Biomechanical comparison of Laprade and Lind techniques for the reconstruction of the medial plane of the knee. Biomechanical study of 18 knees with the Dyneelax® laximeter.

Introduction. Reconstruction of the medial collateral ligament (MCL) and posterior oblique ligament (POL) is necessary to re-establish good stability in chronic lesions of the medial side of the knee. The Lind technique uses a single strand, pedicled semitendinosus autograft to perform a continuous reconstruction of the MCL and POL. The Laprade technique uses two free grafts: one graft for the MCL (double-strand graft of semitendinosus tendon) and one graft for the POL (double-strand graft of gracilis tendon). Our aim was to analyse the differences in sagittal and rotational stability of the Lind and Laprade techniques.

Methods. 18 fresh lower limbs (mean age: 75 years; range, 62-94 years), (14 men and 4 women), disarticulated at the hip, were tested in the Anatomy Laboratory of the Medical School of Rennes. The MCL and POL of each knee were isolated. Each knee was subjected at 30° of flexion, with the Dyneelax® laximeter (repeatability of motion within ± 0.1 mm and ± 0.1°) to anterior tibial translation to 200 N and rotatory torques (internal and external) up to 5 N-m, according to the following sequences: intact knees, LCM + POL transections, and finally after reconstruction with either the Lind or the Laprade procedures. The results were registered as laxity curves (mm and degrees) after ligament sections and then calculated as laxity increase (mm and degrees) at each state. Residual laxity is presented in absolute values (mm or degrees) and in relative values (percentage). Shapiro-Wilk test of normality, ANOVA test with a post hoc Bonferroni correction for multiple t tests comparisons and Student's T-tests were used.

Results. In translation, the knees reconstructed by the Lind technique had a residual laxity of 0.79 ± 0.82 mm against 1.44 ± 1.24 mm for the Laprade technique (residual laxity of 50.8 ± 42.76% compared to 66.2 ± 37.86%). In internal rotation: the knees reconstructed by the Lind technique had a residual laxity of 0.99 ± 0.81° against 1.51 ± 1.9° for the Laprade technique (residual laxity of 39.8 ± 31.46% compared to 52 ± 29.45%). In external rotation: the knees reconstructed by the Lind technique had a residual laxity

of 0.48 ± 0.6° against 1.4 ± 1.41° for the Laprade technique (residual laxity of 20.3 ± 26.51% compared to 31.9 ± 30.15%).

Conclusion. Both chronic MCL and POL reconstruction with Lind or Laprade techniques improved sagittal and rotational knee stability compared to injured knees. The Lind technique had significantly better control of external rotatory laxity ($p=0.005$) and translation ($p<0.001$) than the Laprade technique. They were no significant difference for the control of internal rotation ($p=0.09$. This is the first biomechanical study, to our knowledge, comparing these two “classic” techniques. The results need to be confirmed by a continuation of this work.