



ISAKOS  
CONGRESS  
2023



**Boston**

Massachusetts  
June 18–June 21

# Equivalent Outcomes in MPFL Reconstruction and Tibial Tubercle Osteotomy Versus Isolated MPFL Reconstruction without Increased Morbidity

Kimberley K Lun<sup>1</sup>, Jonathan Warnock<sup>1</sup>, Yoong Lim<sup>1</sup>,  
David Parker<sup>1</sup>

<sup>1</sup>*Sydney Orthopaedic Research Institute, Sydney, Australia*





ISAKOS  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21

# Disclosures:

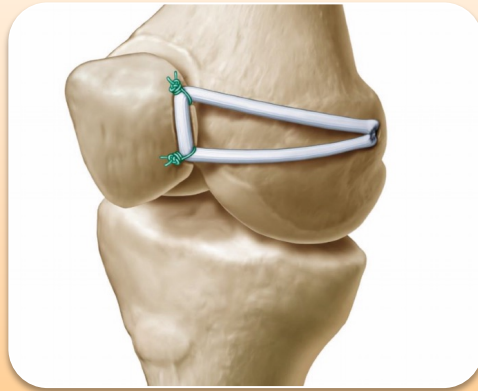
I declare that in the past three years I have:

- held shares in: nil
- received royalties from: nil
- done consulting work for: nil
- given paid presentations for: nil
- received institutional support from: nil

Signed: *Kimberley Lun*

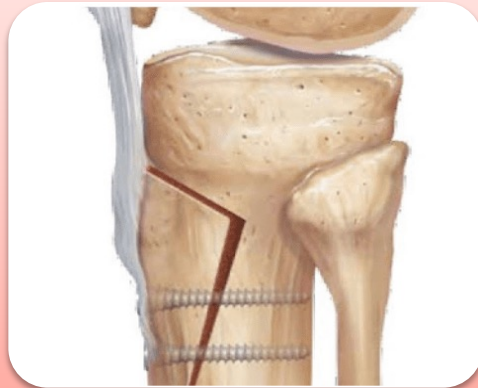


# MPFL Reconstruction (MPFLr) with or without the additional of a tibial tubercle osteotomy (TTO) are common operations for recurrent patellar instability



## MPFLr

- Lower morbidity + post-op complication rate



## MPFLr + TTO

- Commonly performed in patients with patella alta, trochlear dysplasia and increased tubercle offset (TT-TG)
- Higher morbidity + post-op complication rate<sup>2</sup>



# Aims

To investigate :

- Re-dislocation rate, RTS and PROMs following MPFLr versus MPFLr + TTO
- Demographic and radiographic predictors for poorer outcomes in both cohorts



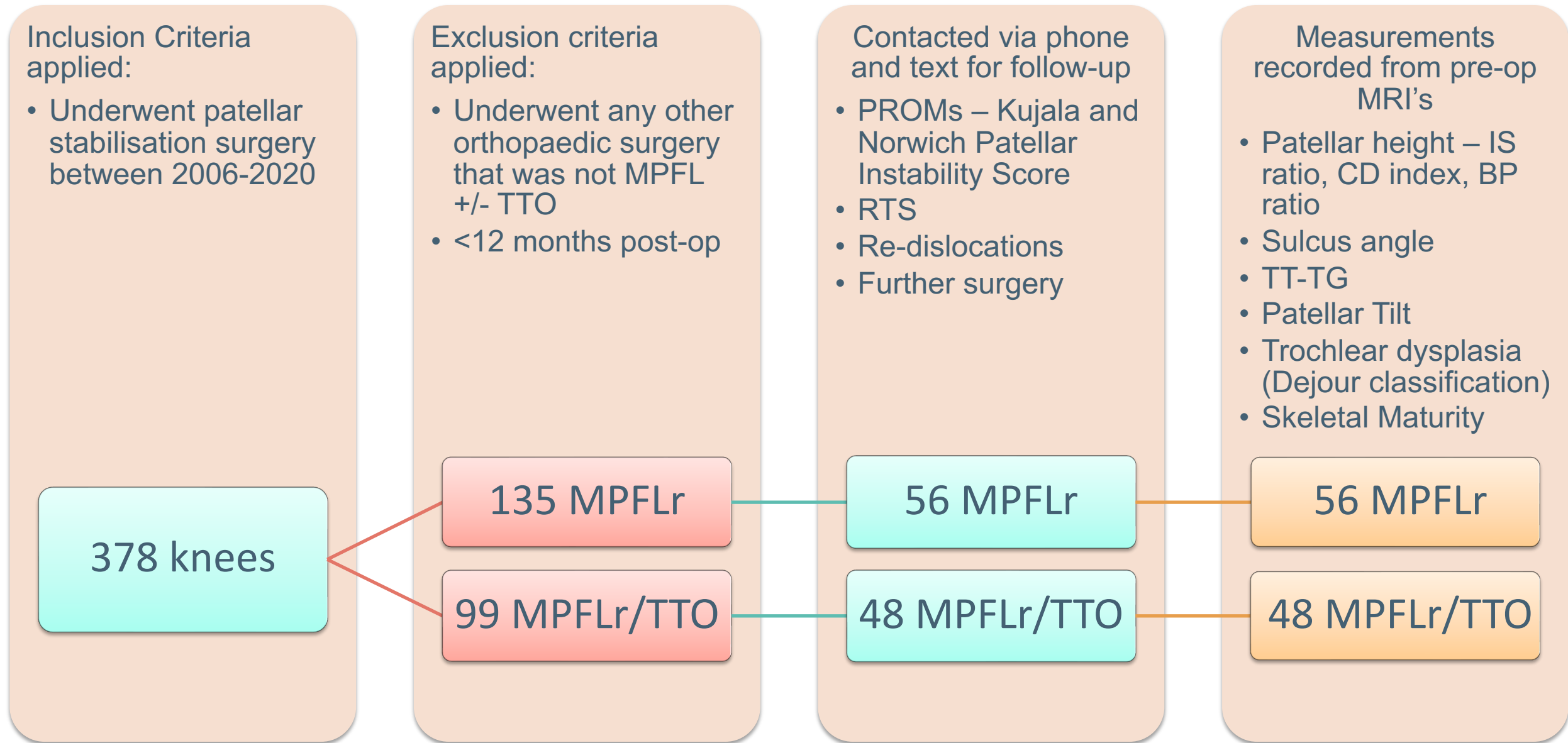
**ISAKOS**  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21



# Methods: Retrospective Cohort Study



# Methods: Statistical Analysis

- Statistical language R<sup>3</sup>
- PROMS
  - Kujala: generalized estimating equations regression
  - NPI: logistic regression
- RTS: Chi Square test and ordinal regression
- Reported discomfort: logistic regression
- Significance set at  $p < 0.05$



# Results: Radiographic Measurements

Measurement	Mean +/- SD		p-value
	MPFLr	MPFLr + TTO	
<b>IS ratio</b> (PA >1.2)	1.25 ± 0.17	1.34 ± 0.24	NS
<b>CD index</b> (PA >1.3)	1.19 ± 0.13	1.30 ± 0.24	<b>0.041</b>
<b>BP ratio</b> (PA >1.0)	1.02 ± 0.15	1.07 ± 0.19	NS
<b>Sulcus Angle</b> (Trochlear dysplasia >145-150)	146.61 ± 7.78	151.41 ± 7.86	<b>0.036</b>
<b>Patellar Tilt</b> (Patellar tilt >11)	17.38 ± 8.90	20.02 ± 9.78	NS
<b>TT-TG</b> (Patellar translation >20)	14.79 ± 5.96	14.80 ± 4.80	NS
<b>Dejour Classification</b>	-	-	NS

Both cohorts had a high incidence of pre-op patellar alta, trochlear dysplasia and patella tilt

Patients in the **MPFLr + TTO** cohort had a **greater patellar height** as measured by the **Caton-Deschamps index** and an **increased sulcus angle**



**ISAKOS**  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18-June 21



# Results: Patient Reported Outcome Measures

	N	Beta	95% CI	p-value
Kujala	96	0.31	-0.04, 0.66	NS
NPI	104	0.02	-1.1, 1.2	NS
Reported Discomfort	104			NS

	MPFLr	MPFLr + TTO	p-value
Re-dislocation rate	5.4%	6.3%	NS
Rate of revision surgery	3.6%	2.1%	NS
Return to sport rate <sup>1</sup>	70.4%	68.75%	NS

<sup>1</sup>Successful return to sport defined as full return to previous activity levels

**No statistically significant difference** between the two cohorts in terms of their **patient reported outcomes, RTS or reported discomfort.**

Re-dislocation rate and the rate of revision surgery was **consistent** with that reported in the literature



**ISAKOS**  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21



# Discussion

- **Patella alta and trochlear dysplasia** were more **common** in the MPFLr +TTO cohort
- The equivalent outcomes between groups suggests **these factors were appropriate and valid indications for TTO** in this population



**ISAKOS**  
CONGRESS  
2023

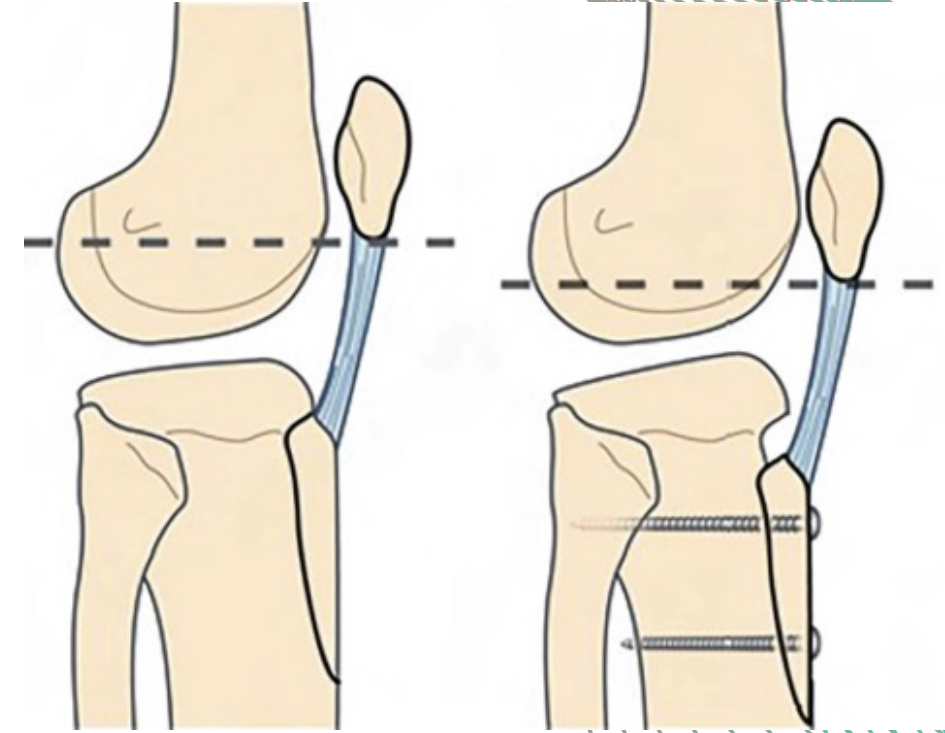


**Boston**  
Massachusetts  
June 18–June 21



# Discussion

- In our clinical practice, a **TTO is commonly indicated for distalisation**, rather than medialization, of the tibial tubercle
  - Tibial tubercle distalisation can correct patella alta and improve osseous restraint
  - Sappey-Marinier et al. (2019)<sup>4</sup>: CD index greater than 1.3 was a predictive factor for MPFLr failure
- In **patients without extremes of patellar lateralisation<sup>1</sup>**, an **isolated MPFLr may comparably correct lateral maltracking<sup>5</sup>**, and an isolated MPFLr may suffice



ISAKOS  
CONGRESS  
2023



**Boston**  
Massachusetts  
June 18–June 21



# Limitations

1. Patients recruited from several surgeons without prior agreed-upon radiographic or demographic selection criteria for an additional TTO
2. No baseline pre-operative PROMs available
3. Moderate inter-rater reliability for radiographic measurements



# Conclusion

1. MPLFr + TTO patients had **comparable post-op outcomes without additional morbidity**, to patients who underwent a less invasive isolated MPFLr
2. **Patella alta and trochlear dysplasia** were more **common** in the MPFLr +TTO cohort, and the equivalent outcomes between groups suggests these factors were appropriate indications for TTO in this population
3. Further study into the interaction of radiographic and demographic factors with post-operative outcomes will help define more precise thresholds for this additional procedure



# References

1. FRANCIOZI, C. E., AMBRA, L. F., ALBERTONI, L. J. B., DEBIEUX, P., DE MELLO GRANATA JR, G. S., KUBOTA, M. S., CARNEIRO, M., ABDALLA, R. J., LUZO, M. V. M. & COHEN, M. 2019. Anteromedial tibial tubercle osteotomy improves results of medial patellofemoral ligament reconstruction for recurrent patellar instability in patients with tibial tuberosity–trochlear groove distance of 17 to 20 mm. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 35, 566-574.
2. PAYNE, J., RIMMKE, N., SCHMITT, L. C., FLANIGAN, D. C. & MAGNUSSEN, R. A. 2015. The incidence of complications of tibial tubercle osteotomy: a systematic review. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 31, 1819-1825.
3. R CORE TEAM, R. 2013. R: A language and environment for statistical computing.
4. SAPPEY-MARINIER, E., SONNERY-COTTET, B., O'LOUGHLIN, P., OUANEZAR, H., REINA FERNANDES, L., KOUEVIDJIN, B. & THAUNAT, M. 2019. Clinical outcomes and predictive factors for failure with isolated MPFL reconstruction for recurrent patellar instability: a series of 211 reconstructions with a minimum follow-up of 3 years. *The American journal of sports medicine*, 47, 1323-1330.
5. SHERMAN, S. L., ERICKSON, B. J., CVETANOVICH, G. L., CHALMERS, P. N., FARR, J., BACH JR, B. R. & COLE, B. J. 2014. Tibial tuberosity osteotomy: indications, techniques, and outcomes. *The American journal of sports medicine*, 42, 2006-2017

