



## Original Article

# Evaluation of clinical tests and magnetic resonance imaging for knee meniscal injuries: correlation with video arthroscopy<sup>☆</sup>



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## ABSTRACT

**Objective:** To determine the specificity, sensitivity, accuracy, likelihood, and correlation of the findings of meniscal tests and magnetic resonance imaging (MRI) to knee video arthroscopy. **Methods:** A cross-sectional study, conducted between June and December 2015, which evaluated 84 patients with meniscal tears (MT) selected for video arthroscopy. Two orthopedic trainees and a resident performed a physical examination with specific tests. The results and reports from MRI were compared with arthroscopy findings. The data were analyzed in the statistical program R.

**Results:** The Steinmann I test was the most specific, with specificity of 86% and 91% for medial meniscus tears (MMT) and lateral meniscus tears (LMT), respectively. With regard to accuracy, the pain test on palpation of the joint interline (PPJI) showed values of 67% and 73% for detection of MMT and LMT, respectively. The PPJI test showed higher sensitivity, with a 77% chance of detecting MMT. Analysis of the set of three tests (McMurray, PPJI, and Steinmann I) compared to arthroscopy showed 85% sensitivity for MMT and 70% sensitivity for LMT. MRI showed a greater specificity for the diagnosis of MMT and LMT; the values were 82% and 91%, respectively.

**Conclusion:** The combination of the three tests shows better results compared to the isolated tests and thus can be associated to the MRI to make an effective diagnosis. However, further studies assisting in the development of a protocol to standardize diagnostic evaluation are required.

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## Avaliação dos testes clínicos e da ressonância magnética para lesões meniscais do joelho: correlação com a videoartroscopia

### R E S U M O

#### Palavras-chave:

Exame físico

Joelho

Artroscopia

Ressonância magnética

**Objetivo:** Determinar a especificidade, sensibilidade, acurácia, razão de verossimilhança e correlação dos achados dos testes meniscais e da ressonância magnética (RM) com a videoartroscopia do joelho.

**Métodos:** Estudo transversal feito entre junho e dezembro de 2015. Avaliaram-se 84 pacientes selecionados para tratamento videoartroscópico das lesões meniscais (LM). Dois ortopedistas especializados em cirurgia do joelho e um residente em ortopedia fizeram o exame físico com testes específicos. Os resultados obtidos e laudos da RM foram comparados com os achados da videoartroscopia. Os dados foram tratados no programa estatístico R.

**Resultados:** O teste de Steinmann I foi mais específico, com especificidade de 86% e 91% para lesões de menisco medial (LMM) e lesões de menisco lateral (LML), respectivamente. Quanto à acurácia, o teste de dor à palpação da interlinha articular (DPIA) apresentou valores de 67% e 73% para detecção de LMM e LML, respectivamente. O teste de DPIA apresentou maior sensibilidade, com 77% de chance de detectar LMM. A análise do conjunto de três testes (McMurray, DPIA e Steinmann I) comparada com a videoartroscopia apresentou 85% de sensibilidade para as LMM e 70% de sensibilidade para as LML. A RM apresentou maior especificidade para o diagnóstico de LMM e LML; 82% e 91%, respectivamente.

**Conclusão:** O conjunto dos três testes apresentou melhores resultados se comparado com os testes isolados e pode ser associado à RM para elaboração de um diagnóstico efetivo. Entretanto, são necessários outros estudos que auxiliem na elaboração de um protocolo para padronizar a avaliação diagnóstica.

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## Introduction

Meniscal tears (MT) are caused by excessive compression and shear forces on normal or degenerate menisci. The exact incidence and prevalence of MT are unknown and there is no correlation with ethnicity. They are usually more common in young male athletes. A second peak of incidence is seen in people over the age of 55 because the degenerated meniscus is more susceptible to tears from low energy trauma.<sup>1</sup>

The diagnosis is made by medical history and physical examination, and complemented by magnetic resonance imaging (MRI). Kocabey et al.<sup>2</sup> evaluated the pain tests on palpation of the joint line (PPJL), and found that all of these tests had an accuracy of 80% for medial meniscus tear (MMT) and 92% for lateral meniscus tear (LMT). In addition, Harrison et al.,<sup>3</sup> in their study for validation of the Thessaly test, found that, when positive, sensitivity was 90.3% and specificity was 97.7%, confirmed through video arthroscopy.

Imaging analyses have made the diagnosis of MT more precise, and MRI is the exam of choice because it is highly accurate.<sup>2,4</sup> Regarding the therapeutic methods, video arthroscopy is less aggressive and provides a postoperative period with a lower rate of complications.<sup>2</sup> In the face of technological advances in the diagnosis of MT, the search for an effective approach that is comfortable and easy for the physician and the patient is inevitable.

The aim of this study was to determine the specificity, sensitivity, accuracy, likelihood ratio and correlation of meniscal and MRI findings with knee video arthroscopy.

## Material and methods

This is a cross-sectional study performed between June and December 2015 that evaluated patients undergoing video arthroscopy in the hospitals where the knee surgery and rehabilitation group of our hospital work. These hospitals attend patients of health plans, and private and public network patients. The evaluation was made through case history, specific tests and knee MRI. All patients were previously examined by four experienced surgeons, knee specialists, who indicated video arthroscopy.

Only after this evaluation were the patients with MT referred to video arthroscopic surgical treatment and thus included in the study. At this stage, a preoperative physical examination was performed by two specialists in knee surgery and an orthopedics and traumatology resident physician that received specific training to standardize the examination. These latter reviewers were masked to avoid bias. Next, the MRI reports were evaluated and the data for the study were taken from the reports issued by the respective radiologists. Knee MRI was made in several diagnostic centers in Belo Horizonte, state of Minas Gerais.

Regarding knee video arthroscopy, the patient was referred to the operating room and, after anesthesia, a sepsis, and

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