

## Poster Abstracts

### Poster 1

#### Outcome of Total Knee Arthroplasty When the Extensor Mechanism is Preserved

Michael Anderson, MD  
Brad Penenberg, MD

**Introduction:** Several so-called "soft-tissue sparing" approaches to total knee arthroplasty have been utilized over the last decade. The goal of such an approach is improvement in early clinical outcomes. The purpose of this prospective study was to determine the early outcomes using soft tissue sparing instrumentation that facilitated preservation of the extensor mechanism.

**Methods:** Forty unilateral patients were enrolled at 4 sites and implanted using anterior rough cut instrumentation that had been modified to accommodate bone cuts through minimal soft-tissue dissection. Detailed operative data was collected including blood loss, length of quadriceps split and the extent of any tear in the quadriceps tendon or VMO. The Knee Society Score (KSS) and Oxford Score (OS) were collected at the 6 weeks visit to determine early outcome of this conservative approach.

**Results:** Demographics for age, BMI, preop KSS and OS were 68 years, 29.5, 52, 38, respectively. Subvastus approach was taken in 62.5% of the cases, with the remainder being parapatellar. The quad tendon was split in 25% of the cases, with an average split length of 2.6cm. Quad tendon and VMO tears occurred in only 2 cases, with lengths less than 0.5cm. Mean improvement from baseline at 6 weeks was 31 points and 14 points for the KSS and OS, respectively. Parapatellar approach showed a greater KSS improvement from baseline than subvastus ( $p < 0.05$ ).

**Discussion and Conclusion:** This soft tissue sparing approach provided preservation of the extensor mechanism, resulting in early postoperative improvement. The greater KSS improvement in patients having parapatellar approach may indicate that a more technically demanding subvastus approach may diminish the effect of soft-tissue sparing.

### Poster 2

#### Complications of Medial Malleolar Screw Hemiepiphysiodesis for Ankle Valgus

Ivan J. Antosh, MD  
Paul M. Caskey, MD  
Bryan J. Tompkins

**Introduction:** Ankle valgus can be treated in the growing child with percutaneous medial malleolar screw hemiepiphysiodesis. The purpose of this study was to report our experience with medial malleolar screw hemiepiphysiodesis over a ten year period, the complications we encountered and provide recommendations regarding optimal screw dimensions and type.

**Methods:** A retrospective review of medial malleolar screw hemiepiphysiodesis to correct ankle valgus from 1997 to 2007 was performed at our institution. To meet inclusion criteria, subjects needed clinical and radiographic evidence of ankle valgus, a minimum of one year follow-up data following screw removal or end of growth and no concomitant procedures affecting outcome. Preoperative, postoperative, and follow-up clinical and radiographic data were collected from all patients over this interval.

**Results:** Our population consisted of 282 ankles in 170 patients, 113 males and 57 females. Common underlying diagnoses included clubfoot, multiple hereditary exostoses, and cerebral palsy. Major complications requiring additional surgery occurred in 4.3% of our patients, including hardware migration without correction (5), screw breakage without correction (2), failure to correct with intact hardware (3), an allergic reaction to the hardware (1) and a medial physeal growth arrest (1). Smaller diameter, partially threaded or shorter screws accounted for the majority of cases of hardware migration or failure without correction. Minor complications occurred in 20.6% including temporary pain, screw breakage or migration (with continued correction), bent screws, superficial infection, skin breakdown, guide pin breakage and hypertrophic scar. Two patients had undesirable overcorrection because of failure to follow up.

**Conclusions:** Temporary medial malleolar screw hemiepiphysiodesis is a safe and reliable means of correcting ankle

valgus. Major complications were infrequent. Screw breakage, screw migration, failure of correction and hardware removal problems are encountered more frequently with partially threaded, shorter and smaller diameter screws. Fully threaded 4.5mm screws are preferred to avoid hardware complications.

Poster 3

### Ultrasonographic Nerve Abnormalities in Charcot-Marie-Tooth Disease

Timothy C. Beals, MD  
Florian Nickisch, MD  
Jeffrey Swensen, MD

**Introduction:** Since Charcot-Marie-Tooth disease was recognized in the early 20th century, attempts have been made to characterize patients and discern the different genetic variations of the condition and assess the manifestations of the disease as it affects the peripheral extremities. During the course of care of these patients, we have observed that in some of these patients who presented for surgical foot and ankle reconstruction, that the size of peripheral nerves, particularly the sciatic nerve, was remarkably large relative to normals. This is a novel observation.

**Methods:** Ten patients have been identified with clinically apparent and EMG proven Charcot-Marie-Tooth disease that have undergone peripheral extremity ultrasound during the course of routine care for placement of peripheral nerve catheters for perioperative pain control for elective foot and ankle surgery. The size of the nerves were recorded at consistent locations relative to normals.

**Results:** In each of the ten patients, dramatically increased nerve diameters have been observed relative to normal patients. Each patient has been observed to have a large size of nerve at comparable depths to control patients. The large nerve diameters have been observed in both the upper and lower extremities.

**Discussion and Conclusions:** To our knowledge, the observation by clinical ultrasound of significantly enlarged peripheral nerve volumes in patients with Charcot-Marie-Tooth disease is a novel observation. There is potential to utilize ultrasound as a screening evaluation tool for patients considered to have peripheral sensory motor neuropathies. Genetic testing for CMT is available for some genotypes and this observation may allow investigation of the characteristics of patients with

different genetic subtypes of CMT in a noninvasive, inexpensive, and reproducible manner.

Poster 4

### Modular Necks: Achieving Leg Length Equality and Stability

William Seth Bolling, MD  
Brad L. Penenberg, MD

**Purpose:** The current version of a modular neck femoral component was introduced in Italy 20 years ago. It was approved for use in this country in early 2003. The proposed benefit in THA is greater intra-op versatility in adjusting leg length and offset, thereby reducing rates of over-lengthening and dislocation. We have retrospectively reviewed over 900 modular femoral neck implants to evaluate this proposed benefit and determine a new level of "fine tuning" in an effort to optimize muscle balance.

**Methods:** Between March 2003 and April 2007 we implanted 922 modular neck femoral components. 857 were grit blasted straight titanium femoral stems, 58 were modular titanium revision stems, and 7 were cemented polished Co-Cr. Femoral head size ranged from 28mm to 54mm. Titanium neck options included short or long, and varus, neutral, or valgus, with 0, 4, 8, 15 degree ante-, or retroverted options of each. Initial choice of head/neck combination was based on the patient's native anteversion, varus/valgus orientation, and offset. Preliminary leg length assessment was made based on relative knee height. Intra-op ROM testing was carried out in extreme extension and external rotation, flexion 30-70 degrees while adducting 30-45 degrees, and internally rotating as high as 80-90 degrees. The hip was then taken into deep flexion (thigh to chest), maintaining neutral ab/adduction and neutral rotation. Neck adjustments were made as indicated. Anterior instability was corrected by adding retroversion and/or offset and posterior instability by adding anteversion and/or offset. Intra-op AP pelvis x-ray was taken in all patients to assess leg length, component alignment, and femoral fit.

**Results:** We found no modular neck dissociations. Also, there were no dislocations using a soft tissue sparing, capsule preserving posterior approach. Leg length difference was +/- 0-3mm in 98% of patients.

**Discussion:** Modular neck femoral components offer unprecedented versatility in THA. After >90,000 implantations worldwide there has been no identified risk associated with third

body wear or neck failure. We have noted a more precise ability to achieve leg length equality and optimal muscle balance with modular necks. In addition, we have found improved patient satisfaction without compromise of hip balance.

#### Poster 5

### No Functional Differences Between a Mobile Bearing Unicompartmental and Total Knee Arthroplasty One Year Post Operatively

Mark Campbell, MD

\*M. Wade Shrader, MD

Manoshi Bhowmik-Stoker, MS

David J. Jacofsky, MD

Marc C. Jacofsky, MA

**Introduction:** Total knee arthroplasty (TKA) is the standard treatment option for patients with severe pain and decreased joint motion resulting from late stage osteoarthritis (OA). For patients with OA limited to the medial knee compartment, unicompartmental knee arthroplasty (UKA) may be indicated. Functional differences between TKA and UKA patients during activities of daily living (ADL) such as walking or stair negotiation have not been critically investigated, but proponents of the mobile bearing UKA suggest better mechanics and function with this device. This study compares knee function during ADLs at the one year time point following TKA and UKA.

**Methods:** A quantitative motion analysis laboratory was used to record three dimensional kinematic and kinetic data using a 10-camera system, four floor-embedded forceplates, and an instrumented 4 step staircase. Ten patients with a mobile bearing UKA (mean age 69), 11 patients with TKA (mean age 70), and 11 healthy controls (mean age 70) volunteered for this study.

**Results:** One year post-operatively, all sagittal and frontal plane mechanics were statistically similar to control subjects during gait for both the TKA and UKA groups. At one year both groups displayed improvements for stair ascent/descent, but were still slightly inferior compared to normal controls. There were no differences in kinetics or kinematics between the TKA and UKA patients.

**Discussion:** Both UKA and TKA had near normal gait and function one year postoperatively. The mobile bearing UKA

did not provide better mechanics or function compared to TKA.

#### Poster 6

### The Relationship Between Skeletal Muscle Serum Markers and Primary Total Hip Arthroplasty: A Preliminary Report

Russell G. Cohen, MD

\*Lawrence R. Housman, MD

Jay A. Katz, MD

Nebojsa V. Skrepnik, MD, PhD

**Introduction:** Various reports confirm elevations in serum markers associated with skeletal muscle injury exist and can occur after orthopaedic surgery in the absence of overt clinical manifestations of myocardial injury. We therefore measured the influence surgical approach has on these serum markers following primary total hip arthroplasty (THA).

**Methods:** We non-randomly enrolled 30 non-consecutive THA patients into three groups of 10 based on current surgical approaches used at our facility: (1) MIS modified Watson Jones approach, (2) miniposterior transmuscular approach (MIS-I), (3) MIS-II incision. Blood samples for hemoglobin, hematocrit, cardiac troponin I, total creatine kinase, creatine phosphokinase, and serum myoglobin were obtained in the morning prior to surgery as a baseline, immediately postoperatively and through 72 hours thereafter.

**Results:** We found reproducible trends in serum enzyme levels consistent with skeletal muscle damage resulting from primary THA surgery. Troponin I remained normal in all but one case throughout the entire study indicating no myocardial contribution to measured serum enzyme levels.

**Discussion and Conclusion:** We conclude all three procedures result in reproducible trends in serum enzyme markers relevant to primary THA. Although, while minimal numbers were reviewed, no surgical approach appears to affect the degree of muscle trauma more or less than another.

Poster 7

## Outcomes For Total and Uni Knee Arthroplasty Using an Innovative Joint Replacement Program

Jon R. Cook, DPT  
Paul Prefontaine, PT  
Jack W. Wylie, MD

**Introduction:** The purpose is to compare outcomes for uni-compartmental (UKA) and total knee arthroplasty (TKA) in our innovative Joint Replacement Program (JRP) that aims to shorten length of stay (LOS), facilitate discharge (D/C), efficiently utilize physical therapy (PT), minimize complications, and optimize outcomes.

**Methods:** 128 patients with TKA and 68 patients with UKA were prospectively studied over 36 months. The JRP consists of pre-op education, proactive D/C planning, comprehensive peri-operative pain management, and aggressive PT. Patients were evaluated with the 6 minute walk test (6MWT) and Knee Injury and Osteoarthritis Outcome Score (KOOS) pre-op, at D/C from PT, and 6-12 months post-op. LOS, D/C destination, ROM, number of PT visits, and days from initiation to completion of PT were tracked.

**Results:** Average LOS was 2.70 for TKA and 2.38 days for UKA. At D/C 56% of patients with TKA had outpatient PT, 40% home health, and 4% skilled nursing care while UKA had 82%, 12%, and 6% respectively. TKA patient showed average flexion ROM at D/C from PT of 1-118° while UKA had 0-124°. Average number of PT visits was 16 for both groups. Patients with UKA on average completed outpatient PT 6 days sooner than those with TKA. There was no incidence of DVT or infection. Both groups showed similar increases in average 6MWT distance and KOOS scores from pre-op, to D/C from PT, and 6-12 month follow-up.

**Discussion and Conclusion:** The results indicate that patients with UKA had 1) shorter LOS, 2) higher percentage of D/C to outpatient, 3) increased ROM, 4) faster completion of outpatient PT, and 5) similar increases in KOOS and 6 MWT scores compared to TKA.

Poster 8

## A Novel Alternative Technique For Removal of the Axialif Screw in the Setting of Pseudoarthrosis of L5-S1: Technical Description and Case Presentation

David A. Crawford, MD  
John G. Devine, MD  
Niten Singh, MD

**Objective:** The authors describe a new approach and option for removing a L5-S1 transsacral implant that was placed through a percutaneous paracoccygeal approach. The purpose of this technical note is to demonstrate that use of the previous percutaneous presacral tract is not mandatory. In cases of anterior pseudoarthrosis following this device, the paramedian, retroperitoneal approach to L5-S1 not only allows for adequate visualization for revision, but also provides adequate and safe caudal exposure over the sacral promontory to remove the implant through its previous osseous path.

**Methods:** This technical note highlights the concerns for revision of a presacral corridor through its previous scarred tract as well as lack of author experience with this new approach. The AxiaLif (TranS1), used in this case, is an alternative method to transforaminal lumbar interbody fusion or posterior lumbar interbody fusion. Removal of this implant for pseudoarthrosis was performed through a paramedian, retroperitoneal approach with caudal extension. Following partial discectomy, the AxiaLif screw was removed through the disc space by turning with a heavy needle driver. It was delivered through the sacrum followed by standard anterior lumbar interbody fusion techniques and exchange posterior pedicle screw fixation.

**Conclusions:** This novel technique of avoiding a scarred down presacral corridor in the hands of surgeons unfamiliar with the technique allows for safe removal of the implant coupled with revision to anterior lumbar interbody fusion through the same incision.

## Poster 9

### Engaging Versus Non-Engaging Hill-Sachs Lesions: Clinical Evaluation of the Glenoid Track

Scott A. Crow, MD  
\*Payam Moazzaz, MD

**Introduction:** An engaging Hill-Sachs lesion is a risk factor for recurrent dislocation after a Bankart repair and controversy exists regarding what size of Hill-Sachs lesion needs treatment. Recent studies indicate that the size of the lesion is not the most important factor in determining risk of engagement, but it is the size of the lesion relative to the size of the glenoid. Yamamoto (1) et al introduced the concept of the glenoid track, or contact area between the glenoid and humeral head as the shoulder is abducted and externally rotated. They postulate that a Hill-Sachs lesion has a risk of engagement and dislocation if it is greater than 84 percent of the width of the glenoid. The purpose of this study is to evaluate the concept of the glenoid track and compare the size of engaging and non-engaging Hill-Sachs lesions relative to the glenoid in patients who underwent shoulder arthroscopy for anterior shoulder dislocation.

**Methods:** Two orthopedic surgeons performed shoulder arthroscopy on 48 patients with anterior shoulder instability at our institution between 7/28/2005 and 8/30/2007. Of these patients, 33 had Hill-Sachs lesions described in the operative report. The operative notes contained inadequate documentation of humeral head engagement in 17 of the 33 patients, and one other patient did not have available images. This left 15 patients with preoperative MR images and Hill-Sachs lesions intraoperatively classified as engaging (7 patients) or non-engaging (8 patients). The preoperative MRs of the 15 patients were evaluated and the width of the Hill-Sachs lesion and glenoid was measured in the axial plane. The width of the Hill-Sachs lesion was defined as a percentage of the glenoid width and compared between engaging and non-engaging lesions.

**Results:** In the 8 patients with documented non-engaging lesions, the mean width of the Hill-Sachs lesion and glenoid was 15.1 mm and 27.3 mm, respectively. For the 7 patients with engaging Hill-Sachs lesions, the average width of lesion was 22.5 mm and the average width of the glenoid was 23.0 mm. Overall, the average engaging Hill-Sachs lesion was 98 percent of the width of the glenoid and the average non-engaging lesion was 55 percent of the width of the glenoid ( $p < 0.0004$ ). In each of the non-engaging patients, the lesion was less than 84 percent of the width of the glenoid. Four of

the seven lesions in the engaging group were greater than 84 percent of the width of the glenoid, while 3 were less than 84 percent.

**Discussion and Conclusion:** Hill-Sachs lesions that were intraoperatively found to be engaging were significantly wider relative to the glenoid than non-engaging lesion. Our data supports the concept of the glenoid track as described by Yamamoto. If the medial margin of a Hill-Sachs lesion is more medial than the glenoid track, a Hill-Sachs lesion has a risk of engagement and dislocation. However, the exact width of the glenoid track is unknown, considering that 3 of the engaging patients had lesions that were less than 84% of the glenoid. The results of this study may aid in preoperative planning to predict which patients might need additional humeral head augmentation.

## Poster 10

### Cementless Total Hip Arthroplasty in Patients Less Than 50 Years of Age: Nine to Seventeen Year Follow-Up

Michael R. Dayton, MD  
Benjamin E. Bierbaum, MD  
David A. Mattingly, MD

**Introduction:** Total hip arthroplasty (THA) outcomes in active younger patients have historically been less successful than those in older disease-matched patients. The purpose of this investigation is to review the survivorship outcome in a population of patients undergoing cementless THA at less than 50 years of age.

**Methods:** Fifty-seven primary cementless THAs in 50 patients were reviewed. Mean age at time of index procedure was 40.3 years (range 22 – 49). The retrospective review of 26 male and 24 female patients was performed 9 to 17 years following primary THA. Harris Hip Scores (HHS) were noted pre-operatively, and at follow-up examination. Heterotopic ossification, if present, and radiolucency was noted. Locations of specific osteolysis were noted according to acetabular and femoral zones. Linear wear was also noted and measured.

**Results:** At average follow-up of 12.1 years (range 9 – 17), mean HHS for all patients improved from 52.6 (range 11-79) pre-operatively to 86.4 (range 50-100) post-operatively. With failure defined as implant revision, implant survival was 86.0% for femoral components, 87.7% for acetabular components. Of 8 femoral stem failures, 7 (87.5%) occurred in one

specific stem design. Acetabular shell failures occurred in 7 cups, of which a variety of designs were utilized. Radiographic review depicted osteolysis around 16 of 57 (28.1%) femoral stems and 15 of 57 (26.3%) acetabular shells. Heterotopic ossification was noted in 4 of 57 (7.0%) of hips.

**Discussion and Conclusion:** We report the clinical and radiographic outcome of two experienced surgeons at a single institution over a nine to seventeen year period. It is apparent from examination of the data that marked disparity in survivorship exists between varying femoral stems and cup designs. Cementless total hip arthroplasty in patients less than fifty years old is an effective treatment with good potential for successful long-term survival.

#### Poster 11

### Is it Safe to Use Rhbmp-2 in Pediatric Spinal Surgery?

Jaspaul Gogia, MD  
\*Gaurav Abbi, MD  
Munish Gupta, MD  
David Wright, BS

**Introduction:** The use of recombinant human bone morphogenetic protein in adult spinal surgery has been well studied; its use has not been well-studied in the pediatric population. The FDA recently issued a warning related to its use in patients less than eighteen years of age due to concerns over the effects of antibody formation, possibility of bony overgrowth and reproductive toxicity to the fetus. Our study is the second to demonstrate the safety and efficacy of rh-BMP2 for use in pediatric spinal surgery.

**Methods:** We performed a retrospective review of 300 consecutive spine surgeries performed at one institution between 2005 and 2008. Twenty-six patients (27 cases) met the inclusion criteria of the use of rhBMP-2. Chart review was performed to identify procedure, amount of rhBMP-2 used and complications. Radiographic investigation of pre-operative, post-operative, and final follow-up films for fusion and maintenance of correction was performed.

**Results:** A total of 26 patients were identified with 27 uses of rhBMP-2. Average age was 14 (range 5 – 19). Average length of follow-up was 17 months. Diagnoses included congenital kyphosis, spondylolisthesis, cervical instability, neurofibromatosis, post-traumatic deformity and cerebral palsy. Seven of 26 patients had undergone previous spinal surgery, and 7 were treated with anterior and posterior surgery. The average major

coronal curve preoperatively was 73 degrees and 30 degrees postoperatively, with an average loss of 0.25 degrees at final follow-up. Average kyphosis correction was 54 degrees with an average loss of 1 degree at final follow-up. Two patients developed deep infections, one failure of instrumentation with pseudoarthrosis, and two showed signs of clinically insignificant overgrowth to one additional level.

**Discussion and Conclusion:** rhBMP-2 was successfully used in pediatric spinal surgery obviating the need for iliac crest bone graft. In this short term study, the use of rhBMP-2 in 27 cases of pediatric spinal deformity showed no significant adverse events.

#### Poster 12

### Sonographic Evaluation of the Sciatic Nerve in Patients With Knee Amputations

Ahmet Salim Goktepe, MD  
Erkam Komurcu  
Levent Ozcakar  
Ismail Safaz  
Kamil Yazicioglu

**Introduction:** The purpose of our study was two-fold: first we aimed to perform sonographic evaluation of the sciatic nerve after lower limb amputation due to nonmalignant causes; second we also aimed to find out whether those changes were related with the clinical characteristics of the subjects.

**Methods:** Twenty-three males who had been under follow up after lower limb amputations due to traumatic injuries were enrolled. After physical examination of the limb, pain was evaluated by visual analogue scale (VAS) and LANSS (Leeds Assessment of Neuropathic Symptoms and Signs). Sonographic evaluations were performed by using a linear array probe (Aloka UST-5524-7.5 MHz). Sciatic nerve diameters were measured bilaterally at the same level proximal to the bifurcation and the values pertaining to the normal limbs were taken as controls. All the major nerve trunks and their distal ends were also evaluated for the presence of a neuroma.

**Results:** Sciatic nerve width and the thickness values were found to be greater on the amputated sides when compared with those of the normal sides. The thickness values were greater in above knee amputees than below knee amputees. Subjects with a neuroma had also thicker sciatic nerves. The diameters were found not to change between subjects with different liners. The thickness and width values of the amputated sides were found to correlate with the duration (time after

amputation. Although the duration and LANSS scores were correlated, diameters of the sciatic nerve were not correlated either with VAS or LANSS scores.

**Discussion and Conclusion:** Our results clearly displayed that the sciatic nerves were wider and thicker on the amputated sides. Amputation level, duration and the presence of a neuroma seem to affect the eventual diameters of the nerves.

### Poster 13

## The Role of Immunologic Response in Fresh Osteochondral Allografting of the Knee

Harold E. Hunt Jr., MD  
William D. Bugbee, MD  
Simon Görtz, MD  
Lauralynn K. Lebeck, PhD

**Introduction:** Osteochondral allografting is a restorative treatment option for articular cartilage lesions in the knee. The technique involves transplantation of fresh, unmatched osteochondral tissue. Although retrieval studies have not consistently shown evidence of immunologic response, development of anti-HLA cytotoxic antibodies has been observed in allograft recipients. We hypothesize that post-allograft antibody formation is related to graft size and may impact clinical outcome.

**Methods:** We retrospectively compared 42 antibody positive post-allograft patients with 42 antibody negative patients. Average follow-up was 52.7 months (24-165 months). Groups were matched for age, gender, and BMI, but not intra-articular disease severity. Mean age was 38.1 years with 58% being male. Graft area was categorized as small (<5 cm<sup>2</sup>), medium (5-10 cm<sup>2</sup>) or large (>10 cm<sup>2</sup>). Graft survival and Knee Society function scores were used to measure clinical outcome.

**Results:** Eighty patients had graft area data. 19 of 27 patients (70%) with large graft area had positive postoperative antibody screens, compared to 1 of 16 (6%) with small graft area. This difference was statistically significant. 17 patients (20%) were lost to follow-up. Graft survival rates in the antibody positive and negative groups were 64% and 76%, respectively. Mean post-op Knee Society function scores in surviving antibody positive and antibody negative groups were 88.3 and 84.6 points, respectively.

**Discussion and Conclusion:** Antibody development after fresh, unmatched osteochondral allograft transplantation in

the knee appears related to graft size. Although likely multifactorial, a trend toward decreased graft survival in antibody positive patients was present. This immunologic phenomenon and its effect on clinical outcomes merits further investigation.

### Poster 14

## A Critical Appraisal of Lumbar Interfusion Techniques, Materials, and Biologics on Fusion Outcomes

Larry T. Khoo, MD

**Introduction:** Difficulties of adequate disc space preparation using the unilateral posterior approach and the resulting negative impact on the environment for fusion have been well documented. To address these challenges, new devices have been developed to improve disc space preparation and biologic materials have been applied. The purpose of this analysis is to compare the surgical, functional, pain, and fusion long term outcome data from patients treated by minimally invasive unilateral transforaminal interbody fusion (MITLF) with and without the application of recombinant bone morphogenic protein (rhBMP-2) and with and without hydrosurgical devices.

**Methods:** This is a non-randomized, prospective series of patients (mean age 48 years) treated by MIS TLIF by a single surgical group, for diagnoses of spondylolisthesis, disc herniations with radiculopathy and/or back pain, and degenerative disc disease. Fusion success was assessed postoperatively on thin slice CT images by two independent radiologists blinded to the methods and materials used.

**Results:** There were 248 MITLIF's performed with 129 one level and 119 two level cases. Conventional instruments were used in 172 cases, 68 of which received rhBMP due to the presence of a risk factor (smoking, obesity, diabetes). Hydrosurgical instruments were used in 76 cases without rhBMP. Followup period was a minimum of 18 months with a mean of 22 months. Radiographic fusion rates were 91.3% for the conventional instruments/no rhBMP group; 96.6% for the conventional instruments/with rhBMP group; and 93.6% for the hydrosurgery group. Functional (ODI) and pain (VAS) improvements were similar for all groups. Post operative radicular pain occurred in 8.7% for the conventional instruments/no rhBMP group; 22% for the conventional instruments/with rhBMP group and 3.9% for the hydrosurgery group. Reoperations occurred in the follow-up period for 3.8% for the conventional instruments/no rhBMP group; 10.3% for

the conventional instruments/with rhBMP group; and 3.9% for the hydrosurgery group.

**Discussion and Conclusions:** As shown previously, rhBMP can improve fusion rates compared to conventional methods. However, no statistically significant improvement is seen when compared to the hydrosurgery group. In addition, the rhBMP group showed significantly higher rates of reoperation and post operative radicular pain; while the hydrosurgery group had a similar rate of reoperation as that seen with the conventional methods without rhBMP and significantly fewer incidents of post operative radiculopathy when compared to conventional methods with or without rhBMP.

### Poster 15

## Is Severe Osteoporosis a Contraindication to Cementless Hip Arthroplasty?

D. Kevin Lester, MD  
Mark Wick, MD

**Introduction:** The adverse effects of using cemented fixation in hip arthroplasty have been described and are especially detrimental to the elderly population, with some centers recommending against the use of cement in seniors needing hip replacement. The efficacy of cementless hip replacement in active patients with good bone quality has been well established, but some centers maintain that osteoporotic bone impedes proper fixation and compromises clinical and radiographic outcome. To date, there have been no reports comparing the radiographic and clinical outcome of cementless fixation in patients with osteoporosis versus those with non-osteoporotic bone.

**Materials and Methods:** From 1987 to 1999 898 consecutive, non-selected hip replacements were performed using the same cementless femoral stem without regard to bone condition. Bone type was categorized according to Dorr's classification. All complications, including intraoperative fracture, were summarized. Radiographic changes were measured at a minimum 2-year follow-up. Clinical parameters were measured using the Harris Hip Score at a minimum 5-year followup. These parameters were compared according to Bone type.

**Results:** Bone types were: A - 48%; B - 32%; C - 20% Stress shielding: (>2 years) The mean incidence and mean number of zones of proximal bone atrophy differed. A: 82%/2 zones, B:86%/4 zones, C:100%/5 zones (p=0.0056). Radiolucencies:

(More than 2 zones) (>5years) A:0, B:2, C:0 Osteolysis: (>5 years) A:3; B:2; C:1 Fracture: Two patients had intraoperative fracture. A:1, C:1. Two patients had a fracture within three months of surgery (with clinical fall) A:1, C:1. Four patients had late femoral fracture (all with a clinical fall). A:1, B:2, C:1. Clinical results: (>5 years) Mean Harris Hip Score: A:90, B:82, C:92 Pain Subscale, number of patients with <40 points: A:1, B:1, C:2 Incidence of thigh pain: A:1, B:1, C:0.

**Discussion:** Clinical results were not compromised in patients with type C bone. Radiographic signs differed. Stress shielding occurs with a greater incidence and a greater number of affected zones in patients with preexisting osteoporosis. Radiolucencies are no more frequent in the osteoporotic patient, and osteolysis is less frequent in osteoporotic patients. Intraoperative fracture was not a risk of cementless implantation in this series. Complications associated with cement may be avoided.

**Conclusion:** There appears to be NO contraindication for the use of cementless implantation in hip replacement surgery in patients with severe osteoporosis.

### Poster 16

## Three Dimensional Titanium Porous Scaffolding on Tibial Components in Total Knee Arthroplasty

Paul Lux, MD  
\*Jonette Hodge, RN, BSN

**Introduction:** Survivorship and performance of cementless tibial components are closely related to their ability to resist forces at the bone / prosthesis interface. To date, cementing remains the gold standard for routine total knee replacement. A novel, highly porous, foam metal material in the form of a titanium lattice has been developed to optimize osseointegration. The purpose this study is to report on the early results of a series of cementless knees that utilize this foam metal material.

**Methods:** One hundred and four knees in 89 patients were consecutively enrolled at 4 sites with a foam metal tibial component and beaded femoral component. Approximately 95% of the cases used screws to affix the tibial bases, whereas the remaining 5% did not. Radiolucencies, functional and pain outcomes were assessed at 6 months using the Knee Society systems. Functional and pain outcomes were assessed versus preoperative values.

**Results:** Eighteen knees were unavailable for follow-up and 14 were not yet due for the 6 month visit, leaving 72 knees for follow-up. Demographics for age, BMI, and preop KSS were 64 years, 31, 53, respectively. A subvastus approach was taken in 68% of the cases, with the remainder being medial parapatellar. Mean KSS improvement from baseline at 6 months was 36 points, with 94% of knees reporting no or slight/occasional pain during walking. There were no radiolucencies identified out of the 10 KSS tibial component zones examined.

**Conclusions:** This novel three dimensional lattice exhibited no radiolucencies at the implant / bone interface even in the screwless tibias. The absence of great than slight/occasional pain suggests that this material is providing an environment for osseointegration. Longer term data will be collected to determine if the absence of radiolucencies and pain persists.

#### Poster 17

### Arthroscopic Reduction and Internal Fixation of a Displaced Femoral Head Osteochondral Fracture

Dean K. Matsuda, MD

**Introduction:** This is the first documented case report of the arthroscopic reduction and internal fixation of a displaced femoral head osteochondral fracture. Arthroscopic hip surgery can go beyond the removal of intraarticular fragments and allows an attractive arthroscopic option to open reduction and internal fixation which has particular significance in the trauma patient.

**Methods:** Using relevant imaging studies and intraoperative photographs and video segments, this unique case presentation of a 19 year old trauma patient shows the arthroscopic reduction of a large displaced femoral head osteochondral fracture using an innovative "chopstick" technique, followed by arthroscopic fixation using Herbert screws. An anatomic reduction is obtained using completely arthroscopic techniques.

**Results:** Nine months after surgery, this patient has no pain or mechanical symptoms, has self-perceived full functional activity, and is pleased with her outcome. Her arthroscopic hip surgery allowed for the preservation of a significant weight-bearing fragment with minimal blood loss, outstanding cosmesis, and a very rapid recovery of functional status. Imaging studies confirm radiographic union without early evidence of osteonecrosis or osteoarthritis.

**Discussion and Conclusion:** Arthroscopic hip surgery can now go beyond simple fragment removal in the case of osteochondral hip fractures. By using crossover techniques derived from experience with arthroscopic femoroacetabular impingement surgery and adding innovative techniques, truly minimally invasive surgery can be performed in selected patients that might otherwise have required a more invasive open reduction with internal fixation.

#### Poster 18

### Antibiotic Protocol to Improve SCIP-3 Compliance

John P. Meehan, MD  
Amir Jamali, MD

**Introduction:** Pay for performance measures are becoming a reality which links reimbursement for health care services to clinical practice. It is evolving from reimbursement for successful completion of chart audits with quality reporting to reimbursement for a minimum attainment score for each core measure indicator, such as SCIP-3 for arthroplasties.

**Methods:** A protocol which includes an incision closing dose of antibiotics for hip and a tourniquet deflation dose for knees followed by two additional doses in 8 hour increments was instituted. Quarterly reviews of 24 randomly selected patient charts were performed by the CQI department and assessed for discontinuation of prophylactic antibiotics within 24 hours of surgery end time.

**Results:** Compliance with SCIP-3 improved from 20% to over 80% in less than two years. This would have allowed for successful passing of a CMS validation audit at 80% or better. There were no change in wound infection rates during this time period and there were no negative reactions to the post-operative dose of antibiotics being given 2-3 hours after the preoperative dose.

**Discussion and Conclusion:** This change in surgical practice allows for the infusion of 3 doses of postoperative kefzol in 16 hours, thereby providing a longer time interval to remain in compliance with the SCIP-3 core measure. This longer interval minimizes nursing and pharmacy delays, which were the most common causes of non-compliance prior to the protocol introduction. Future Medicare annual payment updates will be based on achieving compliance scores of yet to be determined thresholds which include SCIP-3.