INNOVATIVE HEALTH TECHNOLOGIES PROGRAMME



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ECONOMIC

& SOCIAL RESEARCH COUNCIL

Innovation, Assessment and the Hip Prosthesis

KEY FINDINGS

Total hip replacement has developed since the 1960s as a major element of orthopaedic surgery, with approximately 35000 operations performed each year in the NHS. The operation involves replacing both the ball and the socket that make up the hip joint. The first total hip prosthesis to be taken up worldwide was that designed by John Charnley in the early 1960s at Wrightington Hospital in the Manchester region, and the Charnley hip remains in use today. This study, carried out by the Centre for the History of Science, Technology and Medicine at the University of Manchester, set out to document and analyse the development of the Charnley prosthesis in a wider context, including regional and industrial influences, a comparison of the Charnley development with other British programmes, the broader evolution of design and materials for prostheses, the Americanisation of the orthopaedic industry, and a comparison of innovation within the public and private sectors.

Key Findings:

- The study used hip replacement as an example of the relationships between surgeons and companies, from the early British developments which were surgeon-led, to the later dynamics in which companies, mostly American, played the major roles.
- Detailed research on the British hip prosthesis programmes that ran alongside Charnley's, including the Norwich, Stanmore, Redhill and Exeter designs, has provided information about why certain designs have persisted and why there are still many different designs in use.
- While patients seem to be highly appreciative of hip replacement surgery, technical appraisal was difficult, especially when companies were producing many new variants. The 'gold standard' randomised controlled trial has historically been rarely applied in surgery. A national register of total hip replacement has recently been established to provide better data on the performance of various hips.

Other Findings:

- The north-west of England had a strong industrial tradition and a history of innovation in orthopaedics. Charnley's employment of local apprentice-trained engineers reflects the mechanical tradition of the region. Charnley's early work built upon surgical and medial research on diseases such as rheumatism and arthritis that were deemed 'industrial'.
- As a surgeon-inventor, Charnley set up a research unit at Wrightington hospital where he experimented with different designs of implant. Having resolved issues of wear and loosening of the prosthesis, using a stainless steel femoral head and a plastic cup, Charnley worked with Charles F Thackray Ltd of Leeds to fabricate and sell the artificial joints. Initially Charnley took out no patents and tried to keep costs down, intending the hips chiefly for the NHS. The designs were soon pirated, especially in the US.
- The project highlighted important comparisons between innovations emanating from the private and public sectors, which is to be the subject of a future study. It also explored some features of the surgeon-company relation which are now giving cause for concern, especially in the USA.

RESEARCH TEAM

Professor John Pickstone, Dr Julie Anderson, Dr David Cantor, Dr Francis Neary, University of Manchester

In collaboration with and co-sponsored by



Professor James Raftery, University of Birmingham

Further detail coming soon.

About the Project

Brief description of the project 350-550 words max

For further information contact: Professor Andrew Webster, IHT Programme Director Department of Sociology, University of York, Heslington, York YO10 5DD Tel: +44 1904 43 3064/4740 ◆ Fax: +44 1904 43 4702/3043 ◆ E-mail: iht@york.ac.uk Web site: http://www.york.ac.uk/res/iht/