



Reprint of “Hip arthroplasty” ☆

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Abstract Total hip arthroplasty is a cost-effective surgical procedure undertaken to relieve pain and restore function to the arthritic hip joint. More than 1 million arthroplasties are done every year worldwide, and this number is projected to double within the next two decades. Symptomatic osteoarthritis is the indication for surgery in more than 90% of patients, and its incidence is increasing because of an ageing population and the obesity epidemic. Excellent functional outcomes are reported; however, careful patient selection is needed to achieve best possible results. The present economic situation in many developed countries will place increased pressure on containment of costs. Future demand for hip arthroplasty, especially in patients younger than 65 years, emphasises the need for objective outcome measures and joint registries that can track lifetime implant survivorship. New generations of bearing surfaces such as metal-on-metal, ceramic-on-ceramic, and metal-on-ceramic, and techniques such as resurfacing arthroplasty have the potential to improve outcomes and survivorship, but findings from prospective trials are needed to show efficacy. With the recall of some metal-on-metal bearings, new bearing surfaces have to be monitored carefully before they can be assumed to be better than traditional bearings.

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Introduction

Hip arthroplasty has evolved from a salvage procedure with poor long-term outcomes reserved for the most infirm patients, to one of the most suc-

cessful and frequently undertaken elective surgeries. The era of modern total hip arthroplasty began in the 1970s, after widespread use of the Charnley prosthesis. More than 500 000 procedures are done every year in the UK and USA, with excellent clinical outcomes showing greater than 95% survivorship at 10-year follow-up, and greater than 80% implant survivorship at 25-year follow-up (Kurtz et al., 2007; National Joint Registry for England and Wales, 2010). However, in the present climate of tightening health-care budgets and debate about fiscal austerity, the implications of increasing demand for hip arthroplasty have led to intense discussion about the cost-effectiveness of new technologies. This Seminar is presented as an update of what is new in the specialty of total hip

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arthroplasty since this topic was last reviewed in *The Lancet* in 2007.

Epidemiology

Total hip arthroplasty is common, with more than 1 million procedures undertaken worldwide. Rates for primary and revision total hip arthroplasty have been increasing; between 1990 and 2002, the rate of primary total hip arthroplasties in the USA increased 50% from 47 per 100 000 population to 69 per 100 000 population. Between 2005 and 2010, the number of total hip arthroplasties in the UK increased 16%. Slightly higher utilisation rates have been reported in Finland and Norway, whereas lower rates are noted in South Korea. Between 2005 and 2030, the number of primary total hip arthroplasties in the USA is projected to increase 174% to 572 000 procedures every year. Similarly, the revision rate in the USA increased 60% from 9.5 per 100 000 to 15.2 per 100 000, and is projected to increase 137% by 2030 (Kurtz et al., 2007; National Joint Registry for England and Wales, 2010; Singh, 2011).

Search strategy and selection criteria

We identified reports published in peer-reviewed published work within the past 5 years by searching Medline, Embase, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Web of Science. We used a combination of medical subject heading terms and Boolean search queries with wildcard queries to identify relevant studies and reviews published in the English language. The web appendix provides a list of the search terms used. Preference was given to randomised controlled trials, meta-analyses, and data from national registries. We included studies with a lower level of evidence and those published earlier than 5 years ago when appropriate, or when higher level studies were not available.

Utilisation rates are 1.5–2 times higher for women than for men, with the greatest disparity occurring in South Korea, where women undergo total hip arthroplasty seven to eight times as frequently as do men. Utilisation rates have been increasing equally for both sexes. The greatest proportion of procedures (65%) is in patients aged 65 years and older. However, the proportion of patients younger than 65 years is projected to increase to 50% of all arthroplasties by 2030 (Kurtz et al., 2009).

The indications for surgery in the UK are osteoarthritis (93%), osteonecrosis (2%), femoral neck fracture (2%), developmental dysplasia of the hip (2%), and inflammatory arthritis (1%). Risk factors for osteoarthritis include female sex, advanced age (≥ 65 years), and obesity. The reported age-standardised incidence (20–89 years) of osteoarthritis is 88 per 100 000 patient-years, whereas the prevalence of symptomatic osteoarthritis is 9% in men and 11% in women (Zhang and Jordan, 2008; Oliveria et al., 1995). The cause of osteoarthritis is multifactorial, but findings from several studies have implicated femoroacetabular, cam, or pincer-type impingement, especially in young men. Prevalence of any type of congenital or acquired hip malformation is 4.3% in men and 3.6% in women. Of patients with symptomatic osteoarthritis, 71% of men and 36% of women have concomitant malformation of the hip joint (Gosvig et al., 2010). Many surgical procedures are being used to address impingement to forestall or obviate the need for total hip arthroplasty.

Surgical indication

Surgical indications for hip arthroplasty are guided by pain, functional impairment, physical examination, and radiographic findings (Fig. 1). However, an initial course of conservative therapy should always be attempted with analgesia, activity modification, ambulatory aids, and weight loss (Hunter and Lo, 2008). Intra-articular injections can be useful to differentiate arthritic pain from referred sources, such as back pain, knee pain, or hernia (Pateder and Hungerford, 2007; Faraj et al., 2003).

The US National Institutes of Health 1995 position statement for total hip arthroplasty recommended surgery for patients with chronic pain and significant functional impairment (NIH Consensus Development Panel on Total Hip Replacement, 1995). However, no international consensus position exists for surgical indications. The Global Orthopaedic Registry has shown that patient selection criteria varies between practitioners, surgeons, and referring physicians, and between countries (Crawford and Murray, 1997; Dreinhöfer et al., 2006; Waddell et al., 2010; Siopack and Jergesen, 1995). Wait time can be an important factor in patient outcomes since poor function before and after the operation are correlated. Early functional improvement is lower in patients who wait 6 months than in those who wait less than 3 months, which has implications for resource use and patient prioritisation (Vergara et al., 2011).

Optimum surgical results are obtained through careful patient selection. Obesity, advanced age,

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