

Identification of limiting friction coefficient towards improved hip prostheses

Abstract

Wear generated by the presence of friction on hip joint contact surfaces can cause debris, which may lead to loosening and failure of the hip prostheses. The objective of this study is to examine the limiting friction coefficient of the hip joint using Finite Element (FE) method. The hip joint model was developed to represent the contact surfaces between femoral head and inner socket, and the contact surfaces between inner socket and acetabular cup. The measured angle from 0° to 15° was applied to the inner socket for normal walking condition. The maximum contact pressure on the acetabular cup surface was found at the position angle of 10°. Therefore, further examination was carried out and the results showed that the highest friction coefficient of 0.4 was determined.

Keywords

Contact mechanics; Finite Element method; Friction coefficient; Hip prostheses