

# Diagnostic validity of combining history elements and physical tests for traumatic and degenerative symptomatic meniscal tears

Décary S, Fallaha M, Pelletier B, Belzile S, Frémont P, Martel-Pelletier J, Pelletier J-P, Feldman D, Sylvestre M-P, Vendittoli P-A, Légaré F, Desmeules F.

Preventing Overdiagnosis 5<sup>th</sup> International Conference

Canada, Quebec, August 2017

Université   
de Montréal

Centre intégré  
universitaire de santé  
et de services sociaux  
de l'Est-de-  
l'Île-de-Montréal  
Québec 

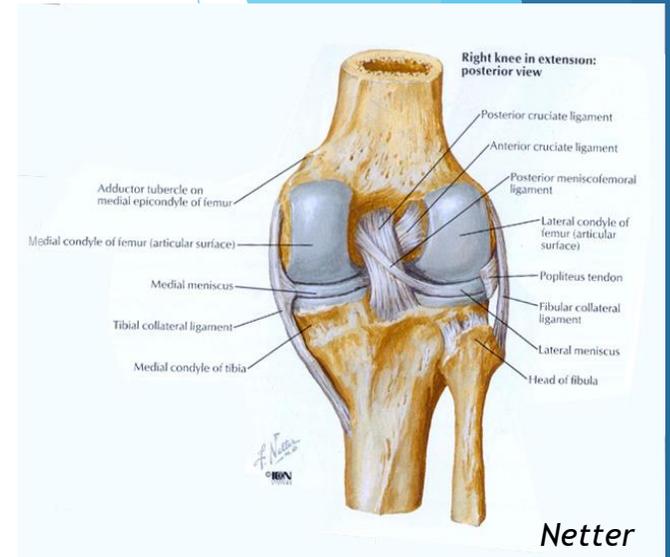


UNIVERSITÉ  
L'AVAL

Centre intégré  
universitaire de santé  
et de services sociaux  
de la Capitale-Nationale  
Québec 

# Background

- ▶ Distributing compression and pivotal forces for joint stability in activities and sports.
- ▶ Meniscal tears: traumatic or degenerative onset
- ▶ Overreliance on MRI for the diagnosis of knee pain (INESSS, 2017)
  - ▶ Overdiagnosis of asymptomatic meniscal tears (Englund, 2008)
  - ▶ Overuse of knee arthroscopies (Mather, 2015)



# Background

- ▶ Choosing Wisely - CASEM recommendation
- ▶ Emphasis on appropriate history elements and physical tests (Decary, 2016)?

**1** Don't order an MRI for suspected degenerative meniscal tears or osteoarthritis (OA).

**Choosing  
Wisely  
Canada**



# Objective

- ▶ To assess the validity of diagnostic clusters combining history elements and physical tests to diagnose or exclude symptomatic meniscal tears (SMT) compared to other knee disorders.

# Methods

- ▶ QUADAS and STARD.
- ▶ 279 prospective new patients consulting for any knee complaint; 359 primary and secondary diagnoses.
- ▶ Two orthopaedic clinics, two family medicine clinics, university community.
- ▶ **Index tests:** standardized musculoskeletal examination including history elements and physical tests obtained by a blinded physiotherapist.
  - ▶ Mechanical symptoms (locking, catching), JLT, McMurray, Thessaly.
- ▶ **Reference standard:** independent expert physicians' composite diagnosis including both physical tests and MRI for all SMT cases.

# Statistical methods

- ▶ LASSO and recursive partitioning to develop diagnostic clusters
  - ▶ Sensitivity, specificity, predictive values and likelihood ratios

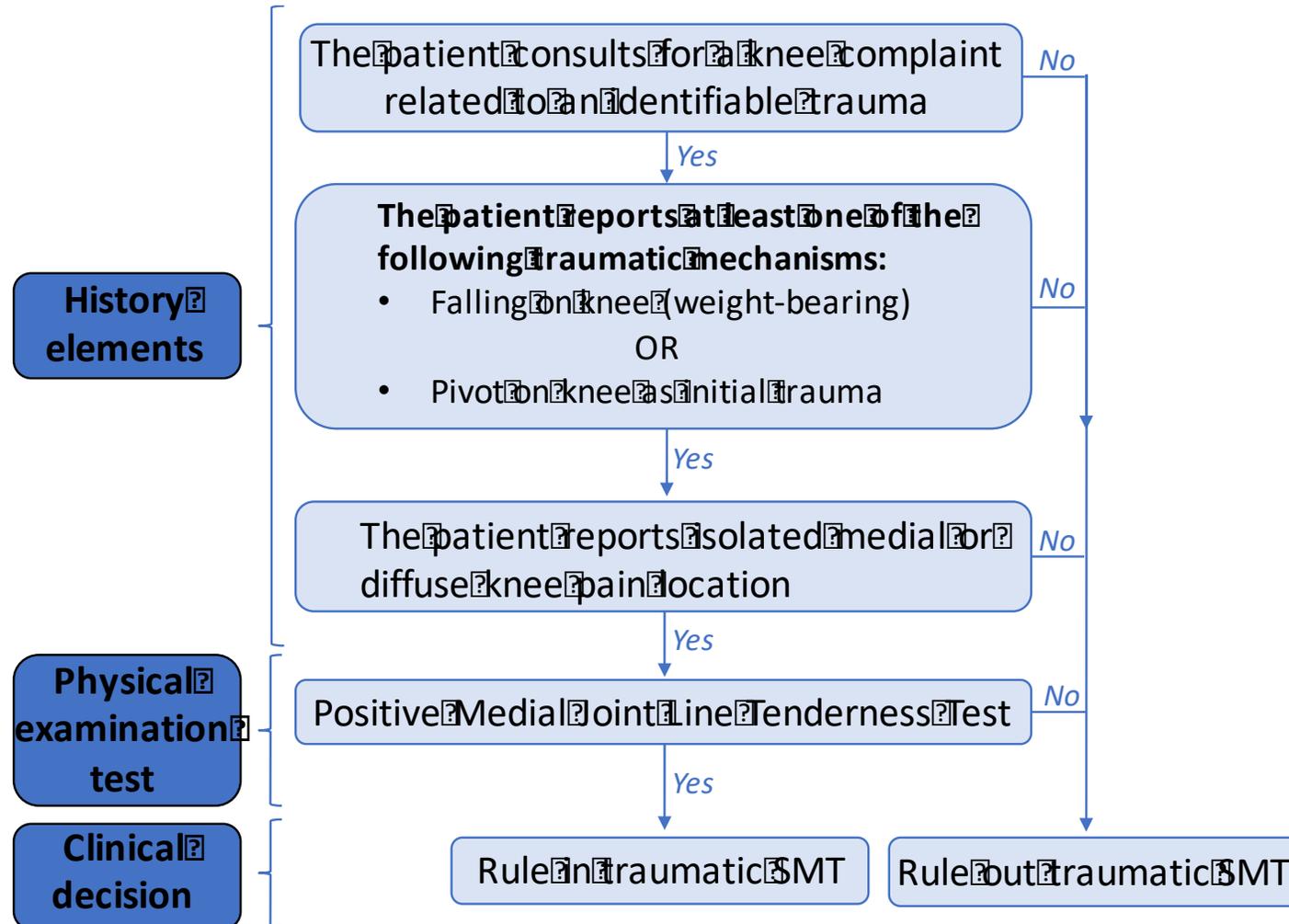
LR+	LR-	Interpretation
>10	<0.1	Generate large and often conclusive shifts in probability
5-10	0.1-0.2	Generate moderate shifts in probability
2-5	0.2-0.5	Generate small but sometimes important shifts in probability
1-2	0.5-1	Alter probability to a small and rarely important degree

Modified from Jaeschke et al<sup>17</sup>.

# Characteristics of patients with a knee complaint (n=279)

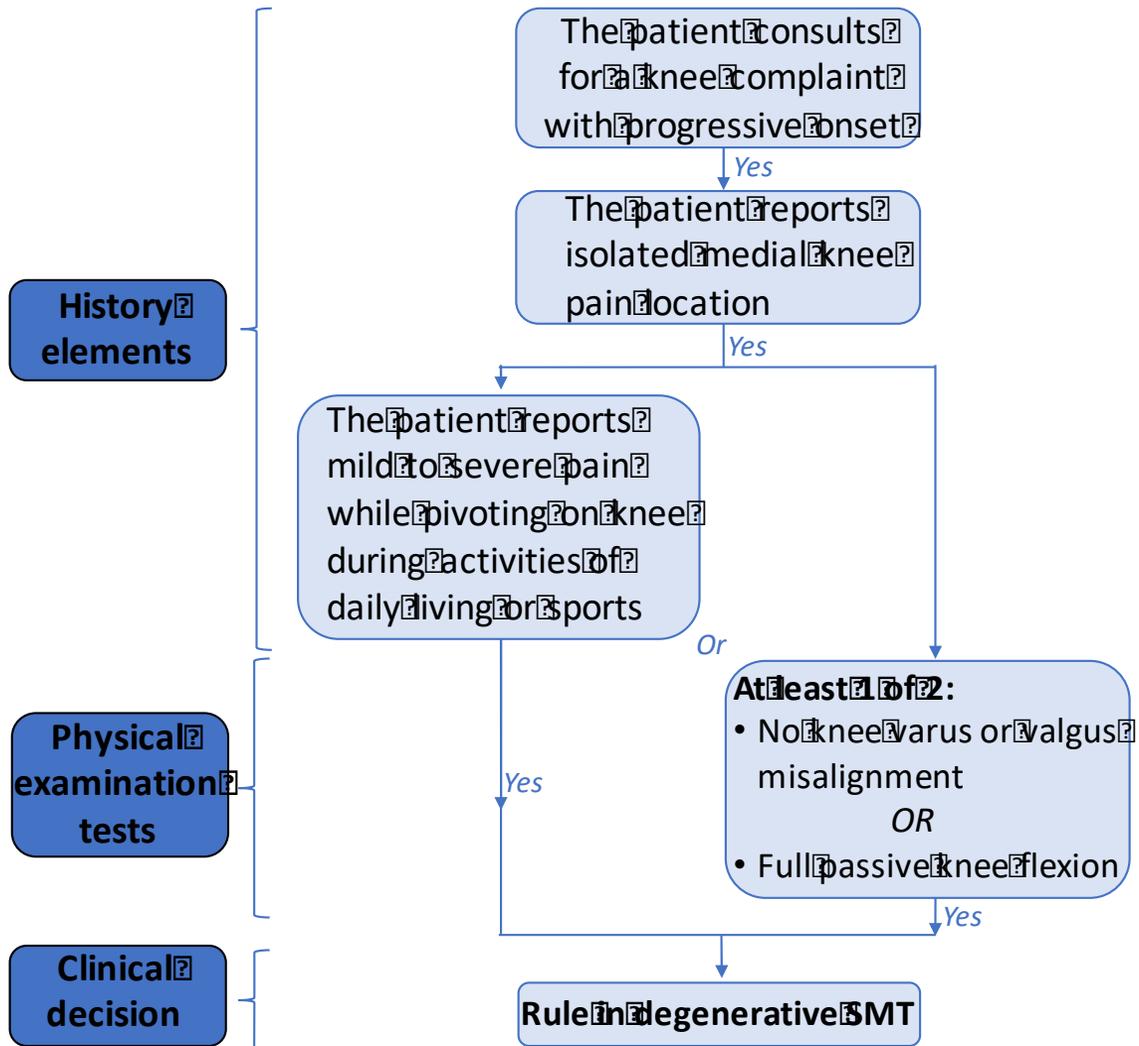
Characteristics	Traumatic SMT (n=35)		Degenerative SMT (n=45)		Other diagnoses (n=199)	
	n(%)	mean(SD)	n(%)	mean(SD)	n(%)	Mean(SD)
Age		45.4(13.9)		49.1(11.6)		49.8(16.9)
Body Mass Index (Kg/m <sup>2</sup> )		28.1(5.7)		28.8(4.6)		29.7(6.9)
Female gender	18(51.4)		22(48.9)		121(60.8)	
History of trauma	35(100.0)*†		0(0.0)‡		52(26.1)	
Duration of pain at time of consultation						
<3 months	9(25.7)*		5(11.1)		20(10.1)	
3-12 months	15(42.9)*		18(40.0)§		39(19.6)	
>12 months	11(31.4)*		22(48.9)§		140(70.3)	
Referred to surgery after consultation	12(34.3)*		11(24.4)		25(12.6)	
SMT primary diagnosis	21(60)		33(73)			
SMT alone with no other knee disorder	10(29)		16(36)			
SMT combined with ACL tear	13(37)		5(11)			
SMT combined with osteoarthritis	3(9)		18(40)			
Medial meniscal tear	31(89)		41(91)			

# Traumatic meniscal tears



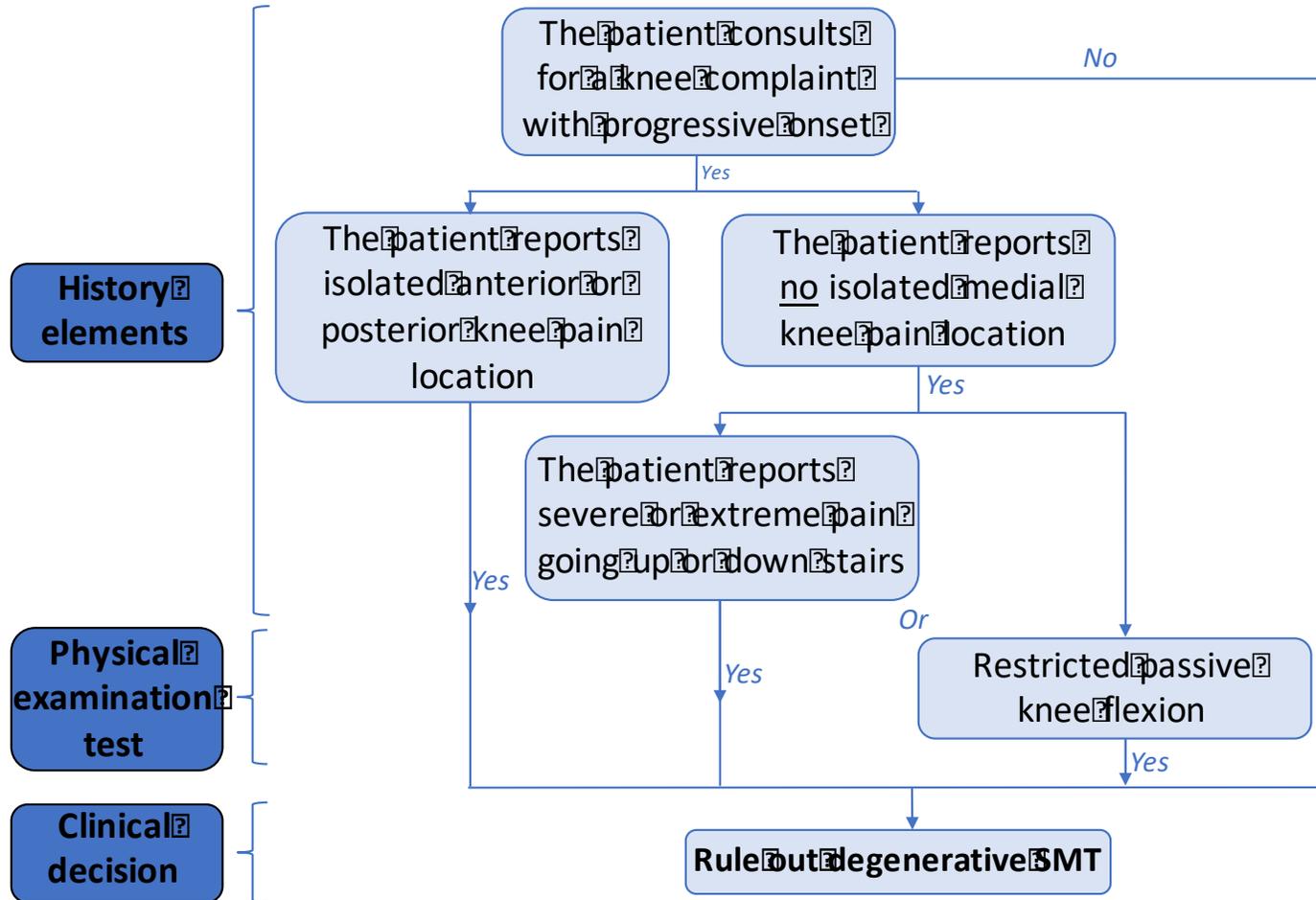
Se	Sp	NPV	PPV	LR-	LR+
0.91 (0.77-0.98)	0.90 (0.85-0.93)	0.99 (0.96-1.00)	0.56 (0.42-0.69)	0.10 (0.03-0.28)	8.92 (6.07-13.11)

# Degenerative SMT (High Sp)



Se	Sp	PPV	LR+
0.58 (0.42-0.72)	0.91 (0.87-0.94)	0.55 (0.40-0.70)	6.44 (3.99-10.39)

# Degenerative SMT (High Se)



Se	Sp	NPV	LR-
<b>0.93</b> (0.82-0.99)	<b>0.65</b> (0.59-0.71)	<b>0.98</b> (0.94-1.00)	<b>0.10</b> (0.03-0.31)

# Conclusions

- ▶ Diagnostic clusters were able to accurately discriminate between SMT and non-SMT individuals without systematically relying on MRI.
- ▶ History elements included onset of pain, traumatic mechanism, pain location, pain while pivoting during activities.
- ▶ Physical tests included: Joint Line tenderness, valgus/varus knee alignment, knee flexion passive range of motion.
- ▶ Common mechanical history elements and physical tests were not associated with the diagnosis of SMT.
- ▶ Next step: external validation is warranted. Build clusters into a training program to support the recommendations.