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OREF SOUTHEAST REGION
RESIDENT RESEARCH SYMPOSIUM
Friday, October 4, 2024

University of South Florida/Florida Orthopedic Institute
Resident Research Symposium
Five Labs
4115 West Spruce Street
Tampa, Florida

Host:
Roy Sanders, MD
Chair, Department of Orthopaedic Surgery
University of South Florida/Florida Orthopedic Institute

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About OREF:
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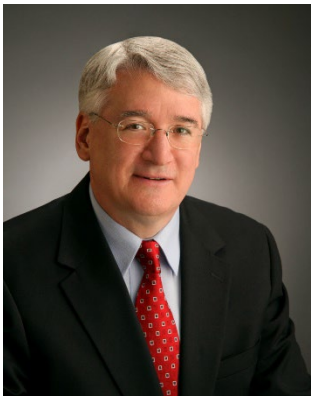
OREF SOUTHEAST REGION RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA
Friday, October 4, 2024

7:00 a.m. – 8:00 a.m.	**Registration and Breakfast**
8:00 a.m. – 8:05 a.m.	**Welcome and Introductions** Roy Sanders, MD Chair Department of Orthopaedic Surgery University of South Florida/Florida Orthopedic Institute
8:05 a.m. – 8:10 a.m.	**OREF Welcome** Lee Grossman, MBA, ML, CAE Chief Executive Officer Orthopaedic Research and Education Foundation
8:10 a.m. – 8:44 a.m.	**Session I – Resident Research Presentations & Discussion** **Arthroplasty**
8:44 a.m. – 9:18 a.m.	**Session II – Resident Research Presentations & Discussion** **Hand and Upper Extremity**
	Break – Please submit your scores from Sessions I and II to OREF Staff
9:28 a.m. – 10:02 a.m.	**Session III – Resident Research Presentations & Discussion** **Sports/Spine**
10:02 a.m.– 10:42 a.m.	**Session IV – Resident Research Presentations and Discussion** **Trauma**
	Break – Please submit your scores from Sessions III and IV to OREF Staff
10:42 a.m.-10:47 a.m.	**Keynote Speaker Introduction**
10:47 a.m.-11:30 a.m.	**Keynote Address** **Demystifying Tribocorrosion: Concepts and Clinical Ramifications** Joshua J. Jacobs, MD Grainger Director, Rush Arthritis and Orthopaedics Institute Professor of Orthopaedic Surgery Director, Institute for Translational Medicine Rush University Medical Center
11:30 a.m.-11:45 a.m.	**Awards Presentation and Closing Remarks** *Thank you to all sponsors!* *Closing of program to OREF TV audience*
Noon – 1:00 p.m.	**Lunch Reception**

KEYNOTE SPEAKER



Joshua J. Jacobs, MD

Grainger Director, Rush Arthritis and Orthopaedics Institute
Professor of Orthopaedic Surgery
Director, Institute for Translational Medicine
Rush University Medical Center

Joshua J. Jacobs, MD received a Bachelor of Science degree in Materials Science and Engineering from Northwestern University and graduated from the University of Illinois Medical School. Dr. Jacobs completed his residency training at the Combined Harvard Orthopaedic Residency Program followed by a fellowship in Adult Reconstructive Orthopaedic Surgery at Rush University Medical Center under the direction of Dr. Jorge Galante. Dr. Jacobs remained at Rush since his fellowship training and served as the William A. Hark, M.D./Susanne G. Swift Professor and Chair of the Department of Orthopaedic Surgery for 16 years until he recently stepped down to become the Director of the Rush Arthritis and Orthopaedics Institute.

Dr. Jacobs has published over 300 peer-reviewed manuscripts, most of which focus on the biological consequences of material degradation from joint replacement implants. He is a Multiple Principal Investigator on two large NIH awards including the University of Chicago/Rush University Clinical and Translational Science Award from NCATS and the Acute to Chronic Pain Signature (A2CPS) consortium of the NIH Common Fund's Helping End Addiction Long-term (HEAL) initiative. Dr. Jacobs has received several awards for his research and leadership including a Career Development Award from the OREF, the Otto Aufranc Award from The Hip Society, the Ann Doner Vaughan Kappa Delta Award from the AAOS, the Mark Coventry Award from the Knee Society, the ORS/OREF Distinguished Investigator Award, the William W. Tipton, Jr. MD, Leadership Award from the AAOS and the Nicolas Andry Lifetime Achievement Award from the Association of Bone and Joint Surgeons.

Dr. Jacobs has served in leadership positions in several professional organizations related to orthopaedic surgery. He is a Past President of the AAOS, ORS, the United States Bone and Joint Decade, and The Hip Society. Dr. Jacobs currently serves as a Director of the American Board of Orthopaedic Surgery, the President of the Board of Trustees of the OREF and the Immediate Past-Chairman of Board of Trustees of the Journal of Bone and Joint Surgery.

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Judges

Thomas L. Bernasek, MD
Florida Orthopaedic Institute

Odion Binitie, MD
Moffit Cancer Center

Caroline Chebli, MD
USF and James A Haley Medical Center

Joshua J. Jacobs, MD
Rush University Medical Center

Trey Remaley, DO
University of South Florida

OREF Southeast Region Resident Research Symposium
DETAILED AGENDA
Friday, October 4, 2024

8:00 a.m. – 8:05 a.m.	**Welcome and Introductions** Roy Sanders, MD Chair Department of Orthopaedic Surgery University of South Florida/Florida Orthopedic Institute
8:05 a.m. – 8:10 a.m.	**OREF Welcome** Lee Grossman, MBA, ML, CAE Chief Executive Officer Orthopaedic Research and Education Foundation
	Session I – Resident Research Presentations & Discussion **Arthroplasty**
8:10 a.m. – 8:16 a.m.	*Conventional versus Robotic-Arm Assisted Medial Uni-compartmental Knee Arthroplasty: A-20-Year Analysis of Radiographic and Clinical Outcomes* John T. Wilson, MD, University of South Florida/Florida Orthopedic Institute
8:16 a.m. – 8:22 a.m.	*Approach to Press-Fit Hemiarthroplasty for Fracture Has No Impact on Fracture Risk and Dislocation Rates* Meghan McCaskey, MD, University of South Florida/Florida Orthopedic Institute
8:22 a.m. – 8:28 a.m.	*Uncemented Tibial Components Placed in Greater or Less than 3 Degrees of Varus: A Case Series* Kyle Deivert, MD – University of Mississippi Medical Center
8:28 a.m. – 8:34 a.m.	*Knee Dislocations after Total Knee Arthroplasty in Obese Patients: A Presentation of Three Patients* Carver Montgomery, MD – University of Mississippi Medical Center
8:34 a.m. – 8:44 a.m.	**Question and Answer**
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8:44 a.m. – 8:50 a.m.	*Impact of Socioeconomic Factors in Outpatient Peripheral Nerve Reconstruction* Blaire McCarthy, MD – Vanderbilt University Medical Center
8:50 a.m. – 8:56 a.m.	*Incision or Excision? What to do with the A1 Pulley for Trigger Finger: Results of a Multi-Surgeon Randomized Controlled Trial* Zaamin Hussain, MD – Emory University
8:56 a.m. – 9:02 a.m.	*Stone-Hinge: A Case Report of Primary Tumoral Calcinosis in a Pediatric Elbow* Ahsia Clayton, MD – University of Mississippi Medical Center
9:02 a.m. – 9:08 a.m.	*Clinical Outcomes of Operative Management for Radial Tunnel Syndrome According to Surgical Approach: A Systematic Review* Brittany Raymond, MD – University of Florida

OREF Southeast Region Resident Research Symposium
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9:08 a.m. – 9:18 a.m.	**Question and Answer**
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9:34 a.m. – 9:40 a.m.	*Repair Technique and Fellowship Training Background Predict Major and Minor Complications after Achilles Tendon Repair* Benjamin Averkamp, MD – Carolinas Medical Center/OrthoCarolina
9:40 a.m. – 9:46 a.m.	*Comparison of Recent Trends in Medicare Utilization and Reimbursement for Cervical Spine Discectomy and Fusion Procedures Versus Cervical Disc Arthroplasty* Bradley Alexander, MD – University of Mississippi Medical Center
9:46 a.m. – 9:52 a.m.	*Diagnostic and Predictive Performance of Artificial Intelligence in Diagnosing Patellofemoral Osteoarthritis, Trochlear Dysplasia and Patellofemoral Tracking* John Twomey-Kozak, MD – Duke University
9:52 a.m. – 10:02 a.m.	**Question and Answer**
	Session IV – Resident Research Presentations & Discussion **Trauma**
10:02 a.m. – 10:08 a.m.	*Long vs Short: A Multi-center Study of Peri-Implant Femur Fractures* Aleksander Mika, MD – Vanderbilt University Medical Center
10:08 a.m. – 10:14 a.m.	*Psychiatric and Behavioral Health Comorbidities as Modifiable Risk Factors for Orthopaedic Trauma* Reece Vesperman, MD – Vanderbilt University Medical Center
10:14 a.m. – 10:20 a.m.	*An Anterior Approach to Posterior Wall for Pipkin IV Fractures* David Patch, MD – University of Alabama at Birmingham
10:20 a.m. – 10:26 a.m.	*Implant Selection in Distal Femur Fractures: An Analysis of Alignment and Outcomes* Aseel Dib, MD – Carolinas Medical Center/OrthoCarolina
10:26 a.m. – 10:32 a.m.	*Rate of Fibular Nonunion in Patients with Tibial Shaft Fractures* Andrew Day, MD – University of Mississippi Medical Center
10:32 a.m. – 10:42 a.m.	**Question and Answer**
	Break

OREF Southeast Region Resident Research Symposium
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10:42 a.m. – 10:47 a.m.	**Introduction of Keynote Speaker**
10:47 a.m. – 11:30 a.m.	**Keynote Address** **Demystifying Tribocorrosion: Concepts and Clinical Ramifications** Joshua J. Jacobs, MD Grainger Director, Rush Arthritis and Orthopaedics Institute Professor of Orthopaedic Surgery Director, Institute for Translational Medicine Rush University Medical Center
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Conventional versus Robotic-Arm Assisted Medial Uni-compartmental Knee Arthroplasty: A 20-Year Analysis of Radiographic and Clinical Outcomes

John T. Wilson, MD
University of South Florida/Florida Orthopedic Institute

Purpose: This project hypothesizes that failure rates and functional outcomes following robotic UKA versus conventional UKA will be equivalent.

Significance: Unicompartmental knee arthroplasty (UKA) is a treatment option for knee osteoarthritis, representing 5-8% of all knee replacements in 2022 (1). However, there have been disadvantages reported following UKA, namely, reduced long-term survivorship of UKA compared to TKA (4). UKA can be performed robotically or with conventional instruments.

Methodology: This retrospective analysis compared the revision rate between conventional versus robotic assisted UKA. Secondary outcomes included radiographic parameters and outcome measurements.

Results: 719 patients were included in this study. 421 patients underwent a rUKA and 298 were in the cUKA group. We found a significant revision rate difference between cUKA and rUKA. We observed 27 revisions (9.06%) in the cUKA group and 15 revisions (3.56%) in the rUKA group. This paper also demonstrated signicant differences in outcome scores and two radiographic parameters.

Conclusion: It is crucial to determine the most effective way to perform UKA to maximize patient outcomes. While UKA has significant benefits and pitfalls (1-6), evidence supports a lower revision rate in the rUKA (12,13). There was an increased revision rate of 254% in the cUKA population compared to the rUKA population in this study.

Approach to Press-Fit Hemiarthroplasty for Fracture Has No Impact on Fracture Risk and Dislocation Rates

Meghan McCaskey, MD
University of South Florida/Florida Orthopedic Institute

Introduction: Many studies have reported the risks associated with various approaches and implant choice in hemiarthroplasty for fracture. Our goal is to report on the rates of subsidence, intra-operative fracture, periprosthetic fracture and dislocation rates for femoral neck fractures treated with press-fit hemiarthroplasty from anterolateral, direct lateral, or posterior approaches.

Design: Retrospective cohort study

Results: There were 145 patients included. Post-hoc power analysis demonstrates adequate power at 0.9. Twenty-one patients had an anterolateral approach, 22 had a direct lateral, and 102 had a posterior. There were 0 reports of subsidence in the anterior group compared to 2 and 4 in the direct lateral and posterior groups (p=0.33). Zero reports of intra-operative fracture in the anterior approach group compared to 2 and 5 in the direct lateral and posterior groups (p=0.40). One patient in the anterior group, 3 patients in the direct lateral group, and 7 patients in the posterior group reported periprosthetic fractures (p=0.51). No dislocations were reported for the anterior group, whereas 1 patient in the direct lateral and 4 in the posterior group experienced posterior dislocations (p=0.65).

Conclusion: Our data suggests that approach has no impact on subsidence, intra-operative fracture, periprosthetic fracture or dislocation rates for press-fit hemiarthroplasty.

Uncemented Tibial Components Placed in Greater or Less than 3 Degrees of Varus: A Case Series

Kyle Deivert, MD
University of Mississippi Medical Center

Purpose: This study examines the outcomes of TKA utilizing kinematic alignment in ≤ 3º or > 3º degrees of varus utilizing a non-cemented cruciate retaining implant with a dual pivot articulation.

Significance: Uncemented total knee arthroplasty components are becoming increasingly common. It is unclear how placing the tibial component at an oblique angle affects aseptic loosening.

Methods: A retrospective case series included patients who underwent TKA from January 2021 to December 2023 with uncemented fixation. The primary outcome was aseptic loosening.

Results: Forty-three patients met criteria for final analysis. Thirty-five patients had a tibial angle ≤ 3º of varus while 8 patients had tibial implants placed in >3º of varus. There were no cases of aseptic loosening regardless of tibial angulation. Three patients experienced pain greater than three months after surgery. There were no significant differences in outcome between patients who underwent a tibial cut >3º varus and patients who underwent tibial cut ≤ 3º ($p = 0.123$).

Conclusion: There does not seem to be an increased risk of press fit knees experiencing aseptic loosening when utilizing kinematic alignment philosophy, even with a tibial component placed with over 3º varus. Larger cohorts need to be published to validate these findings.

Knee Dislocations after Total Knee Arthroplasty in Obese Patients: A Presentation of Three Patients

Carver Montgomery, MD
University of Mississippi Medical Center

Purpose: To present three cases of tibiofemoral dislocation after total knee arthroplasty (TKA) of patients with BMI ≥40kg/m^2 who experienced ultra-low velocity, low-impact injuries.

Significance: TKA is one of the most common orthopedic procedures worldwide. Dislocation is a postoperative complication with rates of 0.15%-0.5% and are classified as high-velocity or low-velocity. However, there has been a development of ultra-low velocity injuries associated with walking or ground level falls seen almost exclusively in the obese population.

Methods: Case-series analyzing three patients with BMI ≥40kg/m^2 who underwent TKA with subsequent ultra-low velocity dislocation associated with activities of daily living.

Results: Average BMI for the three patients was 47.4kg/m^2. Two patients had undergone previous revision TKA for either aseptic loosening or prosthetic joint infection. One patient experienced a fall from ground level, while the other two patients' dislocations were associated with walking. All three patients received revision TKA. Two patients were able to regain ambulatory status, with a third not being adherent to physical therapy, citing secondary medical complications.

Conclusion: Performing TKAs in obese patients requires extra caution to avoid complications, including tibiofemoral dislocations. Cases such as these are becoming more prominent as the number of total joint arthroplasties and the percentage of the population with high BMIs increases.

Impact of Socioeconomic Factors in Outpatient Peripheral Nerve Reconstruction

Blaire McCarthy, MD
Vanderbilt University Medical Center

Purpose: We aimed to determine if socioeconomic factors influence the utilization of nerve allograft or autograft in ambulatory surgery centers.

Significance: When a peripheral nerve injury (PNI) cannot be primarily repaired, nerve autograft or allograft may be indicated. Nerve autograft is considered the gold standard for nerve reconstruction; however, autograft has higher morbidity and longer surgical times. Nerve allograft is more expensive to use.

Methodology: Analysis of the Healthcare Cost and Utilization Project National Ambulatory Surgery Sample for the year 2018 was performed and nerve reconstruction patients were identified by current procedural terminology (CPT) codes. Univariate analysis was performed with Pearson chi-square test, Fisher's exact test, or Kruskal-Wallis H test where appropriate. Multivariate logistic regression was performed.

Results: Of 5,082 patients, 537 underwent reconstruction with autograft and 4,543 received allograft. Females and patients younger than 33 or older than 50 were more likely to receive allograft. Hospitals in the Midwest and urban teaching hospitals are more likely to use autograft.

Conclusions: Socioeconomic differences exist between the use of autograft and allograft in outpatient surgery centers; a surgeon's decision on nerve graft selection should include the evaluation of extrinsic and intrinsic bias to ensure equitable healthcare for nerve injury patients.

Incision or Excision? What to do with the A1 Pulley for Trigger Finger: Results of a Multi-Surgeon Randomized Controlled Trial

Zaamin Hussain, MD
Emory University

Purpose: To compare pain and complication rates between incision and excision of the A1 pulley.

Significance: Trigger finger is caused by A1 pulley thickening, preventing smooth flexor tendon gliding. Open A1 incision is the gold standard, but recurrence is common. Excising the entire pulley may reduce recurrence. We hypothesized that excision would result in lower recurrence rates, better symptom relief and higher patient reported outcome measures (PROMs).

Methods: A randomized controlled trial of consecutive patients undergoing first-time trigger finger release by five hand surgeons, where patients were randomly assigned to incision or excision. The primary outcome was VAS pain at the base of the digit. Other PROMs, complication and recurrence rates were secondary outcomes.

Results: Sixty patients were enrolled (30 per group). At minimum six months follow up, patients had significantly less pain ($p=0.011$) and greater pain reduction ($p=0.024$) after incision. There was no significant difference in other outcomes. Two excision patients needed irrigation and debridement, secondary to dehiscence and flexor tenosynovitis. Two incision patients had minor complications – stiffness and glue reaction. One patient in each group had recurrence.

Conclusion: At 6 months, incision and excision performed similarly, although incision did significantly reduce pain. Complications after excision require further exploration.

Stone-Hinge: A Case Report of Primary Tumoral Calcinosis in a Pediatric Elbow

Ahsia Clayton, MD
University of Mississippi Medical Center

Case: A 6-year-old black female with no prior history presented with a mass on her right elbow for two months that had become progressively more painful. Imaging favored primary tumoral calcinosis (TC). Surgical excision and biopsy confirmed the diagnosis. The patient is doing well but has probable recurrence.

Conclusion: Primary tumoral calcinosis (TC) is a rare benign disease, especially in pediatric populations, that results in calcium phosphate deposition in periarticular soft tissues on the extensor surface of large joints and the cervical or lumbar portions of the spine. As of 2022, 30 pediatric cases and 100 familial cases have been reported. Diagnostic imaging with x-ray and MRI are sufficient for diagnosis of TC, and surgical excision is a curative treatment with a low rate of recurrence. Laboratory studies, complete physical exam, and biopsy should be performed to evaluate malignant or pathologic causes of TC

Clinical Outcomes of Operative Management for Radial Tunnel Syndrome According to Surgical Approach: A Systematic Review

Brittany Raymond, MD
University of Florida

Purpose: To review the literature regarding surgical management of radial tunnel syndrome (RTS) and objectively guide evidence-based decisions.

Significance: There is little consensus regarding the ideal surgical approach for RTS to achieve satisfactory outcomes. This review aims to report on patient-reported-outcomes (PROs) and complications from studies reporting surgical treatment of RTS stratified by approach.

Methodology: This review was performed utilizing PRISMA guidelines. The PubMed/Medline, Embase, Web of Science, and Cochrane databases were reviewed. Inclusion required English publications with original data, at least five patients, surgical technique, and outcome measures. Descriptive synthesis was performed given the heterogenicity of available data.

Results: Eleven studies met criteria, including 401 extremities with mean follow up of 42 months. Of the included forearms, 54% were approached dorsally and 46% volarly. These were further stratified by interval with the ERCB/EDC showing the most favorable Roles and Maudsley scores. While overall complication rates were similar (44% vs. 56%, volar vs, dorsal, respectively), those associated with the volar approach were more severe and permanent.

Conclusion: While there is wide variability in surgical approaches used in RTS treatment, this study suggests that dorsal approaches may have less severe complications and potentially favorable postoperative satisfaction. Further, addressing heterogenicity in PROs will help with future investigation.

Early Success in Anterior Compartment Sparing Tibial Tubercle Osteotomy Utilizing Back-Cut Technique

Raahil Patel, MD
University of South Florida/Florida Orthopaedic Institute

Purpose: We present a tibial tubercle osteotomy (TTO) technique that aims to reduce the risk of postoperative compartment syndrome by eliminating dissection of the anterior compartment musculature during the approach.

Significance: TTO is commonly indicated for patellofemoral instability and/or patellar chondral repair. Despite its success in addressing these conditions, TTO has been associated with a relatively high postoperative complication rate with compartment syndrome posing as one of the most severe.

Methods: We conducted a retrospective review of two patients following our proposed TTO technique performed by one fellowship-trained surgeon. We collected demographic data, evaluated intra- and postoperative complications, and analyzed the postoperative recovery protocol.

Results: Two patients underwent our TTO approach without any major intraoperative complications. Following surgery, both patients began physical therapy within the first week. At the one-year follow-up, patients reported satisfaction with workout performance, but both noted intermittent discomfort without notable swelling.

Conclusion: Our technique intentionally separates cortical layers to facilitate tubercle mobilization while preserving periosteum integrity, reducing pain and minimizing fracture risk. Our diamond cut safeguards the tibia's proximal metaphysis, while medial guide pin placement enhances surgical flexibility. Further, we avoid the need to compromise the anterior compartment, reducing risk of compartment syndrome and neurovascular injury.

Repair Technique and Fellowship Training Background Predict Major and Minor Complications after Achilles Tendon Repair

Benjamin Averkamp, MD
Carolinas Medical Center/OrthoCarolina

Purpose: The purpose of this study was to characterize the complication rate in acute Achilles tendon repair in a major metropolitan area.

Significance: Achilles tendon ruptures remain the most common tendon injury within the lower extremity with multiple surgical techniques, immobilization protocols, and surgical preferences commonly utilized.

Methods: 1036 Achilles tendon repairs performed from 1/1/2018 through 12/31/2022 were included. The primary outcome measure was major complication rate (reoperation, deep infection, tendon re-rupture, and loss of Achilles tension requiring re-operation). Minor complication rate (sural neuritis, superficial infection, delayed wound healing, heel pain, and loss of Achilles tension not requiring re-operation) was also documented. Complication rate by procedure type (open, percutaneous, suture anchor fixation), surgeon training, patient age, mechanism of injury, and rehabilitation protocol were recorded.

Results: The overall complication rate was 15.8%—with 3% (N=31) having major complications. Patients were 4.0 and 2.2 times more likely, respectively, to experience a major (p=0.0152) or minor complication (p=0.0039) with suture anchor fixation compared to open technique. There was no difference in complication rate by rehab protocol (p=0.738)

Conclusion: Patients undergoing suture anchor fixation of Achilles tendon injuries sustain major and minor complications at a significantly higher rate than percutaneous or open procedures.

Comparison of Recent Trends in Medicare Utilization and Reimbursement for Cervical Spine Discectomy and Fusion Procedures Versus Cervical Disc Arthroplasty

Bradley Alexander, MD
University of Mississippi Medical Center

Purpose: This study seeks to compare volume and utilization of cervical fusion versus cervical arthroplasty while also considering variations in reimbursement rates in the Medicare system between 2011 and 2021.

Significance: ACDF and CDA are indicated for cervical myelopathy and radiculopathy and have similar post-operative outcomes but significant differences in Medicare compensation, which has yet to be discussed in current literature.

Methods: This cross-sectional study used publicly available databases to aggregate annual claims and payments for ACDF and CDA procedures based on CPT codes.

Results: The mean Medicare reimbursement per case for single level cervical fusion decreased by 1.8% from $2,447 in 2011 to $2,403 in 2021. In contrast, the mean Medicare reimbursement per case for single level cervical arthroplasty increased by 59.3% from $2,228 in 2011 to $3,550 in 2021. Multi-level ACDF and CDA procedures remained consistent in mean Medicare reimbursement per case over the study period.

Conclusion: This study reports that while ACDF utilization and reimbursement rates have stayed relatively stable from 2011 to 2021, the utilization and reimbursement rates for single level CDA have drastically increased despite similar postoperative outcomes, likely due to transitioning to a value-based care model and surgeon exposure.

Diagnostic and Predictive Performance of Artificial Intelligence in Diagnosing Patellofemoral Osteoarthritis, Trochlear Dysplasia and Patellofemoral Tracking

John Twomey-Kozak, MD
Duke University

Purpose: This study aimed to (1) assess the diagnostic accuracy and predictive power of artificial intelligence (AI) in detecting patellofemoral (PF) compartment pathology and (2) compare AI performance against human clinical experts.

Significance: Integrating AI into clinical practice can enhance diagnostic accuracy, streamline complex pathology assessments, and support informed patient care.

Methods: A systematic review was conducted using PRISMA guidelines across PubMed, OVID/Medline, and Cochrane databases for studies focusing on AI methods for diagnosing trochlear dysplasia, patellofemoral osteoarthritis (PFOA), or PF instability on cross-sectional imaging. Data on AI models, input/output, performance metrics (accuracy, AUC, sensitivity, specificity), sample sizes, imaging modalities, and study limitations were extracted.

Results: Seventeen studies met inclusion criteria. Ten focused on PFOA, four on PF tracking/instability, and three on trochlear dysplasia. AI models utilized CT scans, MRIs, and radiographs, with AUC values ranging from 0.664 to 0.990 and accuracies from 74% to 99%. AI performance was moderate to excellent, often outperforming traditional methods in efficiency. Limitations included sample size, single-center data, and dataset biases.

Conclusion: AI models performed moderate to excellent in diagnosing PF pathologies and predicting disease progression. AI models outperformed ground-truth-methods in several studies, though results were limited by model heterogeneity and reference standards.

Long vs Short: A Multi-Center Study of Peri-Implant Femur Fractures

Aleksander Mika, MD
Vanderbilt University Medical Center

Purpose: Compare injury patterns and treatment outcomes following peri-implant fractures below short or long cephalomedullary nails.

Significance: Cephalomedullary nails are commonly used for intertrochanteric femur fractures. Both long and short constructs are used with no consensus on the ideal nail length.

Methods: We performed a multi-center retrospective cohort study that identified 58 patients. Fracture patterns, treatment strategy, operative details, and outcomes were compared between cohorts.

Results: There were no differences in operative time, fluoroscopy, length of stay, or transfusion requirement. Regarding weight bearing, 26% of short nail patients were non-weight bearing compared to 58% of long nail patients ($p=0.019$).

Subgroup analysis comparing open reduction internal fixation (ORIF) to all other fixation strategies was also performed. There were no differences in operative time, transfusion requirement, or length of stay. ORIF required less fluoroscopy time ($p=0.006$), were more likely to have a total knee in place ($p=0.012$), have restricted weight bearing, ($p<0.001$), and discharge to a skilled nursing facility ($p=0.009$).

Discussion: The theoretical advantages of short and long nail options are still subject to debate. Fixation choice may play the largest role in differences between ORIF and other fixation methods proving the most important for weight-bearing status, disposition, and x-ray time

Psychiatric and Behavioral Health Comorbidities as Modifiable Risk Factors for Orthopaedic Trauma

Reece Vesperman, MD
Vanderbilt University Medical Center

Purpose: We hypothesize that mental health conditions are modifiable risk factors for orthopedic lower extremity trauma postoperative outcomes.

Significance: It has been well documented in literature that patients with a preexisting mental health condition do worse following orthopedic surgical intervention. Furthermore, orthopedic specialists realize the implications mental health can have on patient outcomes but do poorly in addressing these psychological aspects. To our knowledge, no study to date has investigated psychiatric/behavioral health diagnoses as a modifiable risk factor for orthopedic surgery postoperative outcomes. More specifically, no study has investigated whether patients being treated for their behavioral health condition at the time of surgery have better postoperative outcomes than those who were not.

Methods: Retrospective chart review of orthopedic trauma patients treated with a tibial or femoral nail between 2018-2023 with a diagnosis of depression.

Results: Our intent is to analyze the surgical outcomes, including hospital length of stay, revision rate, and postoperative disposition, in patients receiving pharmacotherapy for their psychiatric illness and those who are not.

Conclusion: We intend to prove that patients treated for their mental health disorders have better postoperative outcomes after orthopedic trauma surgery than those with the same mental health disorders who are not being treated.

An Anterior Approach to Posterior Wall for Pipkin IV Fractures

David Patch, MD
University of Alabama at Birmingham

Purpose: To compare size of posterior wall (PW) fragments in Pipkin IV fractures managed with anterior approach versus those managed with posterior approach.

Significance: Optimal surgical approach for Pipkin IV fractures is not well defined. Posterior approach allows treatment of the femoral head and PW but may be unnecessary if the PW is stable, making non-operative management of PW viable.

Methods: Retrospective review at single institution (2013-2024) of patients with isolated PW acetabular and femoral head fractures that underwent ORIF. Excluded patients managed non-operatively, under 18yo and <3mo follow up. Primary outcome was PW size using acetabular fracture index (AFI), distance to acetabular dome and sagittal CT angle.

Results: 41 patients included, 12 (29.3%) had an anterior approach and 29 (70.7%) posterior approach. Non-operative management of PW fracture was more common with anterior approach (100%v 20.7%,p<0.001). Anterior approach had smaller AFI than posterior [18%(13.8%-22.6%)v 31%(25.5%-37.2%);p<0.001]. No difference was noted with distance to acetabular dome. The AFI of PW fractures managed non-operatively was lower than those that underwent fixation [21.0(15.6-25.9)v 32.6(26.2-39.3);p=0.007].

Conclusion: Pipkin IV fractures with isolated PW should be managed with anterior approach in fractures with AFI is below 25.9% in combination with EUA and conversion to combined approach if unstable.

Implant Selection in Distal Femur Fractures: An Analysis of Alignment and Outcomes

Aseel Dib, MD
Carolinas Medical Center/OrthoCarolina

Purpose/Significance Periarticular distal femur fractures can be managed with intramedullary nailing (IMN), plate fixation, or a combination of both. Alignment, outcomes, and complications were compared among these techniques.

Methods: Retrospective review at a level one trauma center evaluated patients with OTA 33A-C fractures treated operatively between 2018-2022. Patients (N=137) were >18, fixed with IMN (N=71), plate (N=27), or both (N=39), with ≥6 months follow-up. Anatomic angles were measured intra-operatively and at final follow-up. Outcomes included time to union (mRUST>10), time to weightbearing re-operations and complications.

Results: Older patients more commonly received an IMN+Plate or Plate than IMN alone. There were no significant differences in gender, BMI, smoking status, substance abuse history, Charlson comorbidity index, implant for open fractures compared to closed, in the change in coronal or sagittal alignment based on index implant, and in time to union. During average follow-up (317 days), 89.7% of IMN+Plate patients achieved union, compared to 70.4% of IMN and 66.7% of Plate patients. No short-term difference in re-operation rates between these constructs occurred. IMN+Plate took longer to WBAT than IMN alone.

Conclusion: IMN+Plate may lead to earlier radiographic union. There is no difference in maintenance of alignment or short-term reoperation compared to IMN alone.

Rate of Fibular Nonunion in Patients with Tibial Shaft Fractures

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Purpose: To assess the rates of fibular nonunion in patients with tibial shaft fractures while identifying any associated factors, primarily fibular fixation.

Significance: Current practice for fibular fixation with associated tibial shaft fractures is surgeon dependent. Literature regarding painful fibular nonunion is lacking.

Methods: Retrospective cohort study performed at a level one trauma center reviewing patients that had fibular fractures with associated tibial shaft fractures from June 2012 – June 2021. To meet the inclusion criteria for this study, patients had a minimum of three months of follow-up and fibular fractures with associated tibial shaft fractures fixated with an intramedullary rod.

Results: 403 patients met inclusion criteria. The rate of fibular nonunion was 21.1%. Patients that had fibular fixation went on to nonunion at a rate of 25.6%, and patients that did not have fibular fixation went on to form nonunion at a rate of 18.9%. Patients that do not have fibular fixation show no statistical significance of being at higher risk for developing nonunion (p=.126).

Conclusion: This study identified the rate of fibular nonunion in patients with associated tibial shaft fractures treated with an intramedullary rod and suggests that fibular fixation has no statistical effect on fibular nonunion.

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