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Associated Anatomic Abnormalities in Patients Undergoing Rotational Tibial Osteotomies for Patellofemoral Pathology and Implications for the Level of Correction

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Faculty Disclosure Information

- This paper has subsequently been published in Journal of Cartilage

Background and Purpose

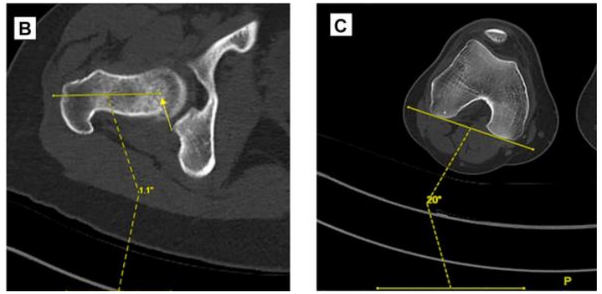
- Tibial rotational deformity is a known risk factor for patellofemoral joint (PFJ) disorders. However, it is commonly associated with other abnormalities which affect the PFJ.

- The purpose of this study was to describe the prevalence of associated factors known to affect the PFJ in patients undergoing rotational tibial osteotomy and their implication for the correction level

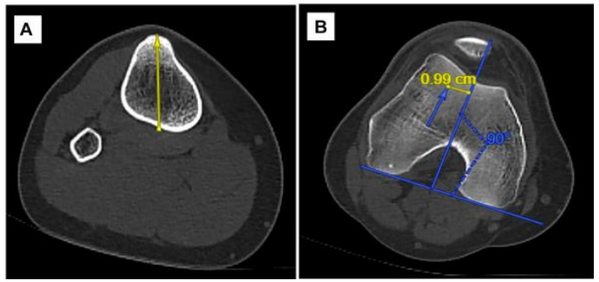
Methods

- All patients with PFJ pain and or instability, who underwent rotational tibial osteotomy between July 2009 and February 2020, were included.
- Patients were excluded if there were no preoperative computed tomography (CT)/ magnetic resonance imaging (MRI).
- Scans were analyzed by 2 observers. Parameters of interest were:

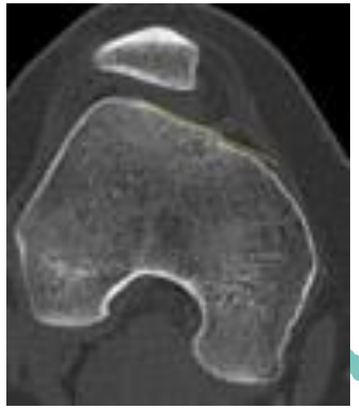
femoral version



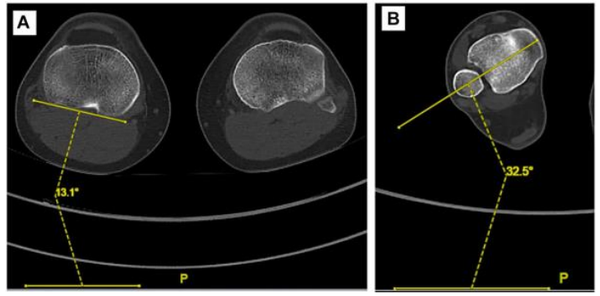
tibial tuberosity–trochlear groove (TT-TG)



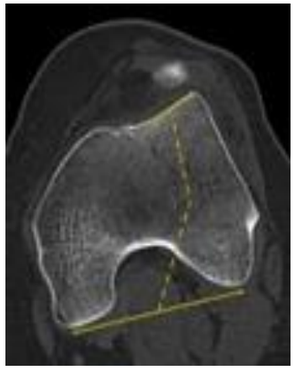
trochlear dysplasia



tibial torsion



lateral trochlear inclination (LTI)



Insall-Salvati (IS) and Caton Deschamps Index (CDI)

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Results

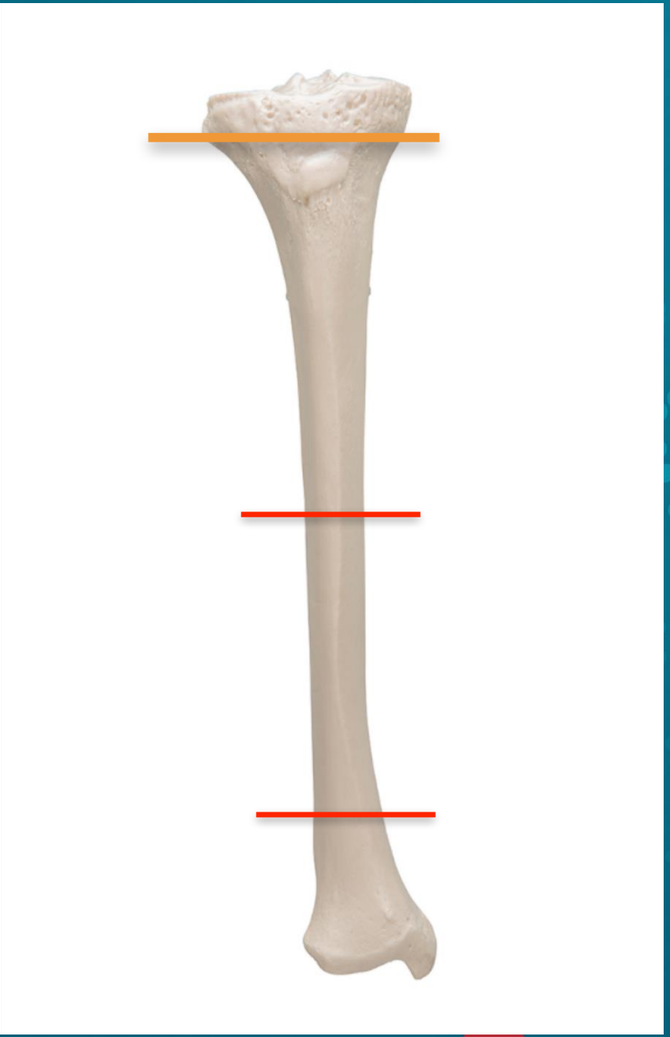
- The final study population consisted of 80 knees.
- **High-grade trochlear dysplasia was found in 25%.**
- **42.5% had TT-TG value of ≥ 20 mm.**
- **Patella alta/baja was found in 54%** based on CDI or IS >1.2 and <0.8.
- **29% had excessive tibial torsion but normal TT-TG and patella height.**
- **18% had abnormal TT-TG but normal patellar height**

Parameter	Statistical description
Femoral version	
Min.-Max	−1.0 to 51.0
Mean ± SD	21.0 ± 11.7
Median (IQR)	20.8 (13.0-27.5)
Tibial torsion	
Min.-Max	37-62.7
Mean ± SD	45.9 ± 9.1
Median (IQR)	47.1 (43.0-50.5)
TT-TG (mm)	
<20	46 (57.5%)
≥20	34 (42.5%)
Min.-Max	7.7-34.0
Mean ± SD	18.3 ± 5.5
Median (IQR)	18.3 (13.5-22.2)
Trochlear dysplasia CT	
Normal	16 (20.0%)
Mild (low grade)	44 (55.0%)
Moderate (high grade)	9 (11.3%)
Severe (high grade)	11 (13.8%)
LTI/CT	
Min.-Max	−43.0 to 30.0
Mean ± SD	11.4 ± 14.7
Median (IQR)	15.8 (10.0-20.3)
CDI	
Min.-Max	0.583-1.68
Mean ± SD	1.17 ± 0.17
Median (IQR)	1.18 (1.1-1.3)
IS	
Min.-Max	0.69 ± 1.5
Mean ± SD	1.19 ± 0.18
Median (IQR)	1.20 (1.1-1.3)
Patellar height	
Normal	37 (46%)
Alta	42 (53%)
Baja	1 (1%)

IQR = interquartile range; SD = standard deviation.

Results

- Based on the associated abnormalities of patella height and tubercle lateralization,
  - 18% of the population were suitable for **supratubercle osteotomy** (abnormal TTTG and normal patella height)
  - 29% of patients were suitable for **diaphyseal or distal tibial** osteotomy (normal TTTG and patella height)
  - 59% of patients required a tibial tubercle osteotomy in order to address as abnormal TTTG or patella height.



Conclusions

- Tibial torsion is associated with a high incidence of associated anatomical abnormalities that effect the PFJ
- Correction of all significant associated abnormalities is required in order to maximise surgical outcomes
- Only an osteotomy at the level of the tubercle can be used in all patients. In patients with patella alta the tubercle can be distalised and in patients with a normal TTTG it can be lateralised