Adolescent Distal Femoral Cortical Irregularity in the Knee; Stress or Strain?

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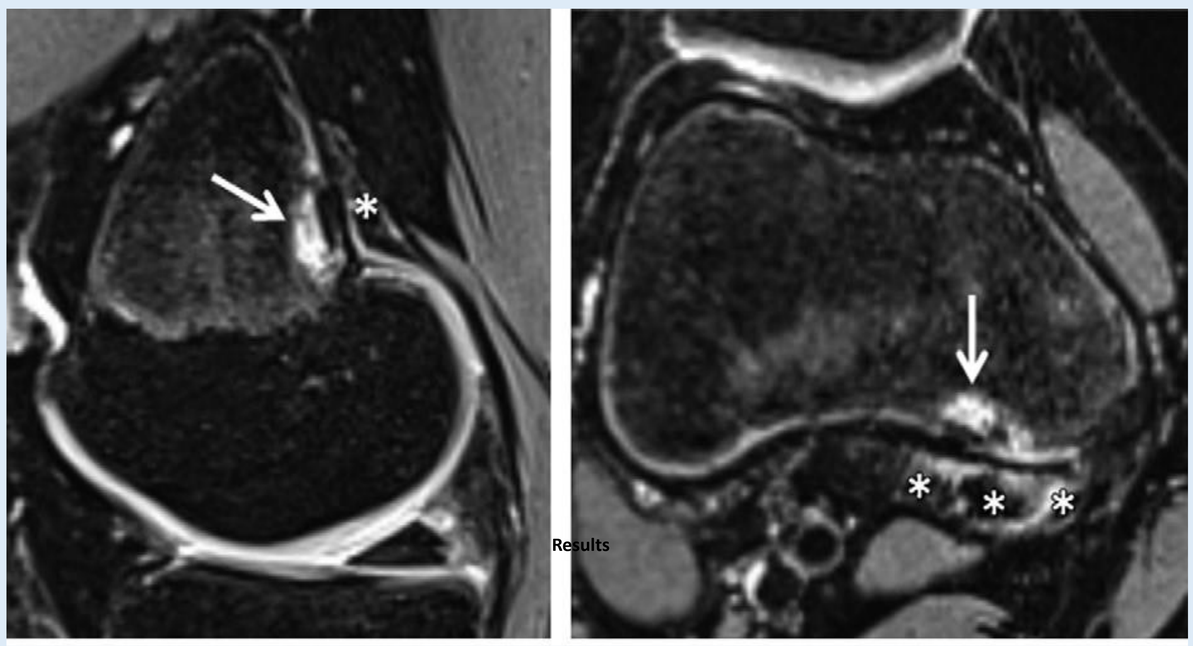
Introduction

A distal femoral cortical irregularity (DFCI) is a benign lesion in the cortex of the posterior region of the distal femur in adolescents. The pathogenesis is still not fully understood, however, it is hypothesised that the lesion occurs due to a repetitive mechanical stress at the attachment sites of the medial head of the gastrocnemius (MHG) and the aponeurosis of the adductor magnus(1-3). Pathogenesis not fully understood but a theory exists that it is related to trauma.

AIM: To assess prevalence of DFCI in pivotal knee injuries in adolescents.



Results

Images demonstrate DFCI present on sagittal and axial fat-suppressed T2-weighted MRI scans (white arrow).

Methods

- Retrospective observational study
- Knee MRI scans reviewed for 5 years (2014-2019)
- Adolescents (Aged 10-19 at time of scan)
- MRIs reviewed by 2 experienced MSK radiology consultants
- Assessed for:
  - Demographics and mechanism of action
  - Presence of DFCI
  - Size of DFCI (>2cm diameter on sagittal images)
  - Site of DFCI
- Exclusions – malignancy, infection, polytrauma, previous operation on same knee

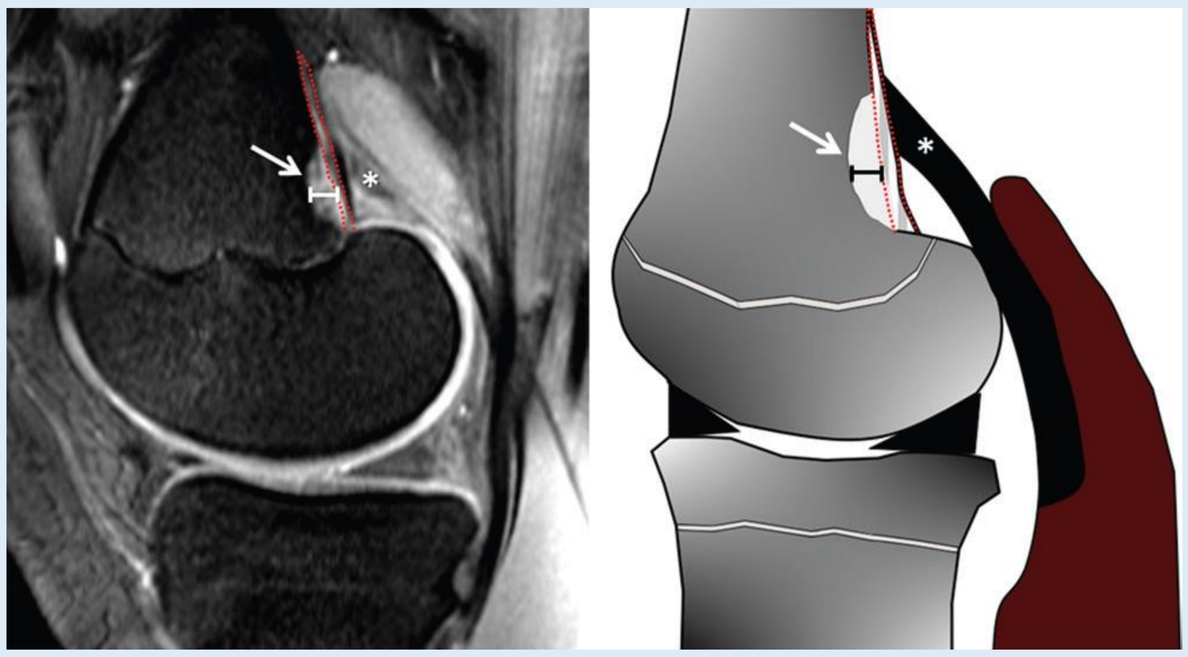
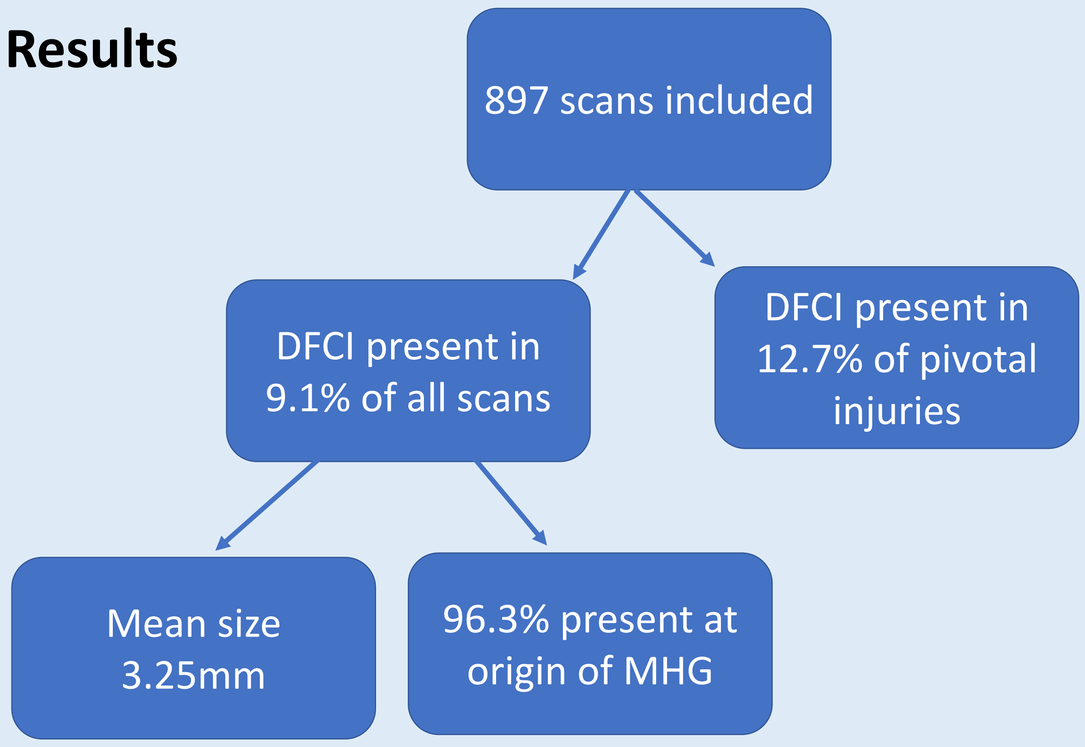
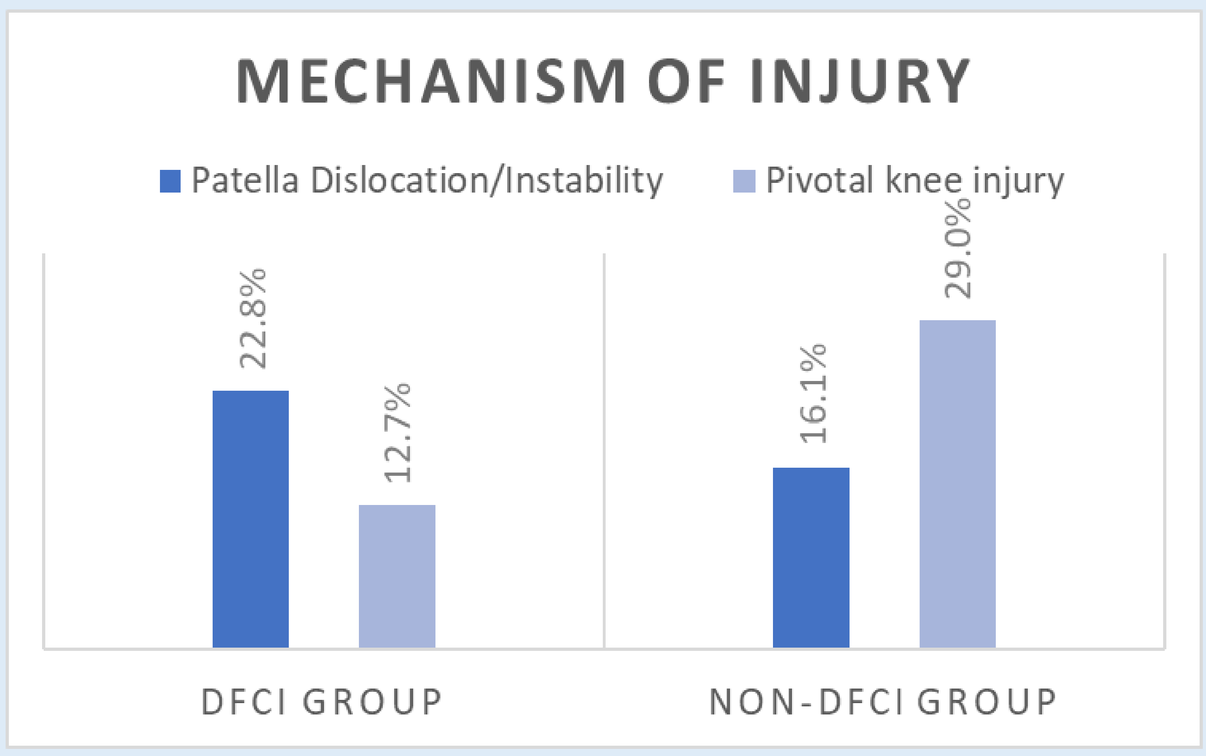


Image shows measuring technique for DFCI (3).

Results



The group that experienced a **DFCI were statistically significantly younger** than the group that had not experienced a DFCI (14.3 vs 15.4 years; P=0.002**), were more likely to be female** (68.3% vs 42.0%; p<0.001), and less likely to have experienced an ACL tear (P=0.023). There was a statistically significant difference between groups in the mechanism of injury (P=0.015); those that experienced a DFCI were more likely to have a patella instability / dislocation (22.8% vs 16.1%), **whilst less likely to have had a pivotal knee injury (12.7% vs 29.0%).** Multivariate analysis demonstrated that only statistically significant differences between the DFCI groups in sex remained (P<0.001).



Conclusions

- **DFCI is present in around 9% of adolescent patients.**
- **It is benign and should remain conservatively managed.**
- **It is not significantly associated with pivotal knee injuries, only being present in 12.7%.**
- **Younger, female patients are more likely to have a DFCI due repetitive stress at the origin of the MHG. This could be due to a biomechanical difference in young females compared to males.**

References

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2. La Rocca Vieira R, Bencardino JT, Rosenberg ZS, Nomikos G. MRI Features of Cortical Desmoid in Acute Knee Trauma. Am J Roentgenol. 2011 Feb;196(2):424–8.
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