Poster 122

T1ρ Relaxation Times Indicate Cartilage Degradation for Adolescents Following MPFL Reconstruction

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Disclosures

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- No other conflicts of interest related to this study

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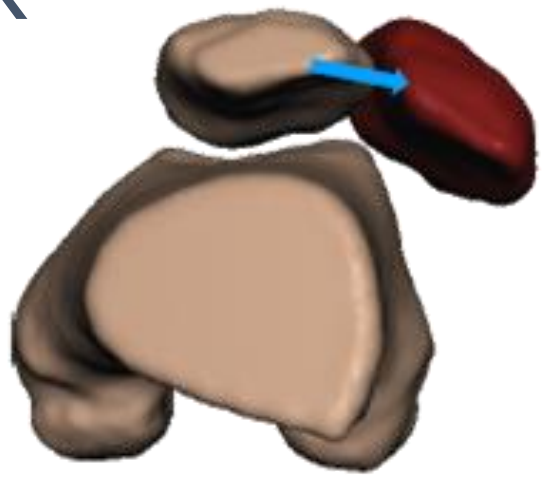
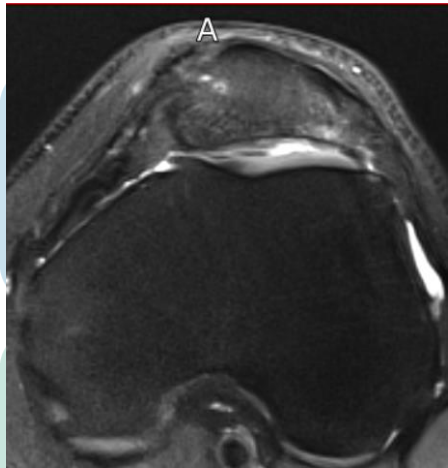
Patellar Dislocations and OA

- Patellar dislocation → post-traumatic OA
- 8x increased risk of patellofemoral OA [1]
- 4.5x additional increase in risk of OA following multiple dislocations
- 4x additional increase in risk of OA for adolescents





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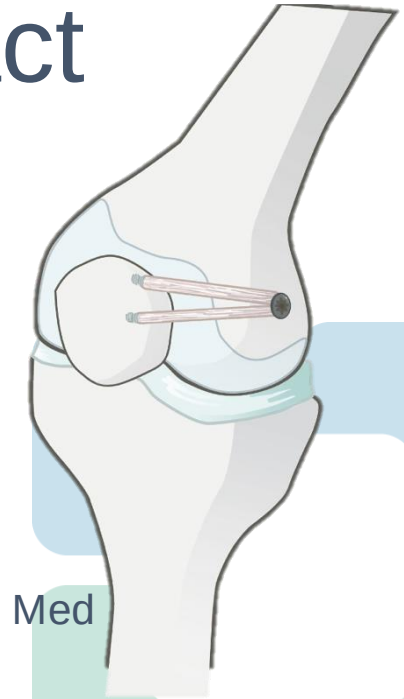
1. Sanders et al. Am J Sports Med 45:1012–7

MPFL Reconstruction

- Increasingly being used to stabilize patella for adolescents
- Preventing additional dislocations spares cartilage from ongoing traumatic impact
- Progressive cartilage degradation for more than 40% of patients following MPFL reconstruction [2]



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2. Wong et al. Skeletal Radiol 50:981-991

Kreulen et al. Ortho J Sports Med 12:23259671241235597

Study Aims

- Characterize cartilage properties for adolescents following MPFL reconstruction
- Comparison to healthy knees & conservative treatment

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Subjects

- IRB approval
- Healthy controls
  - 7 males, 8 females, 13-24 years old
- Patients treated for patellar dislocations at 13-19 years old, ≤ 23 years old for evaluation
- Conservative treatment
  - 7 males, 13 females, 6 for multiple dislocations, 0.5-3.5 years since most recent dislocation
- MPFL reconstruction
  - 7 males, 10 females, 15 treated for multiple dislocations, 0.5-5.7 years following surgery

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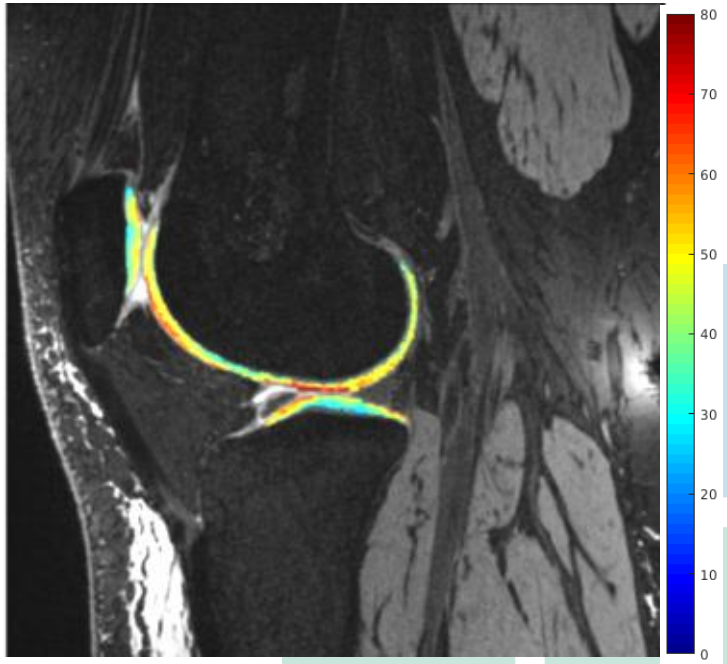
Cartilage Degradation

- 3T MRI with a knee coil
  - 3D DESS and T1ρ relaxation time scans [3]
- T1ρ relaxation times inversely related to proteoglycan content
- T1ρ relaxation times mapped to cartilage
- Average T1ρ relaxation times for patella & trochlear groove

T1ρ Mapped to Cartilage



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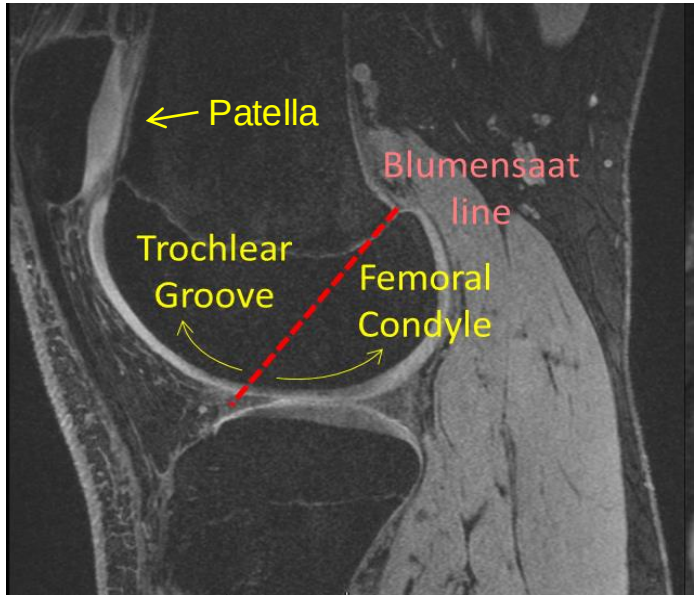
3. Elias et al. Cartilage 2022;13:19476035221102570.

Data Analysis

- Average T1ρ relaxation times for patella & trochlear groove
- T1ρ relaxation times compared between 3 groups
  - ANCOVA treating age as a co-variate and Bonferroni post-hoc tests



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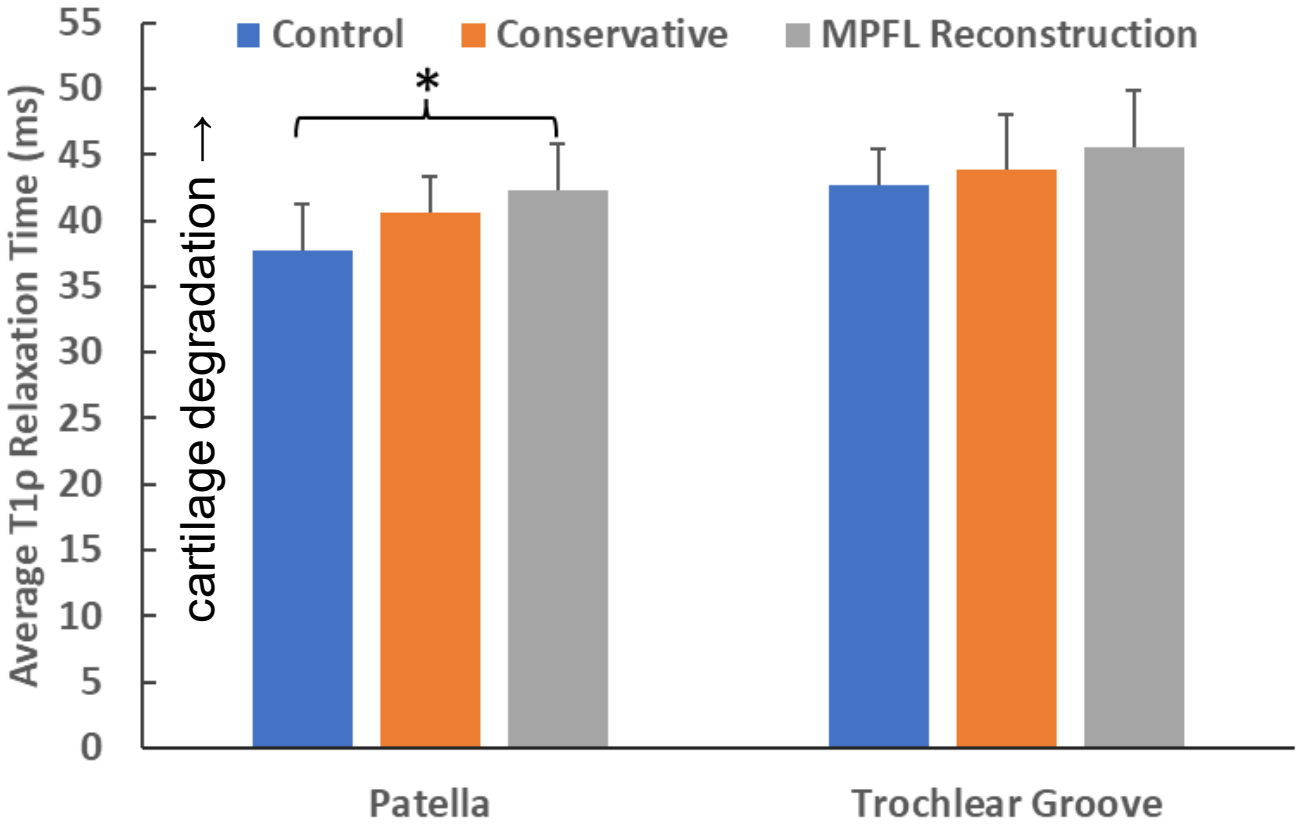
T1ρ Relaxation Times

- Average T1ρ relaxation times largest for MPFL reconstruction
- MPFL reconstruction > controls for patella ($p = 0.003$)
- No other significant differences ($p > 0.1$)



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Discussion

- T1ρ relaxation times indicate degradation within the cartilage matrix following MPFL reconstruction over the whole patella, as compared to healthy controls
- Early degradation could potentially progress to post-traumatic osteoarthritis

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Discussion

- Cartilage degradation may be greater for MPFL reconstruction group than conservative treatment prior to surgery
- Longer term follow up needed to relate choice of conservative treatment vs. MPFL reconstruction to risk of post-traumatic osteoarthritis

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Conclusion

- Early cartilage degradation does not support MPFL reconstruction as a treatment option for cartilage preservation, but longer term follow up is needed

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