

## The Influence of the Section of the Antero-Lateral Knee Ligament on Rotational Laxity of the Knee. An Experimental Study

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### Summary:

Anterolateral knee ligament may have little impact on rotational laxity when ilio-tibial band is preserved

### Abstract:

**INTRODUCTION:** The anatomy of the antero-lateral ligament (ALL) of the knee has been described on anatomic preparation, suggesting that this ligament might be a restraint of knee internal rotation. However, experimental results showed conflicting results about the impact of the ALL on knee stability. The goal of the study was to measure the changes in the rotational knee laxity according to the status of the antero-lateral ligament (ALL) and of the anterior cruciate ligament (ACL). We hypothesized that section of the ALL will significantly increase the rotational laxity of the knee.

**MATERIAL AND METHODS:** 5 pairs of fresh frozen gross specimens were analyzed. The knee was positioned at 20° of flexion on a special splint. An increasing calibrated internal/external torque was applied; the knee internal/external rotation was measured by a navigation system for each applied torque. Three settings were used for each knee: intact ACL and ALL, section of the ACL or ALL (randomly assigned to each knee of a pair), section of both ACL and ALL. The reference for each knee was the measurement by intact knee. The primary criterion was the rotational laxity at 8 Nm. The paired increase of rotational laxity was calculated for each situation. The results were compared between all couples of situations with a Mann-Whitney test at a 0.05 level of significance. Similar process was performed for stiffness.

**RESULTS:** The mean rotational laxity for intact knees was  $27.1 \pm 3.7$  degrees. There was no significant difference between right ( $26.6 \pm 4.0$  degrees) and left ( $27.6 \pm 3.8$  degrees) knees. The mean paired increase was 0.8 degrees after isolated ALL section, 1.2 degrees after isolated ACL section, and 0.8 degrees after combined ALL and ACL section. There was no significant increase of rotational laxity after isolated ALL section. There was no significant increase after isolated ACL section. There was no significant difference after additional ALL section by ACL deficient knees.

The mean knee stiffness in rotation for intact knees was  $3.18 \pm 0.7$  Nm/degree. There was no significant difference between right ( $3.2 \pm 0.6$  Nm/degree) and left ( $3.2 \pm 0.9$  Nm/degree) knees. The mean paired increase was 0.16 Nm/degree after isolated ALL section, 0.16 Nm/degree after isolated ACL section, and 0.24 Nm/degree after combined ALL and ACL section. There was no significant increase after isolated ALL section. There was no significant increase after isolated ACL section. There was no significant difference after additional ALL section by ACL deficient knees.

**DISCUSSION:** The main result of this study is that section of the ALL did not significantly impact rotational knee laxity and rotational stiffness of the knee in comparison to normal knee, neither isolated or by ACL deficient knee. The expected role of ALL in controlling rotational knee laxity could not be confirmed. We suggest that preservation of the iliotibial band may be a major explanation for these unexpected results.

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**CONCLUSION:** We suggest that the potential influence of the ALL on knee stability should be further investigated before performing routine ALL reconstruction. Anterolateral knee ligament may have little impact on rotational laxity when iliotibial band is preserved.