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The value of magnetic resonance imaging in diagnosing meniscal tears: A retrospective cohort study

Menisküs yırtıklarının tanısında manyetik rezonans görüntülemenin tanısal değeri: Retrospektif kohort çalışma

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Abstract

Aim: Diagnostic arthroscopy is an invasive and an expensive method using for the diagnosis of meniscal tears. The aim of this study was to determine the value of knee magnetic resonance imaging in the diagnosis of meniscal tears and its role in the prevention of unnecessary diagnostic arthroscopy.

Methods: A total of 105 patients who underwent knee magnetic resonance imaging and arthroscopy due to meniscus injury were included in the study. Fifty-nine patients were examined using a 1.5 Tesla magnetic resonance scanner and 46 were examined using a 3.0 Tesla magnetic resonance scanner. Magnetic resonance imaging findings were evaluated retrospectively in workstations by two radiologists experienced in musculoskeletal magnetic resonance imaging. Meniscal tears were reported as anterior horn tear, corpus tear or posterior horn tear. Meniscal tears were classified by using surgical classification. Each patient's magnetic resonance images were evaluated with a consensus and compared with the arthroscopic diagnosis.

Results: Meniscal tears were detected in 96 out of 106 knees on arthroscopy. By using arthroscopy as the gold standard for diagnosis of meniscal tears, the sensitivity, specificity, and accuracy values of the magnetic resonance imaging evaluation were found as 85.71% (95% CI: 77.84-91.61), 93% (95% CI: 86.11-97.14) and 89.15% (95% CI: 84.17-93), respectively. These values of magnetic resonance imaging were found high in the diagnosis of meniscal tears.

Conclusions: Magnetic resonance imaging is an effective imaging method in the diagnosis of meniscal tears. Although the resolution of 3.0 Tesla magnetic resonance imaging is higher, 1.5 Tesla magnetic resonance imaging is sufficient in routine meniscus tear diagnosis.

Keywords: Magnetic resonance imaging, Arthroscopy, Meniscus

Öz

Amaç: Tanısal artroskopi, menisküs yırtıklarının tanısında kullanılan invaziv ve pahalı bir yöntemdir. Çalışmamızın amacı; diz manyetik rezonans görüntülemenin, menisküs yırtıklarının tanısında tanısal değerini ve gereksiz tanısal artroskopinin önlenmesindeki rolünü belirlemektir.

Yöntemler: Çalışmaya, menisküs yaralanması nedeniyle diz manyetik rezonans görüntüleme ve artroskopi yapılan toplam 105 hasta dahil edildi. 59 hasta 1,5 Tesla manyetik rezonans tarayıcı kullanarak, 46 hasta ise 3,0 Tesla manyetik rezonans tarayıcı kullanılarak incelendi.

Manyetik rezonans görüntüleme bulguları, kas iskelet sistemi manyetik rezonans görüntülemede deneyimli iki radyolog tarafından iş istasyonlarında retrospektif olarak değerlendirildi. Menisküs yırtıkları; ön boynuz, gövde veya arka boynuz yırtıkları olarak raporlandırıldı. Menisküs yırtıkları, cerrahi sınıflama kullanılarak sınıflandırıldı. Her hastanın manyetik rezonans görüntüleri, değerlendirilip fikir birliği sağlandı ve artroskopi tanısı ile karşılaştırıldı.

Bulgular: Artroskopide, 106 dizin 96'sında menisküs yırtığı tespit edildi. Menisküs yırtığı tanısında, altın standart olarak artroskopi kullanılarak, manyetik rezonans görüntülemenin duyarlılık, özgüllük ve doğruluk değerleri sırasıyla; %85,71 (%95 CI: 77,84-91,61), %93 (%95 CI: 86,11-97,14) ve %89,15 (%95 CI: 84,17-93) bulundu. Menisküs yırtığı tanısında manyetik rezonans görüntülemenin tanısal değerleri yüksek bulundu.

Sonuçlar: Manyetik rezonans görüntüleme, menisküs yırtığı tanısında etkili bir görüntüleme yöntemidir. 3,0 Tesla manyetik rezonans görüntülemede imajların çözünürlüğü daha yüksek olsa da, rutin menisküs yırtığı tanısında 1,5 Tesla manyetik rezonans görüntüleme yeterlidir.

Anahtar kelimeler: Manyetik rezonans görüntüleme, Artroskopi, Menisküs

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Introduction

Magnetic resonance imaging (MRI) plays an important role in the evaluation of musculoskeletal diseases. MRI has been used successfully for imaging of knee joints since Reicher et al. [1] explained meniscal anatomy in detail in 1985 and they began to use MRI for the diagnosis of knee joint pathologies. MRI is a non-invasive diagnostic method. MRI enables observation of intra-articular and extra-articular structures of the knee joint concurrently [2].

There are many studies depicting the accuracy of MRI in meniscal pathologies by using arthroscopy as the gold standard. In most studies, arthroscopy was performed in different hospitals or by different surgeons, and there were no prospective protocols used to report the arthroscopic results. In our study, a protocol was designed previously for arthroscopic findings, and the same orthopedic team performed the arthroscopy in all cases.

The aim of our study was to determine the value of knee MRI in the diagnosis of meniscal tears and to evaluate the reasons behind false-positive and false-negative MRI findings.

Materials and methods

Study population

Our institutional review board approved the study (approval number: 2010-009). Between June 2010 and June 2011, knee MRI of 114 patients who underwent arthroscopy by the same team of orthopedists were included in the study. Nine patients with previous knee surgery were excluded from the study. The final study group therefore involved 105 patients (63 females and 42 males) with a mean age of 49.53 (range, 19-76) years. The time intervals between symptom onset and arthroscopic surgery, and between MRI and arthroscopic surgery were recorded. The history of trauma was also noted.

Arthroscopic evaluation

In the evaluation of arthroscopic findings, a protocol was designed previously by consensus of the radiologists and orthopedists performing the study.

MRI technique

Fifty-nine (56.1%) patients were examined using a 1.5 T MRI scanner (Signa Excite; GE Healthcare, Wisconsin, USA), and 46 (43.8%) were examined using a 3.0 T MRI scanner (Verio VB17; Siemens Healthineers, Erlangen, Germany). A QD extremity coil was used in the 1.5 T MR scanner and an 8-channel knee coil was used in the 3.0 T MRI scanner. Knees were imaged in the neutral position through putting them in extension. On the 1.5 T MRI scanner, gradient recalled echo (GRE) T2-weighted (T2*W) sequences in the axial plane were obtained, fast spin echo (FSE) T2-weighted (T2W) and fat suppressed proton density-weighted (PDW) sequences in the sagittal plane, and T1W and FSE fat suppressed T2W sequences in the coronal plane. The sequence parameters used in 1.5 T MRI are shown in Table 1. On the 3.0 T MRI scanner, turbo spin echo (TSE) fat suppressed PDW sequences in the axial plane were obtained, TSE T2W and fat suppressed PDW sequences in the sagittal plane, T1W and TSE fat suppressed T2W sequences in the coronal plane. The sequence parameters used in 3.0 T MRI are shown in Table 2. On both 1.5 T and 3.0 T MRI, the total durations of examination were between ten and fifteen minutes.

Table 1: Sequence parameters used in 1.5 Tesla MRI

Parameters	Axial GRE T2W*	Sagittal Fat Sat FSE-PDW	Sagittal FSE- T2W	Coronal Fat Sat FSE-T2W	Coronal FSE- T1W
Slice Thickness (mm)	4	4	4	4	4
Number of slices	20	20	20	16	16
Slice gap (mm)	1	1	1	1	1
Matrix	320×192	288×192	320×192	256×160	288×192
TR (ms)	485	2600	4500	3825	375
TE (ms)	15	22	85	85	15
Average (NEX)	1	2	3	3	1
FOV (cm)	18	18	18	16	16

MRI: magnetic resonance imaging, W: weighted, GRE: gradient recalled echo, Sat: saturation, FSE: fast spin echo, PD: proton density, mm: millimeter, TR: repetition time, ms: millisecond, TE: time to echo, NEX: number of excitations, FOV: field of view, cm: centimeter

Table 2: Sequence parameters used in 3.0 Tesla MRI

Parameters	Axial Fat Sat TSE-PDW	Sagittal Fat Sat TSE-PDW	Sagittal TSE-T2W	Coronal Fat Sat TSE-T2W	Coronal TSE- T1W
Slice Thickness (mm)	3	3	3	3	3
Number of slices	25	25	25	25	25
Slice gap (mm)	0.3	0.6	0.6	0.3	0.3
Matrix	384×326	384×288	448×336	448×358	384×288
TR (ms)	2730	3800	4000	4230	550
TE (ms)	34	34	90	86	17
Average (NEX)	2	2	1	2	1
FOV (cm)	16	16	16	16	16

MRI: magnetic resonance imaging, Sat: saturation, TSE: turbo spin echo, PD: proton density, W: weighted, mm: millimeter, TR: repetition time, ms: millisecond, TE: time to echo, NEX: number of excitations, FOV: field of view, cm: centimeter.

Analysis of MRI imaging

MRI images were evaluated retrospectively on two workstations (Advantage V 4.1; GE Healthcare, Wisconsin, USA and Siemens satellite console; Siemens Healthineers, Erlangen, Germany) by two radiologists who had five and sixteen years' experience in musculoskeletal imaging, respectively. The radiologists were blinded to the arthroscopy findings. Each patient was evaluated through a consensus between these two radiologists.

The presence of intrameniscal signal increase related to one joint surface or free margin in two or more sequential images or both on coronal and sagittal images, or the presence of an abnormal meniscal morphology in the absence of meniscal surgery was evaluated as definite meniscal tear on MRI. Meniscal tears were defined as anterior horn, corpus or posterior horn tears according to their locations. On both MRI and arthroscopy, surgical classification was used, and meniscal tears were classified as radial, flap, horizontal, longitudinal, bucket-handle and complex tears.

Statistical analysis

Data analysis was performed using the SPSS 20.0 package program (IBM Corp.). The median, minimum, and maximum values of age, time interval between symptom onset and arthroscopic examination, and time interval between MRI and arthroscopic examination were calculated. Based on the arthroscopic findings, the diagnostic performance of MRI in the discrimination of patients with and without meniscal tears was evaluated using sensitivity, selectivity, and accuracy rates with a confidence interval (CI) of 95%. We also compared the diagnostic performance of 1.5 Tesla (T) and 3.0 Tesla (T) MRI in detecting meniscal tears in our study. Pearson's Chi-square test or Fisher's exact test was used to compare the sensitivity, specificity, and accuracy. An overall p value of less than 0.05 was considered to show statistical significance.

Results

Of 105 patients included in the study, 63 (60%) were females and 42 (40%) were males. Our study included 106 knees because both knees of one patient were included in the study. The mean age of the patients was 49.53 (range, 19-76) years. The duration from symptom onset and arthroscopic examination was between one day and 120 days (mean: 30.77 days). The duration from MRI and arthroscopic examination varied between three days and 365 days (mean: 56.52 days). Imaging was performed using a 1.5 T MRI device in 59 (56.1%) patients and with a 3.0 T MRI device in 46 (43.8%). There was history of trauma in 40 (38%) of the 105 patients.

According to data obtained from arthroscopy reports of the participants, meniscal tear was detected in 96 (90.5%) out of 106 knees. In arthroscopy, 61 (63.5%) of 96 knees with tears were detected in the medial meniscus, 19 (19.7%) in the lateral meniscus, and 16 (16.6%) in both lateral and medial menisci.

False-positive findings

According to the MRI findings, there were seven false-positive findings. Three were misdiagnosed as complex tears in the anterior or posterior horn of the lateral meniscus. Three patients had incorrect diagnoses of horizontal tears that extended to the inferior or superior surface of the posterior horn of the medial meniscus. The other case was misdiagnosed as a horizontal tear in the body and posterior horn of the lateral meniscus. Four false-positive findings were acquired in 1.5 T MRI. Three false-positive findings were acquired in 3.0 T MRI.

False-negative findings

According to MRI findings, there were 16 false-negative findings in which ten were in the medial meniscus, and six were in the lateral meniscus. All of the false-negative findings except two cases involved the body or posterior horns of the medial and lateral menisci. Two cases were in the anterior horn of the lateral meniscus. Of the 16 false-negative findings, six were complex, four were radial, five were horizontal tears, and one was a longitudinal tear. Ten false-negative findings were acquired in 1.5 T MRI. Six false-negative findings were acquired in 3.0 T MRI.

The diagnostic performance of MRI for the detection of patients with meniscal tears using arthroscopy as the gold standard is shown in Table 3. A comparison of diagnostic performance of MRI in detecting medial and lateral meniscal tears is shown in Table 4. A comparison of diagnostic performance of 1.5 T and 3.0 T MRI in detecting meniscal tears is shown in Table 5.

Table 3: Diagnostic performance of MRI for detection of the patients with meniscal tears by using arthroscopy as a gold standard

	Values (95% CI)
Sensitivity	85.71% (77.84-91.61)
Specificity	93% (86.11-97.14)
Accuracy	89.15% (84.17-93)

MRI: magnetic resonance imaging, CI: confidence interval.

Table 4: Comparison of diagnostic performance of MRI in detecting medial and lateral meniscal tears

	Medial Meniscus (95% CI)	Lateral Meniscus (95% CI)	p
Sensitivity	87.01% (77.41-93.59)	82.86% (66.35-93.44)	0.560
Specificity	89.66% (72.65-97.81)	94.37% (86.20-98.44)	0.410
Accuracy	87.74% (79.94-93.31)	90.57% (83.33-95.38)	0.508

MRI: magnetic resonance imaging, CI: confidence interval.

Table 5: Comparison of diagnostic performance of 1.5 Tesla and 3.0 Tesla MRI in detecting meniscal tears

	1.5 T MRI (95% CI)	3.0 T MRI (95% CI)	p
Sensitivity	84.62% (73.52-92.37)	87.23% (74.26-95.17)	0.696
Specificity	92.45% (81.79-97.91)	93.62% (82.46-98.66)	0.999
Accuracy	88.14% (80.90-93.36)	90.43% (82.60-95.53)	0.594

MRI: magnetic resonance imaging, CI, confidence interval.

Discussion

The use of MRI in the diagnosis of meniscal tears has become daily routine practice. The accuracy of MRI in the diagnosis of meniscal tears has been reported widely in the literature [3,4]. A meta-analysis including 19 prospective studies reported that the sensitivity and specificity of MRI and arthroscopy in the diagnosis of meniscal tears were 89% (95% CI: 83-94) and 88% (95% CI: 82-93), respectively, for medial meniscal tears, and 78% (95% CI: 66-87) and 95% (95% CI: 91-97), respectively, for lateral meniscal tears [5]. In our study, the diagnostic accuracy of MRI was found to be similar to the literature. As in some studies in the literature, the sensitivity of MRI in the diagnosis of meniscus tears in the lateral meniscus was found slightly lower than that of the medial meniscus in our study [5–9]. However, this result was not statistically significant (p = 0.560). In several studies, the reasons for this result were thought to be the complex anatomy of the point joining the anterior cruciate ligament (ACL) with the lateral meniscus, the presence of ACL tears, magic angle phenomenon, and insufficient imaging of the posterior horn of the lateral meniscus on MRI due to pulsation artifact [6,7,9].

In our study, similar to studies in the literature, the specificity of MRI was found to be high in the diagnosis of meniscal tears at 89.66% (95% CI: 72.65-97.81) and 94.37% (95% CI: 86.20-98.44) for medial and lateral meniscal tears, respectively. Therefore, it was put forward that MRI detected patients without meniscal tears with high accuracy. According to the results of our study, it may be suggested that arthroscopy is unnecessary in cases in which meniscal tears are not detected on MRI. It was reported that the use of MRI could be prevented in 51% of diagnostic arthroscopic procedures [10]. Another study revealed that pre-operative knee MRI examinations precluded the need for surgery in 42% of patients [11]. However, the clinical findings of patients are of great importance. Arthroscopy must be performed in cases with high clinical suspicion for meniscal tears because MRI cannot detect small tears in the free margins of the meniscus [12].

The spatial resolution of images obtained with 3.0 T MRI was higher than those obtained with 1.5 T MRI. However, there was no statistically significant difference in the diagnostic performance regarding meniscus tears between 1.5 T and 3.0 T MRI in our study. The diagnostic performance rates of 1.5 T and 3.0 T MRI in terms of meniscus tears in the literature are compatible with our study [13–15]. Schoth et al. [16] showed that 3.0 T MRI provided better visibility of the meniscus and ligaments as compared with 1.5 T MRI. However, meniscus lesions were not investigated in this study with arthroscopic correlation. In the study of Wong et al., meniscal lesions were better visualized with 3.0 T than with 1.5 T, but the difference in diagnostic performances was not statistically significant [17]. In the retrospective study of Grossman et al., there was no significant difference in the efficacy of 1.5 T and 3.0 T MRI in terms of meniscus tears. The authors suggested that the reason for this was the easy detectability of meniscus tears [13]. According to a meta-analysis by Smith et al., there is no evidence that the diagnostic efficacy of 3.0 T MRI is superior to that of 1.5 T, although 3.0 T MRI has perfect diagnostic ability to detect meniscus injuries [18]. Van Dyck et al. [19] performed their prospective study with 1.5 T and 3.0 T MRI in the same patients for diagnosing meniscal tears. This study showed that a routine 3.0 T knee MRI protocol did not significantly improve diagnostic performance for evaluating menisci pathology in symptomatic patients compared with a similar 1.5 T protocol. They suggested that image quality and diagnostic accuracy were not only based on magnetic field strength. Other factors, such as imaging planes, sequence type, parameter settings, and coil technology took an equally important role in the diagnostic quality of MRI examinations. The prospective study of Nouri et al. showed that 3.0 T MRI of the knee does not improve diagnosis accuracy compared with 1.5T MRI for detecting meniscal lesions [20].

In our study, there were seven false-positive findings. Three were misdiagnosed as complex tears in the anterior or posterior horn of lateral meniscus. Other cases were misdiagnosed as horizontal tears in the body and posterior horn of the lateral meniscus. Complex tears in the anterior horn of the lateral meniscus were seen at arthroscopy as degeneration (Figures 1a and 1b). On sagittal images, a linear band of lateral meniscus and anterior transverse ligament, occasionally simulate an oblique meniscal tear (Figure 1b) [21-23]. We may have exaggerated the degeneration of meniscus as a tear due to the transverse ligament. Complex tears in the posterior horn of the lateral meniscus and horizontal tears in the body and posterior horn of lateral meniscus can be misdiagnosed on MRI due to several anatomic structures or artifacts [21,24,25]. Three of the false-positive horizontal tears on MRI were documented as degeneration at arthroscopy, in our study. The orthopedists were often unable to directly visualize the inferior surface of medial menisci. These areas of the menisci could only be evaluated indirectly with a probe. This might be a reason for false-positive findings in horizontal tears of the medial meniscus that extend to the inferior surface [6,17,26]. In addition, some anatomic variations such as a fissured appearance of meniscus posterior roots, which looks like a meniscus tear in MRI, may cause misinterpretation [21].

In our study, there were 16 false-negative findings, ten of which were in the medial meniscus, and six were in the lateral meniscus. All of the false-negative findings except two cases involved the body or posterior horns of the medial and lateral menisci. The two cases were in the anterior horn of the lateral meniscus. Posterior horn tears can be missed on MRI due to several anatomic structures or artifacts. Common anatomic structures including the popliteomeniscal fascicles, meniscofemoral and meniscomeniscal ligaments can prevent visualizing meniscal tears on MRI. Truncation and arterial pulsation artifacts may complicate diagnosis of meniscal tears by causing streaks in MRI images (Figure 2a). The magic angle effect commonly occurs within the posterior horn of the lateral meniscus and it causes amorphous increased signal intensity that does not extend to the articular surface on MRI [21,24,25]. Of the false-negative findings, six were complex tears, four were radial, five were horizontal, and one was a longitudinal tear. The complex and horizontal tears appeared as meniscal degeneration signals on MRI. We interpreted the diffuse signal as degeneration because it did not extend to the surface area of the meniscus (Figures 2a and 2b). Due to the wide fibrillation of the degenerated meniscus articular surface, it may sometimes be difficult to detect the contact of the internal signal to the meniscus surface. It is difficult to differentiate a meniscal tear from fraying of the meniscus [21,27].

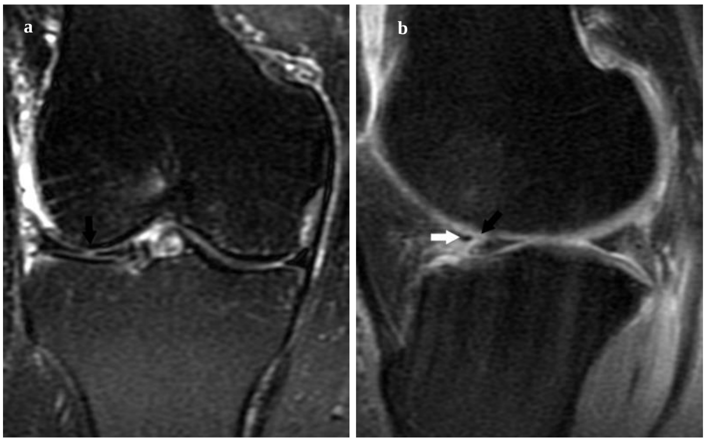

Figure 1. a, b: Coronal T2W Fat Sat 1.5 T MRI image shows a vertical tear in the lateral meniscus anterior horn (arrow, a). Sagittal PDW Fat Sat 1.5 T MRI image demonstrates an oblique tear (black arrow, b) adjacent to the transverse ligament (white arrow, b) in lateral meniscus anterior horn.

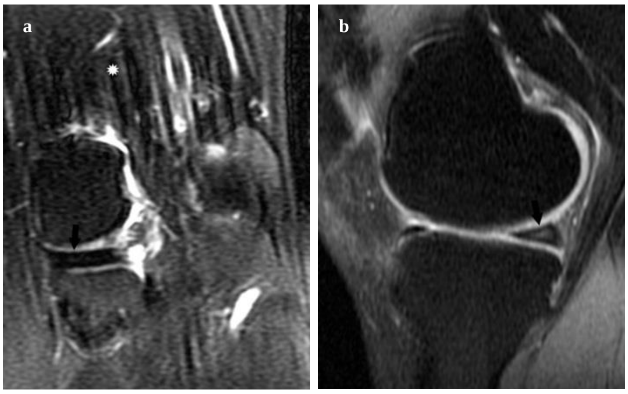

Figure 2. a, b: Coronal T2W Fat Sat 1.5 T MRI image shows linear signal did not extend to any of the surface area of the meniscus in medial meniscus posterior horn (arrow, a) and pulsation artefacts (star, a). Sagittal PDW Fat Sat 1.5 T MRI image demonstrates diffuse signal extended to no surface area of meniscus in medial meniscus posterior horn (arrow, b).

However, the orthopedists detected five horizontal tears and six complex tears in the posterior horn of the medial meniscus at the arthroscopy. We found that the interval of MRI and arthroscopy of these patients was long. The MRI and arthroscopy interval of horizontal tears was between 30 and 150 days. In this time interval, patients may experience trauma or overuse. This may lead to progression of the meniscus pathology and a false-negative diagnosis [25,28,29]. The radial tears and longitudinal tear in our study were very small in size. Radial and longitudinal tears may not be visualized clearly on coronal and sagittal MRI images because of the oblique orientation and smallness in size [21,22,30]. We did not evaluate them as a tear (Figures 3a and 3b, Figures 4a-4c).

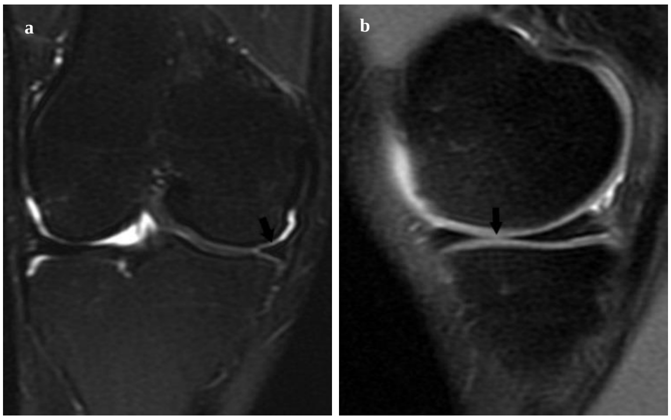

Figure 3. a, b: Coronal T2W Fat Sat 1.5 T MRI image shows the normal triangle shape of the medial meniscus and no signal at the tip of the free edge of medial meniscus body (arrow, a) Sagittal PDW Fat Sat 1.5 T MRI image shows a very small signal at the free edge of the medial meniscus body in only a single section (arrow, b).

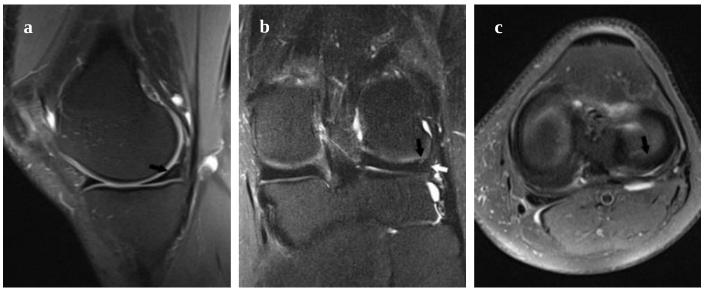

Figure 4. a-c: Sagittal PDW Fat Sat 3.0 T MRI image shows diffuse signal extended to no surface area of lateral meniscus posterior horn (arrow, a). Coronal T2W Fat Sat 3.0 T MRI image shows very small extrameniscal signal adjacent to lateral meniscus posterior horn (black arrow, b) due to the effusion between the popliteus muscle tendon (white arrow, b) and meniscus. There is no signal in lateral meniscus posterior horn in axial PDW Fat Sat 3.0 T MRI image (arrow, c).

In the literature, the accuracy of arthroscopy was reported as between 90% and 95% in the diagnosis of meniscal tears [31]. Therefore, arthroscopy was accepted as the gold standard method in the diagnosis of meniscus tears [32]. On the other hand, compared with arthroscopy, MRI shows the anatomy of the meniscus and other structures of the knee joint better [33]. The posterior horn of the medial meniscus and roots, particularly in the inferior part of the medial meniscus, cannot be clearly evaluated on arthroscopy [26]. The diagnostic sensitivity of arthroscopy depends on the clinical experience of the physician. Therefore, arthroscopy was reported as an insufficient diagnostic method in the evaluation of meniscal tears in the study of Kijowski et al. [6]. Arthroscopy is both an invasive and an expensive diagnostic method. Arthroscopy has surgical risks, including saphenous and peroneal nerve injures, deep infections, superficial infections, vascular injuries, and pulmonary embolism [34,35]. Arthroscopy is not usually needed in cases in which meniscal tears are not observed on MRI due to the high sensitivity of MRI in the diagnosis of meniscal tears. Therefore, MRI prevents unnecessary arthroscopic surgeries and the morbidity associated with arthroscopy. MRI also shows other pathologies that may lead to knee pain. The high diagnostic performance rate of MRI in our study compared with arthroscopy also demonstrates the importance of MRI the assessment of meniscal tears. MRI plays an important role in the diagnosis of knee pathologies, particularly meniscal tears [32].

Our study is a retrospective study, but we had MRI findings and we recorded them before looking at arthroscopy findings. Therefore, bias of the radiologists was prevented. After the arthroscopic evaluation, the radiologists and the orthopedists compared the MRI findings with those of arthroscopy. Another advantage of our study is that we used the same terminology for the evaluation of arthroscopy and MRI findings [31]. The use of a common terminology for imaging meniscal tears by orthopedists and radiologists' can potentially improve the interpretation of meniscal tears [36]. There are some limitations to our study that should be addressed. One of these limitations is the evaluation of MRI images of patients by orthopedists before arthroscopy. This may cause orthopedists to be biased. The second limitation is the long time interval from MRI to arthroscopy, which is between three days and 365 (mean: 56.52) days. This situation is likely to cause inconsistencies between MRI and arthroscopy findings. The third limitation is the relatively small-sized study population.

Conclusion

Although arthroscopy is accepted as the gold standard, MRI has been shown to be quite effective in the diagnosis of meniscus tears. Due to the high specificity value of MRI, arthroscopic surgery should not be performed in cases in which meniscal tears have not been observed on MRI examination. Besides, although the resolution of 3.0 T MRI is higher, we found no superiority over 1.5 T MRI in the diagnosis of meniscal tears. Based on our study's results, 1.5 T MRI can be considered sufficient in the routine diagnosis meniscus tears. Further prospective studies with a large number of patients should be performed to evaluate the sensitivity and specificity of MRI in the diagnosis of meniscus pathologies.

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