Comparison of subchondral bone stresses with physiological and simplified articular loading using FE analysis

Background: While finite element (FE) models of bone and bone-implant constructs were improved continuously over the last years, loading conditions were often over-simplified. For instance, a block of embedding material is frequently used to apply loading at the articular surface rather than including articular contact in the model.

Problem: We hypothesize that simplified loading conditions do not represent the subchondral bone stresses just below the articular surface with sufficient accuracy. Thus, FE model predictions of bone-implant systems which rely on these subchondral stresses are limited.

Goal: The goal of this work is to compare the subchondral bone stresses in FE models with simplified articular loading conditions and physiological loading conditions (i.e. contact). The work will be performed using computed-tomography-based bone geometries of the radius and carpal bones.

Field: Numerical Biomechanics

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