

IN-VITRO ANALYSIS OF THE CONTRIBUTION OF MEDIAL PATELLO-FEMORAL LIGAMENT IN PATELLO-FEMORAL JOINT KINEMATICS AND STABILITY

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Introduction

Evaluation of patello-femoral (PF) joint pathology and efficacy of treatment is challenged by lack of consensus on its kinematics [Bull, 2002]. Damages to Medial Patello-femoral Ligament (MPFL) have been suggested to be primarily important in patellar lateral dislocation [Amis, 2003, Nomura, 2000]. Moreover MPFL reconstruction has been advocated to be extremely important to prevent alteration of PF kinematics, joint compression and long term chondral degeneration [Buckens, 2010]. The objective of this study was to analyse how the MPFL influences PF kinematics and stability.

Methods

A kinematic study on 6 cadaveric knees, using a non-image based navigation system (BLUGS, Orthokey, USA), under an axial quadriceps load of 60 N was performed; the kinematics was tested in MPFL-intact and MPFL-deficient state and moreover, to test PF stability, a laterally directed load of 25 N was applied at 0°, 30°, 60° and 90° of flexion.

Results

The medial shift between 20°-25° of tibial flexion in the MPFL intact, was absent in the MPFL-deficient state and the patella lateralized even without a laterally directed load (figure 1).

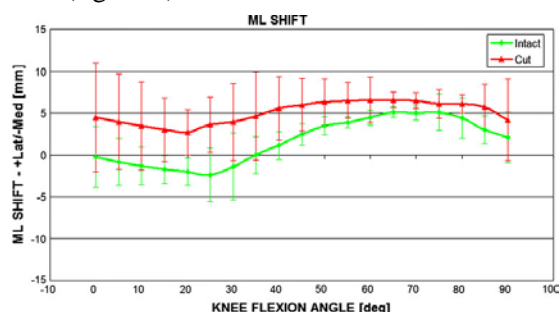


Figure 1: Medial lateral shift of the patella during PROM in MPFL intact and resected condition

Patella did not exhibit any medial tilt between 20°-25° in the current study (figure 2).

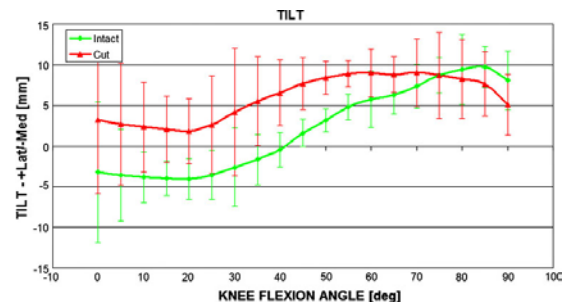


Figure 2: Patellar tilt during PROM in MPFL intact and resected condition

A laterally directed load significantly increased the lateral patellar shift after MPFL dissection, peaking at 30° and 60° (figure 3).

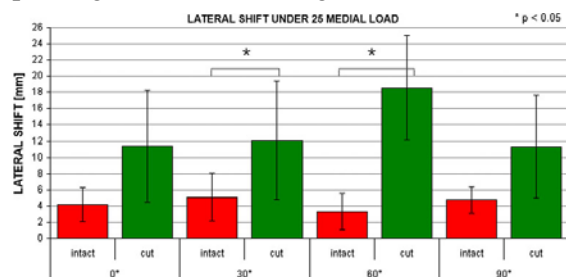


Figure 3: Patellar medial-lateral shift during static test under lateral load condition

Discussion

The current study shows a statistically significant lateral shift and tilt in this state. The peak patellar shift under load between 30° and 50° in MPFL deficient state probably reflects the peak strain on the MFPL in this range of knee flexion. These comparisons clarify that the MFPL has an aponeurotic nature that works as a restraint during motion, with an active role under stress, but low role during neutral knee flexion.

References

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