

**MAOA BREAK-OUT SESSION #1
TOTAL HIP ARTHROPLASTY
April 20, 2006**

**9. Cementless Acetabular Fixation in Patients Under
50 Years of Age: A 10-18 Year Follow-Up Study**

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Especially in the young patient, cemented acetabular fixation in the total hip arthroplasty construct has had limited long-term durability. For this reason, the senior two authors began using cementless acetabular components exclusively in 1986. The authors address the question, "Is the durability of cementless acetabular fixation greater than cemented fixation in younger patients at 10 to 18 year follow-up?"

Between 1986 and 1994, 120 consecutive non-selected Harris-Galante I hip replacements were performed by two surgeons in patients under the age of 50 using a cementless acetabular component. The patients were prospectively followed for 10 to 18 years. Hips were evaluated for need of revision, clinical success (WOMAC Score), radiographic loosening, osteolysis, and acetabular component wear. These results were compared to the senior surgeon's cemented acetabular results in this age group, at comparable follow-up.

Only 2 hips were lost to follow-up, leaving 118 hips available for analysis. At final follow-up, three acetabular components were revised for aseptic loosening and associated osteolysis, and an additional four components were revised for osteolysis without loosening. An additional five components required revision of the acetabular liner without replacement of the shell. Including the components revised for loosening, six components were radiographically loose. Osteolysis occurred around 15% of acetabular components and the average radiographic wear rate was 0.20 mm per year. At this interval of follow-up, the revision rate for aseptic acetabular loosening was over five times lower for cementless fixation compared to the senior surgeon's results with cemented fixation in this age population ($p < 0.01$).

Cementless acetabular fixation is more durable than cemented acetabular fixation in patients under age 50. Acetabular wear and osteolysis are the long-term problems. Bearing surface improvements are warranted in this younger age group of hip replacement patients.

10. Minimum 15-Year Follow-Up of a Cementless, Tapered Titanium, Primary Femoral Component

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Given the variety of implant designs on the orthopedic market, long-term follow-up studies are essential for determining optimal treatment choices.

Between 1987 and 1990, 354 consecutive primary THA procedures were performed at two institutions using a proximally, circumferentially porous-plasma sprayed, tapered titanium femoral implant of a single design. A standardized implantation technique was used consisting of reaming and broaching the femur. Clinical and radiographic follow-up was performed on an annual basis when possible. Deceased patients accounted for 49 hips. One hundred thirty-four hips were available for minimum 15-year review. Survivorship with stem revision for any reason as the end-point and aseptic loosening as the end-point were calculated using the Kaplan-Meier method.

To date, three stems have been revised. Two stems were revised for aseptic loosening and one for late infection. Overall stem survivorship was 99.2%. Survivorship with aseptic loosening as the end-point was 99.4% (95% confidence interval: 97.5-99.8) at 5, 10, and 15 years. Femoral stem survivorship in 15-year follow-up living patients was 98.5% for any stem revision and 99.3% for aseptic loosening. Radiographic review revealed positive bony remodeling with increased or unchanged bone quality and no significant stress shielding in the majority of stems.

This tapered titanium porous primary femoral component provides outstanding longevity with a low rate of aseptic loosening and positive bony response as measured by cortical thickness into the second decade of implant life. Both revisions for aseptic loosening were performed before five years follow-up; thus, no case of late loosening has been observed with this device.

This tapered porous primary femoral component provides outstanding longevity with a low rate of aseptic loosening and positive bony response.

11. Twenty-Year Outcome of Primary PCA Cementless Total Hip Arthroplasty

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INTRODUCTION: There were initial concerns reported with the PCA cementless total hip replacement to include bead shedding, radiolucent lines around the device, and thigh pain. This study evaluates the minimum 20-year results of cementless PCA total hip arthroplasty to determine the long-term durability of the prosthesis.

METHODS: One hundred consecutive PCA cementless total hip replacements were inserted in 90 patients between 1984 and 1985. The average age at surgery was 58 years. Patients were prospectively evaluated for clinical results (Harris Hip Scores) as well as the need for femoral or acetabular revision, migration or subsidence of the components, and osteolysis at five year intervals in all cases.

RESULTS: At minimum 20-year follow-up, 50 patients with 58 hips were living and 40 patients with 42 hips deceased. Sixteen acetabular components were revised for osteolysis or loosening, and five femoral components for osteolysis or loosening. Ninety-three percent of femoral components were bone ingrown. In addition to the revised cases, four acetabular components had subsided. Distal osteolysis only occurred around 4 femoral implants; however, acetabular osteolysis occurred around 30 acetabular components. Ten percent of living patients (6 hips) had some thigh pain, but no hip was revised for thigh pain.

DISCUSSION: Although the acetabular results with the PCA have not been comparable to other cementless devices of its generation (probably related to 32 mm heads and press heating polyethylene), the femoral results have been durable with only 2% revised for loosening and 5% revised overall. The femoral component has functioned as well as any first generation cementless component probably related to the circumferential coating and initial stability if proper sizing was performed.

12. Effect of Preoperative Analgesia on Length of Hospital Stay Following Total Joint Arthroplasty: A Comparison of Oral Oxycodone and COX-2 Inhibitors versus Intravenous Patient Controlled Analgesia (PCA)

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INTRODUCTION: Intravenous narcotics cause nausea and vomiting, thereby, prolonging the patient's length of stay (LOS) following orthopedic surgery. Our hypothesis is that patients undergoing total hip or total knee arthroplasty will have a shorter LOS if oral analgesics and anti-inflammatory are used versus conventional intravenous patient controlled narcotic analgesia.

METHOD: A retrospective chart review was conducted following a change in one surgeon's method of treating pain in his joint arthroplasty patients. The study group (n=57) was given a narcotic (Oxycodone) by mouth and a COX-2 inhibitor prior to surgery. They did not have access to IV "patient controlled analgesia" (PCA); however, they received 48 hours of scheduled Oxycodone. The control group (n=69) received no preoperative medications, but was allowed to use a narcotic PCA device for 48 hours. Both groups postoperatively were given oral analgesics on an as needed (prn) basis.

RESULTS: The mean LOS for the group of patients receiving preoperative Oxycodone and a COX-2 inhibitor was 2.74 days, while the intravenous PCA group's LOS was statistically longer at 3.28 days (p=0.001). The group of patients utilizing a PCA consumed significantly (p=0.003) more intravenous morphine (17.7 mg versus 7.2 mg) than the study group. The group receiving IV medicines were twice as likely to miss therapy, experienced a three-fold increase in nausea and vomiting, and were twice as likely to require placement in an extended care facility upon discharge.

CONCLUSION: Patients undergoing total joint arthroplasty who take preoperative Oxycodone and a COX-2 inhibitor utilize less IV narcotics, experience less nausea and vomiting, have a shorter length of stay, and are more likely to be discharged to home when compared to patients utilizing intravenous patient controlled analgesia.

13. Large Diameter Femoral Heads for the Treatment of Recurrent Dislocation after Total Hip Arthroplasty

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INTRODUCTION: Large diameter femoral heads have emerged as a common treatment for recurrent dislocation following total hip arthroplasty (THA). Despite the reported biomechanical advantages of jumbo femoral heads, clinical evidence is lacking. The purpose of this study is to report a series of consecutive patients who underwent hip revision with a jumbo femoral head for recurrent dislocation after THA.

MATERIALS AND METHODS: Nineteen hips in 19 patients with a diagnosis of recurrent hip instability after THA underwent hip revision with a large diameter femoral head. The mean age of the patients was 69 years, with ten men and nine women. The 19 patients had an average of 1.7 THA procedures (range 1-5) and 3.8 dislocations (range, 1-12) prior to the index procedure. A modular, unipolar large diameter femoral head (36-46 mm) was used in every case.

RESULTS: Two patients died at 6 and 12 months postoperatively, and both remained stable without dislocation until the time of death. At minimum of two-year follow-up (range, 2-8 years), no patients were lost to follow-up, and 13 of 17 hips remained stable without dislocation. Four patients suffered recurrent dislocation or required re-operation. One patient developed recurrent instability at 22 months and underwent revision for component malposition. One patient underwent revision to a constrained liner at 17 months for recurrent dislocation. One patient suffered recurrent instability at 39 months and remains dislocated due to medical problems. One patient experienced recurrent anterior subluxation and underwent revision, where a fracture of the elevated polyethylene liner was found at surgery. There were no other revisions or reoperations.

DISCUSSION: To our knowledge, this study represents the first reported series of modular, unipolar, large diameter femoral heads used for the treatment of recurrent instability after THA. This suggests that jumbo femoral heads are an appropriate method of restoring hip stability for recurrent dislocation. Jumbo femoral heads may be a reliable alternative to constrained acetabular articulations for hip instability after THA.

14. Constrained Acetabular Liners Cemented into Cages During Revision Total Hip Arthroplasty

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INTRODUCTION: The combination of acetabular bone loss and hip instability can create quite a challenge for the orthopedic surgeon. The purpose of this paper was to review the results of constrained acetabular liners cemented into cages (protrusio ring) in revision total hip arthroplasty.

METHODS: This is a retrospective review of 16 patients undergoing revision total hip arthroplasty with a constrained acetabular polyethylene liner cemented into a protrusio ring. There were 5 females and 11 males with an average age of 63 years (33 years-75 years). The average follow-up was 28 months (range, 24 months-60 months). Using the Paprosky acetabular classification, eight patients had type II bone loss and eight patients had type III bone loss. Clinical evaluation was performed using the Harris Hip Score along with radiographic data.

RESULTS: At latest follow-up, 3 patients had died leaving 13 patients available for evaluation. The preoperative Harris Hip Score was 27 points which improved postoperatively to 62 points (47-87 points). There were a total of three failures in this group. One patient with aseptic loosening required removal of implants. A second patient was radiographically loose and pending revision. The third patient has a fracture of the polyethylene liner. There were no infections. The overall failure rate was 23%.

DISCUSSION: The disappointing results in this group of patients are multifactorial. The combination of poor acetabular bone stock, mechanical fixation, and altered stresses led to a poor outcome. We have minimized the use of cages and prefer biologic porous fixation on the acetabular side along with the use of large femoral heads for instability when feasible. We would recommend the use of a constrained, cemented, acetabular liner in a protrusio ring with caution only as a salvage procedure.

15. Serum Cobalt and Chromium Levels in Patients with Metal-on-Metal Resurfacing Hip Prostheses

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INTRODUCTION: The purpose of this study was to monitor serum cobalt (Co) and chromium (Cr) levels in patients after metal-on-metal resurfacing hip arthroplasty with the Cormet 2000[®] prosthesis, and to evaluate the effect of patient characteristics, prosthesis characteristics, and clinical and radiographic measures on metal levels.

METHODS: Serum Co and Cr levels were determined in 32 patients with Cormet resurfacing prostheses at 0.5, 1, and 2 years postoperatively using ICP-MS and are reported as µg/L. Control levels were measured in 20 patients without implants.

RESULTS: Medium Co and Cr were 0.21 and 0.16 in controls without implants. Medium Co at 6 months (2.65), 1 year (3.62), and 2 years (2.80), and Cr at 6 months (3.74), 1 year (4.73), and 2 years (4.68) were significantly increased in the Cormet group when compared to control levels ($p < .0001$). Metal levels did not correlate with cup inclination, component position, head size, age, weight, sex, or Harris Hip scores. Markedly elevated Co (35, 63) and Cr (13, 70) levels were found in two patients with excessive cup abduction. In addition, one patient with a loose implant that required revision had markedly elevated Co (19) and Cr (44) levels.

CONCLUSION: Significantly increased levels of cobalt and chromium were released from Cormet 2000 articulations at all time points. Excessive cup abduction was associated with markedly elevated ion levels indicating that accurate cup placement is an important consideration in resurfacing arthroplasty. The significantly increased trace metal levels following resurfacing with the Cormet prosthesis is a concern and warrants further monitoring.

16. The Use of Proximal Fixed Modular Stems in Revision of Total Hip Replacement

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INTRODUCTION: Proximally fixed femoral stems in revision of total hip replacements (THR) have had inconsistent results. The advantages of modularity in these cases have been widely described. The aim of this study was to determine the safety and efficacy of a new proximally fixed modular femoral stem in revision of THR with a minimum two-year follow-up.

MATERIALS AND METHODS: This study was performed in three different centers. We have prospectively followed 62 patients that underwent revision THR with the Exactech Acumatch M Series modular stem®. This stem allows for version independent of the femoral bow by utilizing four components. Patients have been followed for an average of 3.1 years with preoperative and postoperative Harris Hip Score (HHS) and SF-12 scores.

RESULTS: There were 3 dislocations (5%), 2 infections (3%), 2 arrhythmias, 1 stroke, 1 UTI, 1 SBO, and 2 deaths (3%). One stem was revised within four weeks due to subsidence and secondary instability. There were no cases of late mechanical failure. The average BMI was 28 preoperatively and increased to 28.1. Postoperative HHS and SF-12 improved significantly ($p < 0.05$).

DISCUSSION: The use of a modular proximal fixed stem may offer the ability to obtain better proximal and distal stability in the short term compared to one piece stem designs. Additionally, the ability to independently address femoral version may reduce the risk of dislocation in this population. In cases of proximal bone loss, a distally fixed or fully coated prosthesis may offer better fixation.

17. Dislocation After Hip Hemiarthroplasty: Anterior versus Posterior Capsular Approaches

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In 1998 it was predicted that approximately 250,000 femoral neck fractures occurred in the United States annually, with that number expected to double by 2025. The cost of the health care system is projected to be \$9 billion annually. Prosthetic dislocation is a devastating complication after hip hemiarthroplasty. Disruption of the posterior hip joint capsule has been implicated as a potential cause for many of these prosthetic dislocations. Indeed, it has been borne out in previous studies that posterior surgical approaches increase the risk of dislocation. However, previous reports have lacked uniformity in the level of expertise of the surgeons performing the procedures, the technique of prosthesis implantation, and the postoperative rehabilitation with regard to weight-bearing limitations and bed-rest requirements. To determine if the surgical approach to the hip affected rate of dislocation at six months follow-up, we retrospectively reviewed our institution's experience with hip hemiarthroplasty, comparing anterior to posterior capsular approaches in 375 patients over a ten-year period. All procedures were performed by, or under the direct supervision of, a staff orthopedic surgeon.

There were 199 procedures performed through a posterior capsular approach, while 186 procedures were performed through an anterior capsular approach. All prostheses were cemented into place, anatomic capsular closure was performed in all cases, anterior or posterior, and all patients were allowed immediate weight-bearing with no period of bed-bound restriction. Overall, nine (2.3%) dislocations occurred in the study population, all in the posterior group (4.5%). There were no dislocations (0.0%) in the anterior capsular group. This difference was highly statistically significant ($p < .0033$). The two groups were also compared in terms of discharge disposition, length of stay, and cognitive impairment. Cognitive impairment has been shown to lead to higher dislocation rates, owing to an inability to recall limb position restrictions. Discharge disposition and cognitive impairment was also compared between the two groups, and found to be without statistical significance. Length of stay after surgery was slightly increased in the anterior capsular group.

This series bears merit in that it is uniform in its rehabilitation protocol in both groups and that all procedures were performed under the direct supervision of a staff orthopedic surgeon. Other reports on this topic left multiple variables between the two groups, including different postoperative weight-bearing restriction (e.g., posterior group placed on bed rest for a period of time), the patient's operative positioning (e.g., supine or lateral decubitus), implantation techniques (e.g., cemented versus non-cemented), and level of training of the surgeon of record (e.g., staff or resident-physician). The major strength of this study is the uniformity of the two groups and that the only variable was the capsular approach chosen for the procedure.

In conclusion, in our series treating proximal femur fractures with hemiarthroplasty, an anterior capsular approach is associated with increased stability, regardless of cognitive impairment, and did not have detrimental effects on overall length of stay or discharge disposition.

18. Treatment of Anterior Femoroacetabular Impingement with Combined Hip Arthroscopy and Limited Open Osteoplasty

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INTRODUCTION: Anterior femoroacetabular impingement results from abnormal abutment of the anterolateral femoral head-neck junction with the acetabular-labral complex resulting in pain, articular cartilage delamination, labral disease, and eventual secondary osteoarthritis. To date, the recommended surgical treatment strategies to address this disorder include arthroscopy alone or complete surgical dislocation of the hip. The purpose of this study is to evaluate the early clinical results of an alternative strategy that employs hip arthroscopy to address the intra-articular disease and a limited, open anterolateral head-neck junction osteoplasty to resect the impingement lesion.

METHODS: Nineteen consecutive patients (19 hips) with symptomatic anterior femoroacetabular impingement and an aspherical femoral head were treated with hip arthroscopy (labral debridement and chondroplasty) and a limited osteoplasty of the anterolateral head-neck deformity (without dislocation). Standard radiographic and clinical criteria were used to assess this treatment.

RESULTS: Fourteen patients were male, four female and average age 32 years. All hips had arthroscopic debridement of the labral tear. Radiographs demonstrated an aspherical femoral head in all cases and improvement of the head-neck junction offset by an average 11 mm after osteoplasty. No patients had radiographic progression of osteoarthritis. The average Harris hip scores improved from 68.3 preoperatively to 92.8 at average 10-month follow-up. All patients were satisfied with the result. Complications included one superficial wound infection.

DISCUSSION: Combined hip arthroscopy and limited open osteoplasty of the femoral head-neck junction is a safe, effective treatment for focal, anterior femoroacetabular impingement. Longer term follow-up is necessary to determine the durability of this technique.

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