

**SUNDAY, JUNE 3**

<b>0700 – 1000</b>	Registration	<b>Lower Level Convention Centre</b>
<b>0800 – 1030</b>	Partners' Hospitality Suite Open Instructional Course Lectures	<b>Barrington Suite, Delta Barrington</b>
<b>0700 – 0830</b>	(concurrent sessions) ICL-13: Arthroplasty ICL-14: Trauma ICL-15: Sports ICL-17 Spine	<b>Mariner 2</b> <b>Mariner 3</b> <b>Mariner 4</b> <b>Mariner 5</b>
<b>0830 - 0900</b>	Coffee and muffins	<b>Port Royal Foyer</b>

**SCIENTIFIC SESSIONS \*Please note early start time of session 11**

**0900 - 1030**     **Session 10: Upper Extremity – Moderators: David G. Johnston, David R. Pichora, Terry Light, American Orthopaedic Association President**     **Port Royal C**

**Paper 143**     Results of Deep Infection after Reverse Shoulder Arthroplasty  
**0900-0906**     **R. Bicknell, P. Boileau, C. Chuinard, N. Jacquot, Nice, France**

The purpose is to report the treatment of deep infection after a reverse shoulder arthroplasty. This is a multicenter study involving 457 reverse arthroplasties. Fifteen patients (3%) (mean age 71 ± 9 years), presented with a deep infection. Treatment included debridement (n=4), resection (n=10) or two-stage revision (n=1). The infection rate was 2% for primary and 7% for revision procedures. There were two acute, five subacute and eight chronic infections. The most common pathogen was *P. acnes* in six cases (40%). At a mean follow-up of 34 ± 19 months, there were 12 remissions (80%) and three recurrences. The acute and chronic infections were in remission. Among the subacute infections, the resections were in remission, whereas the debridements recurred. Acute infections are satisfactorily treated by debridement or resection. Both resection and two-stage revision can successfully treat subacute and chronic infections. However, debridement is ineffective.

**Paper 144**     Humeral Problems in Reverse Shoulder Arthroplasty  
**0906-0912**     **R. Bicknell, P. Boileau, C. Chuinard, C. Trojani, Nice, France**

The purpose is to describe humeral problems in reverse total shoulder arthroplasty. A multicenter review of 399 reverse humeral arthroplasties implanted between January 1994 and April 2003, yielded 79 patients with humeral problems. Evaluation included subjective satisfaction, range of motion, Constant score and plain radiographs. We identified 26 intra-operative fractures and 11 post-operative fractures. There were four cases of disassembly, three cases of subsidence, and 15 cases of radiographic loosening. At a mean follow-up of 47 months, average active elevation was 111 degrees, external rotation was 7 degrees and Constant score improved from 22 to 50 points. Seventy-one percent of patients were very satisfied or satisfied. Intra-operative fractures were associated with poor final Constant score (42), poor range of motion and increased pain (p=0.001). Re-operation was performed in seven cases (9%).

**Paper 145**     Results of Reverse Shoulder Arthroplasty In Proximal Humerus Fracture  
**0912-0918**     Sequelae  
**R. Bicknell, Pascal Boileau, Chris Chuinard, P. Garaud, Lionel Neyton,**

Nice, France

The purpose was to evaluate the results of reverse shoulder arthroplasty in proximal humerus fracture sequelae. This is a multicenter retrospective series of 45 consecutive patients. Mean age at surgery was 73 years (range, 57-86). Forty-three patients were available at a mean follow-up of 39 months (range, 24-95). Nine reoperations (21%) and 10 complication (23%) occurred, including four infections, two instabilities, one glenoid fracture and one axillary nerve palsy. Thirty-six patients (83%) were very satisfied or satisfied. The adjusted Constant score improved from 29 to 75% ( $p < 0.0001$ ), the Constant score for pain from 4 to 12 points ( $p < 0.0001$ ), and active elevation from 59° to 114° ( $p < 0.0001$ ). The lowest functional results were in surgical neck nonunions and isolated greater tuberosity malunions. Functional results are lower and complication/reoperation rates are higher than for RSA in cuff tear arthritis.

**0918-0924** Discussion

**Paper 146**  
**0924-0930** Patient Motivations and Correlation of Outcome Measures with Self-Reported Satisfaction in MP Arthroplasty for Rheumatoid Arthritis<sup>2</sup>  
**E. Bogoch, B. Escott, K. Ronald, Toronto, ON**

Metacarpophalangeal (MP) arthroplasty restores function, corrects deformity and reduces pain in patients with rheumatoid arthritis (RA). In a randomized controlled trial of MP hand reconstruction, we investigated RA patient motivations and expectations and whether self-reported patient satisfaction with appearance, function and pain correlated with objective and subjective outcome measures. Patient expectations of MCP arthroplasty were uniformly high. The greatest motivation for surgery was functional improvement. Pain was highly ranked, but nearly half of the patients rated hand appearance as one of the highest co-ranked motivators. Patient satisfaction correlated poorly with traditional outcome measures (ROM, grip strength) and moderately with subjective outcome measures (MHQ). Aesthetic appearance is probably underrated as a motivator for surgery and determinant of satisfaction.

**Paper 147**  
**0930-0936** NeuFlex and Swanson Metacarpophalangeal Implants for Rheumatoid Arthritis: A Prospective Controlled Clinical Trial  
**B. Escott, E. Bogoch, K. Ronald, Toronto, ON**

This prospective controlled clinical trial compares the outcomes of metacarpophalangeal (MP) arthroplasty in rheumatoid arthritis patients using the Swanson and NeuFlex MP implants. Forty hands (37 patients) were randomized and evaluated preoperatively and at one year following MCP arthroplasty in digits 2 to 5 for range of motion (ROM; active and passive extension and flexion), ulnar drift and grip strength. Overall, there was a significant improvement in the range of motion, deformity and grip strength following MCP arthroplasty for the full patient group. While both implants restored similar amounts of extension, the NeuFlex implant maintained greater flexion and total range of motion, with the greatest difference in the fifth digit. The Swanson implant had better MHQ function and aesthetics subscores.

**Paper 148**  
**0936-0942** Comparison of Measures of Utility in Patients Undergoing Total Shoulder Arthroplasty  
**D. Beaton, L. Bessette, J. Bukczynski, B. Escott, J. Katz, Toronto, ON**

Purpose: Health utilities indicate the value of a given health state. They are essential components of decision analyses, and economic evaluations. In the area of total shoulder arthroplasty (TSA) we were unable to find literature estimating changes in utilities or the effect of method of obtaining utilities.

**0942-0948** Discussion

**Paper 149**  
**0948-0954** SLAC Wrist in the Absence of Trauma and CPPD: A Prospective Blinded Kinematic Comparative Analysis  
**J. Whitcomb Pollock, A.F. Conway, G. DiPrimio, A.A. Giachino, H. Hrushowy, K. Rakhra, Ottawa, ON**

Purpose: The traditionally accepted etiology of Scapholunate Advanced Collapse (SLAC) requires traumatic rupture of the scapholunate (SL) ligament which leads to abnormal wrist kinematics and thereafter severe localized degenerative arthritis of the wrist. The purpose of this prospective blinded kinematic analysis was to demonstrate that SLAC wrist also exists in the absence of trauma, and that abnormal carpal bone kinematics (specifically, decreased lunate flexion) is the initiating factor.

**Paper 150**  
**0954-1000** Can Carpal Malalignment Predict Early and Late Instability in Nonoperatively Managed Fractures of Distal Radius?  
**S. Batra, A. Gul, S. Kale, North Wales, UK**

Recently, studies have attempted to classify carpal malalignments associated with displaced distal radial fractures based on Effective radiolunate flexion (ERLF) into: midcarpal and radio-carpal malalignment. The aim of this study was to assess various factors including associated carpal malalignment based on ERLF that are predictive of instability based on a timeline of early (1 week) and late failure (six weeks). Regression analysis showed high correlation between the severity of axial shortening before reduction and at six weeks. Age, gender and ulnar styloid fracture were unreliable in predicting early & late failure. The incidence of failure was significantly correlated to radiocarpal malalignment pattern in post reduction radiographs (ERLF > 25) and both at one and six weeks when analysed independently or in combination. Our study reaffirms the need to attention to initial fracture characteristics and highlights the importance of radiocarpal instability pattern as a predictor of early and late instability.

**Paper 151**  
**1000-1006** Outcome Following Surgical Repair of SLAP Type II Lesions: A Two-Year Follow-Up  
**R. Holtby, Eran Maman, Shashank Misra, Helen Razmjou, Toronto, ON**

The purpose of this study was to evaluate the effectiveness of arthroscopic repair of type II SLAP lesions 2 years following arthroscopic repair with suture anchors. Data on thirty-eight consecutive patients (34 males, 4 females, mean age: 45 years, range, 22 to 70 years) were used for analysis. Outcome measures were the American Shoulder and Elbow Surgeons (ASES) assessment form and the Constant-Murley score. All patients showed significant improvement in ASES scores ( $p < 0.0001$ ). However, Patients with work-related injuries did not show a significant improvement in Constant-Murley scores ( $p = 0.20$ ). Associated pathologies did not affect level of disability or subjective scores post-operatively. Strength did not change to a statistically significant level following SLAP repairs.

1006-1012 Discussion

**Paper 152**  
**1012-1018** Prospective Analysis of Arthroscopic Anterior Shoulder Instability Repairs Involving a Bankart Lesion.

*D. Legay, M. Forbes, V. Khanna, M. Ripley, Dartmouth, NS*

Purpose: To prospectively evaluate patient outcome in terms of stability, function and satisfaction following an arthroscopic anterior Bankart repair in order to identify patient characteristics, surgical technique or instrumentation linked to poor outcomes. These findings can then be used to refine selection criteria such that patient benefit from the shoulder instability repair is maximized.

**Paper 153**  
**1018-1024** Review on Acromio Clavicular Stabilization Procedures  
*H. Kovilazhikathu Sugathan, Nottingham, UK*

Choice of surgical procedure for Grade 3 and above Acromio-clavicular joint dislocation is controversial. Our study has shown that extra-articular soft tissue procedures( Modified Weaver Dunn ) have a faster recovery but long term functional results are similar to that of intra-articular Open Reduction and Internal Fixation (Tension Band Wiring ) procedures . We recommend modified WD for the following reasons:  
1.Better short term functional outcome and hence faster recovery.  
2.No need for a second surgery. Hence they imposes less financial burden for the hospital as well as the patient

1024-1030 Discussion

**0830 - 1030** **Session 11: Arthroplasty – Moderators: Emil H. Port Royal B**  
**Schemitsch, Jeffrey D. Gollish**

**Paper 154**  
**0830-0836** Canadian Orthopaedic Surgeon Survey: Antibiotic Prophylaxis for TJR Surgery<sup>1</sup>

*J. De Beer, D. Petruccelli, C. Rotstein, K. Royston, B. Weening, M. Winemaker, Hamilton, ON*

Controversy exists surrounding best practice for TJR antibiotic prophylaxis. A cross-sectional survey of 590 practicing orthopedic surgeons performing TJR in Canada was conducted to inform regarding the most common antibiotic prophylaxis practice. Three orthopaedic surgeons, and one infectious disease specialist developed and established face and content validity of the survey. The survey was mailed to surgeons, and re-mailed to non-responders at 12-weeks. The survey included questions pertaining to prophylaxis indications, antibiotic choice, dosing, route and timing of administration in the primary and revision setting, as well as postoperative wound drainage investigation and management. The response rate after two mail-outs was 410/590 (69.5%). Opinions vary widely amongst surgeons, illustrating the controversy in what constitutes 'best practice'. Despite available published data, a large proportion of Canadian surgeons may fall short in meeting optimal standards of care in some domains such as the dose prescribed and timing of administration. This survey illustrates the lack of available information to guide current management of postoperative wound drainage in the face of shorter patient hospital stays. Much work is needed in this area to determine risks and benefits of these costly tests and interventions in treating arthroplasty patients.

**Paper 155** Prospective Randomized Multi-Centric Evaluation of Computer-Assisted

0836-0842

TKR<sup>2</sup>

**L. Roy, L. P. Amiot, F. Poulin, Montreal, QC**

Purpose: This study compares the alignment accuracy and impact on quality of life between computer assisted TKR and conventional surgery. Methods: 295 patients in six European centers were equally randomised between two groups. Long-standing X-rays as well as clinical data (SF-36 and KSS scores) were collected preoperatively as well as 6 weeks and 6 months postoperatively. Results: HKA alignment was statistically better in the computer-assisted group ( $p=0.01$ ). At 6 months, there were statistically greater improvements in the SF-36 of computer-assisted patients: bodily pain ( $p=0.03$ ), role emotional ( $p=0.03$ ), mental health ( $p<0.001$ ), physical health dimension ( $p=0.01$ ), mental health dimension ( $p=0.005$ ) and global SF36 score ( $p=0.002$ ). Conclusion: Computer assisted surgery improves the accuracy in total knee arthroplasty. It also seems to improve the patient's quality of life compared to standard TKR.

Paper 156  
0842-0848

Randomized, Controlled Trial of Total Knee Replacement Surgery Using Image Guided Navigation<sup>2</sup>

**C. Hiscox, E. Bohm, C. Burnell, D. Hedden, Winnipeg, MB**

This RCT compares 1 year functional outcome and alignment of TKRs inserted with and without a navigation system. While there were no differences in post-operative KSS, WOMAC and seven of eight SF-36 subscales, the navigated group demonstrated better SF-36 General Health scores. Mean leg alignment demonstrated more varus in the navigated group ( $2.1^\circ$ ) versus the non-navigated group ( $0.9^\circ$ ,  $p=0.02$ ), however there was a trend towards a smaller standard deviation in the navigated group. Rotational alignment of the femoral component relative to the femur, tibial component relative to the tibia, and tibial component relative to the femoral component were not statistically different between groups; however, there were larger standard deviations in the non-navigated group. Navigation systems appear to reduce variability in component placement and limb alignment. However, this may not translate into better mean limb alignment or early functional outcome.

Paper 157  
0848-0854

Computer-Assisted Navigation Improves the Accuracy of Assessing Fixed Flexion in Knee Arthroplasty – A Cadaveric Study<sup>2</sup>

**E. Davis, P. Gallie, K. Macgroarty, E. Schemitsch, J. Waddell, Toronto, ON**

The purpose of this study was to assess the accuracy of clinical assessment compared to imageless computer navigation in determining the amount of fixed flexion during knee arthroplasty. The use of computer navigation appears to be more accurate in assessing the degree of knee flexion, with a reduced range of error when compared to clinical assessment. It is therefore less likely to leave the patient with residual fixed flexion after knee arthroplasty.

0854-0900

Discussion

Paper 158  
0900-0906

Total Joint Replacement and Sleep Apnea Syndrome

**J. De Beer, D. Kumbhare, J. Paul, D. Petrucci, L. Piccirillo, M. Winemaker, Hamilton, ON**

The association between obesity and sleep apnea syndrome (SAS) is well known, as is the fact that TJR patients are often obese. The potential impact of SAS, diagnosed and undiagnosed, on TJR outcomes has not

been well described. In the literature it has been suggested that such patients may be at increased risk of prolonged hospital length of stay (LOS), increased risk of postoperative MI and respiratory compromise requiring unplanned transfer to a special care unit (SCU). We undertook a prospective non-randomized survey of 1927 primary TJR patients over a 15-month period to screen for a preoperative diagnosis of SAS, or symptoms suggestive of SAS using the self-report Epworth Sleep Apnea Questionnaire. In addition, we evaluated impact of SAS on LOS, risk of postoperative MI, risk of postoperative respiratory compromise and unplanned transfer to SCU. Despite concerns expressed in the literature, we found that SAS, both diagnosed and suspected, was not associated with prolonged LOS, increased risk of postoperative MI, postoperative respiratory compromise, or unplanned postoperative transfer to a SCU.

**Paper 159**  
**0906-0912** A Randomized Clinical Trial Comparing Five-Year Clinical and Radiographic Outcome of Hydroxylapatite Versus Cemented Tibial Fixation in Primary Total Knee Arthroplasty<sup>2</sup>  
**D.W.C. Johnston**, M. Al Yamani, L. Beaupre, J. R. Huckell, Edmonton, AB

We compared self-reported pain and function, complications and revision rates, and radiographic outcomes of hydroxylapatite(HA) or cemented tibial fixation in the first five years following primary total knee arthroplasty. This was a randomized clinical trial of 81 patients

**Paper 160**  
**0912-0918** Mobile vs. Fixed-Bearing Total Knee Arthroplasty, A Mean 10-Year Follow-Up  
**P. Davoudpour**, R. Bourne, T. Ieda, D. Naudie, C. Rorabeck, London, ON

Purpose: The purpose of this study is to compare the long-term clinical results of two total knee replacement designs (the SAL-II mobile-bearing implant and the fixed-bearing Genesis I implant) to see if there are any advantages to the use of a mobile-bearing design in the long-term.

**Paper 170**  
**0918-0924** Guideline for Wait Time Thresholds for Total Hip and Knee Replacement Surgery Based on Severity<sup>2</sup>  
**R.B. Bourne**, B. Chesworth, N. Mahomed, S. Warner, London, ON

At decision date for surgery, patient baseline severity was captured using the WOMAC disability questionnaire and compared to WOMAC and satisfaction data collected 12 – 18 months post-surgery in 4,437 primary hip or knee replacement patients entered into the Ontario Joint Replacement Registry database. Baseline severity was found to affect outcome more than wait times, however, patients who waited more than one year had poorer outcomes. Twenty percent of patients had baseline WOMAC scores less than 30 out of 100, and in these severely disabled patients, surgery within 3 months was deemed advisable. Three priority levels were recommended with total joint replacement surgery within 4 weeks for Priority 1, 3 months for Priority II and within 6 months for Priority III.

**0924-0930** Discussion

**Paper 171**  
**0930-0936** The Predictive Value of Noninvasive Pharmacological Cardiovascular Stress Testing Before Orthopaedic Surgery: A Pilot Study<sup>2</sup>  
**J. De Beer**, M. Bhandari, P.J. Devereaux, K. Gulenchyn, A. G. Montgomery, Hamilton, ON

Prior to TJR, clinical cardiovascular risk assessment is typically limited by severe exercise restrictions. Noninvasive pharmacological cardiovascular stress tests may predict major perioperative cardiovascular events among TJR patients. We undertook a pilot study to inform the feasibility of a large prospective cohort study. The sample included 30 TJR patients who had risk factors for, or known atherosclerotic disease. Patients underwent preoperative dipyridamole stress perfusion imaging and dobutamine stress echocardiography. All patients had an ECG and troponin-T drawn 6-12 hours postoperatively, and on day 1 to 3. Three patients (10%; 95% CI, 3-26%) suffered a perioperative MI. Twenty-nine patients underwent preoperative dipyridamole stress perfusion imaging; a reversible defect involving 30-50% of the myocardium increased the likelihood of a perioperative MI (LR 4.0; 95% CI, 1.2-13.3). Twenty-six patients underwent dobutamine stress echocardiography; a reversible defect increased the likelihood of a perioperative MI (LR 4.0; 95% CI, 0.7-22.9). This pilot study demonstrates the need for, and feasibility of, a large prospective cohort study to determine if preoperative noninvasive pharmacological cardiovascular stress testing has additional predictive value, beyond clinical variables, for the occurrence of MI in patients undergoing TJR.

**Paper 172**  
**0936-0942**

The Influence of Patient Factors on Contemporary Total Knee Replacement Outcomes at Five to Ten- Year Follow-up<sup>2</sup>  
*R.B. Bourne, S. J. MacDonald, R. W. McCalden, London, ON*

The influence of patient factors on contemporary TKR outcomes were assessed in 436 consecutive Genesis II TKR patients at 6 – 11 (mean = 9) year follow-up. The Kaplan-Meier survivorship of patients was 98% ± 0.8% at 9 years. Large and significant improvements in pre-operative health related quality of life outcomes (KSCR, WOMAC and SF-12) were noted. Female patients demonstrated significantly worse pre-operative and post-operative outcome scores, but similar change scores than their male counterparts. Similarly, patients with rheumatoid arthritis had significantly inferior pre-operative and post-operative outcomes, but similar change scores. Pre-operative deformity did not affect outcomes. Pre-operative range of motion had a significant effect on post-operative range of motion.

**Paper 173**  
**0942-0948**

Epidemiology of Revision Procedures Following Primary Hip and Knee Arthroplasty for Osteoarthritis<sup>2</sup>  
*N. Greidanus, J. Cibere, D. Garbuz, J. Kopec, M. Rahman, E. Sayre, Vancouver, BC*

Revision surgery is an important outcome of hip and knee arthroplasty among patients with osteoarthritis (OA). Between 1986 and 2004, we observed 24,169 first primary hip replacements and 22,875 first primary knee replacements. In these patients, there were 1,313 hip revisions and 914 knee revisions following a primary replacement. The risk of revision at 5, 10 and 15 years after primary replacement according to joint and sex is shown in Table 1. The overall risks were 10.1% for the hip and 8.7% for the knee at 10 years, and 15.5% and 14.7%, respectively, at 15 years. In a multivariate survival regression model including joint, age, sex, and SES, only age and sex were significantly associated with revisions. The hazard ratio was 1.2 for men compared with women ( $p < 0.0001$ ). Revision rates were higher in younger persons, with hazard ratios increasing from 1.7 for age 70-79 ( $p < 0.0001$ ) to 3.9 for age <49 ( $p < 0.0001$ ) compared with age 80+. After adjusting for age and sex, SES was not significantly associated with revision risk following primary hip or knee replacement surgery in this population ( $p = 0.75$ ).

**Paper 174**  
**0948-0954** Comparison of Postoperative Flexion in Posterior Cruciate Ligament Substituting Total Knee Arthroplasty versus Posterior Cruciate Ligament Retaining Total Knee Arthroplasty<sup>2</sup>  
*R. Chaudhary, L. Beaupre, B. Johnston, Edmonton, AB*

We performed a randomized double-blind clinical trial comparing knee flexion over the first 2 post-operative years in primary posterior cruciate ligament substituting total knee arthroplasty versus primary posterior cruciate ligament retaining total knee arthroplasty. Pain, function and quality of life were also compared between groups. Groups had similar preoperative characteristics, including knee flexion. Subjects were assessed at 3-months, 1 and 2-years after surgery. No differences were seen in knee flexion at 2-year follow up ( $p > 0.05$ ) nor in recovery of knee range of motion over time ( $p > 0.05$ ). Groups were also similar in pain, function and quality of life at all measurement points ( $p > 0.05$ ).

**0954-1002** Discussion

**Paper 175**  
**1002-1008** The Outcome of Primary Total Knee Arthroplasty with Posterior Stabilized Implant After a Previous Patellectomy  
*N. Tammachote, R. B. Bourne, S. J. Mac Donald, R. W. McCalden, D. Naudie, C. H. Rorabeck, London, ON*

In patients with patellectomy, previous outcome studies have shown contradictory results. They are limited by small number of patients, included primary and revision implants or involved a heterogeneous group of different constraint implants. We performed retrospective match controlled analysis of a posterior stabilized primary total knee arthroplasty in 42 patients who had previous patellectomy. The average duration of follow-up was 5.3 years. The control group was matched by age, sex, prosthesis type and surgeon. We used the student-t test to compare the outcome measurement. Preoperatively, both groups were not significantly different in terms of Knee Society clinical and functional scores or range of motion. Postoperatively clinical component of the knee society score had a significant difference ( $p < 0.05$ ) however the functional component didn't. The average clinical score in the patellectomy group was 12 points lower than control group. The patellectomy group also had higher extension lag and poorer extension at the last follow up ( $p < 0.05$ ). This study demonstrated outcome of the largest series of primary total knee arthroplasty in patient with previous patellectomy. It was significantly improved but not as good as a knee with intact patella especially function of the extensor mechanism.

**Paper 176**  
**1008-1014** Functional Outcomes of Total Joint Replacement in Patients Suffering Peri-operative Myocardial Infarction  
*J. Kwee, J. De Beer, D. Petruccelli, Hamilton, ON*

The incidence of clinically apparent MI following TJR has been reported to be 1.8% (Gandhi et al, 2006). To our knowledge, the functional outcome of patients suffering a peri-operative MI has not been reported. A retrospective case-control study was undertaken to determine if functional outcomes of TJR patients who had a peri-operative MI are inferior to those who did not. Of 3320 primary TJR's performed over a 7-year period, 62 (1.9%) were identified as having a peri-operative MI, diagnosed clinically and confirmed by biochemical assay. There was an overall mortality of 13%. Only 34/62 (55%) completed follow-up to 1-year. These patients were case-matched for demographics, risk factors and pre-operative functional score. Statistically significant differences were

observed in Oxford Hip scores at 6-weeks post-operative. No statistically significant differences in outcomes were observed among knee patients. Those patients who are well enough to return for TJR follow-up do just as well as those who did not suffer an MI. There may be some differences in the rate of recovery from surgery, but it appears that overall functional outcome of the patients that survive remain good.

**Paper 177**  
**1014-1020** Total Knee Replacement After Medial Opening Wedge High Tibial Osteotomy: Technical Issues, and Early Clinical and Radiological Results  
**S. Erak, R. Bourne, S.J. MacDonald, R. McCalden, D. Naudie, C.H. Rorabeck, London, ON**

We report our results with conversion of 34 medial opening wedge osteotomies to total knee replacement. Average age of the patients was 57 years, and the average time from HTO to TKR was 4.7 years. Technical difficulties encountered were relatively few. Minimum 1 year follow-up was available for 27 patients, with a mean follow-up time of 28 months (range 12 to 93 months). The average Knee Society knee score was 88, and function score 75. Poor results correlated strongly to the presence of chronic pain or workers compensation issues. We conclude that the conversion of a medial opening wedge HTO to a TKR is relatively straightforward technically, and the clinical results are similar to an age matched control group.

**1020-1030** Discussion

**0900 - 1030** **Session 12: Spine and Tumour – Moderators: David I. Highland & William M. Oxner**

**Paper 178**  
**0900-0906** Infectious Spondylodiscitis in Patients Receiving Hemodialysis<sup>2</sup>  
**R. M. Helewa, C. G. Boughen, M. S. Cheang, J. M Embil, M. Goytan, J. M. Zacharias, Winnipeg, MB**

A retrospective case-control study of 22 cases of spondylodiscitis in hemodialysis patients was undertaken so as to elucidate risk factors and outcomes in this patient population. Spondylodiscitis patients had been receiving hemodialysis for a significantly longer average duration than control subjects and a greater proportion of cases than control subjects had microorganism growth from at least one blood culture within 3 months before diagnosis of spondylodiscitis. During the months before diagnosis, a significantly greater proportion of spondylodiscitis patients than control subjects had received blood products, had an invasive procedure, had any type of vascular access established, or had temporary or permanent internal jugular or temporary femoral central venous catheters placed. All patients with spondylodiscitis received prolonged antimicrobial therapy. The death rate was also significantly greater for spondylodiscitis patients than controls, indicating that in the hemodialysis population spondylodiscitis has a poor prognosis and high risk of mortality.

**Paper 179**  
**0906-0912** Blood Transfusion Requirements in Paediatric Spinal Deformity Corrective Surgery: Comparison of Idiopathic and Neuromuscular Etiologies<sup>2</sup>  
**J. A. Grant, S. Al Eissa, J. Harder, J. Luntley, D. Parsons, J. Howard, Calgary, AB**

Purpose: The purpose of this study was to first determine if neuromuscular scoliosis results in greater peri-operative transfusion

requirements compared to idiopathic scoliosis, and secondly to compare the effects of tranexamic acid (TXA) dosing on reducing transfusion requirements in scoliosis surgery. Previous studies have suggested that patients with neuromuscular scoliosis tend to have more blood loss during scoliosis corrective surgery as compared to patients with idiopathic scoliosis. Tranexamic acid has not been studied extensively in these populations and consensus regarding appropriate dosing has not yet been elucidated.

**Paper 180**  
**0912-0918** Clinical Magnification Error in Lateral Spinal Digital Radiographs  
**B. Ravi, Y Raja Rampersaud, Toronto, ON**

The magnification error in plain radiographs is often estimated at 15-30%. This paper assessed the range of magnification error in the lateral spinal digital radiographs of 250 patients with radiographs and corresponding CT/MRI. A large range of magnification error was demonstrated in both the cervical (6-57% / mean =21%) and lumbar spine (9-63% / mean = 31%) respectively. This magnification error is directly related to the distance the area of interest is from the x-ray receiver, therefore as expected the degree of magnification was positively correlated to patient BMI. Radiographic magnification error has a large range. Consequently, clinical-decision making, regardless of the anatomical area, that is based on linear measurements obtained from radiographs that do not account for this error are invalid. In the scenario that this measurement is crucial (e.g. dynamic radiographs), this error can be correct by comparison to morphometric data from CT/MRI.

**0918-0923** Discussion

**Paper 181**  
**0923-0929** Protease Activity in the Stromal Cells of Giant Cell Tumour of Bone  
**A. Rabinovich, Thornhill, ON, N. Colterjohn, R. Cowan, M. Ghert, N. Simunovic, G. Singh, Hamilton, ON.**

Giant cell tumor (GCT) of bone is an osteolytic tumor that is locally aggressive and potentially metastatic. Although the osteoclast-like giant cells have classically been considered the main culprits in bone destruction, the stromal cells are believed to be the neoplastic element of the tumor. Matrix metalloproteinases (MMP-2, MMP-9) are proteases involved in degradation and remodeling of bone matrix, and have been implicated in tumor aggressiveness. In this study, we successfully harvested and established primary cell lines from clinical specimens of GCT of bone. We characterized the cells to be of mesenchymal origin and to produce activated MMP-2 and MMP-9 in vitro. We therefore conclude that the stromal cells of GCT of bone may play a key role in bone destruction through a matrix metalloproteinase mechanism. These results are intriguing due to recent developments of synthetic MMP inhibitors for other disease processes.

**Paper 182**  
**0929-0935** Osteolysis in Cancer: A Role for the Genetic Manipulation of RANK Expression<sup>2</sup>  
**D. J. Costain, M.J. Dunbar, M. Gross, T.D.G. Lee, Halifax, NS**

Tumour-induced osteolysis is a complex process involving signalling between osteoblasts (OB) and osteoclasts (OC). This project examined the inhibition of OC activity using short interfering sequences of RNA, both in the presence and absence of tumour-associated cytokines. Our data reveal a trend towards the reduction of OC function with RNA sequences targeting the RANK receptor. This finding has implications for potential therapeutic targets designed to reduce morbidity associated with

tumour-induced osteolysis.

**Paper 183**  
**0935-0941** Pigment Epithelium-Derived Factor Inhibits Osteosarcoma Growth and Metastasis<sup>2</sup>  
*P. Choong, C. Dass, E. Ek, Melbourne, Australia, F.H. Sim,*

Pigment epithelium-derived factor (PEDF) is the most potent endogenous inhibitor of angiogenesis. We investigated the effects of overexpressed and recombinant PEDF (rPEDF) in several cell-based assays and in two orthotopic models of osteosarcoma (UMR 106-01 and SaOS-2). In vitro, overexpression of PEDF significantly decreased cell proliferation, migration, invasion and increased adhesion to collagen-1. There was a dose-dependent inhibition of cell proliferation, increased collagen adhesion, decreased invasion, and down-regulation of VEGF. In vivo, PEDF inhibited osteosarcoma growth and metastasis when overexpressed and in the recombinant form. In addition, anti-tumour activity was observed upon testing with shorter peptides of PEDF. PEDF demonstrates multi-modal anti-tumour activity via anti-proliferation, anti-angiogenesis, pro-differentiation and anti-metastasis. PEDF may be a promising therapeutic agent for the treatment of patients with osteosarcoma.

**0941-0946** Discussion

**Paper 184**  
**0946-0952** The Use of Preoperative Embolization for Renal Cell Carcinoma Metastases to the Pelvis and Appendicular Skeleton  
*M. Ghert, S. Chou, N. Colterjohn, K. Finlay, J. Ku, Hamilton, ON*

Bone metastases from renal cell carcinoma are aggressive, osteolytic lesions that often require operative intervention for fracture prophylaxis, fracture fixation or palliation. The lesions are hypervascular and intraoperative bleeding is a serious challenge for the orthopaedic surgeon. The purpose of this study was to determine the efficacy of preoperative tumour embolization in reducing blood loss during operative management of renal cell carcinoma metastases to bone. We identified 35 cases (28 patients) from a prospectively accumulated database that had undergone operative management for a renal cell metastasis to bone immediately following preoperative embolization. Embolizations that successfully blocked at least 75% of the blood flow to the tumour significantly decreased surgical blood loss and red blood cell transfusions compared to those that did not. Close communication between the orthopaedic surgeon and interventional radiologist is imperative to maximize the benefits of preoperative embolization in this surgical patient population.

**Paper 185**  
**0952-0958** Importance of the Adamkiewicz Artery in Spinal Tumours  
*L. P. Amiot, G. Barrette, M. Dube, M. Isler, J. C. Vinet, Montreal, QC*

We prospectively enrolled all patients undergoing spinal fixation for a primary spine tumor or metastasis in order to document the presence of an Adamkiewicz artery (AKA) in the vicinity of the involved level. All patients underwent selective spinal angiography of the level above, the level below and level involved with the tumor before surgery. Selective spinal angiographies were performed in 18 patients from T1 to L4. In more than half the patients, the AKA was found in the vicinity of the involved level. The surgical strategy was then re-adjusted accordingly. These findings are important since neurological complications are frequent when operating spine tumors, which are usually heavy surgical cases. This is the first study to document the neighboring presence of the

AKA in cases of spinal tumors.

**Paper 186**  
**0958-1004**

Safe Methods for the Removal of Osteochondromas  
**W. Cole, Toronto, ON**

This study of 250 children with exostoses was undertaken to investigate the outcome of operative procedures designed to reduce the likelihood of neurovascular injury, fracture and tumor recurrence. The literature frequency of neurovascular injuries is about 10% and recurrences have been reported to be common when resections are undertaken before skeletal maturity. Our conclusions are: (1) Remove exostoses after skeletal maturity in order to minimize recurrence risk. (2) Use preoperative CT-angiograms with large solitary or multiple exostoses to aid in operative planning. (3) Decancellate large exostoses in order to collapse the cap away from adherent neurovascular and skeletal structures. The preoperative and operative procedures utilized in the current study enable exostoses, even huge multiple ones, to be safely removed

**1004-1008**

Discussion

**Paper 187**  
**1008-1014**

Outcome of Radiation-induced Pathologic Fractures After Surgery for Soft Tissue Sarcomas  
**K. Saidi, London, ON, R. S. Bell, A. M. Griffin, K. Saidi, J. S. Wunder, Toronto, ON**

The purpose of this study was to determine the outcome of radiation-induced pathologic fractures in a group of patients who had undergone surgery for soft tissue sarcoma. From 1986 to present, 32 patients with soft tissue sarcomas were found to have radiation induced pathologic fractures. Fractures occurred at a mean of 45 months after resection of the sarcoma (range 3-150 months). Eleven of the 32 fractures united. Six patients underwent amputation, eight patients ultimately underwent arthroplasty, and 7 patients have persistent non-unions. In the proximal femur, 3/12 fractures healed, 6 patients eventually underwent arthroplasty and 3 continue to have non-unions. Of 8 femoral diaphyseal fractures, only one united. Radiation induced pathologic fractures are a difficult clinical problem. Primary arthroplasty may be considered in some patients as an alternative to fixation in fractures of the femur in order to avoid long term morbidity and repeated operations.

**Paper 189**  
**1014-1020**

Total Hip Arthroplasty for Periacetabular Tumours Utilizing Porous Tantalum Acetabular Components<sup>2</sup>  
**M. Yanagisawa, Tomino-cho, Hirosaki, Aomori, Japan, P. Choong, Victoria, Australia, D. Lewallen, F. H. Sim, Rochester, MN.**

Neoplastic destruction of the acetabulum is a challenging problem with high loosening rates following standard arthroplasty. We report a series of sixteen total hip arthroplasties utilizing a porous tantalum trabecular metal acetabular component in patients with tumors of the hip. The technique used was determined by the extent of the lesion and the quality of remaining host bone. The early clinical and radiographic results of porous tantalum trabecular metal acetabular components are encouraging in this patient population. Long term follow up is needed to validate the durability of this reconstructive approach.

**Paper 190**  
**1020-1026**

A Biomechanical Comparison of Techniques of Fixation of Pathologic Fractures of Humerus<sup>2</sup>  
**A. S. Al Jahwari, P. C Ferguson, E. Schemitsch, J. Wunder, R. Zdero,**

Toronto, ON

This study examines the biomechanical Performance of five types of recognized fixation Techniques in a model of pathological fracture of the diaphyseal humerus. Forty synthetic humeri were reamed initially to simulate osteoporotic bone seen in patients with metastatic bone disease. A Hemicylindrical defect centered in the middle third was then created. A fracture was produced in the centre of each defect. The bones were randomly assigned to five groups of fixation techniques. Each specimen was tested in external rotation to failure by fracture. The study demonstrates that, in a model of a fracture through a hemicylindrical defect in the mid-diaphysis of the humerus, fixation with a broad 10-hole dynamic compression plate after filling the entire medullary canal with cement is associated with the highest torque to failure and energy to failure with torsional forces. This fixation technique may best accomplish the clinical goal of maximal initial stability.

1026-1030 Discussion

0900 - 1030 **Session 13: Trauma Lower Extremity – Moderators: Highland 6/7**  
**David W. Sanders, Donald Weber, Richard Kyle,**  
**American Academy of Orthopaedic Surgeons**  
**President**

**Paper 191**  
**0900-0906** A Comparison of the Outcome of Patients with Isolated Pulmonary Contusions Versus Those with Pulmonary Contusions and Femoral Shaft Fractures  
**C. M. Haydon, J. Bukczynski, M. Nousiainen, E. H. Schemitsch, D. Stephen, J. P. Wadell, Toronto, ON**

Controversy exists over the impact of concomitant femoral shaft fractures on morbidity and mortality in patients with pulmonary contusions. Patients were identified from prospectively collected trauma databases at two institutions between 1987 and 2006; exclusion criteria included severe head or abdominal trauma (AIS>3), age 60 years, death within 24h of injury and presenting to hospital >24h following injury. A total of 1190 patients with confirmed pulmonary contusion were included; there were 108 femoral shaft fractures. 88% of fractures were treated with intramedullary nailing. There were significantly more incidences of fat embolism syndrome (FES) and acute lung injury (ALI) in patients with femoral fractures (p<0.05). Femoral shaft fractures in patients with pulmonary contusions increase length of stay and the incidences of ALI and FES.

**Paper 192**  
**0906-0912** Hematologic Changes In Pulmonary Fat Embolism: An Animal Study Comparing Two Reamers  
**E. Schemitsch, K.W.A. Bang, M. Blankstein, J. Freedman, R. Li, R. Wang, Toronto, ON**

To investigate differences between the Reamer Irrigator Aspirator and the AO reamer on fat embolism outcome using a porcine model. Blood work was obtained at: baseline, immediately after induction of hypovolemia, one hour post hypovolemia, post stabilization, one minute, five minutes, 1.5 hours and 3 hours after reaming. The results were analyzed for activation of the coagulation system, platelet and neutrophil activation, and cytokine elevation. There was no statistical difference between the two reamers with respect to PT, APTT, and fibrinogen. There was a statistical difference in D-dimer at 1.5 and 3 hours post-

reaming, with the RIA showing a lower value. TNF-alpha spiked immediately post-reaming with the RIA group returning to baseline values and the AO group remaining elevated. Although there is no statistical difference between the RIA and AO reamer, it is possible that activated cells were removed from the systemic circulation and sequestered as thrombi in the pulmonary microvasculature. This hypothesis may be supported by a drop in platelet count and an increase in D-dimer, with the AO reamer suggesting greater thrombi formation. The trends in IL-1B and TNF-alpha seem to suggest that the RIA abrogates the proinflammatory state.

**Paper 193**  
**0912-0918** Do Corticosteroids Reduce the Risk of Fat Embolism Syndrome in Poly-Trauma Patients?: A Meta-Analysis<sup>2</sup>  
**S. S. Bederman, M. D. McKee, E. H. Schemitsch, Toronto, ON, M. Bhandari, Hamilton, ON**

Fat embolism syndrome (FES) is a potentially lethal condition commonly seen in poly- traumatized patients, particularly those with multiple long-bone fractures. Several clinical trials have shown corticosteroids to be beneficial in FES but its use remains controversial. From our meta-analysis of randomized controlled trials, we found that corticosteroids reduced the risk of FES by 78% and that only 8 patients needed to be treated to prevent one case. This would suggest that corticosteroids are beneficial in the prevention of FES. We did not find any significant difference in the rates of mortality, infection, or delayed union.

**0918-0924** Discussion

**Paper 194**  
**0924-0930** Randomized Controlled Trial of Cemented Versus Uncemented Hemiarthroplasty for Displaced Intracapsular Fractures  
**S. Haleem, Cambridge, UK, Glyn A Pryor, Martyn J Parker, Peterborough, ON**

We undertook a prospective randomised controlled trial of 400 patients with a displaced intracapsular hip fracture to determine any difference in outcome between the uncemented Austin Moore Prosthesis and cemented Thompson hemiarthroplasty. All operations were performed or supervised by one orthopaedic surgeon using a standard anterolateral approach, followed by a nurse blinded to the type of prosthesis to assess residual pain and mobility. The average age of the patients was 83 years, 23% were male and 73% lived in own homes. Pain scores ( $p < 0.00001$ ) and mobility change ( $p = 0.002$ ) were less in the cemented prosthesis group. There was no statistically significant difference in mortality, hospital stay, re-operations, implant related or post-operative medical complications between the two groups. A cemented Thompson Hemiarthroplasty causes less pain and less mobility deterioration without any increased complications as compared to the uncemented Austin Moore hemiarthroplasty whose continued use cannot be recommended.

**Paper 195**  
**0930-0936** A Randomized Clinical Trial Comparing Minimally Invasive Surgery (MIS) to Conventional Approach in Hip Fractures – Preliminary Results  
**L. Roy, M. Carrier, Y. Laflamme, Montreal, QC**

This prospective randomized clinical trial was conducted to determine the safety and efficacy of a single posterior mini-incision approach compared to a standard posterior approach for hemiarthroplasty in acute femoral neck fractures. 55 patients have been randomized between the mini-incision surgery group (MIS) and 23 patients in the standard

incision group (STD). While the two operative groups were similar, there was no significant difference for operative time, blood losses, 72h postoperative haemoglobin, the need for transfusion therapy, post-operative morphine use and pain evaluation with the Visual Analog Scale. The functional assessment using the LEM, TUG, Harris Hip score and SF-36 scores did not demonstrate any statistically significant difference between mini and standard incision. This study demonstrates that the clinical and functional outcomes measured are similar between the two groups, thus limiting the potential benefits of MIS in hip fracture patients.

**Paper 196**  
**0936-0942** Femoral Neck Fractures Treated with Hemiarthroplasty: Functional Outcomes Using Validated Measures (Preliminary Results)  
*M. Carrier, Y. Laflamme, L. Roy, Montreal, QC*

Hip fractures in the elderly are associated with considerable morbidity and high economic cost. Physical function is one of the most important outcomes following treatment of a hip fracture. Most often, pain and walking ability are used to report functional status. The latter however encompasses many more facets. The Lower Extremity Measure (LEM) and the Time Up and Go (TUG) are two validated tools adapted to an elderly population. The primary objective of this study was to report the progression of functional status over time after hemiarthroplasty surgery for displaced femoral neck fractures in a 100 patients. Preliminary results show that LEM scores at one year follow-up are significantly lower than pre-operative scores. TUG scores at 3 months follow-up were significantly lower in the female sub-group in comparison to normal controls. This study demonstrates the significant post operative functional repercussions as shown by the deterioration of scores of functional outcome measures used. Predicting functional outcomes based on pre-operative patient baseline data and function is relevant in that it could potentially impact decision to operate and determination of surgical procedure of choice.

**0942-0948** Discussion

**Paper 197**  
**0948-0954** Deep Vein Thrombosis Prophylaxis in Distal Lower Extremity Fractures - A Prospective Randomized Control Trial<sup>2</sup>  
*D. Goel, G. Abelseth, R. Buckley, G. deVries, G. Fick, R. Gray, A. Ni, Calgary, AB*

The incidence of DVT and need for prophylaxis in isolated distal lower extremity fractures is unknown. A Prospective Double Blinded Randomized Control Trial was carried out to answer this question. All 299 consenting males and females between the ages of 18-75 were randomized via computer generation to receive Fragmin or Placebo. These patients subsequently had bilateral venograms at 2 weeks post operatively. Routine follow up was performed at 2, 6, 8 and 12 weeks. The incidence of DVT in isolated distal lower extremity fractures was 11.2% in the Placebo group and 8.2% in the Fragmin treated group ( $p = 0.41$ ). This difference was not statistically significant. Based on these results, there is no need for thrombo-prophylaxis in patients with isolated distal lower extremity fractures. This was irrespective of fracture type, BMI or fracture location.

**Paper 198**  
**0954-1000** Pressure Sores in 4654 Hip Fracture Patients. The Role of Patient Factors, Fracture Types, Surgical and Anaesthetic Factors  
*S. Haleem, Gideon Heinert, Cambridge, UK, Martyn J Parker, Peterborough, ON*

A neck of femur fracture is a high risk factor for the development of pressure sores and associated morbidity, mortality and cost. We have attempted to identify risk factors in these patients for the development of pressure sores and have analysed prospectively collected data of 4654 consecutive patients (1003 males/3473 females). 3.8% developed pressure sores in the sacral, buttock or heel areas. Patient factors that increased the risk of pressure sores were increased age, lower mental test score, diabetes mellitus, higher ASA score and lower admission haemoglobin concentration. An extracapsular fracture was higher risk. . Other risk factors include a fall in blood pressure during surgery. Dynamic hip screw and hemiarthroplasty were higher risk while internal fixation was lower. . Our study indicates a lower current incidence of pressure sores than previously reported. Risk factors of pressure sores are not sufficiently reliable to be used for an individual patient.

**Paper 199**  
**1000-1006** Immediate Unprotected Weight-Bearing of Operatively Treated Ankle Fractures  
**S. Batra, A. Gul, Bangor, UK**

The objective of this study was to determine whether immediate unprotected weight bearing of rigidly internally fixed fractured ankles had a significant effect on function or predisposed to loss of reduction or hardware failure. 25 patients of matched groups either treated in a non-weight bearing plaster cast (A) or immediate full weight bearing (FWB) as tolerated without a plaster (B) were compared for subjective, objective & radiographic outcome (Mean follow up 37.5 months). Matched-pair analysis revealed no differences for hospital stay, functional outcome ( $p=0.858$ ) on Olerud and Molander scoring but had significant difference in time until return to work. Patients in Group B tolerated earlier FWB and had no disadvantages concerning hospital stay, pain and functional scores. We conclude that immediate unprotected weight bearing of rigidly internally fixed fractured ankles doesn't predispose to loss of reduction and the functional results for both groups are comparable.

**1006-1012** Discussion

**Paper 200**  
**1012-1018** Effect of Intraoperative Positioning in the Supine or Lateral Position on Morbidity and Mortality in Orthopaedic Trauma Patients with Femur Fractures Treated with Reamed Intramedullary Nails.  
**K. L. Apostle, P. Blachut, H. Broekhuysse, P. Guy, R. Meek, P.J. O'Brien, Vancouver, BC**

The current study is the first to examine outcomes of singly or multiply injured human subjects with femur fractures subjected to IM nailing in the supine or lateral position. 991 patients representing 1030 femur fractures between the years of 1987 to 2006 were identified. Of these 239 femurs in 228 patients were treated surgically with intramedullary (IM) nails in the lateral position and 802 femurs in 791 patients were treated in the supine position. Logistic regression analysis was used to compare the primary outcomes of mortality and admission to ICU and the secondary outcomes of length of stay in hospital, length of stay in the ICU and discharge disposition. We found that there was no difference in any outcome measure for those treated in the lateral versus the supine position. We conclude that both positions are safe for the surgical stabilization of femoral shaft fractures.

**Paper 201** Cyclic Loading of Periprosthetic Fracture Fixation Constructs<sup>2</sup>

**1018-1024** *E. H. Schemitsch, Toronto, ON, M.Talbot, Montreal, QC, Radovan Zdero, Toronto, ON*

This study was conducted to determine the biomechanical characteristics of three constructs currently used for fixation of periprosthetic femur fractures. Third Generation Composite Femurs were used as specimens. Following cemented stem implantation, Vancouver B1 periprosthetic femur fractures were created. The fractures were fixed with one of three constructs: 1- A non-locking plate and allograft strut (NLP-A) 2- A locking plate and allograft strut (LP-A) 3- A locking plate alone. (LP) Following fixation, the constructs underwent sinusoidal cyclic loading from 200 to 1200 N for 100000 cycles. Stiffness testing was performed before and after cycling. Overall, cyclic loading did not significantly decrease the stiffness of these constructs. The two constructs with allografts were significantly stiffer in coronal plane bending than the construct consisting of only a locking plate. There were no significant differences in axial or torsional stiffness between the constructs. Load to failure of the NLP-A (4095 N) and LP-A (4007 N) constructs was significantly greater than the LP construct (3398 N). We conclude that allograft-plate constructs are stiffer in bending and have a higher load to failure than a stand-alone locking plate. All three constructs are able to withstand strenuous cyclic loading.

**1024-1030** Discussion

**1030 - 1100** Health Break **Port Royal Foyer**  
**1100 - 1230** Symposium #4: Arthroplasty - The Latest on the **Port Royal B**  
Perioperative Management of the TJA Patient

**1230** END OF MEETING  
THANKS FOR JOINING US IN HALIFAX!