

ROLE OF MAGNETIC RESONANCE IMAGING IN ASSESSMENT OF RELATIONSHIP BETWEEN INTERCONDYLAR NOTCH ANGLE AND ANTERIOR CRUCIATE LIGAMENT INJURIES

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Introduction

The anterior cruciate ligament (ACL) is considered the principal stabilizer of the knee joint and it is frequently damaged. Anatomical features are thought to be one the primary unmodifiable risk factors of ACL rupture. It is intimately related to the parameters of the intercondylar notch as well as the tibial slope. Intercondylar notch width (NW), Intercondylar notch width index (NWI), Intercondylar notch angle (INA), Posterior (PTS), lateral (LTS) and medial tibial slopes (MTS) have been linked to higher risk of ACL tear.

Aim of the Work

The aim of this work was to assess the relationship of intercondylar notch angle (INA), lateral (LTS) and medial tibial slope (MTS) in cases with anterior cruciate ligament (ACL) injuries using magnetic resonance imaging technique.

Patients and Methods

This study was conducted on eighty subjects; 40 ACL injured patients and 40 normal subjects ‘as a control group’ with intact ACL yet presenting with another knee problem, referred to the MRI unit at the Radiodiagnosis department at Alexandria University Hospitals for MR imaging. Intercondylar angle (INA), lateral (LTS) and medial tibial slopes (MTS) were measured. INA is the angle between the femoral axis and Blumensaat line. LTS and MTS are measured between the lines of the tibial condyles and the line perpendicular to the long axis of the tibia.

Results

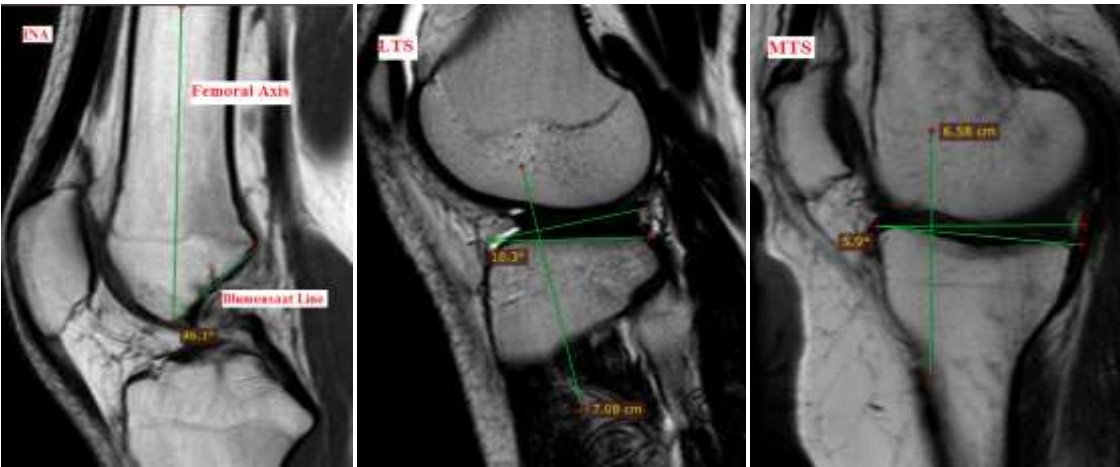
INA showed a statistically significant($p=0.014$) relation to ACL injuries being wider in ACL injured group than the control group with a mean value of $42.43^{\circ} \pm 3.17$ as compared to $40.93^{\circ} \pm 2.02$ in control group. A greater LTS also showed a positive correlation to increased incidence of ACL injuries where mean value of LTS in ACL injured group was $10.4^{\circ} \pm 3.6^{\circ}$ while being $9^{\circ} \pm 3.49^{\circ}$ in normal subjects. MTS displayed no statistically significant correlation to higher risk of ACL injuries.

Table 1: Comparison between the two studied groups according to intercondylar notch angle

INA	Cases (n = 40)	Control (n = 40)	t	p
Min. – Max.	35.80° – 51.60°	36.0 ° – 45.80 °	2.527*	0.014*
Mean ± SD.	$42.43^{\circ} \pm 3.17$	$40.93^{\circ} \pm 2.02$		
Median (IQR)	42.5° (40.75° – 44.0°)	40.60° (39.50° – 42.2°)		

Table 2: Comparison between the two studied groups according to Lateral tibial slope (LTS) and Medial tibial slope (MTS)

Parameter	Cases (n = 40) Mean± SD	Control (n = 40) Mean± SD	P value
LTS	$10.4^{\circ} \pm 3.6^{\circ}$	$9^{\circ} \pm 3.49^{\circ}$	0.008 *
MTS	$6.7^{\circ} \pm 3.17^{\circ}$	$5.5^{\circ} \pm 2.91^{\circ}$	0.045



INA: Intercondylar notch angle= 46.1°
LTS: Lateral tibial slope = 10.3°
MTS: Medial tibial slope = 5.9°

Conclusion

Variations in intercondylar notch angle and tibial slope among subjects directly affect the incidence of anterior cruciate ligament tears. A wide Intercondylar notch angle (INA) and lateral tibial slope angle (LTS) enhance the development of ACL tears by making the ligament more horizontal hencebecoming more susceptible to injury. Medial tibial slope has no appreciable association with a higher risk of ACL injury.