<h4>Medial Meniscus Tears with "Grammar Signs" Benefit from Operative Intervention in the Setting of Early Arthritis</h4>

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INTRODUCTION: Arthroscopic partial meniscectomy (APM) for meniscus tears with concomitant degenerative joint disease remains a topic of debate. Meniscal “grammar signs” are distinct tear patterns on magnetic resonance imaging (MRI), described as inferior or superior displacement of a parrot beak flap tear into the medial gutter. Our study aimed to characterize clinical findings associated with “grammar signs”, particularly medial compartment articular degeneration, and compare outcomes of operative versus non-operative management.

METHODS: A retrospective review was conducted on patients with medial meniscus tears at a single institution from July 2018 to August 2023. T2-weighted coronal images were reviewed to identify patients with a meniscal “grammar sign” and plain radiographs were reviewed for osteoarthritis stage. Associated chondromalacia was noted from MRI and operative reports. Clinical characteristics and outcomes were determined through chart review.

RESULTS: Out of 41 patients with a “grammar sign”, 27 (65.9%) underwent APM. 14 patients (51.9%) in the operative group presented with mechanical symptoms, compared to only 2 (14.3%) in the non-operative group (χ^2=5.47, p=0.019). 29 patients (74.4%) had arthritis KL stages 1-2 and 27 patients (65.9%) had medial chondromalacia per radiology report. The distribution of arthritis and chondromalacia grades did not differ between treatment groups. 74.1% of patients had chondromalacia (ICRS grades 1-3) in the medial compartment per operative reports. Most patients who underwent APM had minimal (56%) to no pain (29%) at final follow-up. The operative group had significantly lower pain ratings at final follow-up (χ^2=14.7, p=0.0021).

DISCUSSION AND CONCLUSION: This study is the largest to comprehensively assess clinical findings and outcomes associated with meniscal “grammar signs”. Pain refractory to conservative management and mechanical symptoms are important factors when indicating patients for surgery. Although “grammar signs” have a close association with grade 1-3 chondromalacia, the decreased pain with operative intervention suggests favorable outcomes with APM, even in the setting of early osteoarthritis.

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)	0.802
Stage 1 % (n)	42.3% (11/26)	30.8% (4/13)	
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

Pain ratings at latest follow-up

	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)