Stress Analysis of Knee Joint Surface in Hyper-extension Posture

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Abstract:

Knee is one of the most important joints in the human body and it is affected in most articular disorders. Malalignment is the underlying cause of many diseases of knee joint. When malalignment is present, the magnitude of applied forces and their distribution may change leading to cartilage degeneration, arthralgia, and joint degeneration. In this research, we have studied the hyper-extension posture and stress changes using numerical method, assuming cartilage and meniscus have linear isotropic properties. Based on obtained results, in this posture, the maximum stress increases and shifts to anterior. These findings were confirmed by published analytical and experimental results. Knowing the altered patterns of stress distributions and their magnitude, we can predict and/or prevent this disease.

Key words: genu recurvatum, knee joint surface, hyper-extension of knee, stress analysis of knee, contact stress