Soft tissue balancing is a critical step in total knee arthroplasty (TKA). Surgeons often assess balance at 0° and 90° flexion primarily considering varus-valgus and distraction laxity. However both anterior-posterior translation and internal-external rotation are also important degrees of freedom. Therefore it is important for surgeons to understand the laxity of the normal knee at 0° and 90° in all four of these degrees of freedom to determine whether the soft tissues are properly balanced. Accordingly, the objective of this study was to measure the laxities of the normal knee at 0° and 90° flexion in internal-external (I-E) and varus-valgus (V-V) rotation and in anterior-posterior (A-P) and compression-distraction (C-D) translation to provide a benchmark for soft tissue balancing in TKA.

Because the laxity of the normal knee increased in all degrees of freedom and both directions except in posterior translation, surgeons following the principle of gap balancing to balance the soft tissue in TKA should be aware that they may be over constraining the knee at 90° flexion, which may lead to stiffness, limited flexion, and abnormal contact kinematics.