

Quantifying the Relationship Between the Medial Patellofemoral Complex and Patellar Borders: A Pediatric Cadaveric Study

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INTRO/BACKGROUND

- Medial Patellofemoral complex (MPFC) is comprised of the medial quadriceps tendon-femoral ligament (MQTFL) superiorly and the medial patellofemoral ligament (MPFL) inferiorly
- This anatomy has only recently been described in skeletally immature patients
- Anatomic relationship between insertion of MPFC on quadriceps tendon and patellar borders has yet to be studied in pediatric specimens

OBJECTIVES/AIMS

- Quantitatively evaluate the relationship between pediatric MPFC to its attachment on the quadriceps tendon and patella

METHODS

- 16 pediatric cadaveric knee specimens (range 4-12 years of age at time of patient death) were dissected via lateral parapatellar arthrotomy and eversion of extensor mechanism
- Measurements made using ImageJ program from high-resolution photographs of specimens
- Following measurements were recorded:
 - Patella articular length (PL)
 - Quadriceps tendon attachment of MPFC above the superior pole of patella (QTA)
 - Ratio of quadriceps tendon attachment to patellar length (QTA/PL%)

RESULTS

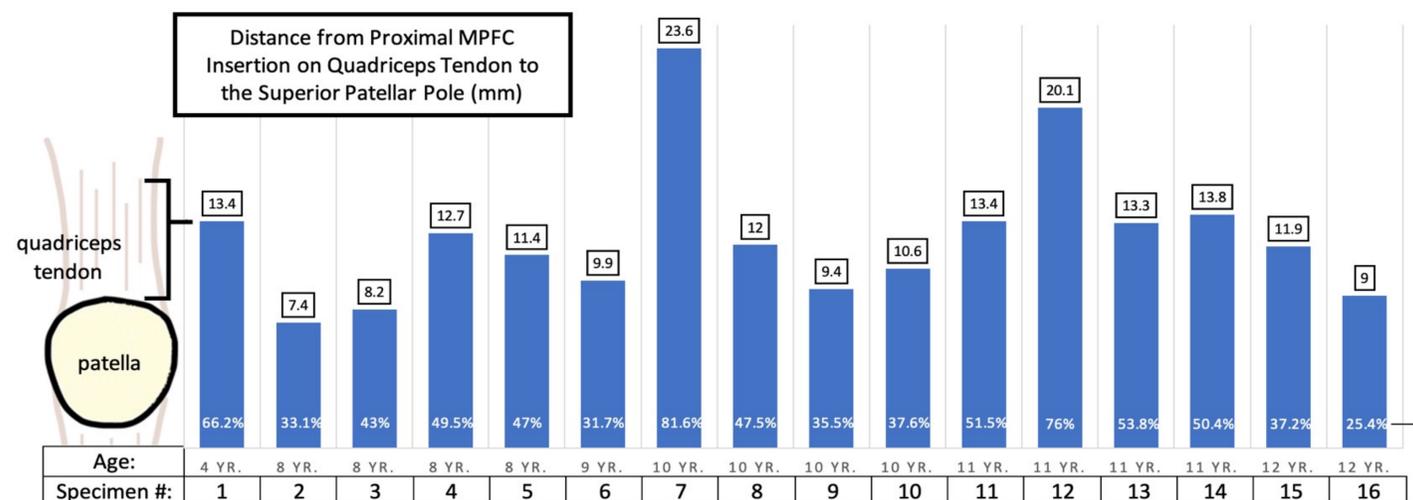
- QTA above patella averaged **10.6mm in younger cohort** (4-8 years) and **13.4mm in older cohort** (9-12 years)
- QTA/PL% was found to be **47.8% and 48% for younger and older cohorts** respectively
- PL was **significantly longer** in the **older cohort**
- **Proximal MPFC insertion** onto quadriceps tendon **can be variable** across specimens

Figure 1: QTA, PL, and QTA/PL% for individual specimens.

Age 4-8yrs	Sex	QTA	Patella Articular Length (PL)	QTA/PL(%)
4	M	13.378	20.198	66.234
8	M	7.380	22.321	33.063
8	M	8.190	19.026	43.046
8	M	12.746	25.770	49.461
8	M	11.422	24.325	46.956
Average		10.623	22.328	47.752
SD		2.700	2.800	12.100
Age 9-12yrs	Sex	QTA	Patella Articular Length (PL)	QTA/PL(%)
9	M	9.911	31.313	31.651
10	M	23.621	28.935	81.635
10	M	11.976	25.187	47.548
10	M	9.439	26.582	35.509
10	M	10.600	28.159	37.643
11	M	13.407	26.058	51.451
11	M	20.110	26.458	76.007
11	F	13.300	24.724	53.794
11	F	13.774	27.319	50.419
12	M	11.890	31.987	37.171
12	M	8.974	35.311	25.414
Average		13.364	28.367	48.022
SD		4.600	3.300	17.700
p-value		0.159	0.004	0.972

QTA = Quadriceps Tendon Attachment; PL = Patellar Articular Length

Figure 2: MPFC Insertion into the Quadriceps Tendon.



*QTA/PL% = Quadriceps Tendon Attachment of MPFC (QTA) / Patellar Articular Length (PL)

LIMITATIONS

- Small sample size consistent with limitations of obtaining pediatric cadaveric tissue for study
- Applicability of findings to all patients across ages and sizes

CONCLUSIONS

- **Our findings are the first to quantitatively characterize the proximal MPFC insertion in the pediatric knee**
- Provides valuable knowledge of MPFC development and relative size with respect to the patella
- Precise understanding of anatomy may assist surgeons in **refining surgical techniques, operative risk evaluation, and maximization of functional recovery in pediatric patients with recurrent patellofemoral instability**

FUTURE DIRECTIONS

- Standardizing extensor musculature eversion to identify undersurface anatomy
- Continue to broaden understanding of pediatric MPFC anatomy across several age groups

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