

# Implementation of Fuzzy Logic Systems into Diagnosing Acute and Degenerative Meniscal Tears

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## Opinion

It is well recognized that the meniscal tears are among the most common knee disorders.<sup>1-4</sup> In fact, arthroscopic partial meniscectomy (APM) is the most routinely performed orthopedic operation, carried out on one million patients annually in the US.<sup>1,2,4</sup> Meniscal tears are also risk factors for subsequent development and progression of knee osteoarthritis (OA) at least 4-fold rate<sup>2</sup> While often asymptomatic,<sup>2</sup> meniscal tears can cause considerable disability and pain, prompting substantial resource utilization. Magnetic resonance imaging (MRI) has become the gold standard for accurate noninvasive evaluation of internal pathologies of the knee. However, it is still an expensive diagnostic tool, plus the newest body of evidence reports a significant amount of false positive results.<sup>5,6</sup> A detailed, focused history and comprehensive physical examination still considered the cornerstones of the diagnosis of meniscal injuries. Conversely, the outputs of the physical examination are usually quite ambiguous / equivocal<sup>7-9</sup> regarding complex even simpler patterns of knee soft tissue injuries, arousing the necessity of a complete different perspective to tackle the problem. That can be achieved inserting into the equation the “fuzzy logic systems” “realm of cybernetics. We believe it is possible to create dynamic, non - linear systems of algorithmic diagnosis, that could evolve and be reprogrammed in correspondence to the inputs and the feedback of the experts in the field of sports medicine and more importantly, to reach and perhaps surpass in accuracy the MRI diagnostic modality, hence providing a useful tool to the armamentarium of the clinician.<sup>10,11</sup>

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## Conflicts of Interest

None.

## References

1. Niu NN, Losina E, Martin SD, et al. Development and Preliminary Validation of a Meniscal Symptom Index. *Arthritis Care Res (Hoboken)* . 2011;63(2):208–215.
2. Snoeker BA, Bakker EW, Kegel CA, et al. Risk factors for meniscal tears: a systematic review including metaanalysis. *J Orthop Sports Phys Ther*. 2013;43(6):352–367.
3. Kocabey Y, Tetik O, Isbell WM, et al. The value of clinical examination versus magnetic resonance imaging in the diagnosis of meniscal tears and anterior cruciate ligament rupture. *Arthroscopy*. 2004;20(7): 696–700.
4. Lohmander LS, Thorlund JB, Roos EM. Routine knee arthroscopic surgery for the painful knee in middle-aged and old patients-time to abandon ship. *Acta Orthopaedica* . 2015;87(1): 2–4.
5. De Smet AA, Nathan DH, Graf BK, et al. Clinical and MRI Findings Associated with False-Positive Knee MR Diagnoses of Medial Meniscal Tears. *AJR Am J Roentgenol*. 2008;191(1):93–99.
6. Crawford R, Walley G, Bridgman S, et al. Magnetic resonance imaging versus arthroscopy in the diagnosis of knee pathology, concentrating on meniscal lesions and ACL tears: a systematic review. *Br Med Bull* . 2007;84: 5–23.
7. Navali AM, Bazavar M, Mohseni MA, et al. Arthroscopic evaluation of the accuracy of clinical examination versus MRI in diagnosing meniscus tears and cruciate ligament ruptures. *Arch Iran Med*. 2013;16(4): 229–232.
8. Solomon DH, Simel DL, Bates DW, et al. The rational clinical examination. Does this patient have a torn meniscus or ligament of the knee? Value of the physical examination. *JAMA* . 2001;286(13):1610–1620.
9. EJ Hegedus, C Cook, V Hasselblad, et al. Physical examination tests for assessing a torn meniscus in the knee: a systematic review with meta-analysis. 2014.
10. Yan R, Wang H, Yang Z, et al. Predicted probability of meniscus tears: comparing history and physical examination with MRI. *Swiss Med Wkly*. 2011;141: w13314.
11. U Bahr R, Krosshaug T. Understanding injury mechanisms: a key component of preventing injuries in sport. *Br J Sports Med*. 2005;39(6):324–329.