

Optimal coefficient of friction on artificial knee joint contact surfaces

Abstract

Wear generated by the presence of friction on knee joint contact surfaces can cause debris, which may lead to failure of the artificial knee joint. In this study, the effects of friction coefficients on the knee joint contact surfaces were examined by Finite Element (FE) method. The knee joint was modelled to represent the contact surfaces between femur, meniscus and tibia. The measured angle from 0° to 15° was applied to analyze contact stresses for normal walking condition. It was found that the position angle of the knee joint at 10° offers the maximum value of contact pressure and shear compared to other knee joint position angles. Therefore, further examination was carried out and the FE results showed that the optimal friction coefficient was within the range of 0.1 and 0.15.

Keywords

Artificial knee joint; Contact interfaces; Finite element method; Friction coefficient