

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

Opinion

It is well recognized that the meniscal tears are among the most common knee disorders [1-4]. In fact, arthroscopic partial meniscectomy (APM) is the most routinely performed orthopedic operation, carried out on one million patients annually in the US [1,2,4]. Meniscal tears are also risk factors for subsequent development and progression of knee osteoarthritis (OA) at least 4-fold rate [2]. While often asymptomatic, [2] 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 [5,6]. 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 [7-9] 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 [10,11].

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Panagiotis Poulios*

University Hospital of Patras, Greece

*Corresponding author: Panagiotis Poulios, University Hospital of Patras, Greece, Email: panpoulios@gmail.com

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