Muscular co-contraction and control of knee stability


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Available online 23 March 2004.

Abstract

A computerized radiographic technique was used to determine the effect of hamstring co-contraction on the stability of the joint during isometric knee extension. Data collected from 12 cadaver knees showed that significant anterior displacement and internal rotation of the tibia occurred with isolated quadriceps loading, whereas significant reduction in anterior displacement and rotation occurred upon simultaneous low-level loading of the hamstrings in the range of motion of 15°–80° flexion. Hamstrings co-contraction was ineffective in the range of 0°–15° of flexion. Larger hamstrings resulted in more pronounced reduction in the anterior displacement and rotation of the tibia. We concluded that hamstring co-contraction has significant effect on maintaining knee stability, providing synergistic action to the anterior cruciate ligament (ACL) by preventing excessive anterior displacement and rotation of the tibia. We also concluded that hamstring strength training is essential therapy in conservative treatment of ACL-deficient knees, as an adjunct therapy to ligament repair procedures and as preventive therapy in high-performance athletes subject to potential risk of ligamentous injury.

Keywords

Co-contraction; Knee; Ligament; Movement