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GEORGETOWN UNIVERSITY
School of Medicine



OREF Mid-Atlantic Medstar Georgetown
Regional Resident Research Symposium
Georgetown University School of Medicine
3900 Reservoir Road
Med-Dent Building
Harvey Amphitheater
Washington, DC

Co-Hosts:

A. Jay Khanna, MD

Physician Executive Director,
MedStar Orthopaedic Institute, Washington Region
D'Aniello Family Department Chair and Professor,
Department of Orthopaedic Surgery
Georgetown University School of Medicine

Addisu Mesfin, MD

Vice Chair of Research, Chief of Spine Oncology and
Professor of Orthopaedic Surgery, MedStar Orthopaedic Institute
Georgetown University School of Medicine

Ryan S. Murray, MD

Assistant Professor of Orthopaedic Surgery
MedStar Georgetown University Hospital

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About OREF

The Orthopaedic Research and Education Foundation (OREF) is a charitable 501(c)(3) organization committed to improving lives by supporting excellence in orthopaedic research through its grant funding and research education programs. As an independent nonprofit, OREF strives to improve clinical care and patient outcomes by advancing innovative research, developing new investigators, and uniting the orthopaedic community in promoting musculoskeletal health. Visit oref.org or follow OREF on Twitter (@OREFtoday).

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**OREF Mid-Atlantic MedStar Georgetown
Region Resident Research Symposium
SUMMARY AGENDA
Saturday, May 11, 2024**

- 8:00 a.m. – 9:00 a.m. **Registration and Breakfast**
- 9:00 a.m. – 9:08 a.m. **Welcome and Introductions**
A. Jay Khanna, MD
Physician Executive Director,
MedStar Orthopaedic Institute, Washington Region
D’Aniello Family Department Chair and Professor,
Department of Orthopaedic Surgery
Georgetown University School of Medicine
- 9:08 a.m. – 9:15 a.m. **OREF Welcome**
Lee Grossman, MBA, ML, CAE
Chief Executive Officer
Orthopaedic Research and Education Foundation
- 9:15 a.m. – 9:51 a.m. **Session I – Resident Research Presentations & Discussion**
- 9:51 a.m. – 10:27 a.m. **Session II – Resident Research Presentations & Discussion**
- Break**
- 10:37a.m. - 11:13 a.m. **Session III – Resident Research Presentation & Discussion**
- 11:13 a.m. - 11:49 a.m. **Session IV – Resident Research Presentations and Discussion**
- 11:49 a.m. - 12:25 p.m. **Session V – Resident Research Presentations and Discussion**
- Break**
- 12:35 p.m. - 12:40 p.m. **Keynote Speaker Introduction**
- 12:40 p.m.– 1:25 p.m. **Keynote Address**
A.M.A.P.-Messages and Pearls from a Surgeon Scientist’s Journey
MaCalus Hogan, MD, FAOA
David Silver Professor and Chair
Department of Orthopaedic Surgery
University of Pittsburgh School of Medicine
- 1:25 p.m. – 1:30 p.m. **Closing Remarks**
Lee Grossman, MBA, ML, CAE
Chief Executive Officer
Orthopaedic Research and Education Foundation
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Closing of program to OREF TV audience
- 1:30 p.m. – 2:15 p.m. **Lunch**

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KEYNOTE SPEAKER



MaCalus Hogan, MD, FAOA

David Silver Professor and Chair
Department of Orthopaedic Surgery
University of Pittsburgh School of Medicine

MaCalus V. Hogan, MD, MBA, is a board-certified orthopaedic surgeon by the American Board of Orthopaedic Surgery. He attended Howard University College of Medicine where he completed his medical degree and then moved on to the University of Virginia Health System to complete his training in orthopaedic surgery with a research focus in Musculoskeletal Regenerative Engineering as NIH T32 fellow, during which time he received the OREF Resident Clinician Scientist Training Grant. Following residency, Dr. Hogan completed his foot and ankle fellowship at The Hospital for Special Surgery where he served as a consultant for the New York Ballet Company, American Ballet Theatre as well several professional and collegiate sport teams. Dr. Hogan also obtained his Executive Master of Business Administration (EMBA) from the University of Pittsburgh Katz School of Business.

Currently, Dr. Hogan serves as the David Silver Professor and Chair of the UPMC Department of Orthopaedic Surgery and Chief of the UPMC Orthopaedic Surgery Service Line. Additionally, Dr. Hogan currently holds the position of director at the Foot and Ankle Injury Research (FAIR) group within the Department of Orthopaedic Surgery. Dr. Hogan has also made major contributions to the field of orthopaedic surgery through his research. He has over 200 manuscripts, book chapters, and presentations both nationally and internationally. In addition to his clinical and research practice, Dr. Hogan serves as a foot and ankle consultant for the athletic departments at the University of Pittsburgh, Carnegie Mellon University, Duquesne University, and Robert Morris University. He also serves as the assistant team physician for Point Park University, including the Conservatory of Performing Arts, Pittsburgh Ballet Theatre, Pittsburgh Penguins and Pittsburgh Steelers.

Judges

Nicholas D. Casscells, MD
MedStar Orthopaedic Institute
Georgetown University School of Medicine
MedStar Georgetown University Hospital

A. Jay Khanna, MD, MBA
MedStar Orthopaedic Institute
Georgetown University School of Medicine
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Addisu Mesfin, MD
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MedStar Washington Hospital Center

Ryan S. Murray, MD
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MedStar Georgetown University Hospital

Kevin O'Malley, MD
MedStar Orthopaedic Institute
Georgetown University School of Medicine
MedStar Washington Hospital Center

Kenneth M. Vaz, MD
MedStar Orthopaedic Institute
Georgetown University School of Medicine
MedStar Georgetown University Hospital

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Lee Grossman, MBA, ML, CAE
Chief Executive Officer
Orthopaedic Research and Education Foundation
- Session I – Resident Research Presentations & Discussion**
- 9:15 a.m. - 9:20 a.m. *Sickle Cell Disease Has No Impact on 10-Year Cumulative Incidence and Indications for Revision Lumbar Fusion*
Theodore Quan, MD - George Washington University
- 9:20 a.m. – 9:25 a.m. *Formal Radiologist Interpretations of Intraoperative Spine Radiographs Have Low Clinical Value*
Christopher J. Como, MD – University of Pittsburgh
- 9:25 a.m. – 9:30 a.m. *Dexamethasone in the Immediate Post-Operative Period is Associated with Increased Risk of Instrumentation and Surgical Site Complications in Diabetic Patients Undergoing Lumbar Spinal Fusion*
Douglass Johnson, MD – Medstar Georgetown University Hospital
- 9:30 a.m. – 9:35 a.m. *Investigation of Orthopaedic Surgery Resident Education Regarding the Management of Unintentional Durotomies*
Austin Carroll, MD – Medstar Georgetown University Hospital
- 9:35 a.m. – 9:40 a.m. *A New Morphologic Classification of Proximal Junctional Kyphosis Following Lower Thoracic to Pelvis Fusion in Adult Spinal Deformity Predicts Revision Surgery and Neurologic Complications*
Micheal Raad, MD – Johns Hopkins Medicine
- 9:40 a.m. – 9:51 a.m. **Question and Answer**
- Session II – Resident Research Presentations & Discussion**
- 9:51 a.m. – 9:56 a.m. *Use of Deep Learning for Automation of Vertebral Classification and Labeling in Intraoperative Spinal Imaging*
Rachel S. Bronheim, MD – Johns Hopkins Medicine
- 9:56 a.m. – 10:01 a.m. *Comparison of Sarcopenia with Frailty and Area Deprivation Index for Predicting Postoperative Mortality and Complications in Thoracolumbar Trauma*
Alexander Ruditsky, MD – University of Maryland Medical Center

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- 10:01 a.m. – 10:06 a.m. *Your iPhone Knows How You Will Recover from Your Fracture*
Brian Shear, MD – University of Maryland Medical Center
- 10:06 a.m. – 10:11 a.m. *Effects of Obesity in Patient Reported Outcomes After Hip Arthroscopy*
Gregory Perraut, MD – Medstar Georgetown University Hospital
- 10:11 a.m. – 10:16 a.m. *Effect of Axillary Nerve Block on Postoperative Emergency Department Visits
Following Fixation of Distal Radius Fractures: A Matched Analysis of 23,950
Patients*
Patrick Burroughs, MD – Medstar Georgetown University Hospital
- 10:16 a.m. – 10:27 a.m. **Question and Answer**
- 10:27 a.m. – 10:37 a.m. **Break**
- Session III – Resident Research Presentation & Discussion**
- 10:37 a.m. – 10:42 a.m. *Minimally Displaced Lateral Humeral Condyle Fractures: Optimizing Follow-up
and Minimizing Cost*
Denver Burton Kraft, MD – Medstar Georgetown University Hospital
- 10:42 a.m. – 10:47 a.m. *Trending Shoulder Motion and Functional Outcomes After Open Latarjet*
Kyle Zittel, MD – Medstar Georgetown University Hospital
- 10:47 a.m. – 10:52 a.m. *Factors Associated with Met Expectations and Satisfaction After Hip Arthroscopy*
Alexandra Baker Lutz, MD – University of Maryland Medical Center
- 10:52 a.m. – 10:57 a.m. *Can Hip and Knee Arthroplasty Surgeons Help Address the Osteoporosis
Epidemic?*
Alex Gu, MD – George Washington University
- 10:57a.m. – 11:02 a.m. *Lower Opioid Prescription Quantity Does Not Negatively Impact Pain Control or
Patient Satisfaction Following ACL Reconstruction: A Randomized, Prospective
Trial*
William Johns, MD – Thomas Jefferson University Hospital/Rothman Institute
- 11:02 a.m. – 11:13 a.m. **Question and Answer**
- Session IV – Resident Research Presentations & Discussion**
- 11:13 a.m. – 11:18 a.m. *Analysis of the Soft Tissue Retraction Pressures in Total Ankle Arthroplasty – An
In-Vitro Human Cadaveric Model*
Julia McCann, MD – Medstar Georgetown University Hospital
- 11:18 a.m. – 11:23 a.m. *“I Can See the Light”: Cataract Surgery Decreases Risk of Orthopaedic Trauma*
Mohammed S. Abdullah, MD – The Hospital of the University of Pennsylvania

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- 11:23 a.m. – 11:28 a.m. *Evaluating the Safety and Efficacy of Same Day Discharges for Total Joint Arthroplasty in a Veterans Affairs Hospital*
Oluwadamilola Kolade, MD – Howard University Hospital
- 11:28 a.m. – 11:33 a.m. *Predicting Blood Transfusion in Primary Total Knee Arthroplasty: An Externally Validated Model for Clinical Use*
Andrew Harris, MD – Johns Hopkins Medicine
- 11:33 a.m. – 11:38 a.m. *Relationship Dynamics During Surgical Residency: A Study on Match Choices, Strain and Support Systems*
Alexandra H. Seidenstein, MD – Johns Hopkins Medicine
- 11:38 a.m. – 11:49 a.m. **Question and Answer**
- Session V – Resident Research Presentations & Discussion**
- 11:49 a.m. – 11:54 a.m. *Syndesmotic Screw Angle in Lateral Fibular Pre-Contoured Plates Impacts Quality of Syndesmotic Reduction: A Cadaveric Study*
Rebekah Belayneh, MD – University of Pittsburgh Medical Center
- 11:54 a.m. – 11:59 a.m. *Evaluation of Peripheral Nerve Perfusion in Tensioned Repairs*
Matthew B. Weber, MD – Virginia Commonwealth University
- 11:59 a.m. – 12:04 p.m. *Development of a Patient-Specific Cartilage Graft Using Magnetic Resonance Imaging and 3D Printing*
Matthew Kolevar, MD – University of Maryland Medical Center
- 12:04 p.m. – 12:09 p.m. *Educating Patients on Osteoporosis and Bone Health: Can “ChatGPT” Provide High Quality Content?*
Majd Marrache, MD – Johns Hopkins Medicine
- 12:09 p.m. – 12:14 p.m. *Biomechanical Testing of a Hollow Stem Designed to Decrease the Incidence of Bone Cement Implantation Syndrome*
Jessa Fogel, MD – University of Maryland Medical Center
- 12:14 p.m. – 12:25 p.m. **Question and Answer**
- 12:25 p.m. – 12:35 p.m. **Break**
- 12:35 p.m. - 12:40 p.m. **Keynote Speaker Introduction**
- 12:40 p.m. – 1:25 p.m.. **Keynote Address**
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Closing Remarks

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Lunch

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Sickle Cell Disease Has No Impact on 10-Year Cumulative Incidence and Indication for Revision Lumbar Fusion

Theodore Quan, MD
George Washington University

Purpose: This study aimed to evaluate the 10-year cumulative incidence and indications for all-cause revision lumbar fusion (LF) between patients with sickle cell disease (SCD) and those without.

Significance: Patients with SCD experience distinct physiological challenges that may alter surgical outcomes, yet little research has investigated their 10-year LF implant survivorship rates.

Methods: A national database was queried to identify patients with and without SCD who underwent primary LF. Kaplan-Meier survival analysis determined the 10-year cumulative incidence rates of revision LF. Multivariable analysis compared indications for revisions and surgical complications between cohorts including instrumentation removal, drainage and evacuation, pseudoarthrosis, and mechanical failure.

Results: No significant differences were found in the cumulative incidence of 10-year all-cause revision LF between patients in the SCD cohort and either the matched or unmatched control cohorts ($p>0.05$ for each). Additionally, there were no significant differences between the SCD cohort and either of the control cohorts regarding the indications for revision or surgical complications in LF ($p>0.05$ for each).

Conclusion: This study indicates that SCD patients do not have increased risk for revision LF, nor any of its indications. As such, spine surgeons need not delay surgery on the basis of survivorship in this population alone.

Formal Radiologist Interpretations of Intraoperative Spine Radiographs Have Low Clinical Value

Christopher J. Como, MD
University of Pittsburgh

Purpose: The purpose of this study was to evaluate the clinical relevance, usefulness, and financial implications of intraoperative radiograph interpretation by radiologists in spine surgery.

Significance: Due to rising healthcare costs, spine surgery is under scrutiny to maximize value-based care. Formal intraoperative radiographic analysis remains a potential source of unnecessary healthcare costs.

Methods: A retrospective cohort analysis was performed on all adult elective spine surgeries between July 2020 and July 2021. Demographic, financial, and radiographic data was collected, including intraoperative localization and post-instrumentation radiographs. Reports were considered clinically relevant if spinal level of the procedure was described and clinically useful if completed prior to conclusion of the procedure and deemed clinically relevant.

Results: 481 intraoperative localization and post-instrumentation radiographs from 360 patients revealed a median delay of 128 minutes between imaging and completion of interpretive report. Only 38.9% of reports were completed before the conclusion of surgery. There were 79.4% deemed clinically relevant and 33.5% clinically useful. Localization reports were completed more frequently before the conclusion of surgery (67.2%vs.34.4%), but with lower clinical relevance (90.1%vs.98.5%) and usefulness (60.3%vs.33.6%) than post-instrumentation reports. There was a minimum total cost of \$15,392.

Conclusion: Formal radiographic interpretation of intraoperative spine radiographs has low clinical utility for spine surgeons.

Dexamethasone in the Immediate Post-Operative Period is Associated with Increased Risk of Instrumentation and Surgical Site Complications in Diabetic Patients Undergoing Lumbar Spinal Fusion

Douglass Johnson, MD
Medstar Georgetown University Hospital

Purpose: This study aims to determine the effects of dexamethasone on post-operative complications in lumbar fusion.

Significance: There are few studies investigating the effects of dexamethasone in a diabetic population that is more at risk when receiving the medication post-operatively.

Methods: Patients undergoing 1- or 2-level posterior lumbar fusions with a diagnosis of diabetes who received dexamethasone within three days post-operatively were identified using the PearlDiver database. Patients were propensity-matched in a 1:10 ratio to diabetic patients undergoing the same procedure who did not receive dexamethasone. Medical, surgical site and instrumentation complications were assessed at 30 days, 90 days, and 1 year.

Results: 7,865 patients comprise this analysis and were included. 715 patients in the test group (female=372, male=343) received dexamethasone post-operatively. There was no difference in UTI, AKI, pneumonia, or transfusion at 90 days. Surgical site complications were significantly elevated in the test group at 30 days, 90 days, and 1 year. Instrumentation complications were significantly elevated in the test group at all time points.

Conclusion: Administration of decadron in the post-operative period after lumbar fusion is associated with higher risk of complications at 30 days, 90 days, and 1 year in patients undergoing one- or two-level lumbar fusions.

Investigation of Orthopaedic Surgery Resident Education Regarding the Management of Unintentional Durotomies

Austin Carroll, MD

Medstar Georgetown University Hospital

Purpose: To investigate orthopedic resident experience with the management of unintentional durotomies during residency training.

Significance: Unintentional dural tears are estimated to occur in 2-5% of all spine surgeries and in 20% or more of patients with spinal trauma

Methods: This was an anonymous eight question survey sent to all accredited orthopaedic residency programs regarding their intraoperative and post-operative experience with managing unintentional durotomies.

Results: 219 residents responded to the survey with 43.4% being senior residents. 28.3% reported feeling comfortable with intra-operative management of unintentional durotomies. Regarding primary suture repair, 2.7% stated they have completed the procedure as lead surgeon with 62.6% having assisted an attending with the process. 34.7% reported having never seen a primary dura suture repair. Regarding fibrin glue or muscle patch, 7.3% reported performing the procedure as lead surgeon, with 47.9% having partially completed or assisted an attending with the procedure. 44.7% reported having never seen a patch repair. Of the 219, 52.5% reported feeling comfortable with post-operative management of unintentional dural tears. 50.2% stated they do not feel comfortable managing lumbar drains. 58.9% felt they would benefit from additional experience during training.

Conclusion: A minority of residents reported confidence managing unintentional dural tears. The majority reported they would benefit from additional experience.

A New Morphologic Classification of Proximal Junctional Kyphosis Following Lower Thoracic to Pelvis Fusion in Adult Spinal Deformity Predicts Revision Surgery and Neurologic Complications

Micheal Raad, MD
Johns Hopkins Medicine

Purpose: To investigate a new classification system for PJK.

Significance: PJK is one of the most common complications after surgery for adult spinal deformity (ASD).

Methods: PJK was defined as 10° angle change of the upper instrumented vertebra (UIV) to UIV+2 from preoperative radiographs. A new system was used to classify patients into 1A (equivalent distribution of kyphosis through segments), 1B (>2/3 of kyphosis comes from one segment), 2A (fracture and loss of >20% of anterior body height at the UIV) and 2B (fracture and loss of >20% of anterior body height at the UIV+1).

Results: A total of 69 patients who underwent T9-L1 fusion to pelvis were analyzed. PJK occurred in 52.2% of patients, with 15.9% requiring revision for PJK. Average time to develop PJK was 17 months. The most common PJK type was 1A (38.9%). Neurologic deficits were highest in the 2B group (71.4%) ($p=0.001$). Revision for PJK was highest in the 2B group (71.4%) ($p<0.01$). Type 2A PJK occurred 100% of the time within 90 days of surgery ($p=0.02$). The highest PJK progression occurred in Type 2B (17.4°) ($p=0.003$).

Conclusion: The proposed PJK classification system is associated with revision risk, neurologic deficits, and timing of PJK development.

Use of Deep Learning for Automation of Vertebral Classification and Labeling in Intraoperative Spinal Imaging

Rachel S. Bronheim, MD

Johns Hopkins Medicine

Purpose: To evaluate the accuracy of a deep learning model in classification and labeling of spinal vertebrae on intraoperative images.

Significance: Accurate spinal level identification is a critical component of spine surgery, as it helps prevent “wrong-level” procedures. Convolutional neural networks (CNN) are deep learning models designed to automatically recognize and extract features from images. A CNN- based algorithm was developed for vertebral labeling on intraoperative images, but has never been validated in the clinical context.

Methods: 56 Long-Film images were acquired from 48 patients undergoing spine surgery at an academic tertiary care center. A custom CNN was used to detect and label vertebrae. Generated labels were deemed accurate if they were within 5 mm of the manual labels. Detection was defined as whether the model placed a label within 5 mm of the manual annotation. Region identification was defined as correctly identifying the label as cervical, thoracic, lumbar, or sacral. Level identification was defined as correctly classifying the vertebral level.

Results: The model had a detection accuracy of ≥ 94.7 , a region identification accuracy of $\geq 93.1\%$, and a level identification accuracy of $\geq 86.4\%$. The average sensitivity and positive predictive value across all patients and levels was greater than 94.5%, and 97.6% on the AP images, and greater than 95.7% and 97.5% on the lateral images, respectively.

Conclusion: This is the first study to demonstrate that a deep learning algorithm can accurately automate vertebral labelling on intra-operative Long-Film images. The potential clinical value of this algorithm lies in its ability to verify spinal levels in the intraoperative context; this may be used to prevent wrong level surgery, or to ensure accurate landmark registration for navigation or robotic technology.

Comparison of Sarcopenia with Frailty and Area Deprivation Index for Predicting Postoperative Mortality and Complications In Thoracolumbar Trauma

Alexander Ruditsky, MD
University of Maryland Medical Center

Purpose: To compare sarcopenia to frailty and socioeconomic deprivation as predictors of mortality and complications after thoracolumbar spine trauma.

Significance: Sarcopenia is a progressive musculoskeletal disorder characterized by decreased muscle mass and function. Recently, it has gained recognition as an important surgical risk factor, but its role in thoracolumbar trauma is not known.

Methods: Adults undergoing surgery for thoracolumbar spine injuries were identified. Sarcopenia was measured using the L3 total psoas area over vertebral body area (TPA/VBA) index via computed tomography (CT). Area deprivation index (ADI) was determined. Frailty was measured using the modified 5-factor frailty index (mFI-5). Statistical analysis consisted of univariate logistic regression, determination of Spearman's correlation coefficient (rs), and multivariable logistic regression analysis.

Results: A total of 276 patients were included. 22 (7.7%) mortalities occurred, with 18 (6.3%) within 90-days postoperatively. On univariate analysis, only mFI-5 was associated with overall mortality (OR=2.29, P<0.001). However, Spearman's correlation and multivariate analysis demonstrated that none of sarcopenia, ADI, or mFI-5 were significantly associated with mortality, complications, or revision.

Conclusion: Frailty is a better predictor of mortality in thoracolumbar trauma when compared to sarcopenia and ADI. However, none are strong predictors and the reasons for mortality in this population are multifactorial.

Your iPhone Knows How You Will Recover from Your Fracture

Brian Shear, MD

University of Maryland Medical Center

Purpose: High-fidelity gait sensors in mobile phones continuously measure mobility, regardless of user setup, providing an expansive pre- and post-injury gait history. We assessed if pre-injury mobility combined with injury data reliably predicted post-fracture mobility.

Significance: These data provide personalized recovery models, augmenting fracture recovery expectations for patients.

Methods: This study enrolled 43 adult patients 6 months after surgery for a lower extremity fracture. Consenting patients securely exported their iPhone mobility metrics, including step count, walking speed, step length, walking asymmetry, and double support time. We integrated the mobility measures with demographic and injury data. Using mixed effects nonlinear modeling, we assessed whether pre-injury mobility metrics combined with injury and baseline data predicted post-fracture mobility.

Results: We fit post-fracture trajectory curves, demonstrating reliable mobility projections 6 months post-fracture ($p < 0.001$). Greater pre-injury mobility was associated with improved post-fracture function (1718 steps per day, $p < 0.001$). Tibia (-1270 steps per day, $p = 0.01$) and pelvic fractures (-1711 steps per day, $p = 0.03$) were associated with more mobility impairment than femur fractures.

Conclusions: The findings highlight the value of high-fidelity pre-injury mobility data in predicting recovery for each patient. Personalized recovery projections could support surgeons in establishing post-fracture expectations and modifying clinical care based on deviations from those projections.

Effects of Obesity in Patient-Reported Outcomes After Hip Arthroscopy

Gregory Perraut, MD

MedStar Georgetown University Hospital

Introduction: While considerable research has investigated the association between obesity and patient-reported outcomes (PROs) in hip arthroscopy, no studies have explored the categorization of obesity severity and its consequent impact on outcomes.

Methods: The Surgical Outcomes System registry was utilized to identify patients who underwent unilateral hip arthroscopy and completed one of the following PROs: the Harris Hip Score (HHS), Visual Analog Pain Scale (VAS), or Veterans RAND 12 (VR-12). The final cohort was comprised of 349 surgeries. Patients were categorized into non-obese (BMI < 30) and obese (BMI ≥ 30). The obese cohort was divided into BMIs between 30-40, and BMIs ≥ 40.

Results: Non-obese patients demonstrated significant improvements across all 4 PROs at every time point. While obese patients overall demonstrated significance, it was found that such improvements were only statistically significant in the 30-40 cohort. At all time periods in which the ≥ 40 cohort was able to be assessed, PRO scores were significantly different between the 3 cohorts.

Conclusions: Outcomes for obese patients were contingent on the distinction between class I/II obesity (BMI 30-40) and class III obesity (BMI ≥ 40). This emphasizes the importance of distinguishing between levels of obesity in assessing hip arthroscopy outcomes.

Effect of Axillary Nerve Block on Postoperative Emergency Department Visits Following Fixation of Distal Radius Fractures: A Matched Analysis of 23,950 Patients

Patrick Burroughs, MD
Medstar Georgetown University Hospital

Purpose: We hypothesize that axillary nerve blocks reduce postoperative emergency department visits following operative fixation of distal radius fractures.

Significance: Distal radius fractures are prevalent in the United States, and 16% require open reduction and internal fixation. Axillary blocks are used for analgesia for distal radius surgery. The effect of axillary nerve blocks on postoperative ED visits is unknown.

Methods: The PearlDiver Mariner administrative database identified patients who underwent open treatment of distal radius fractures and axillary nerve blocks using CPT codes. Patients with and without a block were matched by age, gender, and Elixhauser Comorbidity Index, and the incidence of ED visits were recorded postoperatively.

Results: Among 23,950 matched patients who underwent ORIF of a distal radius fracture there was no significant difference in ED visits between cohorts (299 ED visits vs. 277 ED visits, $p = 0.3758$). The total cost of care related to the ED visits among patients with an axillary block was \$10,065.81 per patient, and \$7,865.59 for those without an axillary block.

Conclusion: In a nationally-representative, matched cohort of 23,950 distal radius fractures with and without an axillary nerve block, there was no difference in ED visits in the seven days following surgery.

Minimally Displaced Lateral Humeral Condyle Fractures: Optimizing Follow-up and Minimizing Cost

Denver Burton Kraft, MD
Medstar Georgetown University Hospital

Purpose: The purpose of this study was to evaluate nonoperatively treated lateral humeral condyle(LHC) fractures, determine the risk of subsequent displacement, analyze practice variability, develop an evidence-based protocol, and evaluate potential savings.

Significance: Minimally displaced LHC fractures may be treated nonoperatively in a long arm cast, but there is not a standardized evidence-based protocol.

Methods: We retrospectively reviewed all patients with LHC fractures treated nonoperatively at our institution from 2009-2015. We calculated the number of visits, casts, and radiographs and analyzed practice variation. The number of children with subsequent displacement needing operative fixation was determined. We also looked at the average duration for each follow-up visit and the charges/costs associated with casting and radiographs.

Results: There were 271 children with LHC fractures treated nonoperatively. In 4 weeks, the average number of visits was 2.6(range: 1-5), casts was 2.4(range: 1-4), and radiographs was 9.4(range: 2-31). Three patients required operative intervention.

Conclusion: Displacement in appropriately selected LHC fractures treated nonoperatively was rare (1.2%), and the data questioned the need for multiple visits and radiographs in the first 4 weeks. Optimal follow-up (follow-up 10-15 days after injury and 4-6 weeks) would be safe, minimize waste, and result in better value-based care.

Trending Shoulder Motion and Functional Outcomes After Open Latarjet

Kyle Zittel, MD

MedStar Georgetown University Hospital

Purpose: This study aims to analyze the interval time for postoperative pain resolution and achieving clinically significant improvements in range of motion (ROM) after open Latarjet surgery.

Significance: Insights into the postoperative recovery trajectory can aid clinicians in setting realistic expectations for their patients regarding pain management and functional rehabilitation.

Methods: A comprehensive assessment was conducted on 21 patients who underwent open Latarjet procedure. Clinical parameters, such as shoulder stability, apprehension, ROM, and Visual Analog Scale (VAS) pain levels, were recorded at regular intervals. A postoperative patient survey was administered, focusing on patient-reported outcomes and impact on daily activities.

Results: ROM significantly decreased post-surgery but gradually recovered. Flexion returned to preoperative levels by 3 months, internal rotation by 4.5 months, and external rotation by 6 months. VAS pain levels significantly reduced by 6 weeks, reaching 0 by 4.5 months. 95% of patients returned to work or sports, with an average time of 5 months.

Conclusion: The study adds to existing literature, highlighting that open Latarjet procedures lead to early and sustained improvements in shoulder stability, pain relief, and ROM. It provides valuable insights into short-term recovery after open Latarjet, guiding clinicians in optimizing patient care during the postoperative period.

Factors Associated with Met Expectations and Satisfaction After Hip Arthroscopy

Alexandra Baker Lutz, MD
University of Maryland Medical Center

Purpose: To identify the factors associated with patients' met expectations and satisfaction two years after hip arthroscopy.

Significance: Satisfaction rates after hip arthroscopy are variable, and the underlying determining factors are not well understood.

Methodology: A cohort of patients aged than 12 years undergoing hip arthroscopy at a single center from 2016-2021 were reviewed. Met expectations and satisfaction were measured at two years using the Musculoskeletal Outcomes Data Evaluation and Management System (MODEMS) expectations domain and Surgical Satisfaction Questionnaire (SSQ-8), respectively. Bivariate analysis using a Wilcoxon Rank-Sum test and Spearman's coefficient (r) was used to identify associated factors.

Results: The median (IQR) MODEMS score was 75 (55-95) and SSQ-8 score was 75 (66-97). MODEMS and SSQ-8 were strongly correlated ($r=.81$, $p<.001$). Among baseline factors, only a history of back pain was associated with lower SSQ-8 scores (65.0 vs 79.1, $p=.04$). Postoperative PROMIS scores, activity levels, and pain were correlated with MODEMS and SSQ-8 scores. The strongest correlations were with PROMIS Physical Function (MODEMS $r=.75$, SSQ-8 $r=.66$, $p<.001$) and PROMIS Pain Interference (MODEMS $r=-.75$, SSQ-8 $r=-.61$, $p<.001$).

Conclusion: Postoperative measures, especially function and pain, are more strongly associated with met expectations and satisfaction after hip arthroscopy than preoperative status.

Can Hip and Knee Arthroplasty Surgeons Help Address The Osteoporosis Epidemic?

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Purposes: (1) What proportion of patients who underwent THA or TKA met criteria for osteoporosis screening? (2) What proportion of these patients received a dual-energy x-ray absorptiometry (DEXA) study before arthroplasty? (3) What was the 5-year cumulative incidence of fragility fracture or periprosthetic fracture after arthroplasty of those at high-risk when compared to those at low-risk for osteoporosis?

Significance: As more than 50% of patients undergoing elective TJA should be screened for osteoporosis but less than 20% of these patients are screened, surgeon-initiated screening would have a high national impact.

Methods: In total, 710,097 and 1,353,218 patients who underwent THA and TKA, respectively, were captured in the PearlDiver database and included for analysis. Patients at high-risk for osteoporosis were filtered using demographic and comorbidity information as defined by national guidelines. The proportion of patients at high-risk for osteoporosis who underwent osteoporosis screening via DEXA scan within 3 years was observed and the 5-year cumulative incidence of periprosthetic fractures and fragility fracture was compared between the high-risk and low-risk cohorts.

Results: In total, 201,450 and 439,982 of patients who underwent THA and TKA, respectively, were considered at high-risk for osteoporosis. Of these patients, 12% (28,898) and 13% (57,022) of patients who underwent THA and TKA, respectively, received a preoperative DEXA scan. Within 5-years, patients at high-risk for osteoporosis undergoing THA and TKA had a higher cumulative incidence for fragility fractures (THA:HR2.1,95%CI:1.9-2.2; TKA:HR1.8,95%CI:1.7-1.9) and periprosthetic fractures (THA:HR1.7,95%CI:1.5-1.8; TKA:HR 1.6,95%CI:1.4-1.7) compared to those at low-risk.

Lower Opioid Prescription Quantity Does Not Negatively Impact Pain Control or Patient Satisfaction Following ACL Reconstruction: A Randomized, Prospective Trial

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Purpose: The purpose of this study is to evaluate the effects of different quantities of prescribed opioid tablets on patient opioid utilization, postoperative pain, and satisfaction following anterior cruciate ligament reconstruction (ACLR).

Significance: There is no consensus for optimal opioid prescriptions following ACLR and excess prescriptions are a risk factor for diversion and misuse.

Methods: This was a prospective, RCT enrolling patients undergoing ACLR. Patients were assigned to one of 3 prescription groups: 15, 25, or 35 tablets containing oxycodone-5mg. Patients completed VAS pain and medication logs, opioid satisfaction surveys, and IKDC questionnaires postoperatively.

Results: Of 180 included patients, there was no significant difference in VAS pain or IKDC scores, opioid pills or MME consumed, or patient satisfaction regarding pain control ($p>0.05$) between treatment groups. 72% of opioids were consumed in the first 3 days postoperatively. 79% of patients in the 15-tablet cohort felt that they received an appropriate prescription.

Conclusion: Prescription of 15 opioid tablets results in equivalent pain control, patient satisfaction, and functional outcomes to that of 25 and 35-tablet prescriptions after ACLR. Lower prescription quantities of opioids may provide equivalent postoperative pain and help minimize the number of unused opioids at risk for possible diversion after ACLR.

Analysis of the Soft Tissue Retraction Pressures in Total Ankle Arthroplasty – An In-Vitro Human Cadaveric Model

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Purpose: In a cadaveric model of the anterior approach to the ankle for total ankle arthroplasty, we hypothesize that Gelpi retractors will generate highest contact pressures due to point loading and larger incisions will reduce contact pressures.

Significance: Total ankle arthroplasty has a notable wound healing complication rate of up to 14.7%. Retraction intraoperatively leads to transient ischemia of soft tissues and may contribute to wound complications. Optimizing retraction technique may decrease complications.

Methods: In twelve frozen cadaveric lower extremities, dissections were performed at 12, 15 and 20cm. Contact pressures were measured between retractors (Gelpi, Army-Navy long and short arms, and Weitlaner) at different lengths using TekScan sensors with data recorded every 30-seconds at 10Hz. Repeated measures ANOVA were run in SPSS (significance $\alpha \leq 0.05$).

Results: Gelpis exerted the greatest pressures except at 20cm. Contact pressures diminished as incision lengths increased for all retractors except Weitlaners. The Army-Navy long-arm demonstrated significantly lower pressures compared to other retractors at 15cm incisions ($p \leq 0.05$). At 12cm, differences were not statistically significant.

Conclusion: Larger incisions and the selective use of Army-Navy long-arm retractors may lower contact pressures on soft tissues. Further studies are recommended to explore whether longer incisions and hand-held over self-retaining retractors may improve wound healing clinically.

“I Can See the Light” Cataract Surgery Decreases Risk of Orthopaedic Trauma

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Purpose: This study explores the link between cataract surgery and orthopedic trauma, assessing the potential of vision restoration in reducing fracture risk.

Significance: Current orthopaedic literature on the topic is limited. Past studies have yet to look all types of fragility fractures in patients with Cataracts.

Methods: Using the TriNetX database, cataract surgery patients were identified alongside a non-surgical control group with age-related cataracts. After propensity score matching (PSM), the study evaluated one-year and lifetime fracture risks for hip, vertebral body, distal radius, and proximal humerus fractures. Analyses were conducted using TriNetX's statistical tools.

Results: Before PSM, 835,230 patients diagnosed with age-related cataracts and 234,124 patients with age-related cataracts who underwent surgical correction were identified. The cataract surgery group had an average age of 67.8 ± 12.7 years, while the control group averaged 66.2 ± 10.7 years. After PSM, both groups comprised 221,923 patients. Subsequent analysis revealed a significant reduction in assessed fracture types within the surgical cohort. Compared to non-surgically managed patients, those who underwent cataract surgery had lower rates of hip fractures (RR:0.889, CI:0.835-0.947, $p < 0.05$), vertebral body fractures (RR:0.909, CI:0.868-0.952, $p < 0.05$), proximal humerus fractures (RR:0.908, CI:0.839-0.982, $p < 0.001$), and distal radius fractures (RR:0.854, CI:0.795-0.917, $p < 0.001$).

Conclusions: These findings underscore the impact of cataract surgery in reducing the occurrence of fragility fractures among patients with age-related cataracts.

Evaluating the Safety and Efficacy of Same Day Discharges for Total Joint Arthroplasty in a Veterans Affairs Hospital

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Introduction: The Veterans Affairs health system is a large provider of total joint arthroplasty in the United States healthcare system. With the aging population and general national trends there has been a considerable uptrend of both hip and knee arthroplasty. This increase has had a direct impact on the healthcare dollars spent nationally. Length of inpatient hospitalization has been directly correlated with increasing healthcare cost. Same day outpatient joint arthroplasty protocols have become a major surgical paradigm, but this protocol has never been attempted routinely in the Veterans Affairs Healthcare system. The primary objective of this study is to demonstrate the feasibility of a comprehensive total joint replacement protocol with early discharge, including same day discharge (SDD) outpatient joint arthroplasty, at a Veteran Affairs hospital. Secondary objectives are to show this protocol is not correlated with an increase in post-operative complications, increased readmissions or greatly increased ER visits compared to previous management protocols.

Methods: A retrospective review of patients undergoing primary total joint arthroplasty performed from January 1, 2017 to December 31, 2018 (prior to initiation of joint replacement program) was compared to patients undergoing primary total joint arthroplasty performed from January 1, 2020 to December 31, 2021 (after the initiation of joint replacement program). The two cohorts were subdivided further into total knee and total hip arthroplasties completed under the control protocol or the comprehensive joint program protocol. Patients' demographics, medical comorbidities, discharge disposition, surgery information (side, surgeon, length of surgery) and 30 and 90-day post-operative complications were collected. Differences between length of stay (LOS), surgical time (from incision to "end of case"), 30-day complication rates, 90-day complication rates, discharge disposition, surgical site infections (SSI) and emergency room (ER) visits were assessed with paired T-tests.

Results: 203 cases (101 TKA, 3 UKA, 99 THA) control cases were compared to 267 cases (165 TKA, 7 UKA, 95 THA) in the comprehensive program group. There were no significant differences between the two cohorts in respect to age, gender or medical comorbidities. The mean LOS reduced from 4.38 in the control cohort to 0.75 days in the comprehensive program cohort ($p < 0.001$), with 890 total inpatient days in the control group compared to just 200 total inpatient days in the comprehensive group. At a reported cost of \$6656/day per VA reports, the program saved over \$4.5 million over 2 years. The comprehensive program successfully discharged 92 patients (34.5%) as a SSD compared to 0 in the control group. In the control group, 47.8% were discharged to rehabilitation centers compared to only 4.5% in the comprehensive program ($p < 0.001$). The 30-day complication rate was 10.3% in the control group ($p = 0.028$) compared to 5.6% in the comprehensive program group. ER visits did not significantly change (8.9% control vs. 9.3% in comprehensive group). Operative time for TKAs was reduced from 162.5 minutes in the control to 86 minutes in the comprehensive group ($p < 0.001$). Operative time for THAs was reduced from 143 minutes in the control to 103 minutes in the comprehensive group ($p < 0.001$). Between the two surgeries, 16,582.5 minutes of operative time was saved over 2 years, and when assuming an average cost of \$31/minute in operating room time, resulted in cost savings of approximately \$514,000.

Conclusion: Overall, LOS and complication rates were reduced in the comprehensive arthroplasty group, exemplifying the viability of such a protocol in the Veteran Affairs healthcare system. In addition, we demonstrate here there are no increased risks accompanied with early discharge to home, including same day discharge outpatient arthroplasty treatment programs. With the concentration on reducing the expenditure of healthcare dollars, this treatment model can be applied to Veteran Affairs hospitals nationally to efficiently utilize funds.

Predicting Blood Transfusion in Primary Total Knee Arthroplasty: An Externally Validated Model for Clinical Use

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Purpose: The aim of this study was to create an externally validated predictive model of allogeneic transfusion risk after Total Knee Arthroplasty (TKA).

Significance: Preoperative identification patients at high-risk for blood transfusion after TKA allows for optimization of modifiable risk factors prior to this elective surgery.

Methods: The initial model was built using National Surgical Quality Improvement Program (NSQIP) data in 318,634 patients. Least absolute shrinkage and selection operator (LASSO) regression was used to select the best predictors of perioperative transfusion. 10-fold cross-validation was used to generate the area under the curve (AUC). External validation was performed using the Nationwide Inpatient Sample (NIS).

Results: 0.8% of patients received a perioperative blood transfusion. Final AUC was 0.80 (95% CI: 0.79-0.82). When externally validated, the AUC was 0.70 (95% CI 0.69-0.70). The top 5 factors were anemia (coef: 2.4), congestive heart failure (CHF) (coef: 1.1), bleeding disorder (coef: 1.0), gender (coef: 0.8), and steroid use (coef: 0.5). This model can be utilized at <https://bit.ly/42ay2VI>.

Conclusion: Our model can predict the need for blood transfusion after primary TKA using preoperative data, with validation using nationally representative sample. Anemia, CHF, diagnosed bleeding disorder, gender and preoperative steroid use were the top five factors associated with requiring a blood transfusion.

Relationship Dynamics During Surgical Residency: A Study on Match Choices, Strain and Support Systems

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Purpose: This study explores the dynamics of relationships during surgical residency a challenging and demanding phase of training

Significance: Existing studies' focus on burnout and work-life balance, leaving a critical gap in understanding relationship dynamics, and the strain of personal support systems during residency.

Methods: The study implemented an IRB approved cross-sectional survey at Johns Hopkins Hospital. The survey was distributed to all surgeons, including residents, fellows, and attending physicians, across all surgical subspecialties.

Results: There were 111 responses, with 48% male and 52% female, primarily aged 25-34 (55%). Notably, 69% were married, with 52% having partners in the medical field. Among medical couples, 81% reported fortified relationships through shared understanding, while 79% acknowledged complexities in work-life balance. Unlike the general population, financial concerns were not a significant strain. Overall, 77% postponed major life events, and 64% endured relationship strain due to extended working hours. Conversely, single surgeons (11%) reported dating life disruptions, however 40% found being single decreased stress.

Conclusion: The study underscores the profound impact of surgical residency on personal relationships. The findings contribute to a deeper understanding of the residency experience, emphasizing the necessity of considering relationship dynamics in developing policies and support mechanisms for surgical trainees.

Syndesmotic Screw Angle in Lateral Fibular Pre-Contoured Plates Impacts Quality of Syndesmotic Reduction: A Cadaveric Study

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Purpose: To assess the effect of syndesmotic screw angle within lateral fibular pre-contoured plates on the quality of syndesmotic reduction.

Significance: The ideal syndesmotic screw angle is approximately 30° and deviation from this angle risks anteroposterior fibular translation and malreduction.

Methods: Twelve cadaveric legs were CT scanned pre- and post-simulated syndesmosis injury, with the uninjured serving as the controls. Six pairs of legs were split into 3 groups of 4, (20-, 30-, and 40-degree screw angles). 3D-printed custom drill guides determined angle of drilling performed by a fellowship-trained trauma surgeon. Tricortical screws were placed and scanned, then repeated with quad-cortical screws. Syndesmosis reduction was assessed via pre- and post-injury CT scans.

Results: Measurements of post injury CT scan showed significant effect of angle on malreductions: 3 of 8 at 20°, 0 of 8 at 30°, and 6 of 8 at 40°(p=0.009). Syndesmotic screw angle significantly impacted change in anteroposterior fibular translation (20°:0.98 mm, 30°:0.068 mm, 40°:-1.91 mm, p=0.0094).Malreduction did not differ between tri- and quad-cortical screws (p=0.5).

Conclusion: Our study shows evidence that deviation of syndesmotic screw angle within a pre-contoured lateral fibula plate significantly impacts malreduction rates and anteroposterior fibular translation regardless of tri- or quad-cortical fixation.

Evaluation of Peripheral Nerve Perfusion in Tensioned Repairs

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Purpose: The relationship between nerve perfusion and tension after primary nerve repair will be evaluated by correlating perfusion with the size of a nerve defect prior to coaptation. We hypothesize that larger defects will result in decreased perfusion after repair.

Significance: Peripheral nerve repair frequently requires gap management due to large zones of injury. Nerve repairs under tension yield particularly poor outcomes, with experimentally demonstrated decreases in axon regeneration. Future investigations of tension management strategies would benefit from a nuanced understanding of the relationship between tension and perfusion.

Methodology: Thirty Lewis rats underwent bilateral sciatic nerve exposure, with the left sciatic nerve repaired across 0mm, 4mm, or 8mm defects. Laser doppler flowmeter measurements were taken immediately and then at 5, 10, and 30 minutes post-repair. Measurement of the intact right sciatic nerve was performed as a control value.

Results: Tensioned repairs at 4mm and 8mm exhibited significant reductions in perfusion immediately post-repair compared to repairs with no nerve defect ($p=0.020$ and $p<0.001$, respectively). Similar results were seen at all time points.

Conclusion: The data support an inverse relationship between the size of nerve defect and blood flow after repair. This implies that the tension associated with repair across larger defects results in impaired tissue perfusion.

Development of a Patient Specific Cartilage Graft Using Magnetic Resonance Imaging and 3D Printing

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Purpose: The purpose of this project was to develop a patient-specific, anatomically correct cartilage graft using MRI data and 3D printing, and to validate the design process. We hypothesized that an individualized, anatomic 3D printed scaffold designed from MRI data would provide a more optimal fill for large cartilage defects compared to a generic flat scaffold.

Significance: The ideal treatment for large articular defects remains unknown. No anatomically correct scaffolds have been successfully designed, fabricated, and implanted.

Methods: Focal cartilage defects were created in human cadaver knees in the medial femoral condyle (MFC), lateral femoral condyle (LFC), patella, and trochlea. Anatomic and flat grafts were 3D printed and implanted in paired left and right knees. MRIs were obtained to measure graft fit.

Results: Graft step-off was significantly better for the anatomic grafts in the MFC, LFC, patella, and trochlea. Graft contour was significantly better for the anatomic grafts in the LFC and trochlea. The anatomic grafts had a maximum step-off of -0.9 mm and a maximum contour mismatch of 0.8 mm.

Conclusion: This study validated a process designed to fabricate anatomically accurate cartilage grafts using MRI and 3D printing technology. Anatomic grafts demonstrated superior fit compared to generic flat grafts.

Educating Patients on Osteoporosis and Bone Health: Can “ChatGPT” Provide High-Quality Content?

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Purpose: The rise of artificial intelligence (AI) models like ChatGPT offers potential for varied applications, including patient education in healthcare. With gaps in osteoporosis and bone health knowledge and adherence to prevention and treatment, this study aims to evaluate the accuracy of ChatGPT in delivering evidence-based information related to osteoporosis.

Methods: Twenty of the most common frequently asked questions (FAQs) related to osteoporosis were subcategorized into diagnosis, diagnostic method, risk factors, and treatment and prevention. These FAQs were sourced online and inputted into ChatGPT-3.5. Three orthopaedic surgeons and one advanced practice provider who routinely treat patients with fragility fractures independently reviewed the ChatGPT-generated answers, grading them on a scale from 0 (harmful) to 4 (excellent). Mean response accuracy scores were calculated. To compare the variance of the means across the four categories, a one-way analysis of variance (ANOVA) was used.

Results: ChatGPT displayed an overall mean accuracy score of 90%, as graded by the expert reviewers. Specifically, 2 responses (10%) were graded as “excellent”, 9 (45%) scored 3.75, 4 (20%) scored 3.5, and 5 (25%) scored 3.25. No answers were deemed inaccurate or harmful. No significant difference was observed in the means of responses across the defined categories.

Conclusion: ChatGPT-3.5 showcased a high degree of accuracy in addressing osteoporosis-related questions, aligning closely with expert opinions and current literature, with structured and inclusive answers. However, while AI models can enhance patient information accessibility, they should be used as an adjunct rather than a substitute for human expertise and clinical judgment.

Biomechanical Testing of a Hollow Stem Designed to Decrease the Incidence of Bone Cement Implantation Syndrome

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Purpose: This study evaluates the biomechanical strength of a novel hollow hip stem designed to decrease pressurization of cement in the femoral canal by comparing its load-to-failure to that of a traditional stem

Significance: Bone Cement Implantation Syndrome (BCIS) is a well-described phenomenon and potential sequela of securing orthopaedic prosthetic hip stems, particularly in oncology patients. Traditional stems are solid, acting like a “plunger” within the intramedullary canal, creating high pressures which may lead to BCIS.

Methods: Five solid and five hollow implants were designed and printed in stainless steel using a computer aided design (CAD) program. The implants were cemented into 5 matched pairs of femora with an average age of 68.2 years. Each specimen was potted and loaded to failure.

Results: For all specimens, failure mode was bone fracture rather than implant failure. The mean peak torque to failure was 140.6 Nm in the hollow group and 128 Nm in the solid group (P = 0.62, paired t-tests).

Conclusion: This study demonstrates that there was no detectable significant difference in the load-to-failure between both the implanted hollow and solid stems groups. This suggests a hollow stem may be utilized to decrease BCIS without compromising fixation.

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