group of patients
- limited follow-up

## Non-operative Tx studies

- more often prospective
- longer follow-up
- wide spectrum of PF instability predisposition
- difficulty in truly establishing similar cohorts

# Acute Patella Dislocation General Recommendation

Conservative treatment is favored  
for most patients with APD  
unless there is evidence of a serious  
accompanying injury



# Non-Operative Treatment

- Aspiration with injection of local anesthetic
- Cryotherapy
- Corticosteroid/NSAIDs
- Immobilization – short-term
- Lateral patella stabilizing brace



# Hemarthrosis Aspiration



- Pain relief
- Blood may interfere with ligament healing

# Conservative treatment 1

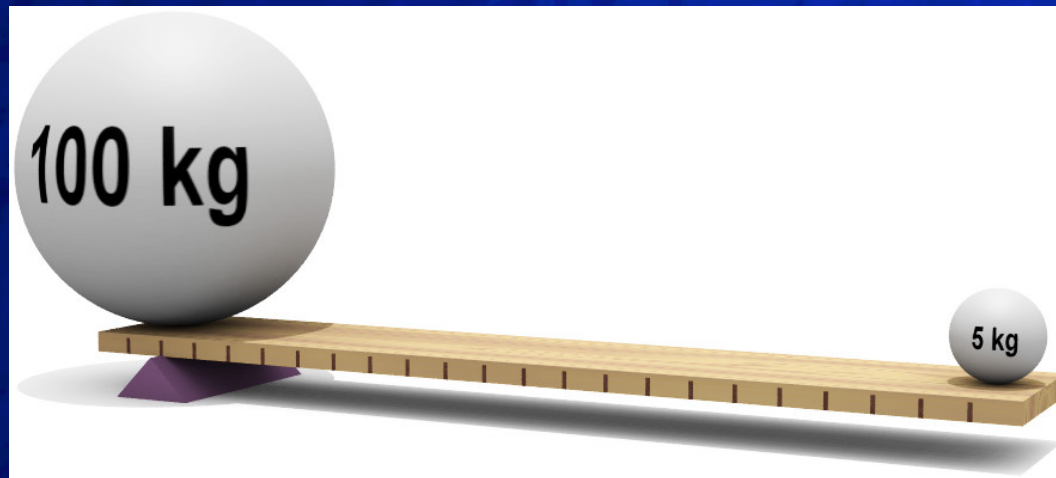
- plaster cast (n=60) vs posterior splint (n=17) vs patellar bandage or brace (n=23)
- av. f-up 13 years
- redislocation/ fup year **0.12 vs 0.08 vs 0.29**
- stiffness with cast
- subjective assessment equal
- operative treatment of redislocations better outcomes than conservative

## Conservative treatment 2

- 59 athletes (69 knees)
- functional rehabilitation program without antecedent immobilization
- min f-up 24 months
- Recurrence rate 26%
- Satisfaction 73%



## Indications for acute surgery after APD



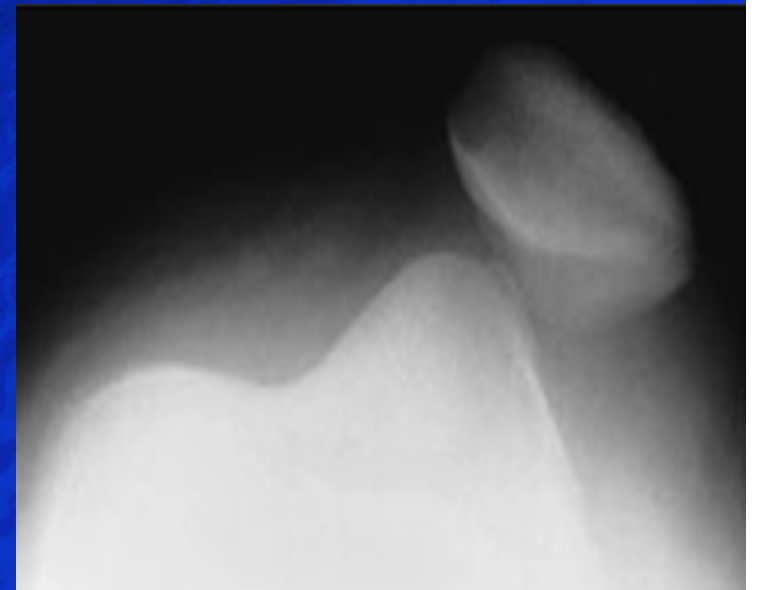
# Indications for Acute Surgery after APD 1

1. chondral injury or osteochondral fracture
2. palpable disruption of the MPFL-VMO-adductor mechanism
3. MRI findings of a large complete avulsion or midsubstance rupture of the MPFL
4. patients with a high level of athletic participation



## Indications for Acute Surgery after APD 2

5. patella subluxation on plain Mercer-Merchant view compared to the other knee
6. patients who fail to improve with nonoperative management



# Patellofemoral Instability Surgical Tx



## Soft tissue

- Lateral release
- VMO advancement
- MPFL reconstruction (acute)
- Galeazzi semiT tenodesis
- Roux Goldthwaite
- Green quadricepsplasty



## Bone

Derotational osteotomies  
Tubercle transfer  
Trochleoplasty  
Microfracture/ACI/MACI

## What doesn't work in Acute Patellar Dislocation

- Repair of medial retinaculum
- Reefing of medial retinaculum
- LRR
- Medial repair or reef/LRR

# Surgical Tx of Acute Patellar Dislocation Study 1

- 127 pts
- 7 year f-up
- 65% women, 70 pts < 16 yrs
- PRCT, closed treatment (57) vs proximal realignment (70)
- 63 pts repair medial retinaculum, 54 LRR, 7 only LRR
- subjective opinion good **81% vs 67%**
- stability **30% vs 36%**
- risk factors for recurrent instability:  
initial contralateral instability and young age

# Surgical Tx of Acute Patellar Dislocation Study 2

- 40 young adults (37 men, 3 women)
- Age 19-22 yrs
- PRCT, medial reefing/Roux vs conservative
- mean f-up 7 yrs
- median Kujala scores **91 vs 90** points
- return to the preinjury level of activity 13 vs 15 pts
- the rate of redislocation for those treated with surgical stabilization was significantly lower

# Surgical Tx of Acute Patellar Dislocation Study 3

- 71 pts < 16 yrs, PRCT
- 14 yrs f-up
- direct repair of the medial structures + LRR if the patella was dislocatable with the patient under anesthesia or LRR if the patella was not dislocatable
- good 75% vs 66%
- recurrence **71% vs 67%**
- Kujala score **84 vs 83**
- contralateral instability 48%
- predictor for recurrence:

family history of patellar instability

positive

# Surgical Tx of Acute Patellar Dislocation Study 4

- 76 consecutive military recruits (72 men, 4 women)
- age range 19-22 at the time of dislocation
- PRCT, arthroscopic medial retinacular repair vs cons. tx
- redislocations **19 vs 23%**
- regained preinjury level **81% vs 56%**
- functional outcomes similar
- PJF DJD no difference

# Surgical Tx of Acute Patellar Dislocation Study 5

- 80 pts
- MPFL direct repair vs conservative treatment
- redislocation rates **17% vs 20%**
- Kujala scores **85 vs 78**
- patella stability subscore was significantly higher in the operative group.
- No difference in Knee Injury and Osteoarthritis Outcome Scores





Horse statues in the new Acropolis Museum