

The effect of anterior cruciate ligament injury on bone curvature: Exploratory analysis in the KANON trial

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Abstract

Objective: Investigate the 5-year longitudinal changes in bone curvature after acute anterior cruciate ligament (ACL) injury, and identify predictors of such changes. **Methods:** In the KANON-trial (ISRCTN 84752559), 111/121 young active adults with an acute ACL tear to a previously un-injured knee had serial 1.5T MR images from baseline (within 5 weeks from injury) to 5 years after injury. Of these, 86 had ACL reconstruction (ACLR) performed early or delayed, 25 were treated with rehabilitation alone. Measures of articulating bone curvature were obtained from computer-assisted segmentation of MR images. Curvature (mm^{-1}) was determined for femur, tibia, medial/lateral femur, trochlea, medial/lateral tibia. Age, sex, treatment, BMI, meniscal injury, osteochondral fracture on baseline MR images were tested for association. **Results:** Over 5 years, curvature decreased in each region ($P < 0.001$) suggesting flattening of convex shapes and increased concavity of concave shapes. A higher BMI was associated with flattening of the femur ($P = 0.03$), trochlea ($P = 0.007$) and increasing concavity of the lateral tibia (LT) ($P = 0.011$). ACLR, compared to rehabilitation alone, was associated with flatter curvature in the femur ($P < 0.001$), medial femoral condyle ($P = 0.006$) and trochlea ($P = 0.003$). Any meniscal injury at baseline was associated with a more flattened curvature in the femur ($P = 0.038$), trochlea ($P = 0.039$), lateral femoral condyle ($P = 0.034$) and increasing concavity of the LT ($P = 0.048$). **Conclusion:** ACL injury is associated with significant changes in articulating bone curvature over a 5 year period. Higher BMI, baseline meniscal injury and undergoing ACL reconstruction (as distinct from undergoing rehabilitation alone) are all associated with flattening of the articulating bone. © 2014 Osteoarthritis Research Society International.

SciVal Topic Prominence

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