



Medial PatelloTibial Ligament Reconstruction in Pediatric and Adolescent Patients with Patella Dislocation in Flexion

Olivia C. Tracey, BS

Joshua T. Bram, MD

Emilie Lijesen, BS

Akshitha Adhiyaman, BS

Ruth H. Jones, BS

Shae K. Simpson, BS

Ryann Davie, MD

Yasir Alabdulkarim, MD

Daniel W. Green, MD

Hospital for Special Surgery, New York, NY, USA



Disclosures

Presenting author: Dr. Daniel Green

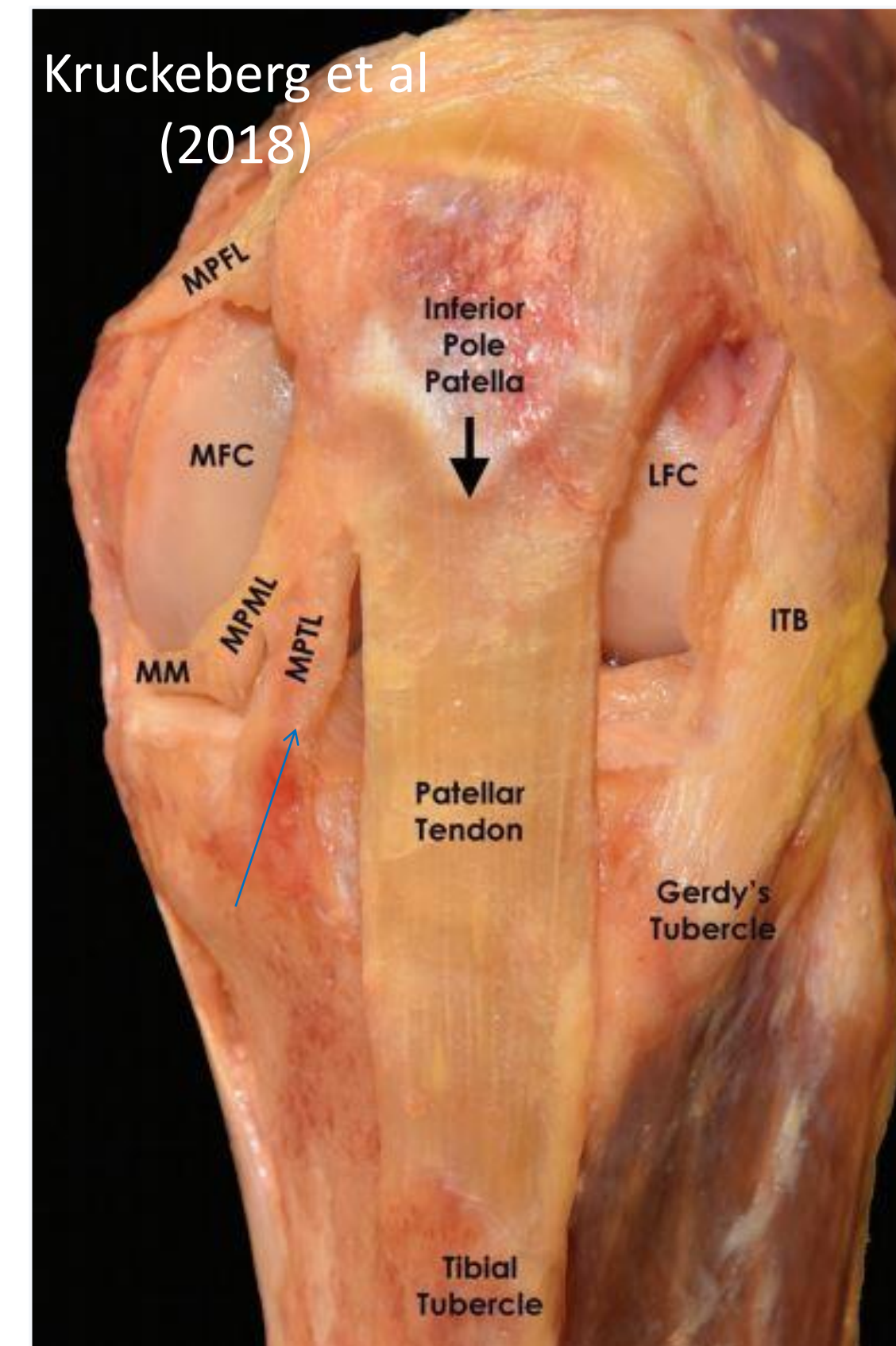
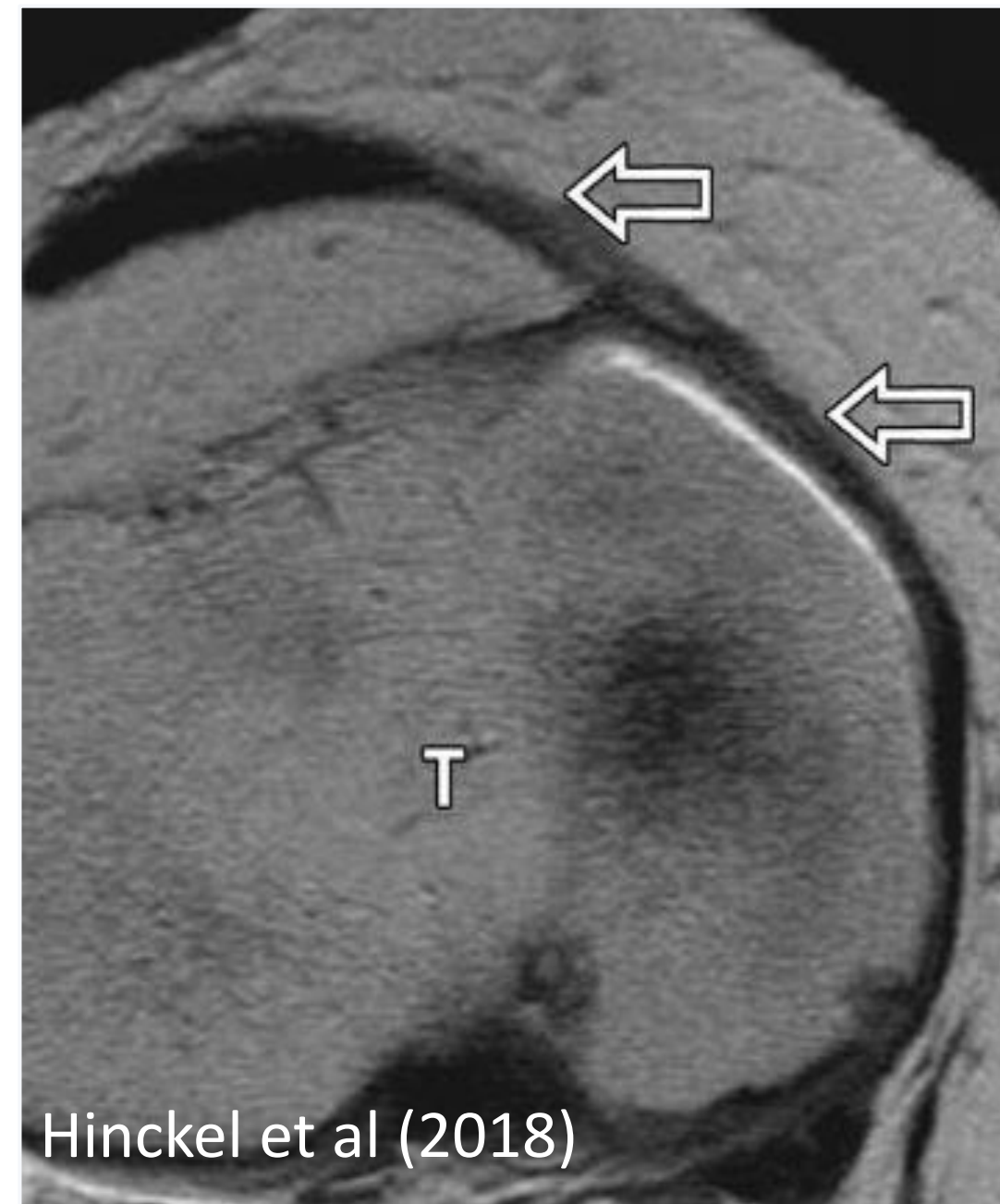
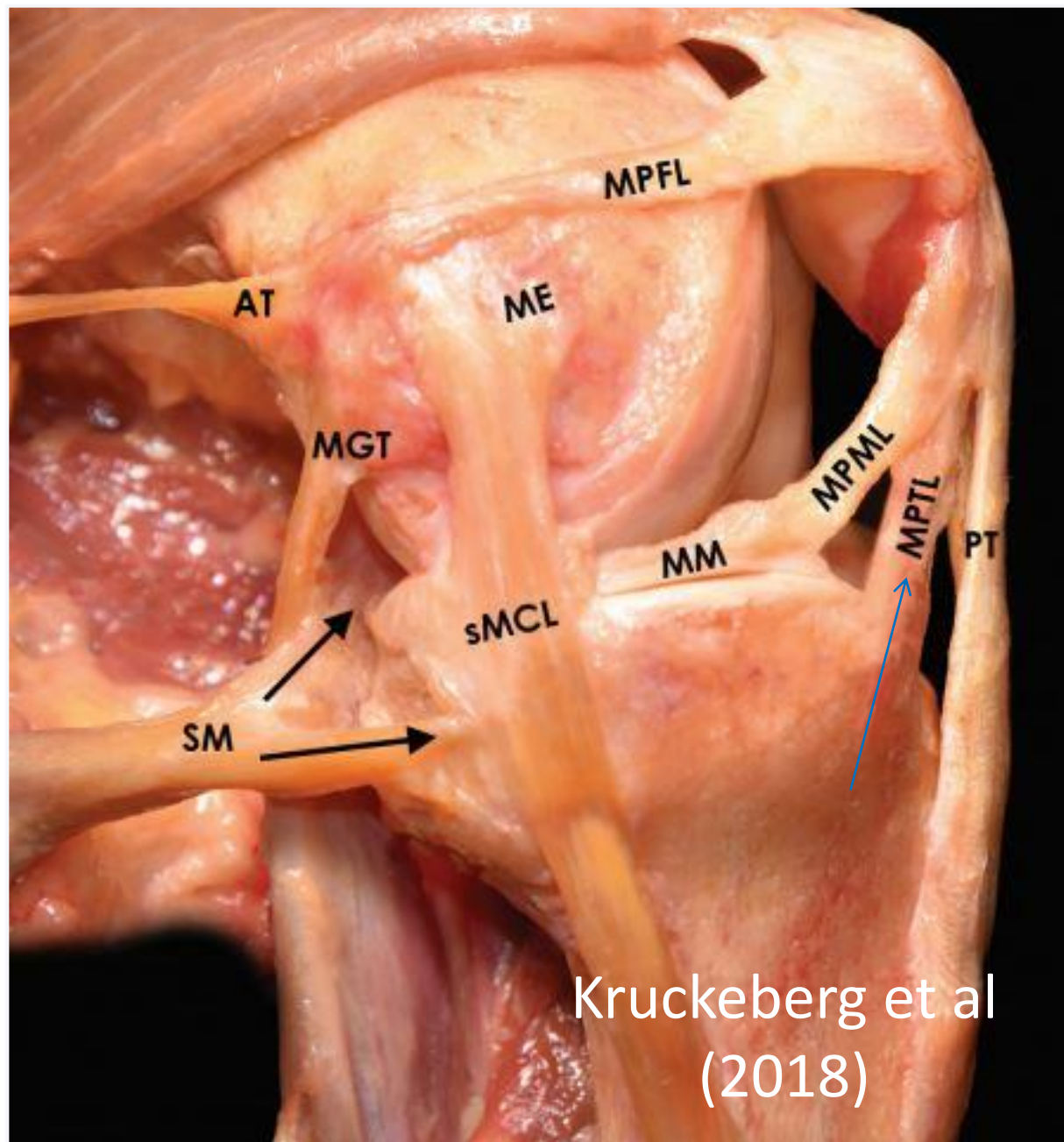
- Royalties: Arthrex, Inc., Pega Medical, *Current Opinion in Pediatrics*, Wolters Kluwer Health – Lippincott Williams & Wilkins
- Paid consultant: Arthrex, Inc.
- Speakers bureau: AO Trauma International, Arthrex, Inc.
- Editorial board: *Current Opinion in Pediatrics*
- Board of Directors: AAOS, New York County Medical Society, Patellofemoral Foundation, POSNA, PRiSM

Disclosures for all authors can be found on the AAOS Disclosures page.

MPTL – Medial PatelloTibial Ligament

MPTL is a significant contributor against lateral patellar shift, patellar tilt, and patellar rotation especially past 45° of flexion (Philippot et al. 2012)

Preliminary reports evaluating MPTL reconstruction for patellar instability demonstrate improved knee function (Zaffagnini et al. 2014; Baumann et al. 2018)

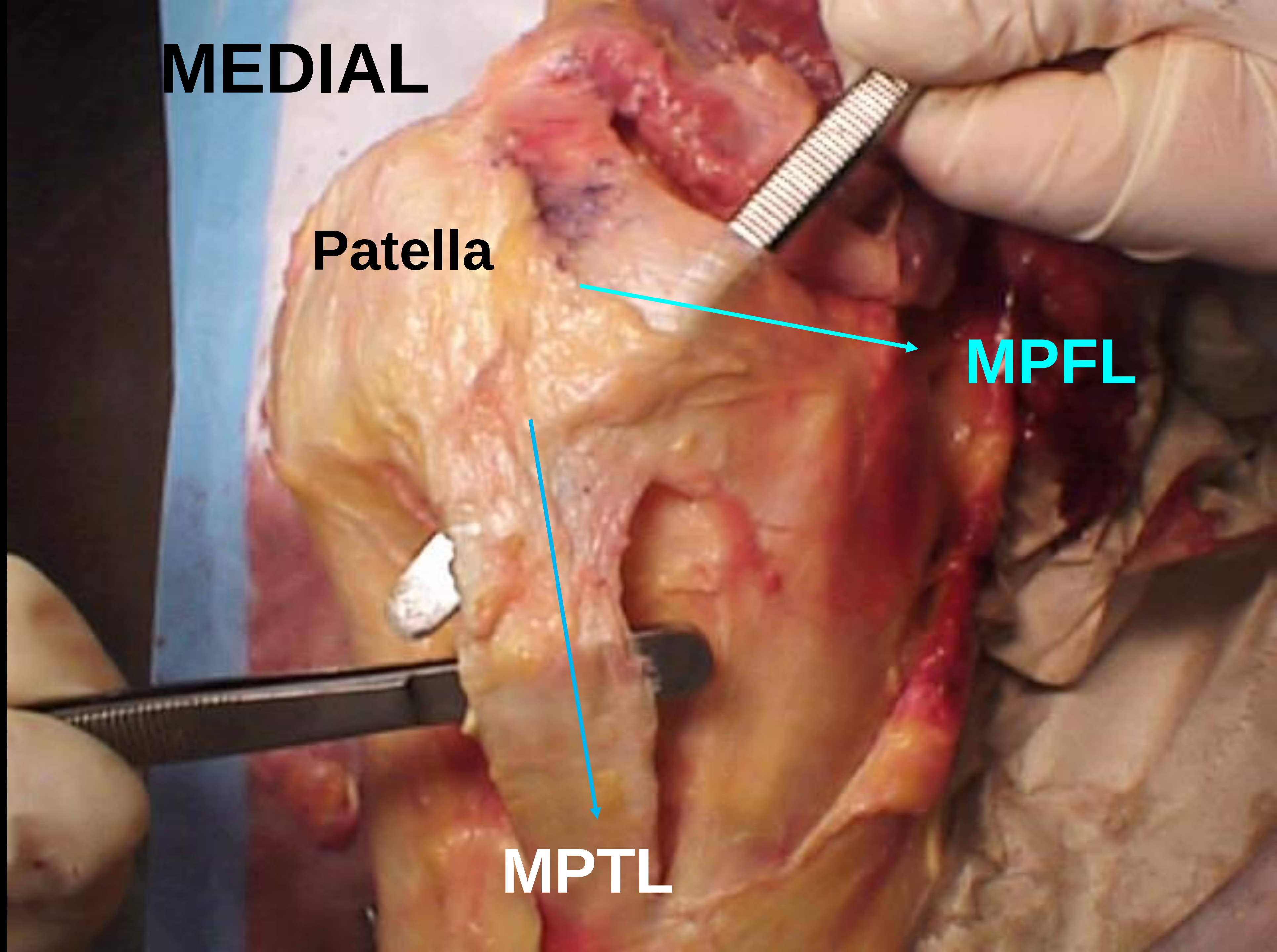


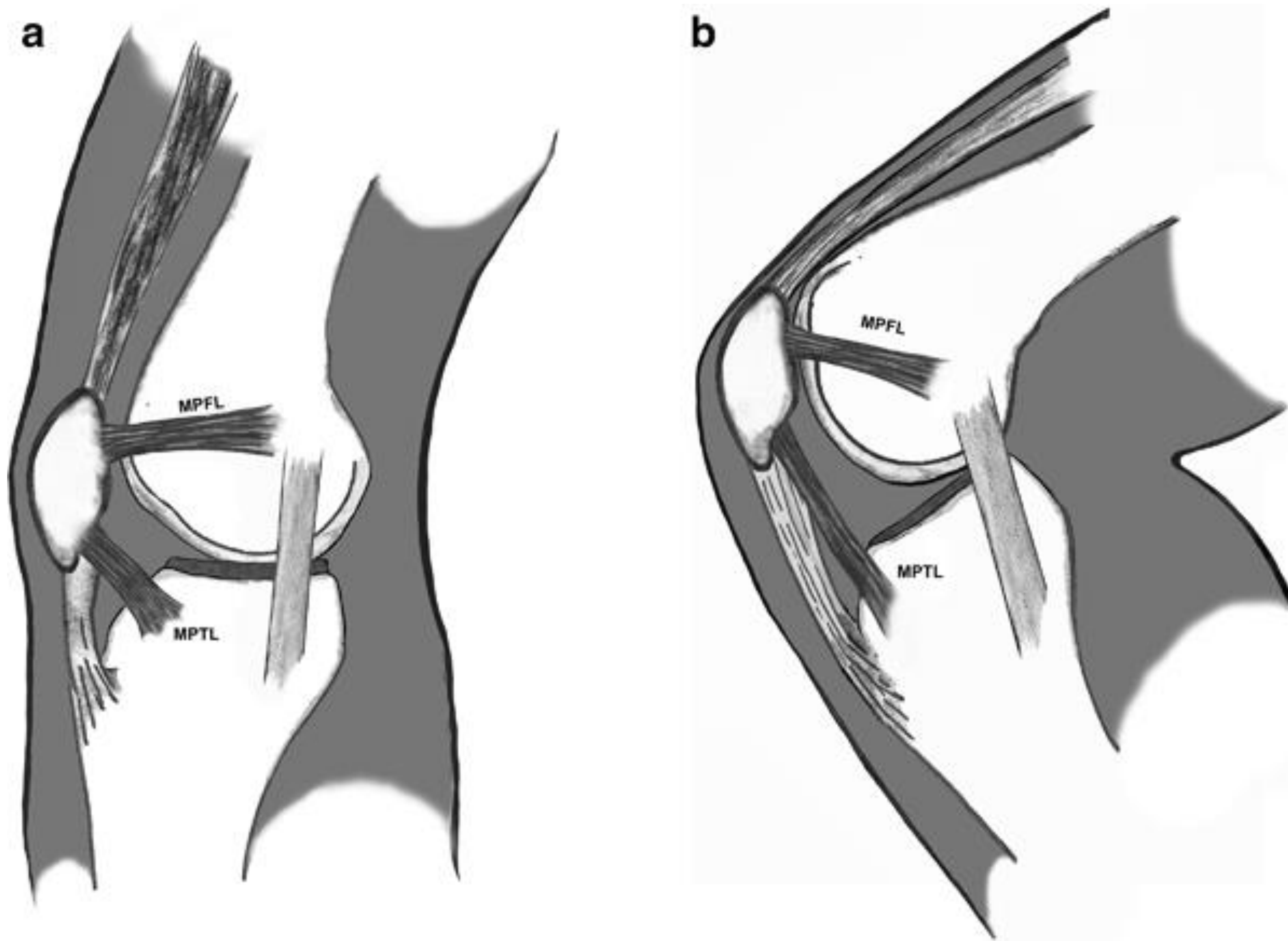
MEDIAL

Patella

MPFL

MPTL





Medial patellotibial ligament and medial patellomeniscal ligament: anatomy, imaging, biomechanics, and clinical review

Betina Bremer Hinckel¹ · Riccardo Gomes Gobbi² · Camila Cohen Kaleka³ ·
Gilberto Luis Camanho² · Elizabeth A. Arendt⁴

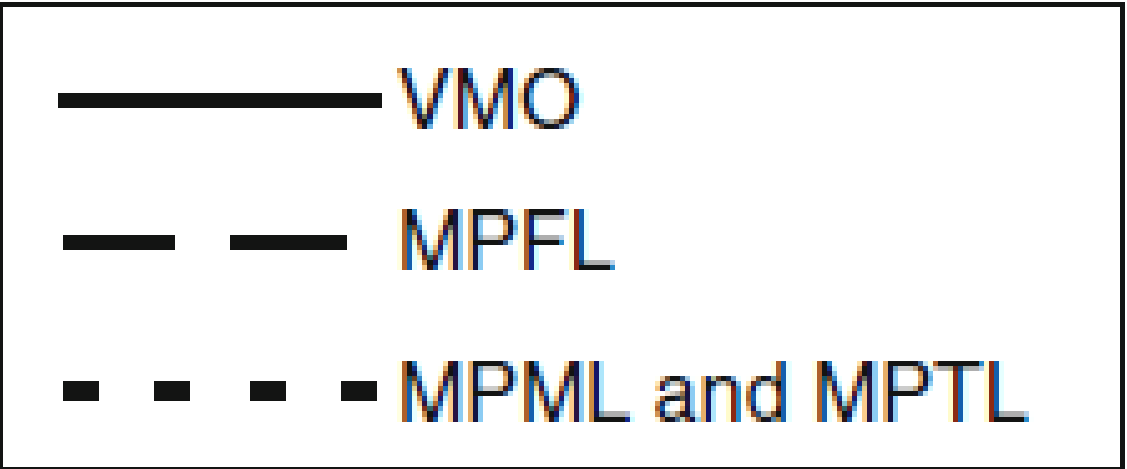
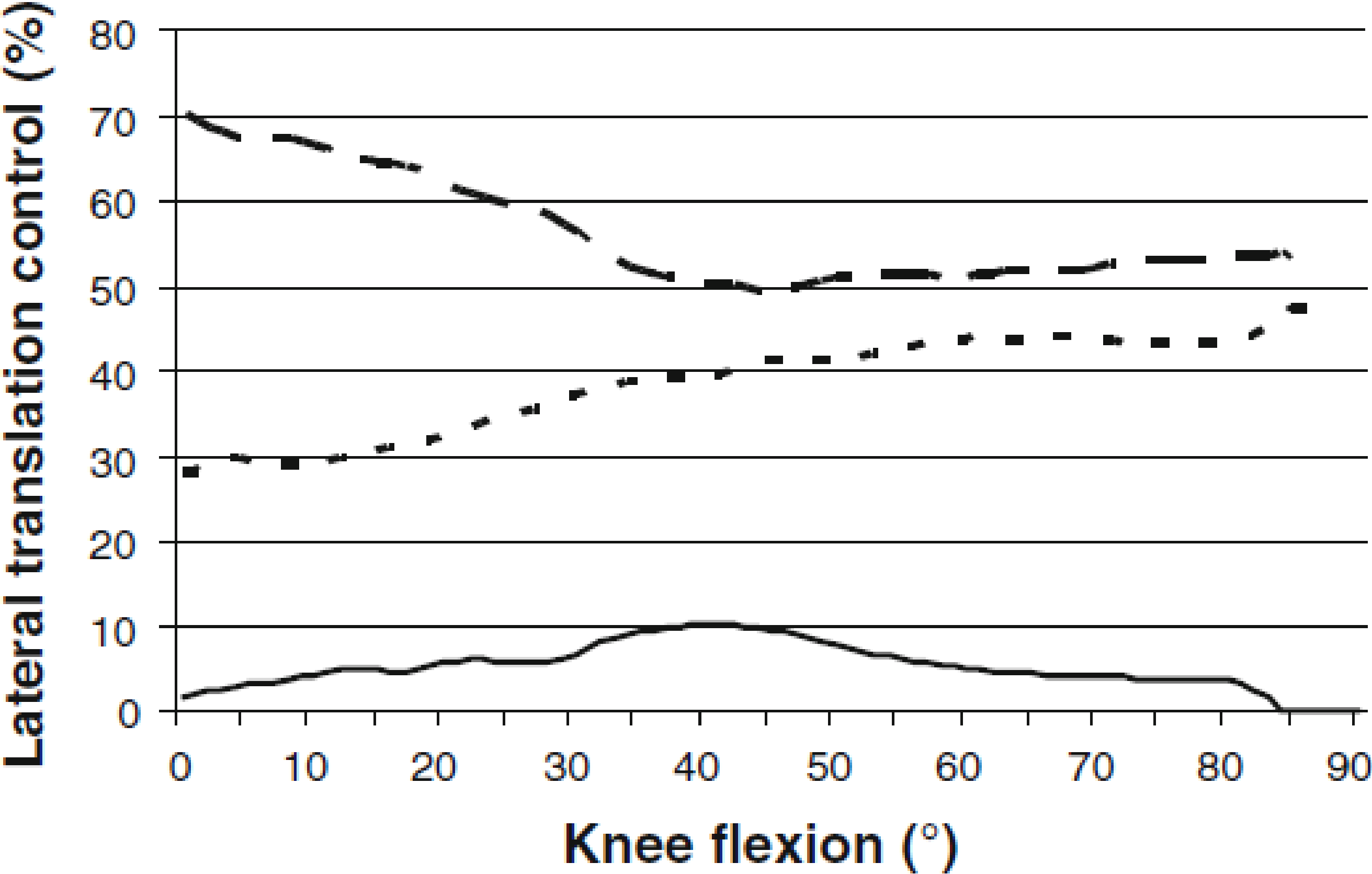
2018 KSSTA

“Behavior of medial patellar secondary ligaments through knee flexion, tensioning in greater degrees of flexion. **a** Knee in near-full extension. **b** Knee at 90° of knee flexion. Note the complementary function of the MPFL and the MPTL to guide patellar excursion through the arc of motion”

MPTL – Medial PatelloTibial Ligament

The role of the medial ligamentous structures on patellar tracking during knee flexion

R. Philippot · B. Boyer · R. Testa · F. Farizon ·
B. Moyen



The medial patellotibial ligament (MPTL) and medial patellomeniscal ligament (MPML) are reported to **contribute 26% to resisting lateral patellar shift in full extension and 46% at 90 degrees of knee flexion.**

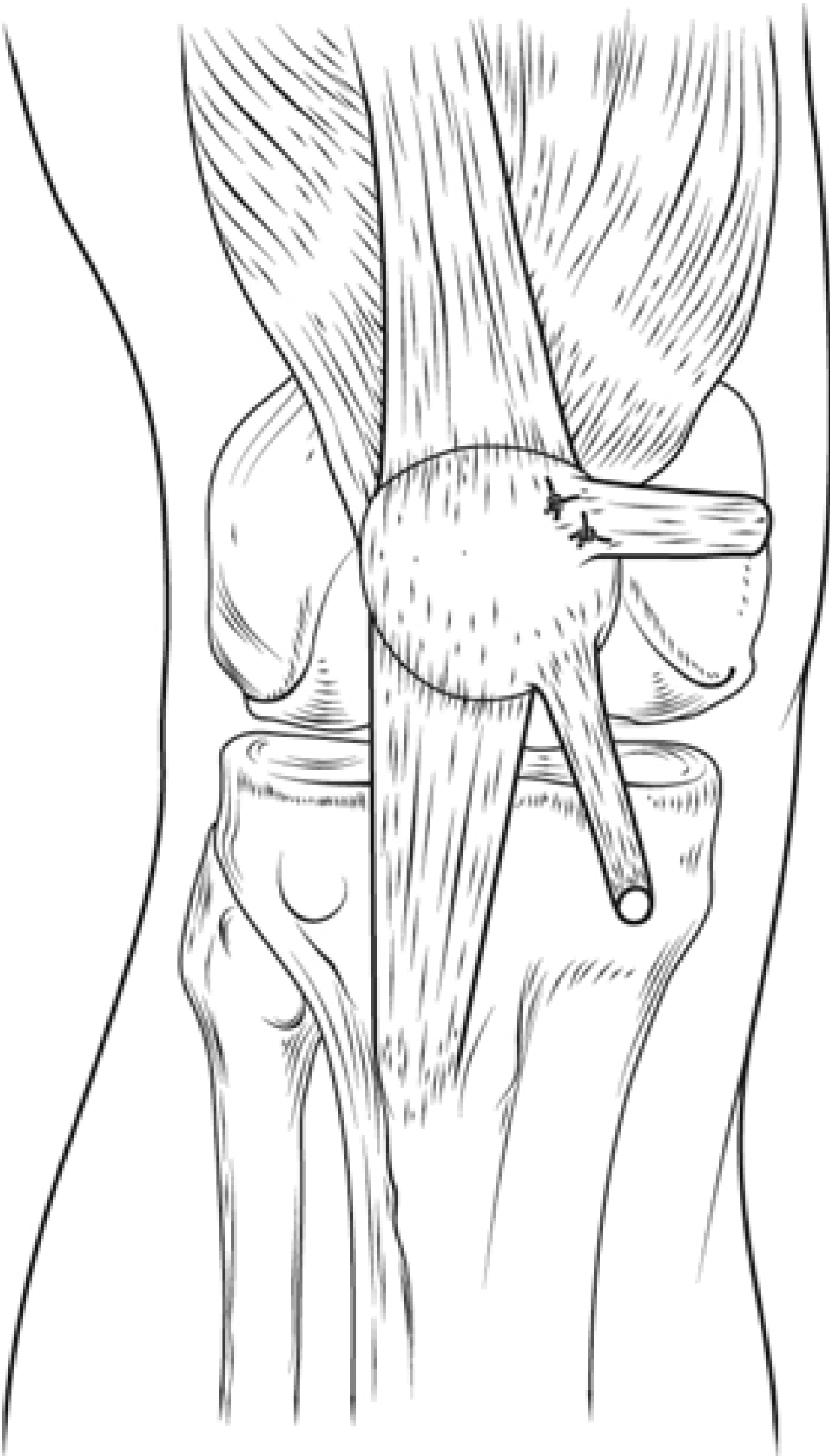
Medial Patellotibial Ligament Reconstruction in Pediatric and Adolescent Patients With Patellofemoral Instability

Olivia C. Tracey, B.A., Joshua T. Bram, M.D., Emilie Lijesen, B.S., Akshitha Adhiyaman, B.S., Ruth H. Jones, B.S., Ryann Davie, M.D., and Daniel W. Green, M.D., M.S.

Table 4. Overview of Relevant MPFL Reconstruction Literature

Study	Study Design	Concomitant Procedures	MPFL Graft Type and Size	Technique
Hinckel et al., 2023 ⁸	Technique report	MPFL, MQTFL	Tibialis anterior allograft, 6-7 mm	Anatomic
Hinckel et al., 2016 ⁹	Technique report	MPFL	Patellar tendon autograft (medial third), 6 mm	Anatomic
Abdelrahman et al., 2021 ¹	Technique report	MPFL	Semitendinosus tendon	Anatomic
Hetsroni et al., 2019 ⁷	Case series: 16 patients, mean age 18 yr (range: 14.5-23 yr)	MPFL	Gracilis autograft (or semitendinosus tendon)	Anatomic
Giordano et al., 2012 ¹¹	Technique report	MPFL	Semitendinosus tendon and gracilis autograft (both MPFL/MPFL)	Transpatellar (Nietosvaara)
Sobhy et al., 2013 ⁴	Case series: 29 patients, mean age 20.3 ± 3 yr (range: 17-26 yr)	MPFL	Semitendinosus tendon autograft	Transpatellar (Nietosvaara)
Maffulli et al., 2020 ²	Case series: 34 patients; mean age 26.5 ± 10.7 years (range: 13-39 yr)	MPFL	Ipsilateral autologous gracilis tendon	Transpatellar (Nietosvaara)
Slone et al., 2024 ¹⁰	Technique report	Patellar tendon shortening	Patellar tendon autograft (medial third), 10 mm	Anatomic

MPFL, medial patellofemoral ligament; MPFL, medial patellotibial ligament; MQTFL, medial quadriceps tendon-femoral ligament



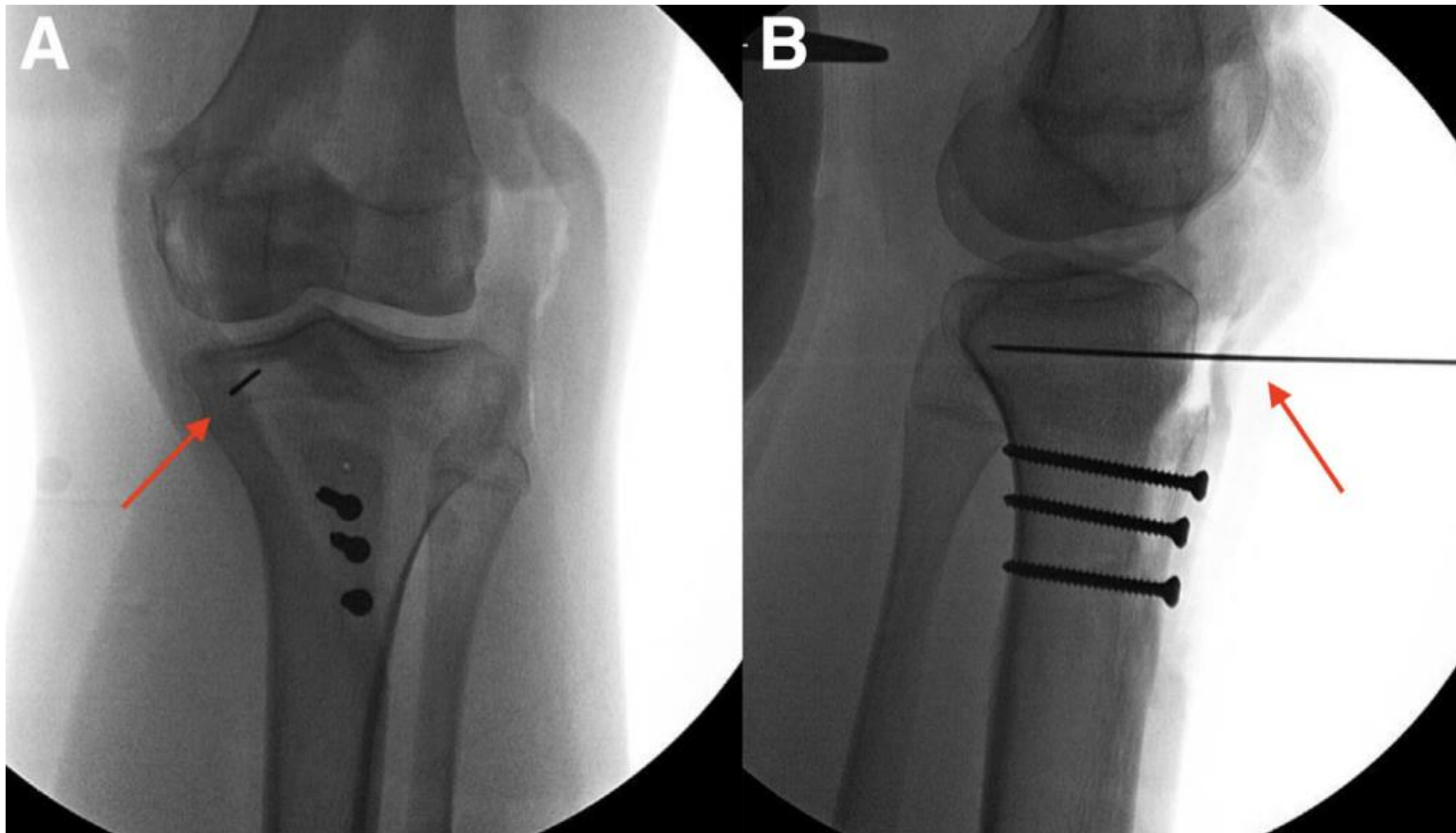
Original article

Reconstruction of medial patellofemoral ligament using quadriceps tendon combined with reconstruction of medial patellotibial ligament using patellar tendon: initial experience[☆]

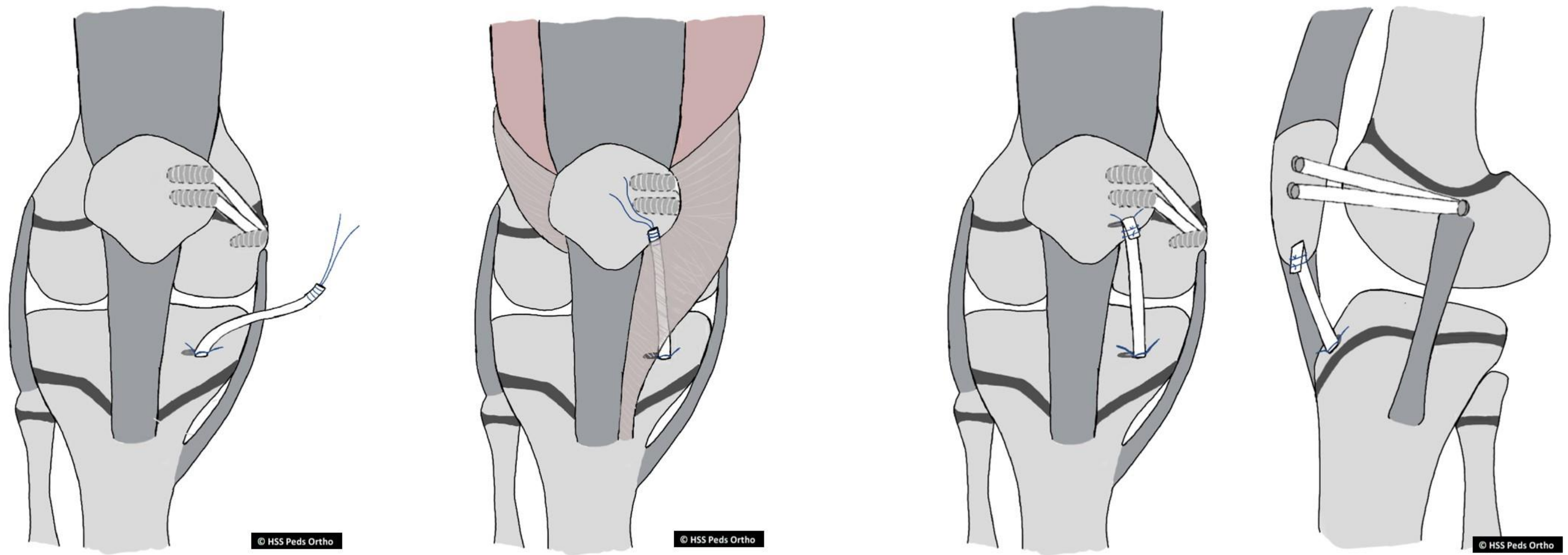
Betina Bremer Hinckel^{*}, Riccardo Gomes Gobbi, Marcelo Batista Bonadio, Marco Kawamura Demange, José Ricardo Pécora, Gilberto Luis Camanho
Instituto de Ortopedia e Traumatologia, Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo, SP, Brazil

Medial Patellotibial Ligament Reconstruction in Pediatric and Adolescent Patients With Patellofemoral Instability

Olivia C. Tracey, B.A., Joshua T. Bram, M.D., Emilie Lijesen, B.S.,
Akshitha Adhiyaman, B.S., Ruth H. Jones, B.S., Ryann Davie, M.D., and
Daniel W. Green, M.D., M.S.



Red arrow marks k wire at tibial attachment of the MPTL



- Standard treatment for patellofemoral instability (PFI) is medial patellofemoral ligament (MPFL) reconstruction
- MPFL reconstruction is a valuable adjunctive procedure, but few studies have examined outcomes of MPFL reconstruction in pediatric patients

AIM: to describe outcomes for patients that received concomitant MPFL and MPFL reconstruction

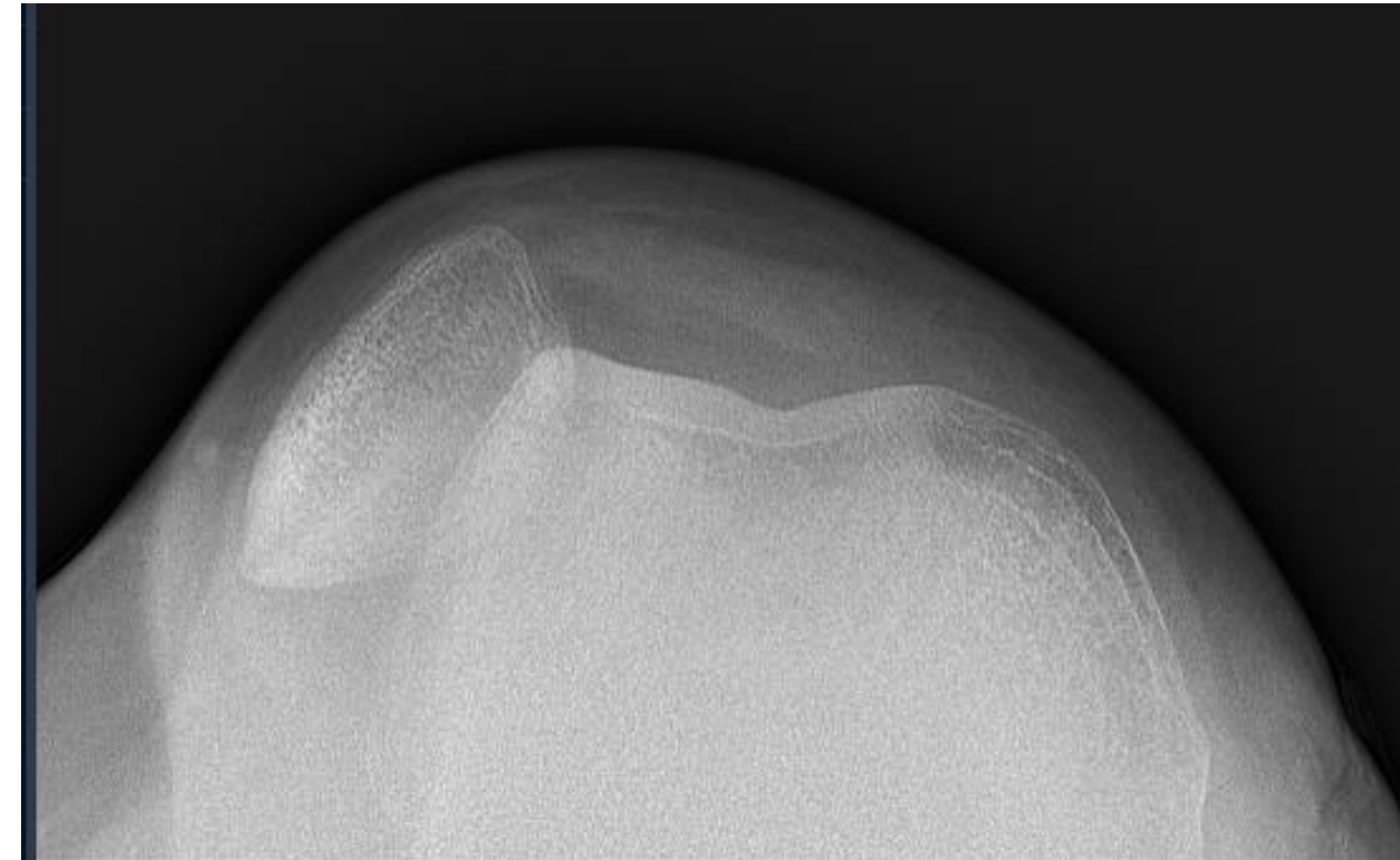
Results

ID	Sex	Age (years)	BMI (kg/m²)	Side	Dislocation	Concurrent Procedure	Total Follow-up (months)
1	F	10.6	29.5	R	Syndromic, fixed	LR, QL, *	65
2	M	20.0	37.5	R	Syndromic, fixed	LR, QL, TTO, ACF	3
3	M	17.8	34.7	L	Syndromic, fixed	LR, QL, ACF, TTO	28
4	M	16.0	16.3	R	Fixed	LR, QL, ACF, TTO	10
5	M	15.5	14.6	L	Fixed	LR, ACF, TTO, MQTFLr	16
6	F	21.7	30.8	R	Syndromic, obligatory	LR	6
7	F	16.1	28.5	R	Obligatory	LR, QL, TTO	4
8	F	11.3	20.8	L	Syndromic, fixed	LR, QL	9
9	M	9.0	12.9	L	Syndromic, obligatory	LR, QL	36
10	M	9.6	13	R	Syndromic, obligatory	LR, QL	29
11	M	12.6	21.8	R	Syndromic, obligatory	MQTFLr, C, GG	10

- 11 extremities in 8 patients included
- 6 fixed patellar dislocations
- 5 obligatory patellar dislocations
- 7 patients reported past medical history of genetic / syndromic conditions or hypermobility syndromes
- No cases of PFI reported postoperatively, no revisions

Conclusion

- MPFL reconstruction is a safe adjunctive procedure for use in the treatment of pediatric and adolescent patients with severe patellofemoral instability
- MPFL reconstruction may contribute to surgical success in cases of fixed and obligatory dislocation



Thank you!



Contact Information: Daniel Green MD, greendw@hss.edu

References

1. Tracey OC, Bram JT, Lijesen E, Adhiyaman A, Jones RH, Davie R, Green DW. Medial patellotibial ligament reconstruction in pediatric and adolescent patients with patellofemoral instability. *Arthroscopy Techniques*. 2024 Dec;103404. doi:10.1016/j.eats.2024.103404.
2. Grantham WJ, Aman ZS, Brady AW, Rosenberg SI, Lee Turnbull T, Storaci HW, Dornan GJ, LaPrade RF. Medial Patellotibial Ligament Reconstruction Improves Patella Tracking When Combined With Medial Patellofemoral Reconstruction: An In Vitro Kinematic Study. *Arthroscopy*. 2020 Sep;36(9):2501-2509. doi: 10.1016/j.arthro.2020.05.014. Epub 2020 May 20. PMID: 32442704.
3. Ambra LF, Franciozi CE, Phan A, Faloppa F, Gomoll AH. Isolated MPRTL reconstruction fails to restore lateral patellar stability when compared to MPFL reconstruction. *Knee Surg Sports Traumatol Arthrosc*. 2021 Mar;29(3):793-799. doi: 10.1007/s00167-020-06015-3. Epub 2020 Apr 28. PMID: 32347346.
4. Philippot R, Boyer B, Testa R, Farizon F, Moyon B. The role of the medial ligamentous structures on patellar tracking during knee flexion. *Knee Surg Sports Traumatol Arthrosc*. 2012 Feb;20(2):331-6. doi: 10.1007/s00167-011-1598-6. Epub 2011 Jul 12. PMID: 21748394.
5. Zaffagnini S, Grassi A, Marcheggiani Muccioli GM, Luetzow WF, Vaccari V, Benzi A, Marcacci M. Medial patellotibial ligament (MPRTL) reconstruction for patellar instability. *Knee Surg Sports Traumatol Arthrosc*. 2014 Oct;22(10):2491-8. doi: 10.1007/s00167-013-2751-1. Epub 2013 Nov 7. PMID: 24196574.
6. Baumann CA, Pratte EL, Sherman SL, Arendt EA, Hinckel BB. Reconstruction of the medial patellotibial ligament results in favorable clinical outcomes: a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2018 Oct;26(10):2920-2933. doi: 10.1007/s00167-018-4833-6. Epub 2018 Jan 17. PMID: 29344696.
7. Hinckel BB, Gobbi RG, Kaleka CC, Camanho GL, Arendt EA. Medial patellotibial ligament and medial patellomeniscal ligament: anatomy, imaging, biomechanics, and clinical review. *Knee Surg Sports Traumatol Arthrosc*. 2018 Mar;26(3):685-696. doi: 10.1007/s00167-017-4469-y. Epub 2017 Mar 13. PMID: 28289819.
8. Hinckel BB, Gobbi RG, Bonadio MB, Demange MK, Pécora JR, Camanho GL. Reconstruction of medial patellofemoral ligament using quadriceps tendon combined with reconstruction of medial patellotibial ligament using patellar tendon: initial experience. *Rev Bras Ortop*. 2016 Jan 13;51(1):75-82. doi: 10.1016/j.rboe.2015.03.012. PMID: 26962504; PMCID: PMC4767827.
9. Kruckeberg BM, Chahla J, Moatshe G, Cinque ME, Muckenhirn KJ, Godin JA, Ridley TJ, Brady AW, Arendt EA, LaPrade RF. Quantitative and Qualitative Analysis of the Medial Patellar Ligaments: An Anatomic and Radiographic Study. *Am J Sports Med*. 2018 Jan;46(1):153-162. doi: 10.1177/0363546517729818. Epub 2017 Oct 10. PMID: 29016187.