

Knee. 2007 Mar;14(2):145-53.

## **EXPERIMENTAL EVALUATION OF THE BIOMECHANICAL PERFORMANCES OF A PMMA-BASED KNEE SPACER.**

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Infection of knee prostheses is still one of the major concerns of the reliability over time of these implantable devices. The preferred treatment of this condition has turned out to be the use of a knee spacer in a two-stage reimplantation technique. The advantages of this technique associated with the use of a mobile spacer lies both in the possibility for the patient to move during the interim period, thus decreasing the risk of muscle contracture due to immobilisation, as well as in the ability to release antibiotics directly to the site of infection. The evaluation of the biomechanical properties of new mobile spacers performed in three different sizes has been carried out subjecting the spacers to i) cyclic tests on a knee simulator for 500,000 walking cycles, ii) constraint tests in medio-lateral, antero-posterior and internal-external directions, iii) fatigue tests on the tibial tray. Particular attention was addressed to the evaluation of the mechanical resistance of the devices, to the quantity of wear debris produced during the tests and to the extent that such debris was influenced by the test parameters and geometrical dimensions of the spacers themselves. Results showed no sign of failure for any of the tested spacers, the constraint and fatigue behaviours were similar to those shown by a total knee prosthesis and the amount of debris turned out to be directly correlated to the size of the devices: in conclusion, the devices showed a good level of mechanical performance and, consequently, a sufficiently high degree of suitability for clinical use.

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