

CLINICAL RESULTS OF ALUMINA CERAMIC-CERAMIC BEARINGS IN TOTAL HIP ARTHROPLASTY

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Introduction

Wear, particulate debris, resulting osteolysis and component loosening are the primary problems affecting total hip arthroplasty. Alumina ceramic-ceramic bearings have demonstrated low wear, both in vitro and in vivo, suggesting that long term clinical results may be significantly improved through their use. Analysis of alumina ceramic-ceramic retrievals have shown wear rates to be 4,000 times less than metal-plastic bearings of the same generation (Dorlot, JM et al. Wear Analysis of Retrieved Heads and Sockets of Hip Prostheses, J Biomed Res, 23:299-310, 1989). Even contemporary cross-linked polyethylene appears to improve wear rates by only two-times (Martell, J: Alternative Bearings Symposium, 2003). Further, ceramic debris particles are less bioreactive than polyethylene particles. The purpose of this study is to document the clinical results of alumina ceramic-ceramic bearings.

Materials and Methods

Beginning in June, 1997, 299 total hip arthroplasties were performed using alumina ceramic-ceramic bearings. All patients treated prior to February, 2003 were participants in a prospective FDA/IDE study (Wright Medical Technology, Inc., Memphis, TN). The acetabulum consisted of an alumina liner joined to a titanium shell using an 18 degree taper (figure 1). The liner is positioned flush with the shell, with no additional metal sleeve adapter. The protocol called for patients to be reexamined twice in the first year and annually thereafter.

Results

Of the 299 THA's, 193 are more than 1 year from surgery and 104 hips have been evaluated at a minimum of 2 years following surgery. The patients had a mean age of 47.7 years \pm 13.5 years (range: 17.8 years — 73.6 years). Thirty six (44%) were men and 46 (56%) were women. Of the 299 hips, there were three implant-related re-operations. One patient had a malseated liner which was corrected acutely. Two patients underwent I&D, one for acute infection, one was culture negative. One femoral component failed to osseointegrate and was revised. There have been no dislocations, no radiographically visible wear or lysis, no evidence of implant impingement, and no bearing fractures. Kaplan-Meier survivorship is 99% at 7 years.

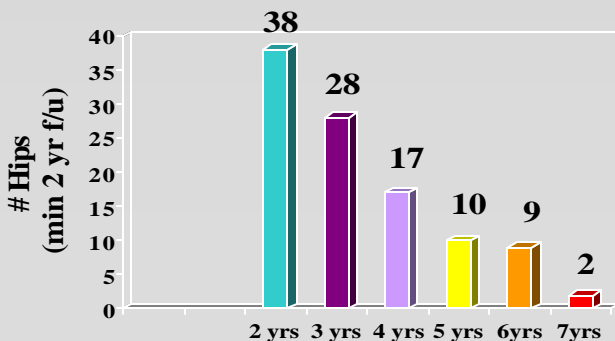


Figure 1

Figure 1. Alumina Ceramic-Ceramic THA with 18 degree taper junction

Figures 2A and 2B. Pre and 5-year Post-operative radiographs of a 48 year old male.



Figure 2A



Figure 2B

Conclusions

Alumina ceramic-ceramic bearings show excellent survivorship and an absence of osteolysis in a young, active patient population at 2 to 7 years followup.