

# Outcome of primary resurfacing hip replacement: evaluation of risk factors for early revision

## 12,093 replacements from the Australian Joint Registry

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**Background and purpose** The outcome of modern resurfacing remains to be determined. The Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) started collection of data on hip resurfacing at a time when modern resurfacing was started in Australia. The rate of resurfacing has been higher in Australia than in many other countries. As a result, the AOANJRR has one of the largest series of resurfacing procedures. This study was undertaken to determine the results of this series and the risk factors associated with revision.

**Patients and methods** Data from the AOANJRR were used to analyze the survivorship of 12,093 primary resurfacing hip replacements reported to the Joint Replacement Registry between September 1999 and December 2008. This was compared to the results of primary conventional total hip replacement reported during the same period. The Kaplan-Meier method and proportional hazards models were used to determine risk factors such as age, sex, femoral component size, primary diagnosis, and implant design.

**Results** Female patients had a higher revision rate than males; however, after adjusting for head size, the revision rates were similar. Prostheses with head sizes of less than 50 mm had a higher revision rate than those with head sizes of 50 mm or more. At 8 years, the cumulative per cent revision of hip resurfacing was 5.3 (4.6–6.2), as compared to 4.0 (3.8–4.2) for total hip replacement. However, in osteoarthritis patients aged less than 55 years with head sizes of 50 mm or more, the 7-year cumulative per cent revision for hip resurfacing was 3.0 (2.2–4.2). Also, hips with dysplasia and some implant designs had an increased risk of revision.

**Interpretation** Risk factors for revision of resurfacing were older patients, smaller femoral head size, patients with developmental dysplasia, and certain implant designs. These results highlight the importance of patient and prosthesis selection in optimizing the outcome of hip resurfacing.

Conventional total hip replacement gives good outcome in older patients, but younger patients have higher revision rates (Boerre and Bannister 1993, Joshi et al. 1993, Dorr et al. 1994, Callaghan et al. 1997, Swedish Hip Arthroplasty Register Annual Report 2006). Resurfacing of the hip using a metal-on-metal, large-diameter bearing has theoretical advantages, particularly in younger patients. These include bone conservation, restoration of proximal femoral anatomy, low wear rates, and ease of future revision. Recent publications have reported promising results (Amstutz et al. 2004, Daniel et al. 2004, Back et al. 2005, Treacy et al. 2005, Girard et al. 2006, Pollard et al. 2006, Mont et al. 2007), especially in younger patients. There remain concerns, however, regarding increased risk of femoral neck fractures, metal ion release, and formation of pseudotumors (Shimmin and Back 2005, Grammatopoulos et al. 2009).

In Australia, hip resurfacing has been performed and recorded in the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) since 1999. This report examines the 12,093 hip resurfacings reported to the Registry and evaluates risk factors for revision.

### Patients and methods

The AOANJRR started collection of data in September 1999. It was implemented in a stepwise manner, becoming fully operational on a national basis in 2002. All hospitals undertaking joint replacement surgery contribute data to the Registry. Cross-validation of procedures reported to the Registry with independently collected health department data ensures that almost all hip procedures are recorded by the Registry. The present analysis includes all primary conventional and resurfacing total hip replacements recorded by the Registry