E-POSTER
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Comparison of Operative and Nonoperative Management for First-Time Patella Dislocation

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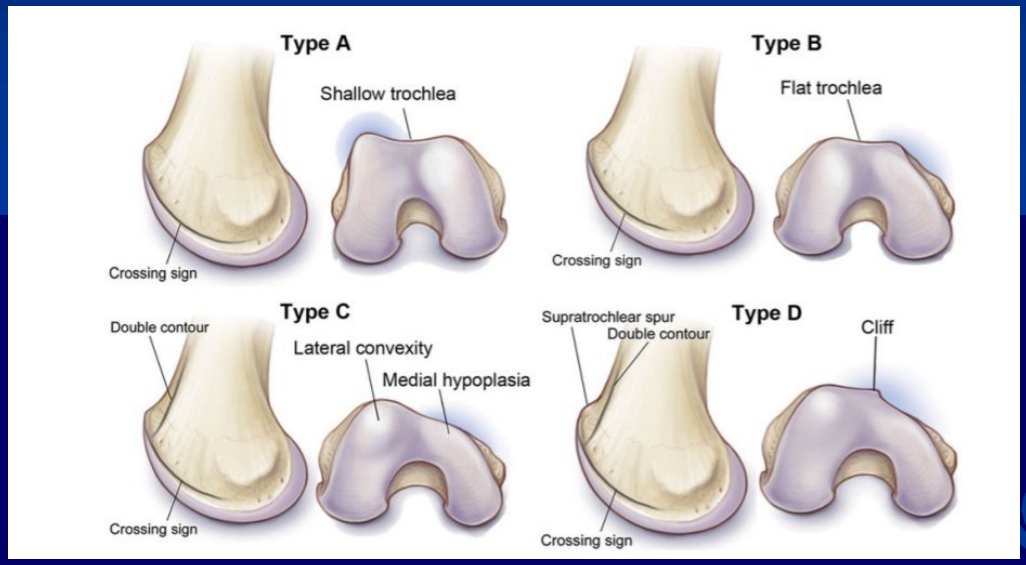
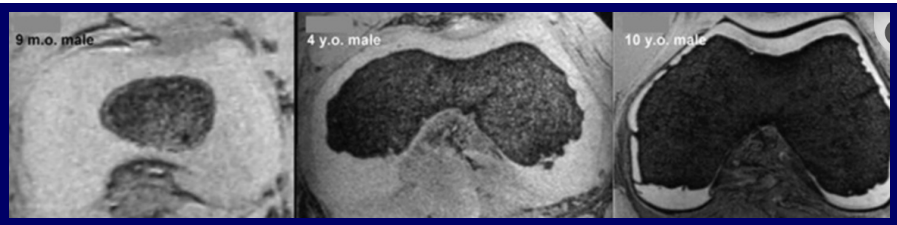
Disclosures

None relevant to this presentation

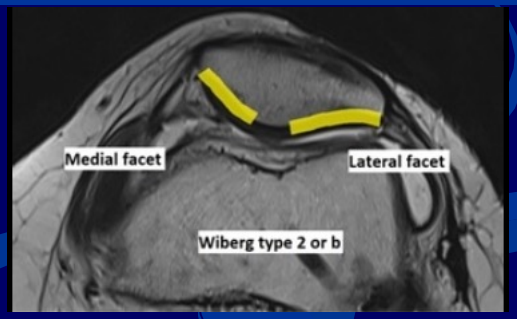
Patellofemoral Instability: Introduction

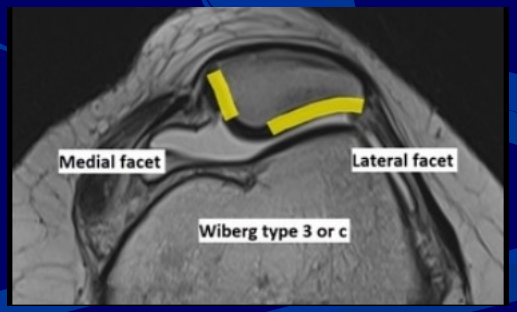
- **Bone Anatomy**





Trochlear dysplasia

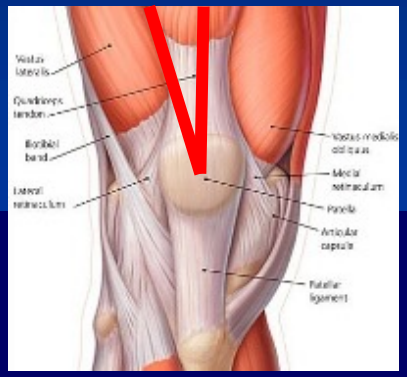




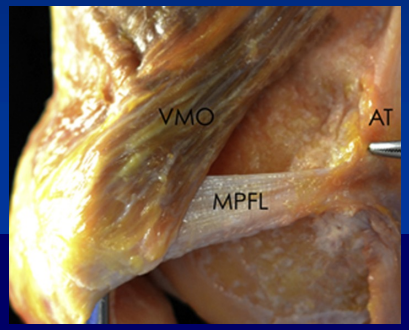
Green 2019
Paschos 2015

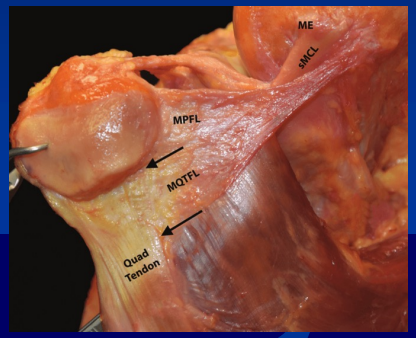
Patellofemoral Instability: Introduction

- **Soft Tissue Anatomy**

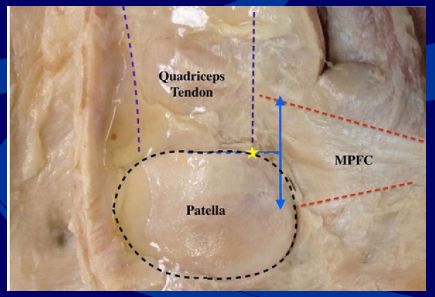


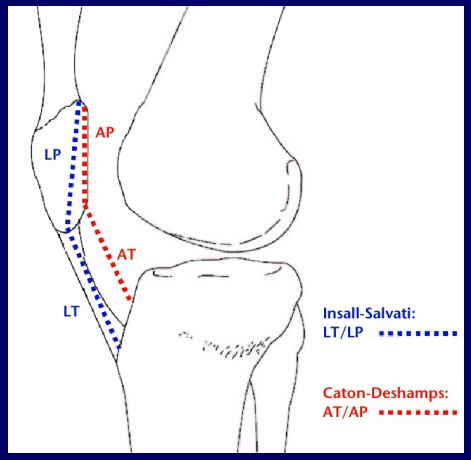
Q angle

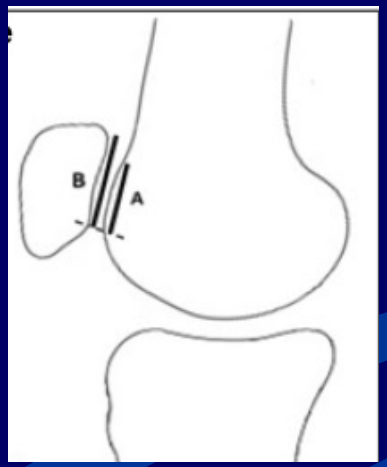




MPFL +MQTFL
MPF complex





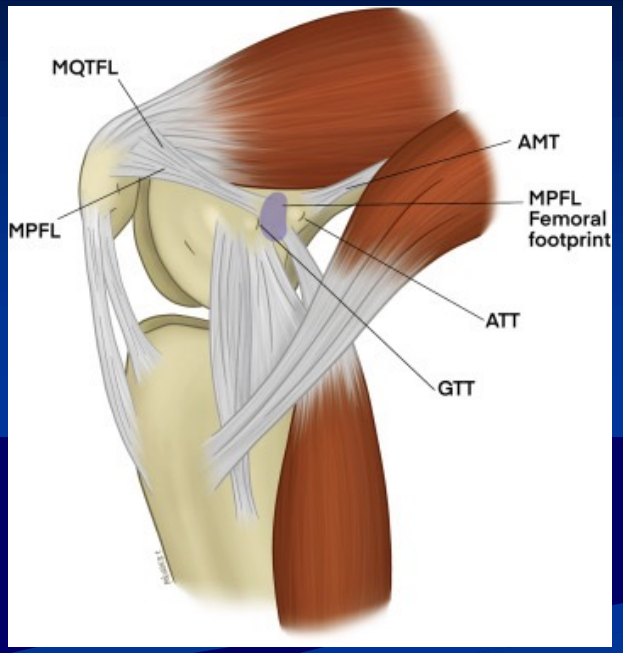


Fulkerson 2013
Tanaka 2018
Paschos 2019
Post 2002

Patellofemoral Instability: Introduction

Constrains of lateral patella translation

- MPF complex (main restrain of lateral translation in knee extension)
  - 50 - 72%
- Trochlear groove (engagement at 20 degrees of knee flexion)
- Medial patellomeniscal ligament
- Medial patellotibial ligament
- VMO Quad – dynamic stabilizer



Soft tissue restraints to lateral patellar translation in the human knee.
Desio SM, et al. Am J Sports Med. 1998. PMID: 9474403

Medial patellotibial ligament and medial patellomeniscal ligament: anatomy, imaging, biomechanics, and clinical review.
Hinckel BB, Gobbi RG, Kaleka CC, Camanho GL, Arendt EA.
Knee Surg Sports Traumatol Arthrosc. 2018 Mar;26(3):685-696. doi: 10.1007/s00167-017-4469-y. Epub 2017

Patellofemoral Instability: Introduction

- **Prevalence**
  - Point prevalence 25% (7-35%)*
  - Adults 23-69/100,000/year
  - Adolescents 143/100,000/year

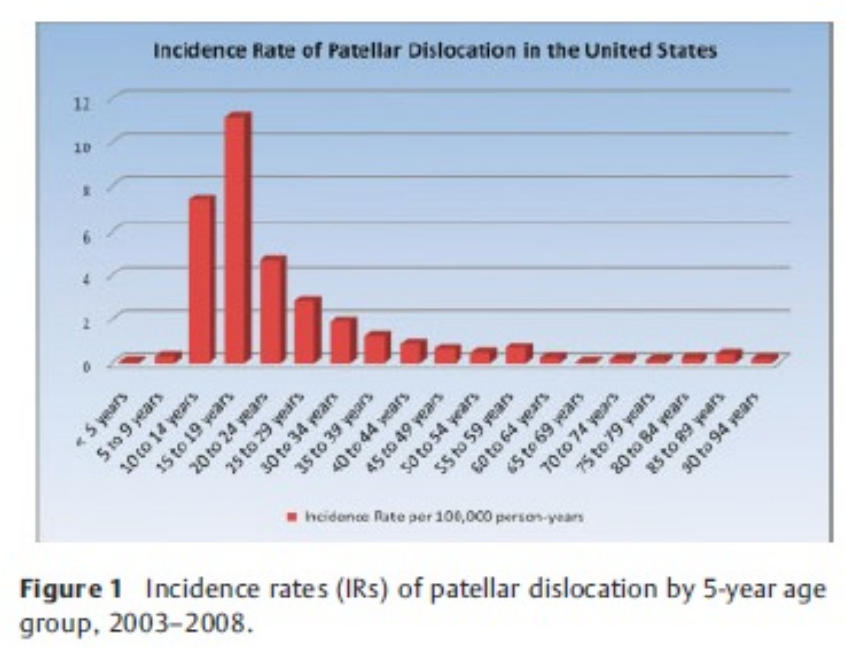


Figure 1 Incidence rates (IRs) of patellar dislocation by 5-year age group, 2003–2008.

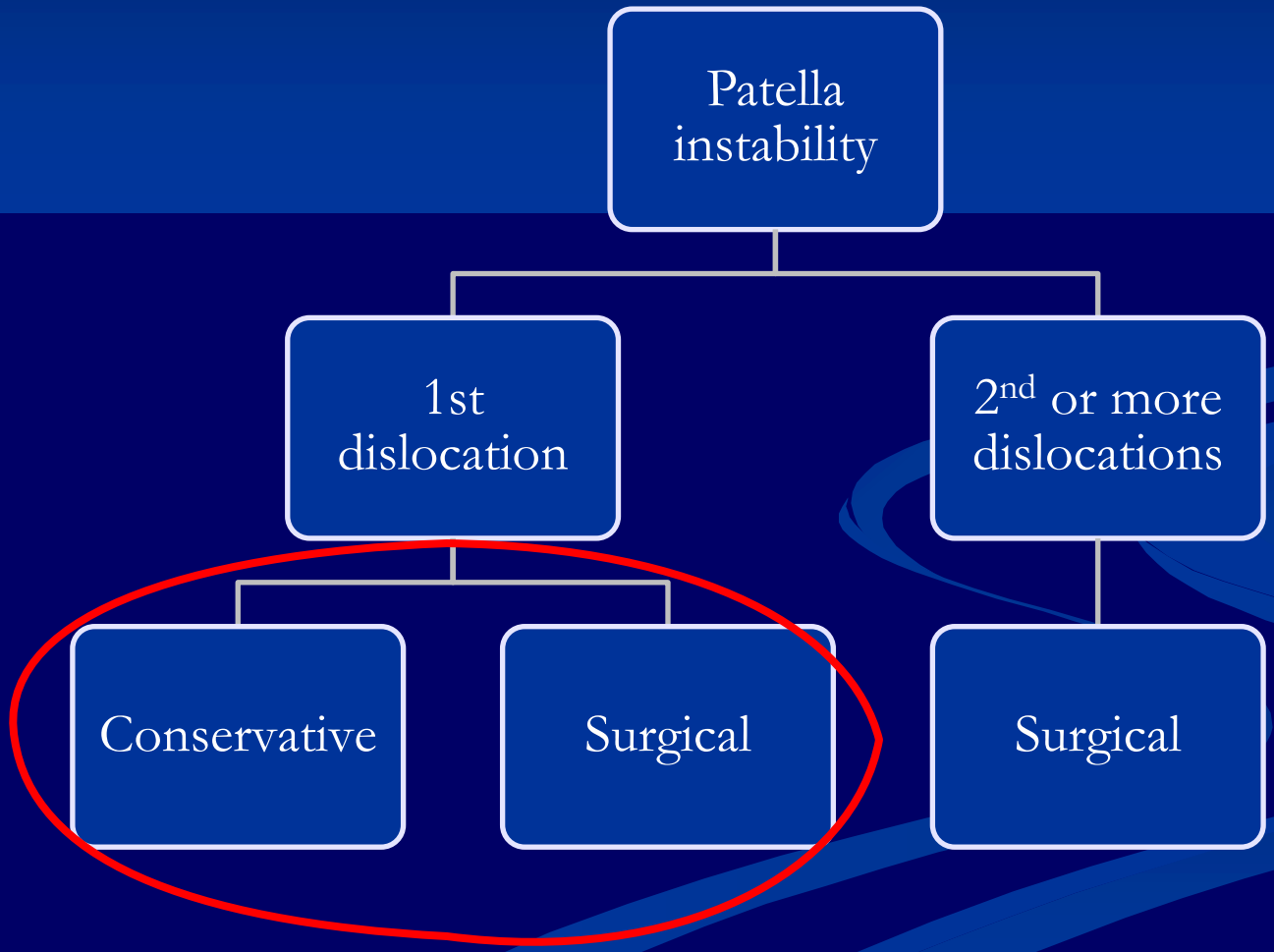
Patellar dislocation in the United States: role of sex, age, race, and athletic participation.

Waterman BR, Belmont PJ Jr, Owens BD.

J Knee Surg. 2012 Mar;25(1):51-7. doi: 10.1055/s-0031-1286199.

Patellofemoral Injuries: Approach

Treatment Algorithm



Aim

Objective

To compare outcomes of operative versus non-operative management for first-time patellofemoral dislocation in pediatric and adolescents.

Methods

Prospective cohort study of consecutive first-time patellofemoral dislocation

Inclusion criteria

- Skeletally immature
- First dislocation event
- Evidence of dislocation was either a witnessed event or imaging findings confirming dislocation

Exclusion criteria

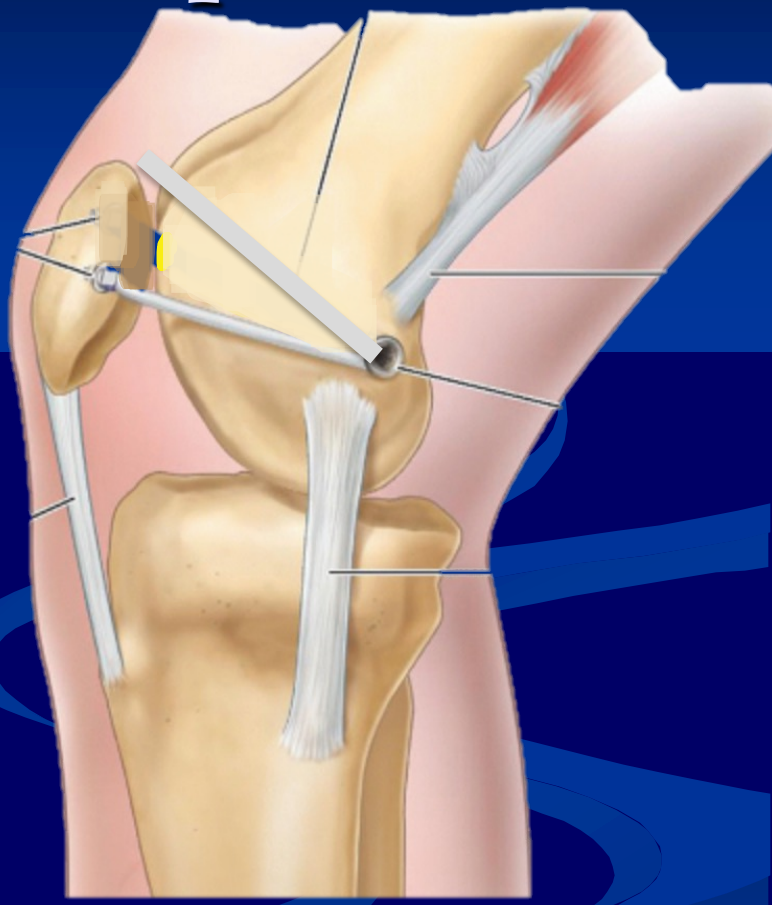
- Prior surgery
- <2 years follow up

Non-Operative management

- Functional bracing with patella support
  - 2-6 weeks
- Organized physical therapy
  - VMO strengthening
  - Hip stability
  - ITB, HS stretching
- Return to sports
  - Minimum 4 months

Operative Technique

MPFL reconstruction – DB hybrid



- Hamstring autograft or allograft
- MPFL - Suture anchor at 60-70 yard line
- MQTFL – fixation on VMO – patella junction

- Rehabilitation
  - WB as tolerated
  - Brace for 4w
  - RTS at >4-5M

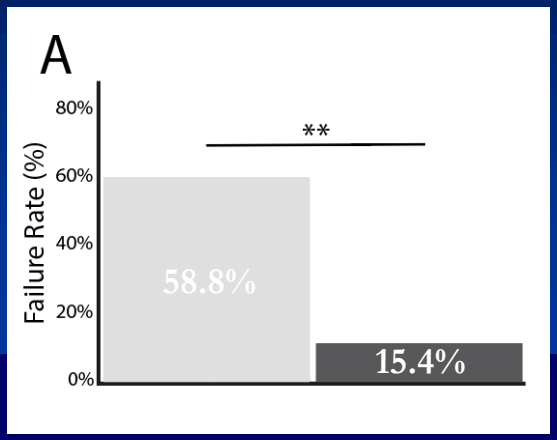
Results

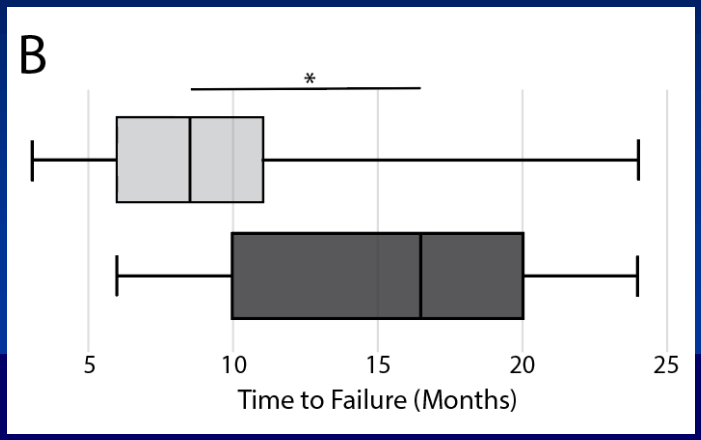
- Mean age was 12.2±2.3
- ♀ : ♂ 99:43
- Mean follow up 3.4 years (2-6 years)
- Most common reasons for surgical management
  - Loose body (45%)
  - Contralateral instability (23%)
  - Family Hx (15%)
  - Activity level (11%)
- No differences in demographics, predictive instability scores, activity level, skeletal maturity, patella alta, trochlear dysplasia incidence

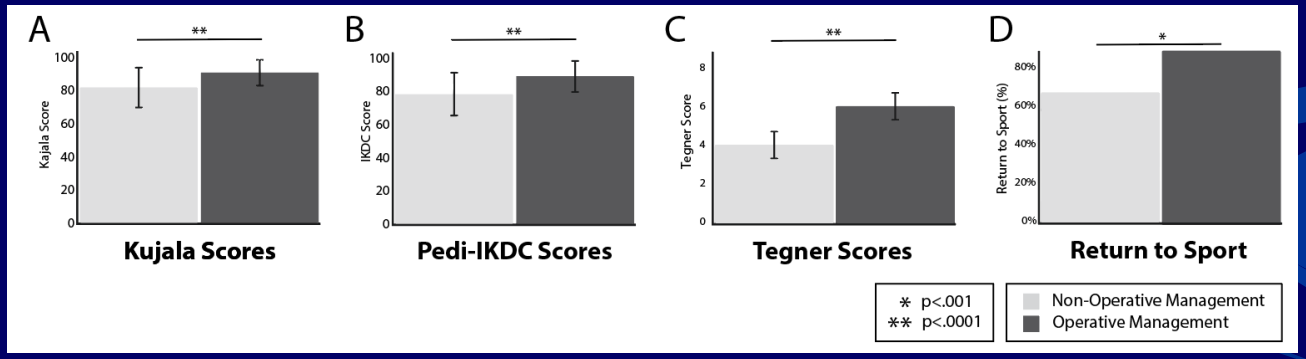
Non - operative
90 patients

52 Operative
patients

Results







- 10 complications in the surgical group (19%)
  - 7 stiffness – only one required OR
  - 2 Quad weakness
  - 1 superficial infection
  - 0 growth disturbances
- 2 complications in the conservative group (2%)
  - 1 contact dermitis from bracing
  - 1 anterior knee pain

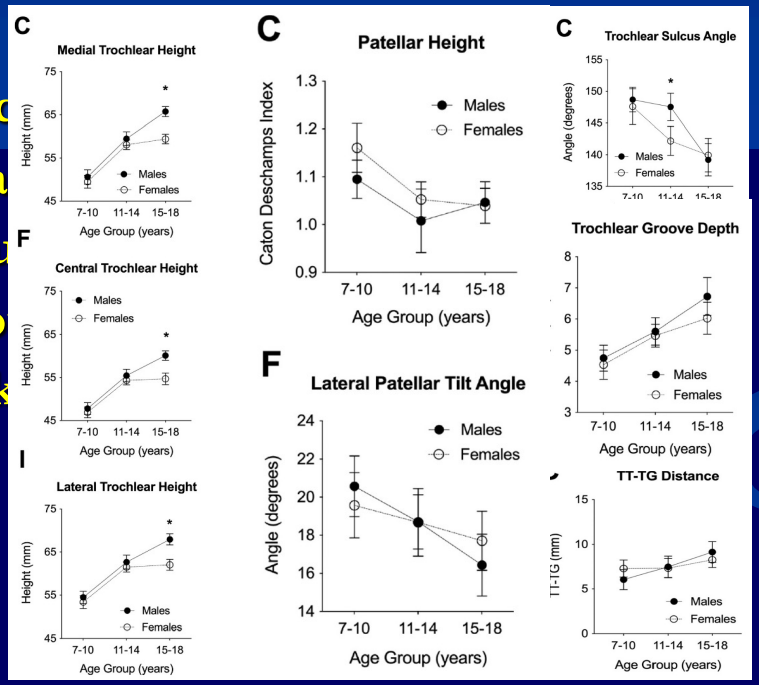
Patellofemoral Instability: Risk Factors

Acute 1st time dislocation

Risk factors –Trying to predict the future

- Trochlear d
- Patella alta
- MPFL insu
- Ligamento
- VMO weak
- Alignment
- TT-TG

ISS score >4



Risk factors	Points
Age (years)	
>16	0
≤16	1
Bilateral instability	
No	0
Yes	1
Trochlear dysplasia	
None	0
Mild	1
Severe	2
Patellar height	
≤1.2	0
>1.2	1
TT–TG (mm)	
<16	0
≥16	1
Patellar tilt (°)	
≤20	0
>20	1
	7

Changes in Anatomic **Risk Factors** for Patellar **Instability** During Skeletal Growth and Maturation.

Pruneski J, O'Mara L, Perrone GS, Kiapour AM.

Am J Sports Med. 2022 Jul;50(9):2424-2432. doi: 10.1177/03635465221102917. Epub 2022 Jun 28.

Jaquith 2017
Pruneski 2022

Significance of our findings

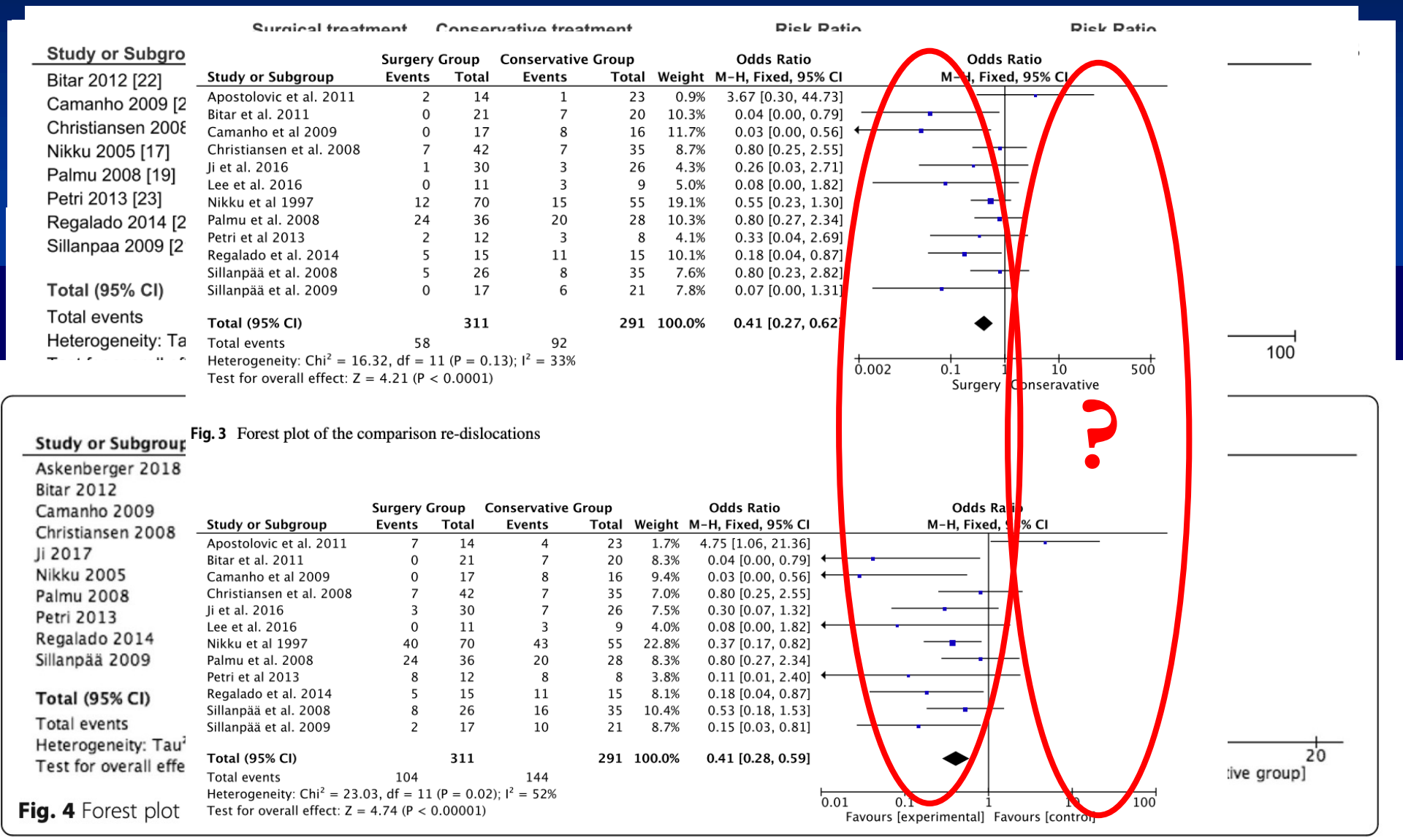
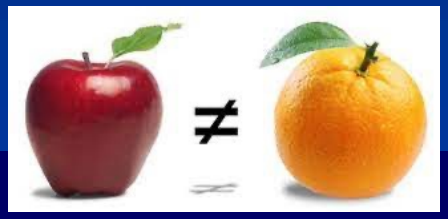


Fig. 3 Forest plot of the comparison re-dislocations

Fig. 4 Forest plot

Patellofemoral Injuries: Treatment

Something does not make sense…



Looking closer…

- **Low level of evidence**
- **Only few of the included studies evaluated MPFL reconstruction**
- **Even fewer studies analyzed data in pediatric only populations**

Significance of our findings

Repair or Reconstruction?

Primary Medial Patellofemoral Ligament **Repair Versus Reconstruction**: Rates and Risk Factors for Instability Recurrence in a Young, Active Patient Population.

Puzzitiello RN, Waterman B, Agarwalla A, Zuke W, Cole BJ, Verma NN, Yanke AB, Forsythe B.

Arthroscopy. 2019 Oct;35(10):2909-2915. doi: 10.1016/j.arthro.2019.05.007.

Results: A total of 76 patients were included, 30 in the MPFL reconstruction cohort and 46 in the MPFL repair or no-treatment cohort. The only difference noted in patient characteristic, radiographic, or surgical variables was a smaller Insall-Salvati ratio in the reconstruction group (1.29 vs 1.42; $P = .011$). Compared with MPFL repair or no treatment, MPFL reconstruction was associated with less recurrent instability (10.0% vs 58.7%; $P < .001$), fewer secondary procedures (6.7% vs 47.8%; $P < .001$), and more frequent return to sports (66.7% vs 39.1%; $P = .003$). No differences in patient-reported outcomes were noted.

Medial Patellofemoral Ligament **Reconstruction** for Adolescents With Acute First-Time Patellar Dislocation With an Associated Loose Body.

Gurusamy P, Pedowitz JM, Carroll AN, Johnson K, Chambers HG, Edmonds EW, Pennock AT.

Am J Sports Med. 2021 Jul;49(8):2159-2164. doi: 10.1177/03635465211013543. Epub 2021 Jun 7.

Results: We identified 51 knees with isolated MPFL surgery (reconstruction in 32 and imbrication and/or repair in 19) at a mean of 59.7 months' follow-up (range, 24-121 months). The overall rate of recurrent dislocations was significantly greater in the repair group (36.9%) versus the reconstruction group (6.3%, P = .01), despite the average CDI being significantly higher in the reconstruction group (1.34 vs 1.23 in repair group, P = .04). No significant difference in the rate of return to baseline activity was found between the groups (77.8% in reconstruction group vs 70% in

Significance of our findings

Acute 1st time dislocation

Table 2 - Risk Score for recurrent dislocations based on previous studies

Study	Risk factors	Number of risk factors	Risk of dislocation (%)
Hevesi *et al.*	Age < 25 years[a]	0–1	0
	Skeletal Immaturity[b]	2–3	30.6
	Dejour A-D dysplasia[b]	4–5	79.2
	TT–TG/PL≥0.5[b]		
Jaquith and Parikh	Trochlear Dysplasia	0	13.8
	History of contralateral dislocation	1	30.1
	Skeletal Immaturity	2	53.6
	CDI > 1.45	3	74.8
		4	88.4
Arendt *et al.*	Skeletal Immaturity	0	7.7
	Sulcus angle ≥ 154	1	22.7
	ISI ≥ 1.3	2	50.9
		3	78.5
Lewallen *et al.*	Age < 25 years	0	8.6
	Patella Alta[c]	1	11.1 - 26.6
	Trochlear Dysplasia[d]	2	29.6 - 60.2
		3	70.4

Conclusions

- Operative management is an effective treatment option for first time patella dislocation , especially when risk factors for recurrence are present
  - lower failure rate
  - higher functional outcome
  - Higher activity level

- Non-operative management remains a reasonable and safe option in low risk patients, but appears to be associated with
  - high failure rate
  - lower functional scores.