UC DAVIS HEALTH | Department of Orthopaedic Surgery

Medial Meniscus Tears with “Grammar Signs” Benefit from Operative Intervention in the Setting of Early Arthritis

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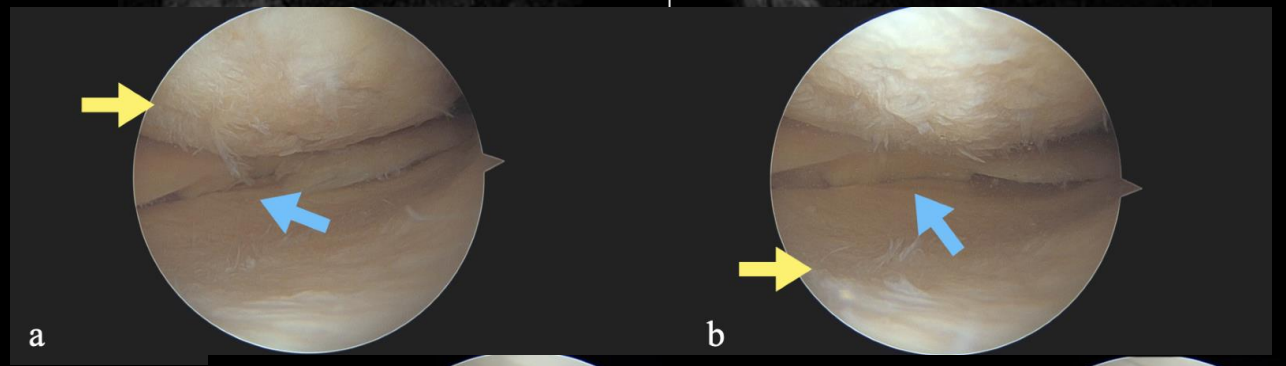
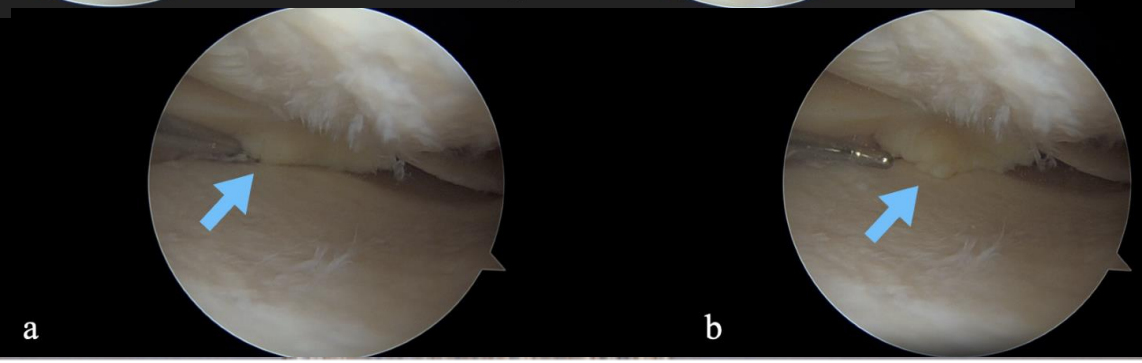
Introduction

- Indications for arthroscopic partial meniscectomy (APM) for degenerative meniscus tears remains a topic of debate[1]
- Particularly in the setting of existing osteoarthritis[2]
- Debilitating mechanical symptoms and pain refractory to conservative management
- Meniscal “Grammar Signs” – commonly associated with debilitating pain and mechanical symptoms[3]
- Important to recognize on MRI as easily missed on diagnostic arthroscopy

Comma Sign[4]

Apostrophe Sign[3]





Methods

- Patients with MRI diagnosed medial meniscus tears from a single institution from July 2018 to August 2023
- Meniscal grammar signs identified on T2-weighted coronal imaging reviewed by two orthopedic surgeons
- Plain radiographs at time of presentation and classified using the Kellgren and Lawrence system for OA grade
- Patient characteristics and clinical outcomes gathered from chart review
- Chi-squared analysis

Results

- 41 patients (9.0% of 453 patients with medial meniscus tears)
- Only 39.0% of the cohort presented with mechanical symptoms, but with a significantly higher rate in the operative group (X^2=5.47, p=0.019)
- Most patients (74.4%) had evidence of minimal arthritis (KL stage 1-2)
- Distribution of arthritis grade between the non-operative and operative groups was not significantly different (X^2=0.996, p=0.802)

Examination and Imaging Findings

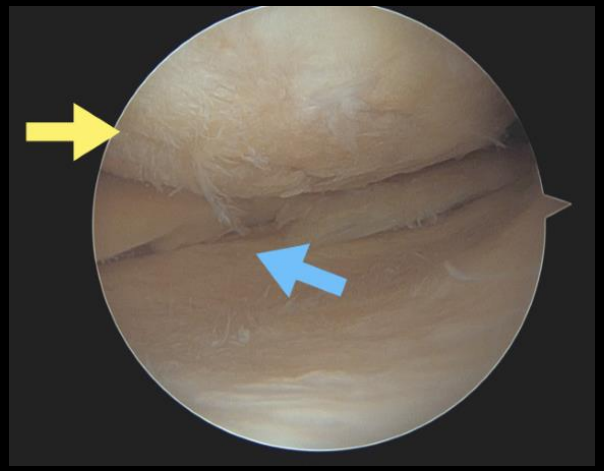
	Operative group	Non-operative group	p
Number of patients % (n)	65.9% (27/41)	34.1% (14/41)	
Examination findings:			
Mechanical symptoms % (n)	51.9% (14/27)	14.3% (2/14)	0.019 *
Positive meniscal tests* % (n)	100% (25/25)	83.3% (10/12)	0.032 *
KL stage^:			
Stage 0 % (n)	15.4% (4/26)	15.4% (2/13)	
Stage 1 % (n)	42.3% (11/26)	30.8% (4/13)	0.802
Stage 2 % (n)	30.8% (8/26)	46.2% (6/13)	
Stage 3 % (n)	11.5% (3/26)	7.7% (1/13)	

*3 patients did not have meniscal tests recorded in their medical notes

^2 patients did not have plain radiographs

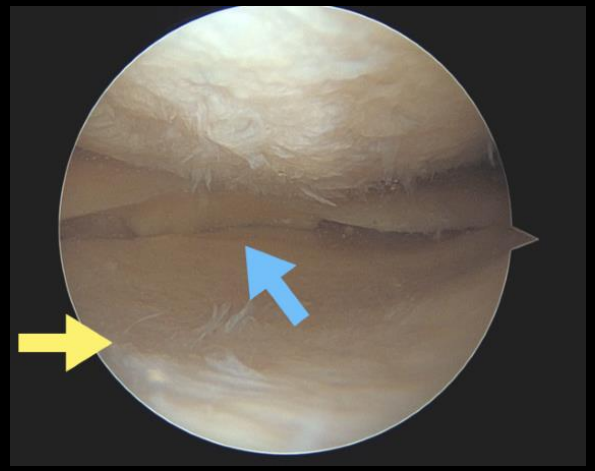
Results

74.1% (n=20) of operatively treated patients had chondromalacia (ICRS grades 1-3) in the medial compartment.



Arthroscopic ICRS grading of chondromalacia

	Medial femoral	Medial tibial plateau
Grade 0 % (n)	26.9% (7)	34.6% (9)
Grade 1 % (n)	30.8% (8)	34.6% (9)
Grade 2 % (n)	11.5% (3)	3.8% (1)
Grade 3 % (n)	30.8% (8)	7.7% (2)
Grade 4 % (n)	0	0

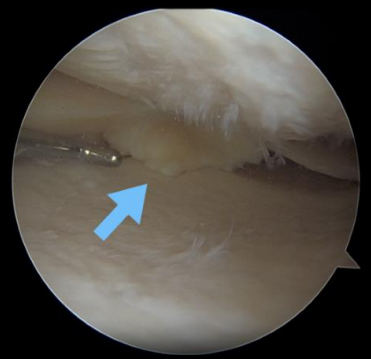


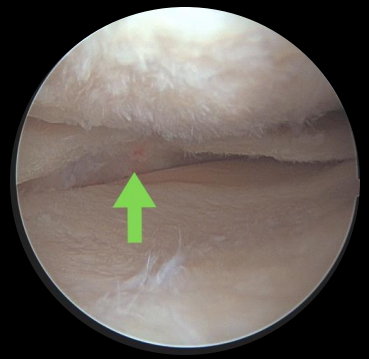
Results

Pain ratings at latest follow-up (mean follow up 252 days)			
	Operative group	**Non-operative group**	**p**
No pain % (n)	29.6% (8/27)	21.4% (3/14)	0.002 *
Minimal or well controlled pain % (n)	55.6% (15/27)	7.1% (1/14)	
Persistent pain but decreased % (n)	3.7% (1/27)	42.9% (6/14)	
Persistent pain unchanged or worsened % (n)	11.1% (3/27)	14.3% (2/14)	

Discussion

- Largest comprehensive study assessing clinical findings and outcomes associated with meniscal “grammar signs”
- Although “grammar signs” have a close association with early arthritis (grade 1-3 chondromalacia), a decrease in post operative pain suggests favorable outcomes with APM





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