

: T2
² .
 : T2
 : 33 T2 (16 , 17)
) 가 T2
 , , ,
 : T2
 (16 14 , 17 2)
 (16 2 , 17 15)
 (p<0.001). 16 14 ,
 17 9 가 70% , T2
 16 14 , 17 15 가 88% .
 : T2

(partial volume averaging),
 volume averaging artifact,
 pulsation artifact
 (oblique) ,
 가
 , , ,
 ,
 가
 T2 가 (1, 2).
 T2 18 54 39 , 가 28 ,
 가 5 .
 1.0T (Magnetom, Impact, Siemens,
 15 ,
 (spen echo)

¹
²
 2001 9 5 2001 11 15

(Table 1). T2 (complete dis - T2 (preservation continuity) 16 14 , 17 2 of band form)가 16 2 , 17 15 (p<0.001) (Fig. 2). (p<0.001) (Fig. 3,

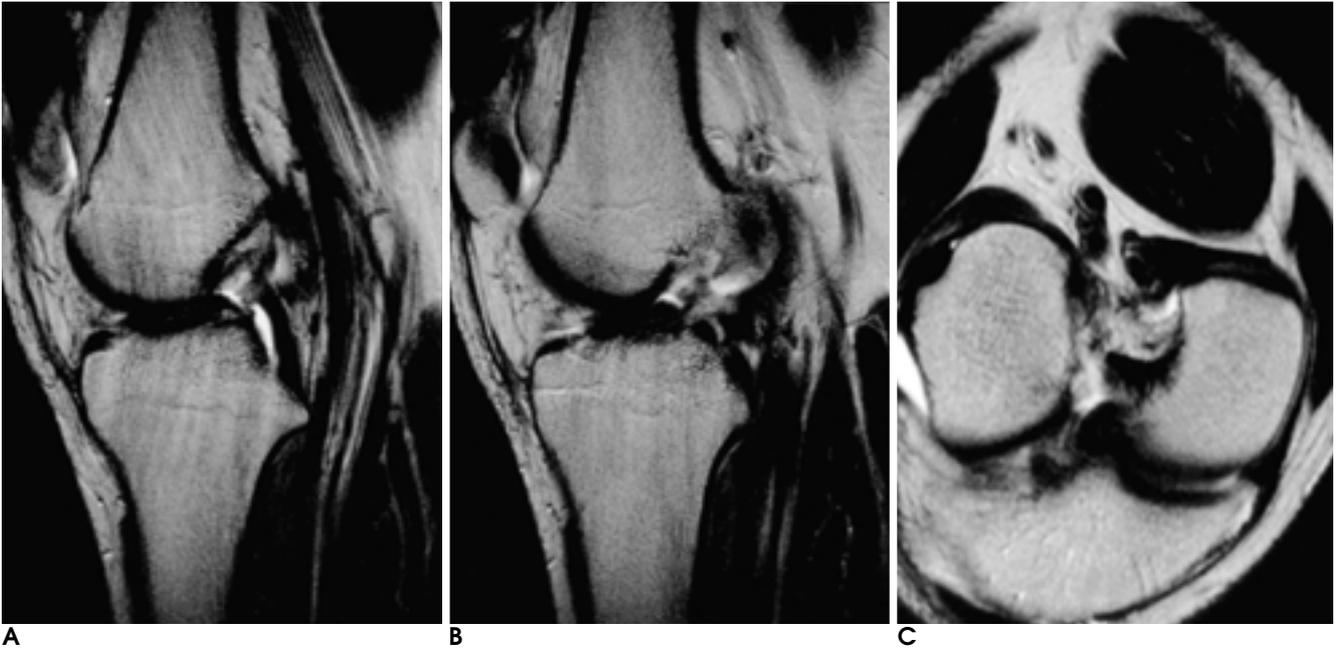


Fig. 2. A 23-year-old man with complete ACL tear.
A, B. Sagittal MR shows complete discontinuity of ACL with decreased slope of residual fibers, suggesting complete tear.
C. T2OCI shows complete discontinuity of ACL with complete loss of band form, suggesting complete tear.

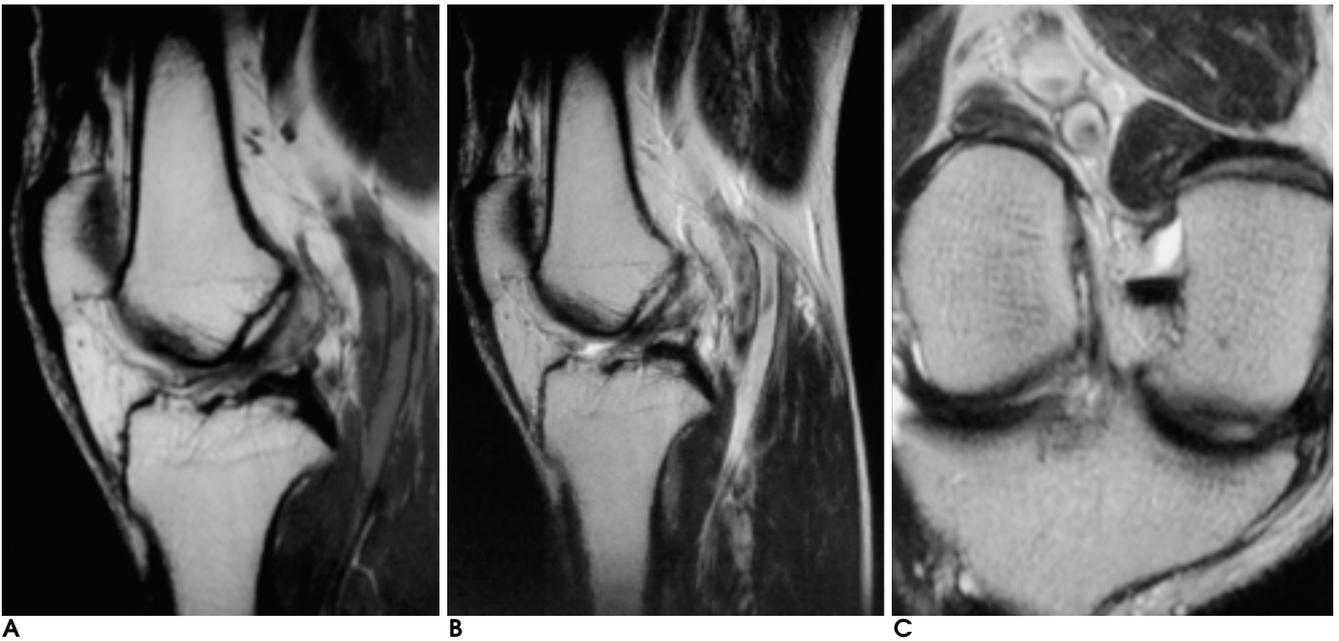


Fig. 3. A 29-year-old woman with partial ACL tear.
A, B. Sagittal MR shows ACL to appear completely torn with decreased slope of residual fibers.
C. T2OCI shows focal defect but preservation of band form, suggesting partial tear.

Table 2. Comparison of Complete Tear & Partial Tear of ACL on T2OCI

	Complete tear (n = 16)	Partial tear (n = 17)
1. Complete discontinuity	14 (88%)	2 (12%)
2. Blurred margin	14 (88%)	15 (88%)
3. Preservation of band form	2 (13%)	15 (88%)
4. Hyperintensity	16 (100%)	17 (100%)
5. Wavy appearance	5 (31%)	4 (24%)

ACL; Anterior cruciate ligament
T2OCI; T2-weighted oblique coronal MR image

Table 2).

16 14 , (4)
가
17 9 가 70% ,
T2 16 14 , Zeiss (8)
17 15 가 88% . 가
가
T2 가
가 (6)
가 V 가
10 - 15 (oblique sagit -
tal) 가 (3), 가
(partial volume averaging), T2
volume averaging artifact,
pulsation artifact
가 (2).
가 T2 가 가 (1).
(intercondylar fossa)
, Blumensaat line T2 가
가
가 (7)
가 , Umans (5)
가 . Lawrance (6)
가 , 가
1. , , T2 .
1998;38:717-722
2. Remer EM, Fitzgerald SW, Friedman H, Rogers LF, Hendrix RW, Schafer MF. Anterior cruciate ligament injury: MR imaging diagnosis and patterns of injury. *Radiographics* 1992;12:901-915
3. Mesgarzadeh M, Schneck CD, Bonakdarpour A. Magnetic resonance imaging of the knee and correlation with normal anatomy. *Radiographics* 1988;8:707-725
4. :
1997;36:687-695
5. Hilary U, Orit W, Nogah H, Yaakov HA, Melvin A, Joseph B. Diagnosis of partial tears of the anterior cruciate ligament of the knee: value of MR imaging. *AJR Am J Roentgenol* 1995;165:893-897
6. Glenn AT, Lawrence MD, Michael EW, Paul DF. Tears of the anterior cruciate ligament: primary and secondary signs at MR imaging. *Radiology* 1993;188:661-667
7. : . 1995;32:617-623
8. Jacob Z, Kevin P, Kevin M, Stephen RS. Comparison of bone contusion seen by MRI in partial and complete tears of the anterior cruciate ligament. *J Comput Tomogr* 1995;19:773-776

MRI Differential Diagnosis of Complete and Partial Tears of the Anterior Cruciate Ligament of the Knee: The Usefulness of Oblique Coronal T2-Weighted Image¹

Seo Young Lee, M.D., Jae-Chan Shim, M.D., Ghi Jai Lee, M.D., Sun Woo Bang, M.D.,
Seok Jong Ryu, M.D., Jeong Seok Kim, M.D.², Ho Kyun Kim, M.D.

¹Department of Diagnostic Radiology, Inje University College of Medicine

²Department of Diagnostic Radiology, Dongguk University College of Medicine

Purpose: To assess the usefulness of T2-weighted oblique coronal MR imaging (T2OCI) in the differential diagnosis of complete and partial tears of the anterior cruciate ligament (ACL) of the knee.

Materials and Methods: Thirty-three patients with ACL tear (16 complete and 17 partial tears), confirmed by arthroscopy, were included in this study. Conventional MR imaging and T2OCI were performed, and the findings were retrospectively reviewed by two radiologists in terms of continuity, shape, axis and internal signal intensity of the ligament. Each finding was tested if there were statistically significant differences in its prevalence between partial and complete tears. The diagnostic accuracy of T2OCI and conventional MR imaging in the detection of partial and complete tears of the ACL were compared.

Results: Conventional MR imaging revealed no statistically significant finding for differential diagnosis of complete and partial ACL tears. The reliable and statistically significant ($p < 0.001$) findings of T2OCI were complete discontinuity of the ligament in cases involving complete ACL tears (14 of 16 complete tears and 2 of 17 partial tears) and the preservation of the band form for partial ACL tears (2 of 16 complete tears and 15 of 17 partial tears). The accuracy of T2OCI and conventional MR imaging was 88% and 70%, respectively.

Conclusion: When ACL injury is vague on conventional MR images, a modality which is more useful in the differential diagnosis of partial and complete tears of the ACL, and in predicting the site of a tear, is T2-weighted oblique coronal imaging.

Index words : Knee, injuries
Knee, ligaments
Knee, MR

Address reprint requests to : Jae-Chan Shim, M.D., Department of Diagnostic Radiology, Seoul Paik Hospital,
College of Medicine, Inje University, 2-85, Jur-dong, Chung-gu, Seoul 100-032, Korea.
Tel. 82-2-2270-0133 Fax. 82-2-2266-6799