

5 CeramTec Award 2000

5.1 CeramTec Award 2000

At the occasion of the International Symposiums in Stuttgart, Germany CeramTec has awarded a prize for outstanding studies with regard to the problems of wear in total joint replacment. This prize shall be awarded to young surgeons, engineers, or scientists who published or submitted as a publication or thesis these research results in the field of wear couple in orthopaedics.

For the CeramTec Award 2000 lots of good papers had been submitted. There were papers on clinical investigations and papers on technical topics, too. The papers were evaluated by

- Prof. Springorum (Bad Mergentheim, Germany)
- Prof. Stock (Braunschweig, Germany)
- Prof. Zichner (Frankfurt, Germany)
- PD Dr. Willmann (Plochingen, Germany)

The committee decided that J. E. Nevelos' paper was the best one, J. Huber's and S. Affato's papers were second, they had the same score.

J. E. Nevelos (U.K.)

Wear of HIPed and Non-HIPed Alumina-Alumina Hip Joints Under Standard and Severe Simulator Testing Conditions (Abstract see next page).

J. Huber (Germany)

Optimierung von Gleitpaarungen für künstliche Gelenke.

S. Affatato (Italy)

Mixed-oxides prosthetic ceramic ball heads.

Part 1: Effect of the ZrO₂ fraction on the wear of ceramic on polyethylene joints

Part 2: effect of the ZrO₂ fraction on the wear of ceramic on ceramic joints.

5.2 Wear of HIPed and Non-HIPed Alumina-Alumina Hip Joints Under Standard and Severe Simulator Testing Conditions

J. E. Nevelos, E. Ingham, C. Doyle, A. B. Nevelos, J. Fisher

Abstract

Wear and wear debris of artificial hip joints remain major concerns in total hip arthroplasty (THA). The long term effects of UHMWPE wear debris are well documented and these have led to interest in alternate bearing materials for THA. Alumina ceramic-ceramic hip joints have been successfully used for nearly thirty years with low wear and little incidence of osteolysis. The most common wear pattern observed on retrieved components is an elliptical wear 'stripe' on the heads and a corresponding worn area on the cup with an approximated wear rate of 1 – 5 mm³ per annum. More severe wear has also occasionally occurred, usually in association with an abnormal clinical history. Modern alumina-alumina THAs use an improved HIPed alumina ceramic bearing material which may be more re-

sistant to severe wear. Previous *in vitro* simulator studies have not replicated *in vivo* wear rates or mechanisms. The aim of this study was to compare previous generation non-HIPed alumina and modern HIPed (hot isostatically pressed) alumina in a physiological hip joint simulator under 'normal' and 'harsh' testing conditions.

HIPed alumina was found to have a lower wear rate than non-HIPed alumina, although the difference was not statistically significant. Testing in Gelofusine® and water lubricants had no effect on the wear rates of either material. Elevated swing phase load testing also had no significant effect on the wear rates of either material. Testing in the absence of any lubricant produced very severe wear of the non-HIPed material in one specimen only.

Key words: Ceramic – Total Hip Arthroplasty – Wear – Hip Simulator

5.3 CeramTec Award 1996 – 1999

The winner of the previous CeramTec Awards had been:

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| 1999 Prudhommeaux F. (Paris, France)
with the paper "Analysis of Alumina – alumina Hip Prostheses Wear Behavior after 10 Years of Implantation" submitted to Clin. Orthop. Rel. Res. | 1997 Th. Lindenfeld (Frankfurt, Germany)
"In vivo Verschleiß der Gleitpaarungen Keramik – Polyethylen gegen Metall – Polyethylen. [In vivo wear of the wear couples ceramics-on-polyethylene and metal-on-polyethylene]"
Orthopäde 26 (1997) 129 – 134 |
| 1998 Lu, Z., H. McKellop (Los Angeles, USA)
with the paper "Frictional heating of bearing materials tested in a hip joint simulator"
Proc. Instn. mech. Engrs 211 Part H (1997) 101 – 108 | 1996 E. Fritsch (Homburg/Saar, Germany)
"Biocompatibility of Alumina – Ceramic in Total Hip Replacement. Macroscopic – and Microscopic Findings on capsular Tissues after Long-term Implantation"
In: W. Puhl (1996) Die Keramikpaarung BIOLOX in der Hüftendoprothetik [The ceramic Wear Couple BIOLOX in Total Hip Replacement] Enke Verlag, Stuttgart, 12 – 17 |