University of Huddersfield Repository

Bills, Paul J., Racasan, Radu, Hart, A. J., Skinner, J. and Blunt, Liam

Accurate determination of clinical wear in retrieved metal-on-metal hip replacement joints

Original Citation


This version is available at http://eprints.hud.ac.uk/14053/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

http://eprints.hud.ac.uk/
Accurate determination of clinical wear in retrieved metal-on-metal hip replacement joints


*EPSRC Centre for Innovative Manufacturing in Advanced Metrology, University of Huddersfield, UK  
**London Implant Retrieval Centre, Imperial College, London, UK  
***Royal National Orthopaedic Hospital, Brockley Hill, Stanmore, UK

Tel.: + 44 [1484] 472769  Fax: + 44[1484] 472161  E-mail: p.j.bills@hud.ac.uk

ABSTRACT

The 2011 edition of the England and Wales National Joint Registry shows an increased failure rate for resurfacing and Large Head Metal-on-Metal (LHMoM) hips compared to other designs. The recent recall of the DePuy ASR has only increased the worldwide interest in the assessment of wear of explanted hip joints. The failure of these components has been linked to increased wear rates. Measuring the wear of explanted components allows a direct insight into the in-vivo behaviour of the implants. Wear analysis is a vital tool in determining failure mechanisms and ultimately improving the longevity of joint replacements through improved design and manufacturing control. To achieve this methods have been developed to accurately quantify in vivo total joint replacement wear from retrieved total hip replacement components.

In this study a CMM and a roundness machine were used to develop traceable measurement methods to determine the overall contribution to wear of each component interface. A number of retrieved hip replacement bearings were supplied and both bearing surfaces and taper junction were analysed. The results are discussed and are analysed in light of possible implications regarding component failure mode.

Keywords: implants, Co-ordinate Measurement, Roundness Measurement, Wear.

Topic: Tissue Engineering & Biomaterials: Wear of implants