

# Current practice in primary total hip replacement: results from the National Hip Replacement Outcome Project

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As part of the National Study of Primary Hip Replacement Outcome, 402 consultant orthopaedic surgeons from three regions were contacted by postal questionnaire which covered all aspects of total hip replacement (THR). There was a 70% response rate of which 71 did not perform hip surgery, a further 33 refused to take part, leaving 181 valid responses.

Preoperative assessment clinics were used by 89% of surgeons, but anaesthetists and rehabilitation services were rarely involved at this stage. Of respondents, 99% used routine thromboprophylaxis, with 79% using a combination of mechanical and chemical methods. Of surgeons, 84% routinely used stockings, whereas 95.5% used chemical prophylaxis, 63% employed low molecular weight heparins. Theatre facilities were shared with other surgical specialties by 6% of surgeons and 18% regularly used body exhaust suits for THR.

Antibiotic loaded cement was used by 69% of surgeons, the majority (65%) used a single brand of normal viscosity cement with 9% using reduced viscosity formulations. Modern cementing techniques were commonly used at least in part, 87% used a cement gun and 94% a cement restrictor for femoral cementing. On the acetabulum, 47% pressurised the cement. In all, 36 different femoral stems and 35 acetabular cups were in routine use, but the majority of surgeons (55%) used Charnley type prostheses. Of the surgeons, 57% performed only cemented THR,

while 3% exclusively used uncemented THR. Of consultants, 21% followed up their patients to 5 years, the majority discharge patients within the first year.

Of concern is a large proportion of surgeons using low molecular weight heparins despite a lack of evidence with regard to reducing fatal pulmonary embolism, and also the small number of surgeons using prostheses of unproven value. Third generation cementing techniques have yet to be fully adopted. The introduction of a national hip register could help to resolve some of these issues.

Total hip replacement (THR) is one of the most common and most cost-effective orthopaedic operations, with over 40 000 being performed in the NHS during 1994/1995, of which three-quarters were primary procedures (1). The National THR Outcome Project is currently being conducted by The Royal College of Surgeons of England. This is a project covering three large English health regions, which started data collection in September 1996. As part of the prestudy assessment, a detailed questionnaire was devised and circulated to orthopaedic surgeons in order to assess their current THR practice.

Orthopaedic surgeons are often reluctant to change practices with which they are familiar and with which they obtain acceptable results (2). Lack of consensus exists in many key areas such as thromboprophylaxis (3) and surgical technique (2,4). In addition, there are large

numbers of different prostheses available to the surgeon, many of which have not been evaluated in long-term studies (4). This prestudy assessment provides information on these issues and explores other less well known areas such as preoperative assessment, rehabilitation and postoperative follow-up.

**Methods**

A postal questionnaire was sent to all consultant orthopaedic surgeons in the three health regions: Trent, East Anglia and Oxford and Northern and Yorkshire. The questionnaire covered the following aspects of THR: preoperative preparation, prophylaxis, operative techniques and prosthesis type, postoperative management and long-term follow-up.

**Results**

**Response rate**

In all, 402 surgeons were eligible to participate, 285 responded (response rate 70.9%). Of the respondents, 71 were excluded owing to retirement, migration, non-hip surgery or long-term sickness, and 33 refused to take part, leaving an audit group of 181.

**Preoperative preparation**

Most surgeons dealt with primary osteoarthritis (98%), inflammatory arthritis and secondary arthritis were also frequently encountered (59% and 51% respectively).

Preoperative assessment clinics were used by 89% of consultants. The staff most commonly involved were nursing staff (61% of clinics) and senior house officers (56% of clinics). Other disciplines were rarely involved (anaesthetists 6%, physiotherapists 5% and occupational therapists 4%).

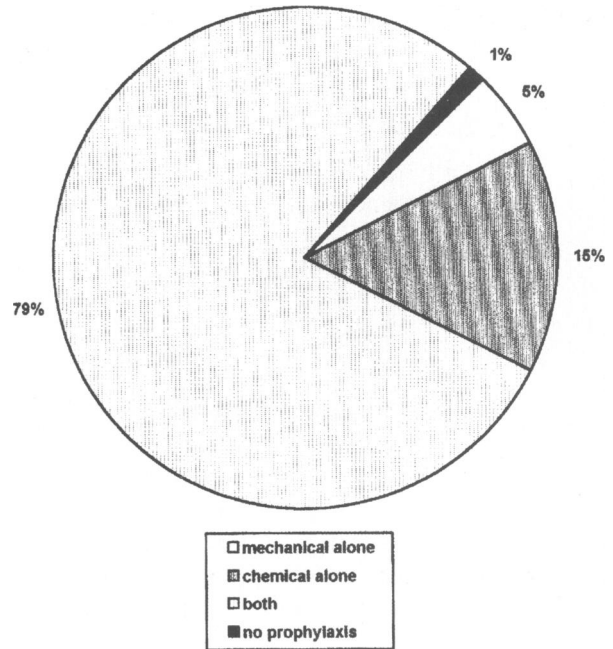


Figure 1. Methods of thromboprophylaxis.

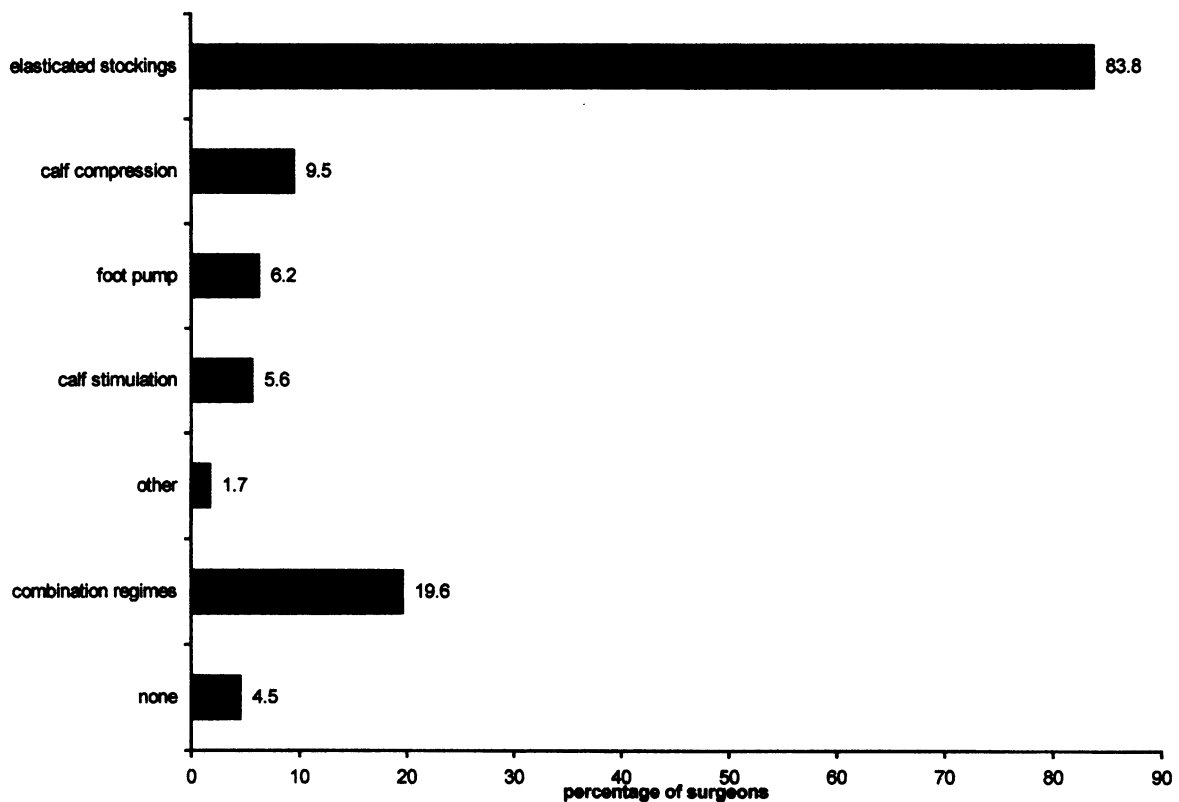


Figure 2. Percentage of surgeons using mechanical thromboprophylaxis in THR.

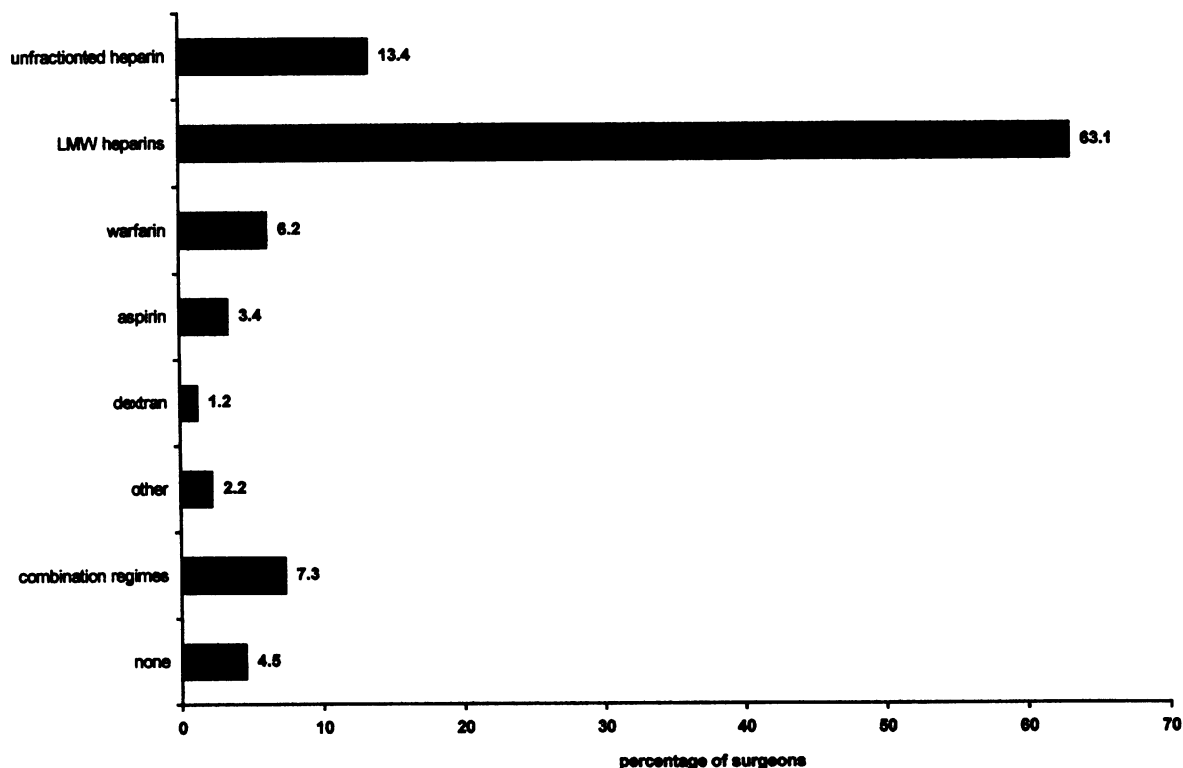


Figure 3. Percentage of surgeons using pharmacological thromboprophylaxis in THR.

### Prophylactic regimens

Almost all surgeons routinely used some form of thromboprophylaxis, the majority using a combination of mechanical and chemical means (Fig. 1). Elasticated stockings were the most commonly used mechanical method (Fig. 2), often in combination with other mechanical devices. Some form of chemical agent was used routinely by 95.5% of surgeons, the most popular being low molecular weight heparins (Fig. 3). Early mobilisation was used by 74.3% of surgeons.

Antibiotic prophylaxis was used by all surgeons, with cephalosporins being the most popular choice (cefuroxime 79%, cephadrine 13%, cefataxime 0.6%). Penicillins accounted for most of the remainder (co-amoxiclav 5%, flucloxacillin 1.8%), although one surgeon routinely used vancomycin.

### Operative technique

#### Theatre

Ultra-clean air theatres were available to 89% of surgeons, although 6% shared theatres with other specialties. In all, 5% did not reply. Exhaust suits were used routinely by 18% of surgeons.

#### Anaesthesia and analgesia

Spinal anaesthesia was used regularly by 60% of surgeons and 50% utilised local anaesthetic blocks. Patient-controlled analgesia was available to 78%.

### Approach

Of the surgeons, 74% routinely used the anterolateral or lateral approach, with 20% favouring the posterior approach, the remaining 6% used a transtrochanteric approach.

### Cement and cementing techniques

Of respondents, 69.3% used an antibiotic-loaded preparation. Viscosity can be broken down into two categories; normal and reduced. Normal viscosity implies that a cement is 'doughy' throughout insertion, in contrast with reduced viscosity, where the cement has both lower and normal viscosity working periods. The data were categorised in this way. Certain assumptions were made as there was a varying amount of detail returned, eg 'CMW' was taken to mean CMW original bone cement. A single brand of normal viscosity cement was used by 65% of surgeons (84.5% Palacos; 15.5% CMW). Only 9% of surgeons used reduced viscosity cements (87.5% Simplex); 20.9% of surgeons used a combination of brands and viscosity, and 5.1% failed to make an entry.

A femoral restrictor was used by 93.9% of surgeons, but only 27.4% used a stem centralising device. A cement gun was used in the femur by 87.2%, but only 27.3% used additional pressurisation devices. Cement pressurisation in the acetabulum was performed by 46.9%. The same number used vacuum mixing.

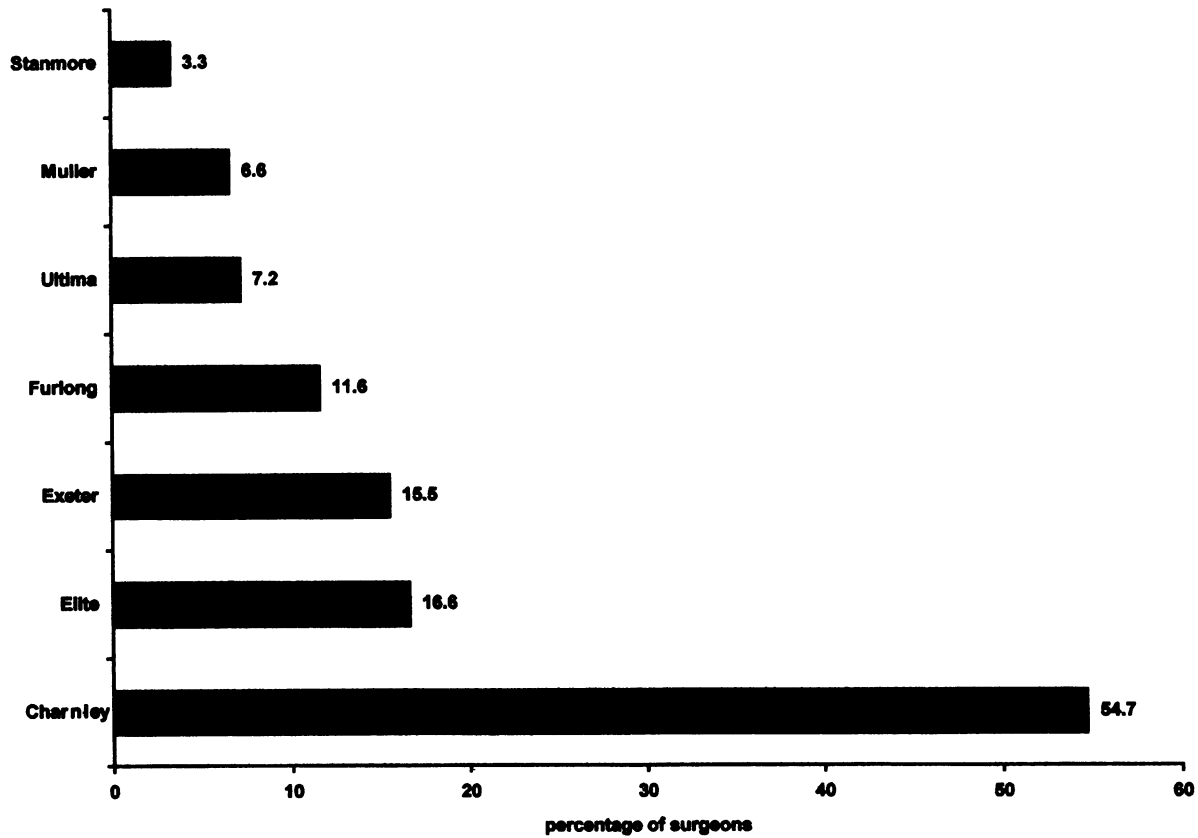


Figure 4. Most commonly used cemented stems

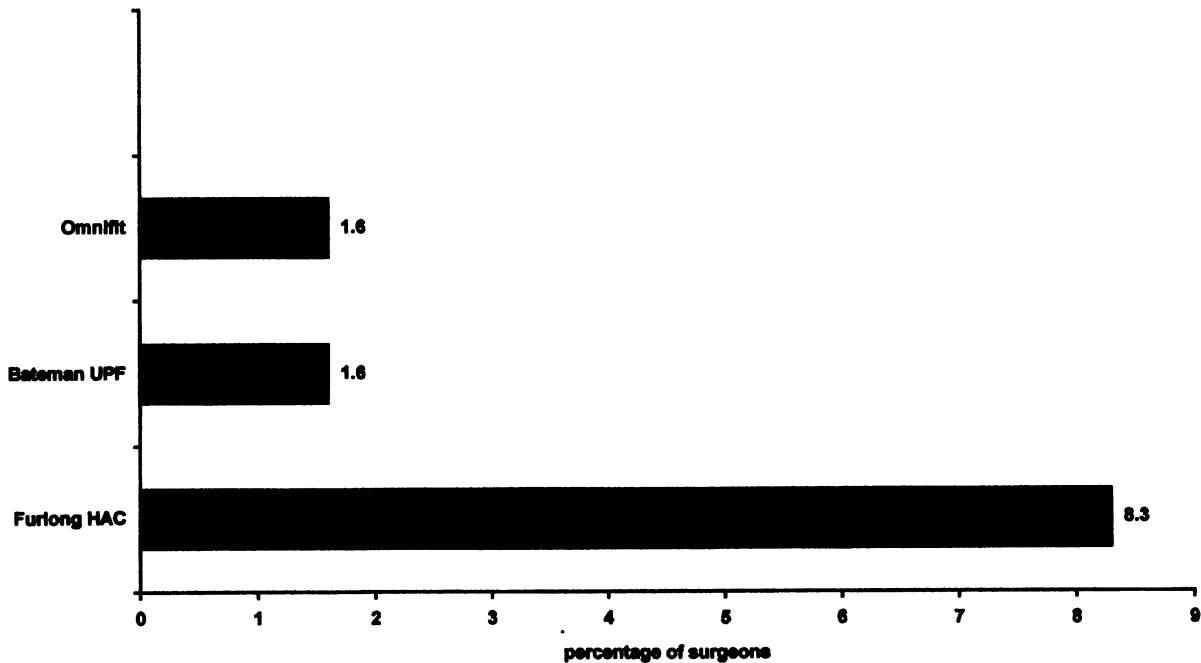


Figure 5. Most commonly used uncemented stems.

**Prosthesis type**

Surgeons were asked which group of prostheses they regularly used—cemented, uncemented or hybrid combinations. The majority of surgeons performed cemented THRs (97%), with 57% exclusively using cemented prostheses. Uncemented THRs were performed by 30.3% with 3% performing these exclusively. Hybrid

combinations were performed by 19.9%. A combination of the three types was used regularly by 40% of surgeons.

A total of 36 different femoral stems were used regularly, the most common cemented and uncemented stems are shown in Fig. 4 and Fig. 5. More than one type of femoral stem was used on a regular basis by 51.4%. On the acetabular side, 35 different types were in regular use, the majority being Charnley type (53.4%), with 50.2% of

surgeons using more than one type of acetabular component on a regular basis. A modular head system was used by 70% of respondents and 33% used ceramic heads.

### Postoperative care and follow-up

The majority of patients stayed for 7–10 days post-operatively (57%) with only 2% routinely staying past 15 days. Rehabilitation facilities were available to 49%, mostly in the form of care of the elderly or rehabilitation beds.

The majority of consultants followed up patients within 6 weeks of surgery (94%) and almost all by 3 months (99.4%). By 1 year, 64% of consultants had routinely discharged their patients and by 5 years only 20.7% continued to follow up hip replacements. The majority of these were involved in long-term studies.

### Discussion

The national study of THR was designed to highlight the current practice of orthopaedic consultants in this country and provide information on 'total hip care', and as such it is perhaps the broadest study to date on this subject and also provides insight into lesser-known areas.

A high percentage of surgeons have access to preoperative assessment clinics which are ideally suited to multidisciplinary patient care; unfortunately, the involvement of other disciplines is poor. In the present climate of health economics, clinics such as these are an efficient way to approach the preparation and rehabilitation of patients undergoing THR and a team approach should, perhaps, be more universally employed.

The use of ultra-clean air theatres has been shown to cut deep infection rates by one-half, antibiotics to produce a threefold reduction and the additional use of body exhaust suits a fourfold reduction in infection rates (5,6). Therefore, it is surprising that 6% of surgeons share theatre facilities with other specialties and 36% do not exclusively use clean air theatres for THR. It would also seem surgeons are not convinced of the effectiveness of body exhaust suits. Whether this is because of economic pressure or because such measures have been reported as unnecessary or uncomfortable (7) is not known. Antibiotic prophylaxis is the single most important anti-infective measure in hip surgery (8,9) so it is not surprising that all surgeons used antibiotics with cephalosporins remaining the most popular choice (10).

Fatal pulmonary embolism (PE) has historically been reported as occurring in 2.3–4% of THR patients (9). The overall death rate in 1991 from THR was 0.35%, with up to 42% of these attributable to PE. The true fatal PE rate therefore probably lies between 0.04% and 0.2% (11). Many studies showing a decrease in the incidence of postoperative deep venous thrombosis (DVT) with the use of thromboprophylaxis do not include THR in the patient cohort (15), often contain small numbers and utilise combination regimens. Furthermore, it is assumed

a decrease in the incidence of DVT will reflect a similar decrease in the rate of fatal PE. It has been suggested that a study involving 28 000 patients would be needed to show this (12). Despite this there continues to be a trend towards the use of chemical thromboprophylaxis, with 95.5% of surgeons in this study routinely using one or more agents. Low molecular weight (LMW) heparins have become the most popular choice (63.1%), even though they were not employed routinely before 1991 (13,14). Whether this is due to ease of use, commercial pressure or because consultants are convinced of their effectiveness is unknown. It remains to be seen if overall mortality is reduced when bleeding complications are considered. The use of mechanical methods of prophylaxis is generally considered safe and effective in most types of surgery (11,15); however, the pattern of thrombosis is different in THR and patients are generally mobilised earlier (11). Antithrombotic stockings have therefore been widely recommended with little scientific evidence to support their use (13,16,17). Of the surgeons surveyed, 83.8% used stockings routinely. The number of surgeons using no form of prophylaxis has been reported as 13–25% (3,17), although in this study less than 1% chose to do so. Surgeons may feel pressured to use prophylaxis in view of the recommendations of European consensus groups who have based their recommendations on historical figures. Whatever the reasons, there is still a continuing trend towards the routine use of both chemical and mechanical thromboprophylaxis and surgeons view thromboembolic complications as important.

This study highlights the large number of different designed THRs in regular use. It is well documented that there is a vast array of prostheses available (18,19), and that there is a large variation in those used by the surgeon (20). The Charnley was by far the most commonly used prosthesis, which is reassuring given the wealth of published long-term survival results (19). The proportion of surgeons using cemented THRs appears to be increasing during the 1990s. This trend has been seen with the Trent Regional Arthroplasty Study (21), with the proportion of cemented THRs increasing from 82.5% in 1990 to 92% in 1995. In Trent in 1990, 35% of surgeons exclusively used cemented THRs (22) compared with 57% in the three regions in this study. This shift towards the use of cemented prostheses and the predominance of a limited number of well-tested designs is encouraging. The large variation of other designs used by small numbers of surgeons remains a matter of concern, and the use of newer innovations such as modular and ceramic heads is not universal.

The importance of stem fixation is often underestimated in favour of stem design. Several studies have reported improved laboratory and clinical results with new cementing techniques. The results of this study show that in the UK there is a low usage of modern cementing techniques, eg reduced viscosity cement and cement pressurisation. There appears to be confusion as to what is the best cementing technique and a consequent lack of consensus. The situation does not appear to have improved over the last few years (2).

The majority of hip patients receive no long-term follow-up and, of those who do, most are involved in ongoing studies. Current economic pressures provide an incentive to improve long-term results (1), and as we come to learn more about prosthesis design and improved fixation the need for follow-up and large multicentre studies such as the national study will increase. One possible future development would be the establishment of a national hip register which could provide the necessary patient numbers to resolve some of the above issues.

This study provides an insight into current UK practice with regard to THR; it shows that, despite a number of publications, third-generation cementing techniques have not been fully adopted but there is a trend towards prostheses with a proven record. In addition, it may be that medicolegal or commercial pressures rather than scientific reasoning are forcing changes in thromboprophylaxis.

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