

Influence of Posterior Cruciate Ligament Tension on Knee Kinematics and Kinetics

Muhammad Shoifi, MD, INDONESIA

Shinichiro Nakamura, MD, PhD, JAPAN

Shinichi Kuriyama, MD, PhD, JAPAN

Hiromu Ito, MD, PhD, JAPAN

Shuichi Matsuda, MD, PhD, JAPAN

Department of Orthopaedic Surgery Kyoto University
Kyoto, JAPAN

Summary:

The Posterior Cruciate Ligament tension has an important role in cruciate retaining TKA to achieve good clinical result

Abstract:

The posterior cruciate ligament has an important role in cruciate retaining TKA to achieve good clinical results. The purpose of the study was to examine the influence of PCL tension on knee kinematics and kinetics and to propose an indicator for proper PCL tension during surgery. A squatting activity was simulated in a weight bearing deep knee bend using a musculoskeletal computer simulation knee model. The length of the PCL was changed to represent different PCL tension models. The amount of PCL tension significantly influenced knee kinematics and kinetics. In the normal PCL model, the facet center positions at 90 degrees of knee flexion were positioned at almost the same position as in full extension. A loose PCL induced paradoxical anterior movement and greater patellofemoral forces, whereas a tight PCL was related to excessive rollback and increased tibiofemoral forces. This study suggested ideal knee kinematics with proper PCL tension, in which the medial contact position at full flexion was almost similar to the position at 90 degrees of knee flexion.