

T1

1

T1

316

323

, T2

, 202

T1 가 T1

202 T1 121

(Chi - square test)

T1 202

94.7%, 92.4%, 93.5%

83.3%,

95.7%, 90.5% T1 121

87.3%, 98.2%, 92.5% T1

(p=.951) (p=.543)

, T2

T1 가

(1, 2). (magnetic resonance, MR)

(1). , 1995 1 1998 9

316

3, 4). (1, MR .7 323

(5) 316 (fast

spin - echo, FSE) MR 646 , 4 71

CSE (31.4) , 가 229 , 가 87 . MR

180 (48.9)

가

T1 1.5 - T Magnetom Vision (Siemens, Erlangen, Germany)

98/5/2[TR/effective TE/ETL/NEX])
 (Double - echo steady state, DESS)
 (25.4/9[TR/TE]; flip angle, 35 °) T2
 FOV 128 - 140 x 160 - 170, 170 - 190 x
 256, 4 mm, 0.8 mm
 FOV 120 x 160, 170 - 190 x 256, 4 mm,
 0.4 mm
 FOV 120 - 160 x 160 - 170, 154 - 192 x 256,
 1.4 mm, 0 mm, 64 . 199 (3
)
 CSE T1 (900/20[TR/TE])
 가 , FOV 128 - 140 x 160 - 170, 154 - 180
 x 256, 4 mm, 0.8 mm . MR

92% (Table 1)(Figs. 1, 2). T1
 121
 92.5%, 94.0%,
 93%, 94%, 90.5% ,
 87.3%, 98.2%,
 98%, 88%, 92.5% ,
 90%, 95%,
 95%, 91%, 93% (Table 2).
 T1
 (p=.951) (p=

가
 (6).
 323 T1 (group
 I, n=202) T1 (group II,
 n=121)

(p=.951) (p=
 (Figs. 2, 3).
 CSE MRI
 , CSE MRI
 (7).

Chi - squire test

T1 202
 94.7%,
 92.4%, 92%, 95%,
 93.5% ,
 83.3%, 95.7%, 93%,
 89%, 90.5% 89%,
 94%, 93%, 92%,

Table 1. Results of MR imaging with Arthroscopic Correlation for Meniscal Tears in a Group with Fat-Supressed T1-weighted Images (group I)

Diagnosis of Meniscal Tear	Medial Meniscus (n=202)	Lateral Meniscus (n=202)	Overall (n=404)
Sensitivity (%)	95	83	89
Specificity (%)	92	96	94
Positive predictive value(%)	92	93	93
Negative predictive value(%)	95	89	92
Accuracy (%)	94	91	92

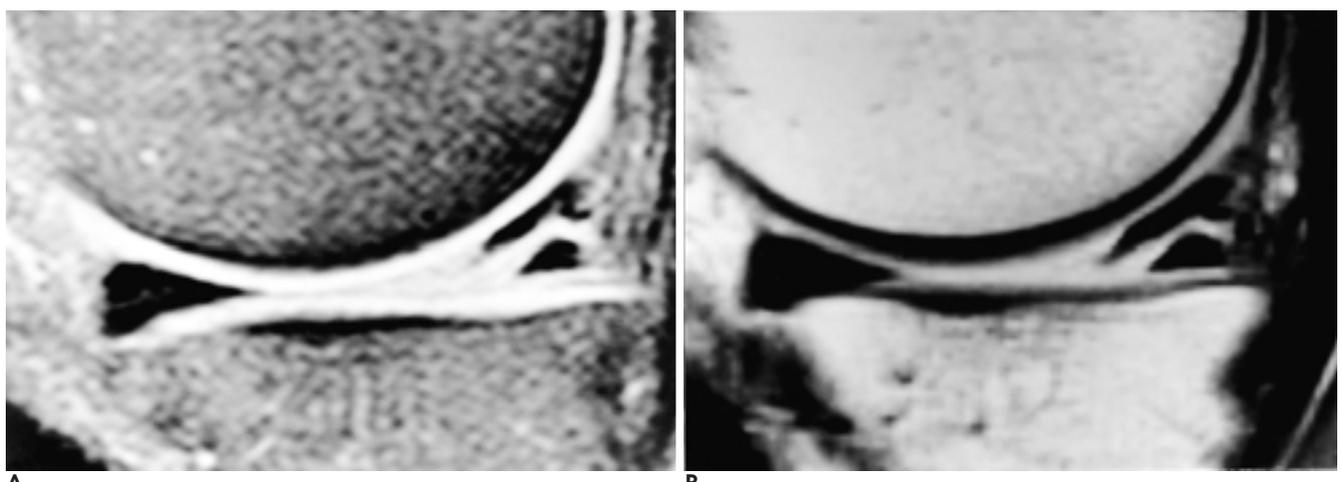


Fig. 1. Sagittal knee MR image in 41-year-old man with knee pain
A. Sagittal fat-suppressed CSE T1-weighted image (TR/TE= 975/20) shows abnormal signal intensity, that extends to the articular surface, within the posterior horn of the medial meniscus.
B. Sagittal FSE proton image (TR/TE= 3500/16) shows similar findings, also. Subsequent arthroscopic findings confirmed a tear.

Table 2. Results of MR imaging with Arthroscopic Correlation for Meniscal Tears in a Group without Fat-Suppressed T1-weighted Images (group II)

Diagnosis of Meniscal Tear	Medial Meniscus (n = 121)	Lateral Meniscus (n = 121)	Overall (n = 242)
Sensitivity (%)	93	87	90
Specificity (%)	94	98	95
Positive predictive value(%)	93	98	95
Negative predictive value(%)	94	88	91
Accuracy (%)	91	93	93

CSE MRI (8-10). MR (1, 2). dynamic range (11). (12).

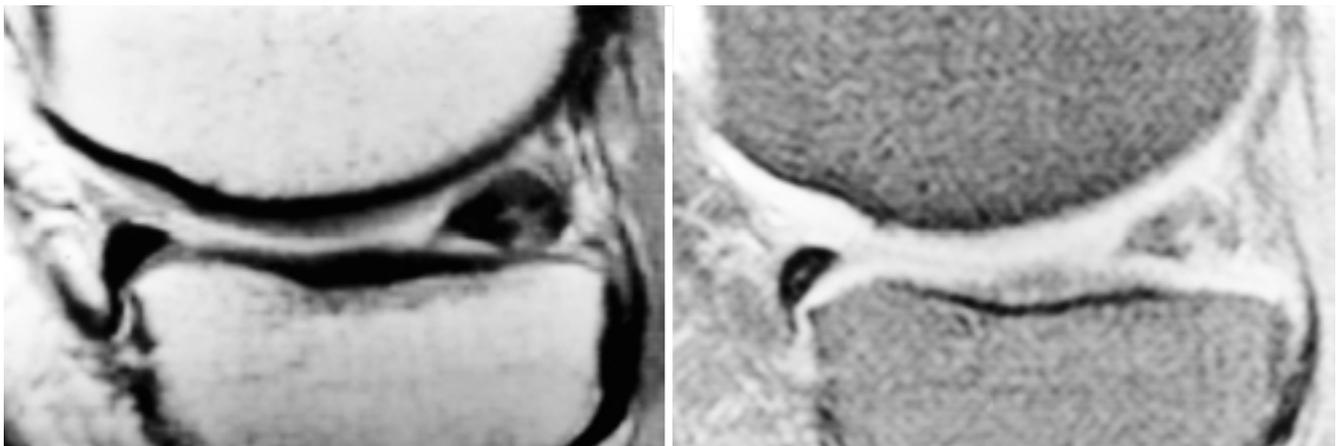


Fig. 2. Sagittal knee MR image in 60-year-old woman with knee pain
A. Sagittal FSE proton image (TR/TE=3500/16) shows abnormal signal intensity, that extends to the surface, within the posterior horn of the medial meniscus.
B. Sagittal fat-suppressed CSE T1-weighted image (TR/TE=975/20) shows similar findings. But, the signal intensity is more higher and more clearly visualized. Subsequent arthroscopic findings confirmed a tear.

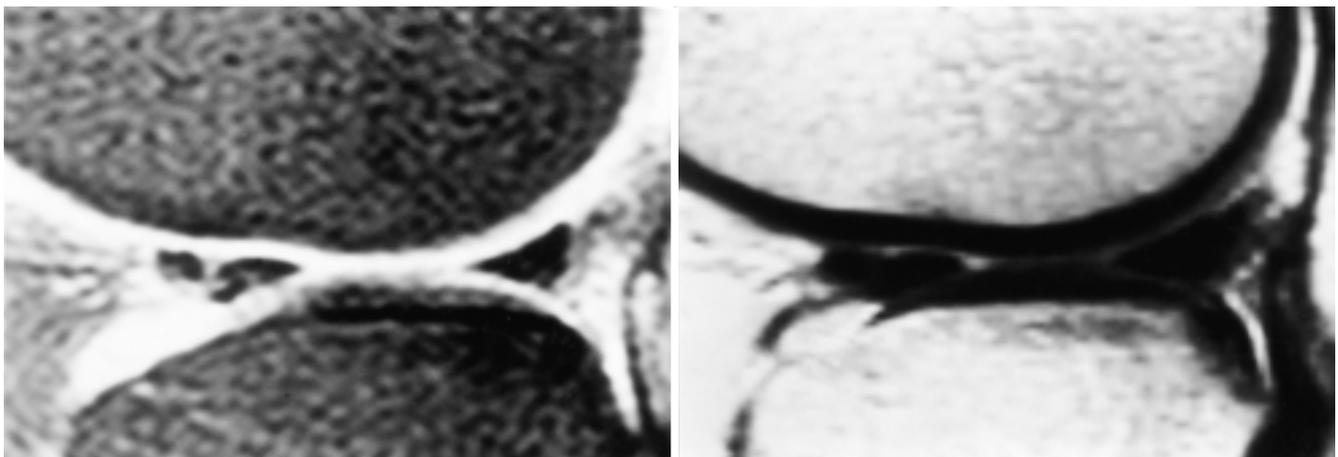


Fig. 3. Sagittal knee MR image in 36-year-old man with knee pain
A. Sagittal fat-suppressed CSE T1-weighted image (TR/TE=975/20) shows abnormal signal intensity, that extends to the articular surface, within the anterior horn of the lateral meniscus.
B. Sagittal FSE proton image (TR/TE=3500/16) shows suspicious findings. Meniscus was called torn on original and retrospective interpretations, but no tear was found at arthroscopic findings.

가
 가 , (free edge abnor-
 mality)
 , MR
 180 (48.9)
 , T2
 , T1 가

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Evaluation of Meniscal Tears of the Knee: The Usefulness of Fat-Suppressed Conventional Spin-Echo T1-Weighted MR Imaging¹

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Purpose: To determine the usefulness of the fat-suppressed (FS) conventional spin-echo (CSE) sequence for the diagnosis of meniscal tears.

Materials and Methods: We retrospectively reviewed 323 MR images of the knee, the standard of reference being the findings of arthroscopy. In all knees, fast SE proton density-weighted and T2-weighted sagittal and coronal images and double-echo in steady state (DESS) sagittal images were obtained, and during 202 MR Procedures, FS-CSE T1-weighted sagittal images were also obtained. The results of MR imaging were then correlated with those of arthroscopy, the accuracy with which meniscal tears were diagnosed being compared between two groups: group I (202 knees for which FS-CSE T1-weighted sagittal images were obtained), and group II (121 knees for which these images were not obtained). For statistical analysis the chi-square test was used.

Results: In group 1, sensitivity, specificity and accuracy were 94.7%, 92.4% and 93.5%, respectively, for the medial meniscus, and 83.3%, 95.7% and 90.5% for the lateral meniscus. In group II, the corresponding findings were 92.5%, 94% and 93.3%; and 87.3%, 98.2% and 92.5%. The differences between the groups were not statistically significant ($p > 0.05$)

Conclusion: For meniscal tears of the knee, the addition of FS-CSE T1-weighted MR imaging to the fast SE proton density-weighted, T2-weighted and DESS sequences does not enhance diagnostic accuracy.

Index words : Knee, MR

Knee, ligaments, menisci, and cartilage

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