



NUMERICAL STUDY OF KNEE PROSTHESIS WEAR AS A FUNCTION OF PROSTHESIS SIZE

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ABSTRACT

Wear is a key factor that significantly limits the survival of total knee arthroplastys (TKAs). Wear itself is known to be highly dependent on load, local kinematics taking place in the knee joint and presumably on the geometry of the TKA. This article has investigated, by means of multibody models, how different TKA sizes and TKA-related geometric parameters affect wear during squatting and gait motion. It has been demonstrated that wear rate does increase, closely linearly, as a function of TKAs size, while the influence of TKA-related geometric parameters on wear propagation can be described by linear or quadratic functions. These results, together with the newly introduced dimensionless parameters, demonstrate that the wear rate of TKAs can be reduced by choosing the right dimensions.

Keywords: multibody simulations, wear, TKA dimensions