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Title: Posterior cruciate buckling angle is not reliable in the diagnosis of anterior cruciate rupture: results of a prospective comparative magnetic imaging resonance study

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POSTERIOR CRUCIATE BUCKLING ANGLE IS NOT RELIABLE IN THE DIAGNOSIS OF ANTERIOR CRUCIATE RUPTURE: RESULTS OF A PROSPECTIVE COMPARATIVE MAGNETIC IMAGING RESONANCE STUDY

INTRODUCTION

- The diagnosis of anterior cruciate ligament (ACL) tear relies on clinical evaluation and magnetic resonance imaging (MRI)
- Direct sign and indirect signs of ACL tear have been described with MRI evaluation
- Posterior cruciate ligament (PCL) buckling has been described as and indirect sign of ACL tear

AIM

- The aim of the present study was to compare the PCL angle in patients with ACL tears to those who had an isolated tear of the medial meniscus. In addition, the influence of risk factors such as tibial slope, ramp lesion of medial meniscus, absence of medial meniscus tear, Lachmann test and pivot shift test were also assessed

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METHODS

- 154 patients (78 in the group with ACL tear and 76 in the control group) were assessed with MRI and lateral weight bearing X-ray to assess PCL buckling angle and tibial slope by two independent observers
- Preoperatively the Lachmann and pivot shift tests were performed under anesthesia
- The presence of a medial meniscus bucket handle or ramp lesion was assessed and recorded at the time of surgery

Table 1. The demographic data

	Study group (n=78)	Control group (N=76)
Age (y), mean±SD	27.2±8	26.4±6.5
Gender		
Male	67 (86%)	61 (80%)
Female	11 (14%)	15 (20%)
Side		
Right	42 (54%)	45(59%)
Left	36 (46%)	31(41%)
Dominance		
Right	54 (69%)	55(72%)
Left	24 (31%)	23(28%)
Associated lesions		
Ramp lesion	37 (47%)	
Bucket Handle Tear	9 (11%)	
Meniscal lesion	13 (17%)	
Chondropatly	3 (4%)	
No meniscus tear	2 (3%)	
Lackmann Test		
Grade 1	23 (29%)	
Grade 2	44 (56%)	
Grade 3	11 (14%)	
Pivot Shift Test		
Grade 1	23 (29%)	
Grade 2	33 (42%)	
Grade 3	22 (28%)	
Delay (days)	333,4±23.5	
Tibial Tunnel (mm)	8.06±3.2	
Femoral Tunnel (mm)	7.9±2.4	

Data are presented as mean ± standard deviation and number (percentage).

Y, years; SD, Standard Deviation.

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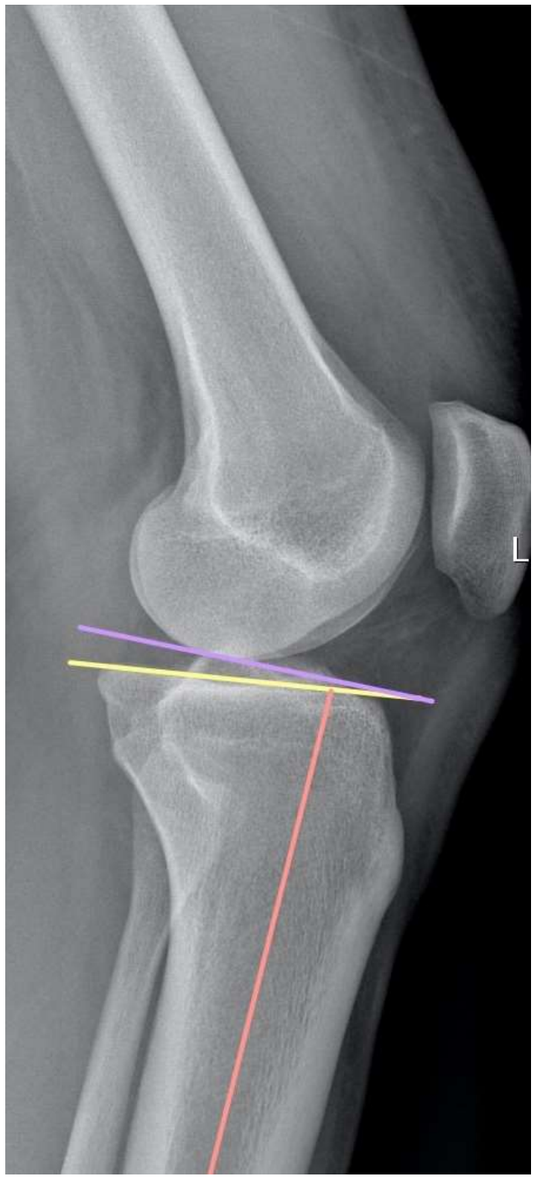
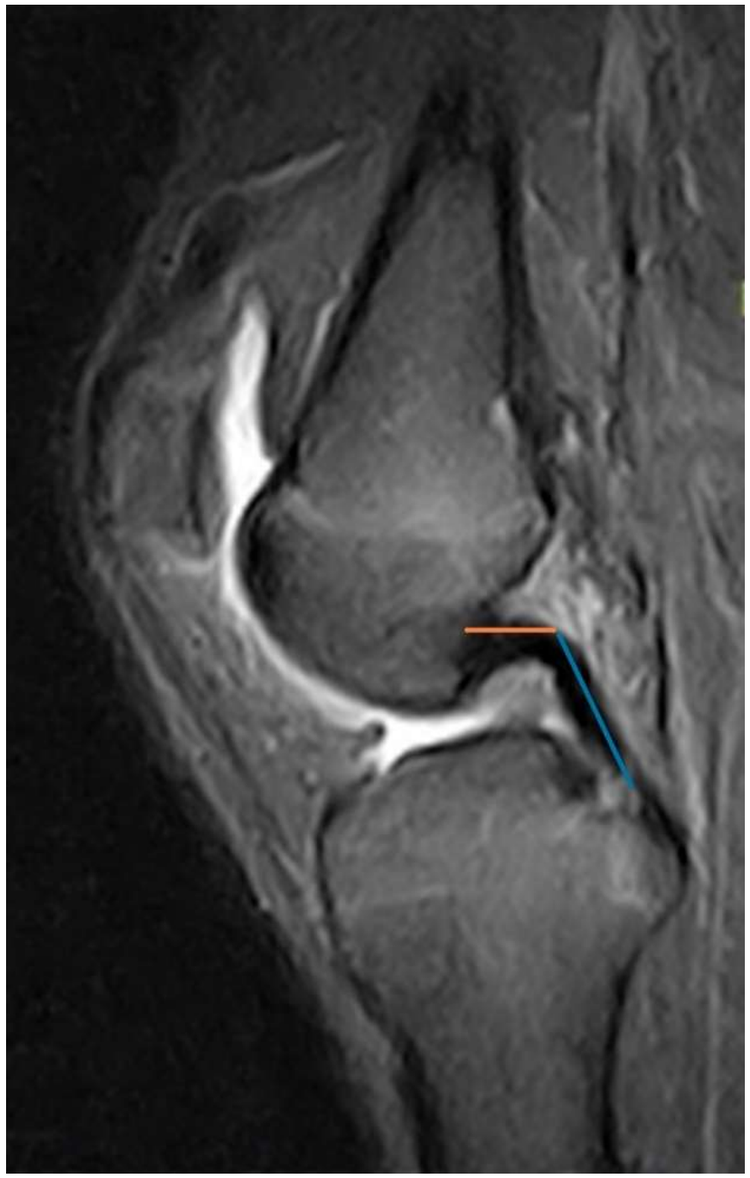
RESULTS

- No statistically significant difference in terms of PCL buckling angle emerged between the two groups for either the first or the second radiographic reviewer
- Tibial slope values were significantly higher in the study group compared to the control group (p. 0.007 and p. 0.001 for the two reviewers respectively)
- The mean angle value in patients with ACL tear was 110.7° +- 15.2° and 115.3° +- 16.2° (for the two examiners respectively) and 114° +- 14.5° (for the two examiners respectively) in patients with an intact, healthy ACL
- An association emerged between bucket handle tears of the medial meniscus (p=0.010) and decreased PCL angles and between ramp lesions of the medial meniscus and increased PCL angles both (p=0.024)





- *Figure 1. The posterior tibial slope was measured according to the method described by Dejour*
- *Figure 2. The PCL buckling angle has been described by Yoon et al [20]. It is formed by the intersection of two lines which follow the proximal and distal parts of the PCL.*

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CONCLUSIONS

- The present study showed no statistically different PCL buckling angle values in patients with ACL tears and in those who had a healthy, intact ACL
- Therefore, although the method showed good interobserver reliability, it should not be routinely in the diagnosis of ACL tears
- In addition, increased tibial slope valus were observed in the cohort of patients with ACL rupture confirming its role as a risk factor that shoulde be considered
- Finally, increased PCL buckling angle values were observed in patients with concomitant ACL and bucket handle tears of the medial meniscus, while decreased PCL buckling angle values were observed in those who had ACL tear and ramp lesion of the medial meniscus

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