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OREF WESTERN REGION RESIDENT RESEARCH SYMPOSIUM

Wednesday, September 4, 2024

University of California, Los Angeles (UCLA)
Resident Research Symposium
UCLA Santa Monica Hospital – Auditorium
1250 16th Street, Suite G340
Santa Monica, CA 90404

Co-Hosts:

Nicholas Bernthal, MD
Professor and Chair, Executive Medical Director,
Jeffrey J. Eckardt Endowed Chair,
Department of Orthopaedic Surgery
David Geffen School of Medicine at UCLA

Frank Petrigliano, MD
Sports Medicine and Shoulder Surgery,
Program Director, Residency Education
Department of Orthopaedic Surgery
University of California, Los Angeles

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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 LinkedIn (Orthopaedic Research and Education Foundation) Facebook (OREFtoday) and X (@OREFtoday).

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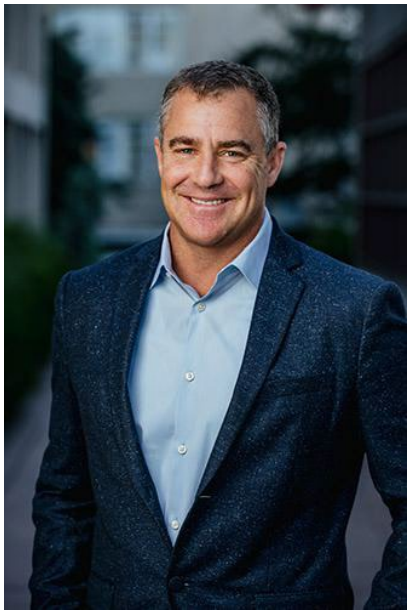
OREF WESTERN REGION RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA
Wednesday, September 4, 2024

7:00 a.m. – 7:45 a.m.	**Registration and Breakfast** The UCLA Santa Monica Hospital - Auditorium 1250 16th Street, Suite G340 Santa Monica, CA
7:45 a.m. – 7:50 a.m.	**Welcome and Introductions** Nicholas Bernthal, MD Professor and Chair Executive Medical Director Jeffrey J. Eckardt Endowed Chair Department of Orthopaedic Surgery David Geffen School of Medicine at UCLA
7:50 a.m. – 7:55 a.m.	**OREF Welcome** Deborah Cummins, PhD Vice President, Grants and Research Orthopaedic Research and Education Foundation
7:55 a.m. – 8:25 a.m..	**Session I – Resident Research Presentations & Discussion**
8:25 a.m. – 8:55 a.m.	**Session II – Resident Research Presentations & Discussion**
	Break – Please submit your scores from Sessions I and II to OREF Staff
9:05 a.m. – 9:39 a.m.	**Session III – Resident Research Presentations & Discussion**
9:39 a.m. – 10:09 a.m.	**Session IV – Resident Research Presentations and Discussion**
	Break – Please submit your scores from Sessions III and IV to OREF Staff
10:19 a.m. - 10:45 a.m.	**Session V – Resident Research Presentations and Discussion**
	Break – Please submit your scores from Session V to OREF Staff
10:55 a.m.- 11:00a.m.	**Keynote Speaker Introduction**
11:00 a.m.–11:45 a.m.	**Keynote Address** **Fitting Research into Your Residency and Beyond** Brian Feeley, MD Chief, Sports Medicine and Shoulder Surgery Ron Conway Family Professor of Sports Medicine Research Associate Vice Chair, Education Department of Orthopaedic Surgery University of California, San Francisco
11:45 a.m. – Noon	**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



Brian Feeley, MD

Chief, Sports Medicine and Shoulder Surgery
Ron Conway Family Professor of Sports Medicine Research
Associate Vice Chair, Education
Department of Orthopaedic Surgery
University of California, San Francisco

Dr. Brian Feeley is an orthopaedic surgeon who specializes in using arthroscopic (minimally invasive) procedures to care for patients with athletic injuries of the shoulder or knee. He is section chief of the UCSF Division of Sports Medicine and Shoulder Surgery and director of the Muscle Stem Cell Lab. His research focuses on common knee and shoulder problems, including causes of muscle atrophy after rotator cuff tears. He also investigates how stem cells within muscle change the muscle tissue and how to stimulate these cells to improve function after injury. His lab has been awarded grants from the NIH, VA, CIRM, OREF and AOSSM.

After earning a bachelor's degree in biology and his medical degree at Stanford University, he completed a residency in orthopaedic surgery at the Ronald Reagan UCLA Medical Center. He then completed a fellowship in sports medicine and shoulder surgery at The Hospital for Special Surgery, where he served as an assistant team physician to the New York Giants football team. He has been at UCSF since 2008.

Dr. Feeley has published more than 300 peer-reviewed articles, review studies and book chapters, as well as a book on rotator cuff injuries. He is associate director of UCSF's residency program in orthopaedic surgery.

He serves as team physician for St. Ignatius College Preparatory high school. An avid surfer, he especially enjoys the waves at San Francisco's Ocean Beach. In his spare time, he watches his five children's sports teams and co-hosts the UCSF podcast "Six to Eight Weeks: Perspectives on Sports Medicine."

Judges

Alexander Christ, MD
University of California, Los Angeles (UCLA)

Frank Petrigliano, MD
University of California, Los Angeles (UCLA)

Lauren Wessel, MD
University of California, Los Angeles (UCLA)

OREF Western Region Resident Research Symposium
DETAILED AGENDA
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7:45 a.m. – 7:50 a.m.	**Welcome and Introductions** Nicholas Bernthal, MD Professor and Chair Executive Medical Director Jeffrey J. Eckardt Endowed Chair Department of Orthopaedic Surgery David Geffen School of Medicine at UCLA
7:50 a.m. – 7:55 a.m.	**OREF Welcome** Deborah Cummins, PhD Vice President - Grants and Research Orthopaedic Research and Education Foundation
	Session I – Resident Research Presentations & Discussion
7:55 a.m. – 7:59 a.m.	*From the Lab to the Clinic: Angiotensin Converting Enzyme Inhibition May Incur Infectious Risk* Rishi Trikha, MD, University of California, Los Angeles
7:59 a.m. – 8:03 a.m.	*A Comparison of Total Knee Arthroplasty Outcomes Between Hemodialysis and Renal Transplant Patients* Seth Ahlquist, MD, University of California, Los Angeles
8:03 a.m. – 8:07 a.m.	*How Have Total Joint Arthroplasty Implant Prices Changed Compared to Overall Costs and Reimbursements?* Jonathan Yu, MD, University of California, Los Angeles
8:07 a.m. – 8:11 a.m.	*Is There an Ideal Surgical Irrigant?* Christopher Hamad, MD, University of California, Los Angeles
8:11 a.m. – 8:15 a.m.	*Chronic Periprosthetic Joint Infection: Antimicrobial Brachytherapy Protocol Early Results* Lisa Su, MD, University of California, Los Angeles
8:15 a.m. – 8:25 a.m.	**Question and Answer**
	Session II – Resident Research Presentations & Discussion
8:25 a.m. – 8:29 a.m.	*Weightbearing Radiography vs Weightbearing Computed Tomography in the Evaluation of the Cavovarus Charcot-Marie-Tooth Deformity: 2D or Not 2D, that is the Question?* Christian Blough, MD, Cedars-Sinai Medical Center
8:29 a.m. – 8:33 a.m.	*Bedside Aspiration for Workup of the Pediatric Septic Hip: Avoid Trips to the OR and Expedited Time to Diagnosis* Kira Skaggs, MD, Stanford University
8:33 a.m. – 8:37 a.m.	*Correction of Fixed Knee Flexion Deformity in Patients with Cerebral Palsy Using Suture Anchors for Anterior Distal Femur Hemi-Epiphysiodesis* Thomas E. Olson, MD, University of California, Los Angeles

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8:37 a.m. – 8:41 a.m.	*Chondroblastoma in Pediatric Patients May Lead to Future Angular Deformity* Brandon Gettleman, MD, University of California, Los Angeles
8:41 a.m. – 8:45 a.m.	*Assessing Performance of Sarcoma Prediction Tools in an Upper Extremity Soft Tissue Sarcoma Cohort'* Nicole J. Newman-Hung, MD, University of California, Los Angeles
8:45 a.m. – 8:55 a.m.	**Question and Answer**
	Break
	Session III – Resident Research Presentation & Discussion
9:05 a.m. – 9:09 a.m.	*Proximal Pole Scaphoid Fracture Nonunion Treated with Ipsilateral Hamate Transfer* Renaldo E. Colon-Morillo, MD, LT, MC, USN, Naval Medical Center San Diego
9:09 a.m. – 9:13 a.m.	*Assessment of Push-ups as a Functional Outcome After Acute Scaphoid Fracture Fixation in a Military Population* Peter Baglien, MD, Naval Medical Cener San Diego
9:13 a.m. – 9:17 a.m.	*A Community-Based Outreach Program Can Change Underrepresented Minority Student Perception of Orthopaedic Profession Fit and Attainability: Lessons from BONE Academy* Molly A. Hulbert, MD, University of California, San Diego
9:17 a.m. – 9:21 a.m.	*Efficacy of Dual Mobility Constructs Combined with Jumbo Cups in Revision Total Hip Arthroplasty* Jeffrey Wing Kee Kwong, MD, University of California, San Francisco
9:21 a.m. – 9:25 a.m.	*Hip Arthroscopy for Femoroacetabular Impingement Syndrome Restores Kinematics to the Contralateral Side by One Year After Surgery* Edgar Garcia-Lopez, MD, University of California, San Francisco
9:25 a.m. – 9:29 a.m.	*Changes in Orthopaedic Resident Education Following COVID-19: A New "Virtual" Era* Harin B. Parikh, MD, Cedars-Sinai Medical Center
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9:43 a.m. – 9:47 a.m.	*Generative AI (GPT-4o) to Predict Surgical Candidacy from Patient Questionnaire and MRI Data in Sports Medicine* Ryan Halvorson, MD, University of California, San Francisco
9:47 a.m. – 9:51 a.m.	*The Impact of Early Sport Specialization on National Basketball Association Players' Injury Load Management and Athletic Success* Andrew Gatto, MD, University of California, San Francisco

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9:55 a.m. – 9:59 a.m.	*Effectiveness of Non-operative Treatment in Patients with Glenohumeral Osteoarthritis: A Prospective Cohort Study* Favian Su, MD, University of California, San Francisco
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	Session V – Resident Research Presentations & Discussion
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10:23 a.m. -10:27 a.m.	*Ballistic and Explosive Orthopaedic Trauma Epidemiology and Infection Rates in Low-and Middle-Income Countries* Jamieson Michael O'Marr, MD, University of California, San Francisco
10:27 a.m. – 10:31 a.m.	*Comparing Approaches for Intramedullary Nailing of Tibial Shaft Fractures: Radiographic Trajectory and Clinical Outcomes* Rahul Bhale, MD, University of California, Davis
10:31 a.m. – 10:35 a.m.	*Laminectomy with Fusion for Cervical Spondylotic Myelopathy is Associated with Higher Early Morbidity and Risk of Perioperative Complications Compared to Laminectomy Alone* Abhinav Sharma, MD, University of California, Irvine
10:35 a.m. – 10:45 a.m.	**Question and Answer**
	Break
10:55 a.m. – 11:00 a.m.	**Introduction of Keynote Speaker**
11:00 a.m. - 11:45 a.m.	**Keynote Address** **Fitting Research into Your Residency and Beyond** Brian Feeley, MD Chief, Sports Medicine and Shoulder Surgery Ron Conway Family Professor of Sports Medicine Research Associate Vice Chair, Education Department of Orthopaedic Surgery University of California, San Francisco
11:45 a.m.- Noon	**Awards Presentation and Closing Remarks**
Noon – 1:00 p.m.	**Lunch Reception**

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From the Lab to the Clinic: Angiotensin Converting Enzyme Inhibition May Incur Infectious Risk

Rishi Trikha, MD
University of California, Los Angeles

Purpose: Prior *in-vivo* animal models from our group have shown that angiotensin-converting enzyme inhibitors (ACEi) may have an immunosuppressive effect. Thus, ACEi treatment may represent an unappreciated risk factor for periprosthetic joint infection (PJI).

Significance: Optimizing the perioperative patient immunoprofile is of paramount importance.

Methods: A retrospective review of a national database was performed. Patients were divided into those taking an ACEi versus an angiotensin receptor blocker (ARB) prior to primary total knee arthroplasty. Current Procedural Terminology codes were used to identify postoperative infections. Propensity matching controlled for medical comorbidities.

Results: There were 77831 patients in the ACEi group and 39105 in ARB group. After propensity score matching, 39105 patients were in each group. Patients in the ACEi group had higher rates of infection compared to the ARB group overall,$p<0.0001$. This was true at 6 months postoperatively (Odds ratio [OR]:4.39), 1 year (OR:4.82), 2 years (OR:4.41), and 5 years (OR:3.94) with all p-values<0.0001.

Conclusion: By expanding on our prior animal model, this translational study indicates that ACEi treatment may represent a modifiable perioperative infectious risk factor. Given the relative interchangeability of ACEis and ARBs, a patient switching from an ACEi to an ARB perioperatively may potentially decrease postoperative infectious burden.

A Comparison of Total Knee Arthroplasty Outcomes Between Hemodialysis and Renal Transplant Patients

Seth Ahlquist, MD
University of California, Los Angeles

Purpose: Evaluate whether hemodialysis (HD) patients have worse outcomes than renal transplant (RT) patients undergoing total knee arthroplasty (TKA).

Significance: TKA in end-stage renal disease is associated with complications. Controversy exists whether elective TKA should be performed while patients are on HD or following RT.

Methods: A national database was retrospectively reviewed for HD and RT patients who underwent primary TKA from 2010 to 2018. Univariate analysis with Wald and Chi-square tests as well as multivariate regression were performed.

Results: 13,611 patients were identified (61.1% HD and 38.9% RT). RT patients had decreased mortality (OR 0.23), complications (OR 0.63), cardiopulmonary complications (OR 0.44), sepsis (OR 0.22), blood transfusion (OR 0.35), hospital length of stay (2.0 days), non-home discharge (OR 0.57), and hospital cost (-$5,300) during index hospitalization compared to HD patients (all $P \leq .02$). RT patients also had decreased readmission (OR 0.54, $P < .001$), periprosthetic joint infection (OR 0.50, $P < .01$), and surgical site infection (OR 0.37, $P < .001$) within 90 days.

Conclusion: These findings suggest that HD patients are a high-risk population in TKA compared to RT patients and warrant stringent perioperative monitoring. Consideration may be given to delaying TKA in HD patients until after RT.

How Have Total Joint Arthroplasty Implant Prices Changed Compared to Overall Costs and Reimbursements?

Jonathan Yu, MD
University of California, Los Angeles

Purpose: To evaluate trends in implant costs and their relative impact on total costs for TKA and THA.

Significance: Implant costs comprise a substantial portion of total costs for primary total knee arthroplasty (TKA) and total hip arthroplasty (THA). However, there is limited information regarding recent trends in implant prices.

Methods: A commercial insurance claims database was queried from 2009-2021 for overall costs, reimbursements, and patient out-of-pocket (OOP) costs. Average implant prices were extracted from Orthopedic Network News (ONN), the largest publicly available implant registry. All values were adjusted for inflation.

Results: Between 2009 and 2021, the average price for TKA implants was $5,899 and $6,776 for THA. There was no significant change in overall costs ($p>0.05$). While both hospital reimbursement ($p=0.03$) and OOP patient cost ($p<0.001$) increased significantly, physician reimbursement ($p<0.001$) and implant prices ($p<0.001$) decreased significantly.

Conclusion: Between 2009 and 2021, inflation-adjusted implant prices decreased significantly for TKA and THA. Despite decreasing implant prices, hospital reimbursements and OOP patient costs rose significantly while physician reimbursement decreased significantly. As joint replacement volumes rise and cost control pressure mounts, understanding these financial trends will be increasingly important for surgeons to consider in implementing future changes to clinical practice, payment, and policies.

Is There an Ideal Surgical Irrigant?

Christopher Hamad, MD
University of California, Los Angeles

Purpose: We hypothesize that various surgical irrigants will greatly vary in their antimicrobial efficacy.

Significance: There is no clear consensus on the most efficacious surgical irrigant. Surgeon or institutional preference often determines which irrigant is used.

Methods: Irrigants include: 0.05% chlorhexidine gluconate (CG), XPERIENCE, Bactisure, Dakins, .35% povidone iodine (.35 PI), 10% povidone iodine (10 PI), 3% hydrogen peroxide (HP), 1:1 (10 PI + HP), and normal saline (NS). These irrigants were tested against 1E6 colony forming units (CFUs) of *S. aureus (SA), C. albicans (CA),* or both in their planktonic and biofilm states.

Results: 10 PI + HP and Bactisure were the only irrigants capable of eliminating *SA* in both planktonic and biofilm states and were tested against polymicrobial infection. Only 10 PI + HP was able to eradicate polymicrobial *SA + CA* in both planktonic and biofilm states.

Conclusion: 10 PI + HP and Bactisure appear to be superior irrigants against *SA* as they were able to eliminate this bacterium in both planktonic and biofilm states. Only 10 PI + HP was able to eradicate polymicrobial biofilm and planktonic infections and is superior in this study.

Chronic Periprosthetic Joint Infection: Antimicrobial Brachytherapy Protocol Early Results

Lisa Su, MD
University of California, Los Angeles

Purpose: Evaluate outcomes of patients treated with an explantation, antibiotic spacer and antibiotic-eluting calcium sulfate beads as local brachytherapy, and oral antibiotics during the interim before second-stage reimplantation of infected total knee arthroplasty.

Significance: Two-stage exchange arthroplasty with interim intravenous (IV) antibiotics is considered the gold standard treatment for chronic periprosthetic joint infection (PJI) of the knee, but extended systemic parenteral antibiotics carry risks.

Methods: Single-center, single-surgeon retrospective cohort of 24 patients who underwent the above treatment for chronic knee PJI. Patients received IV antibiotics perioperatively until postoperative day 3 or discharge and then were switched to oral antibiotics.

Results: Mean patient age was 71.1±10.4 years, 46% female, 71% McPherson B hosts, and 92% McPherson type 3 limbs. Eight percent of infections were polymicrobial, 13% were fungal, and most common organism was MSSA (17%). Sixty-three percent had failed prior septic revision. Fifty-eight percent of patients were re-implanted, 8% died before re-implantation, and 4% opted for above knee amputation due to re-infection. Mean time to re-implantation was 7.3 ± 3.5 months. Of those re-implanted, 86% remained infection-free at 28.7 ± 11.7 months mean follow-up.

Conclusion: Chronic knee PJI treated with explantation, local antibiotic brachytherapy, and oral antibiotics was found to be largely effective in this cohort.

Weightbearing Radiography vs Weightbearing Computed Tomography in the Evaluation of Cavovarus Charcot-Marie-Tooth Deformity: 2D or Not 2D, that is the Question?

Christian Blough, MD
Cedars-Sinai Medical Center

Purpose: This study aims to compare different imaging modalities in the preoperative evaluation of CMT patients.

Significance: The use of weight bearing computed topography (WBCT) in the preoperative evaluation of Charcot-Marie-Tooth (CMT) patients has increased in recent years. Not all surgeons or patients have access to this technology.

Methods: A retrospective review of CMT patients who underwent surgical management with a single surgeon and had both preoperative weight bearing radiographs (WBR) and WBCT was performed. Lateral talus-first metatarsal angle, calcaneal pitch, anteroposterior (AP) talus-first metatarsal angle, and talonavicular coverage angle were measured on WBR, manually on WBCT, and using automated three-dimensional WBCT software.

Results: 38 feet were included in this analysis. There was no difference found in the measurement of deformity between WBR and manual WBCT. Lower forefoot adduction was measured on automated WBCT relative to WBR and manual WBCT.

Conclusion: Measurements of deformity in CMT feet was similar between WBR and manual WBCT. Automated WBCT was shown to measure less forefoot adduction, which is of unclear significance. Surgeons and patients without access to WBCT should rest assured that currently, WBR are sufficient for preoperative evaluation of deformity.

Bedside Aspiration for Workup of the Pediatric Septic Hip: Avoid Trips to the OR and Expedited Time to Diagnosis

Kira Skaggs, MD
Stanford University

Purpose: We hypothesize that bedside arthrocentesis would decrease time to diagnosis, time to OR, and number of patients taken to the OR.

Significance: Septic arthritis is a pediatric orthopedic emergency. Joint synovial fluid aspiration is a critical step of diagnosis, frequently delayed due to limited personnel or OR availability. Our orthopedic residents perform ultrasound-guided bedside arthrocentesis in the emergency department. This study aims to evaluate the impact of this practice on time to diagnosis and definitive treatment of septic arthritis of the hip.

Methods: This is a retrospective study of patients who presented to our pediatric emergency room and required a hip aspiration to rule out septic arthritis between 2003 and 2023.

Results: Hip aspiration was performed to rule out septic arthritis in 57 patients (average age 5.1 years; 58% female). 28 patients underwent ED bedside aspiration, 11 patients underwent IR aspiration, 18 underwent hip aspiration in the OR. Of the 28 patients who underwent bedside aspiration, 15 (54%) avoided a trip to the OR. Time to obtaining joint fluid was significantly shorter for patients undergoing bedside or IR guided aspiration compared to OR aspiration (7.4 hours vs. 5.3 hours vs. 15.7 hours, respectively). Time from presentation to OR for open surgical debridement, total operative time, and the percentage of patients requiring open surgical debridement did not significantly differ between groups.

Conclusion: Bedside hip aspiration by on-call orthopedic residents provides an expedited method to diagnose septic hips in the ED and decreases the number of patients needing to be taken to the OR.

Correction of Fixed Knee Flexion Deformity in Patients with Cerebral Palsy Using Suture Anchors for Anterior Distal Femur Hemi-Epiphysiodesis

Thomas E. Olson, MD
University of California, Los Angeles

Purpose: This study examines outcomes following anterior distal femur hemi-epiphysiodesis (ADFHE) to correct fixed knee flexion deformity in patients with cerebral palsy (CP) utilizing a novel, suture-based approach.

Significance: Established techniques used to mitigate fixed knee flexion deformity using screws or plates can be technically challenging and associated with hardware irritation.

Methods: A consecutive series of patients with CP treated for fixed knee flexion contracture with ADFHE utilizing polyethylene suture tape tensioned across the distal femoral physis and secured with suture anchors between April 2021 and February 2024 at a single tertiary care hospital by a single orthopedic surgeon was reviewed. Time to resolution of contracture (months) and rate of correction (degrees/month) were calculated for each knee. All patients were followed for a minimum of 6 months post-operatively.

Results: Seventeen patients were included, of which 15 underwent bilateral correction (N=26 knees). Correction occurred at a rate of 2.2^{o}/month in ambulatory patients. Average time-to-resolution of contracture was 6.8±7.4 months. Correction occurred at a rate of 1.7^{o}/month in non-ambulatory patients. Average time-to-resolution of contracture was 10.7±7.4 months. There were no reported significant complications nor associated hardware irritation.

Conclusion: The use of suture based epiphysiodesis for ADFHE is an effective, efficient technique, with favorable correction rates compared to historical standard.

Chondroblastoma in Pediatric Patients May Lead to Future Angular Deformity

Brandon Gettleman, MD
University of California, Los Angeles

Purpose: This study documents the outcomes of surgically managed chondroblastomas, with primary outcomes being tumor recurrence and the development of angular deformity.

Significance: Chondroblastomas are rare, benign bone tumors commonly localized to the epiphysis of long bones in pediatric patients that require surgical treatment.

Methods: A retrospective review was performed from 2004-2019. Patients with index surgical treatment of histologically confirmed chondroblastoma and 6 months of follow-up were included. Variables of interest were demographics, tumor location, and use of adjuvants, and primary outcomes were recurrence and development of deformity.

Results: Thirty-three patients met inclusion criteria (mean age, 13.8±2.1 years). Fifteen patients (45.5%) had tumors in the femur. At a mean follow-up of 2.2±1.1 years, 3 patients (9.1%) experienced recurrence, and 5 (15.2%) developed an angular deformity. Recurrence was not significantly correlated with adjuvant type ($p>0.05$), tumor location ($p=0.827$), tumor size ($p=0.247$), or age at surgery ($p=0.616$).

Conclusion: With a recurrence rate of 9%, our results are consistent with previous literature. This study identified the development of angular deformities in 15% of patients, with each patient requiring subsequent treatment. Thus, it may be important for physicians to consider these findings when determining patient follow-up and counseling families on long-term outcomes of treatment of chondroblastomas.

Assessing Performance of Sarcoma Prediction Tools in an Upper Extremity Soft Tissue Sarcoma Cohort

Nicole J. Newman-Hung, MD
University of California, Los Angeles

Purpose: To assess the performance of sarcoma prediction tools in a contemporary upper extremity (UE) soft tissue sarcoma (STS) surveillance cohort.

Significance: Given unique presenting characteristics and surgical considerations of UE STS, currently used prognostic models for sarcoma outcomes may lack generalizability.

Methods: The Memorial Sloan Kettering Cancer Center nomogram, Sarculator, and PERSARC predict outcomes in extremity soft tissue sarcoma. An UE STS surveillance cohort including patients treated at a sarcoma center from 2012-2022 was used to externally validate these models by assessing calibration.

Results: A total of 211 patients were identified with average clinical follow-up of 4.9 years. Forty-nine patients (23%) experienced local recurrence while 47 patients (22%) developed metastatic disease (DM). Thirty-five patients expired (17%) at an average of 41.0 months after presentation. Sarculator had the strongest overall performance in predicting 5- and 10-year DM (C=0.63; C=0.62) and the weakest overall performance in predicting 5- and 10-year overall survival (C=0.41; C=0.41).

Conclusion: Nuances in tumor presentation and unique surgical considerations in UE STS may contribute to poor performance in models developed from anatomically heterogenous cohorts. Prognostic tools derived from historical cohorts may also perform poorly due to demographics differences, variable event distribution, and evolving treatment paradigms.

Proximal Pole Scaphoid Fracture Nonunion Treated with Ipsilateral Hamate Transfer

Reinaldo E. Colon-Morillo, MD, LT, MC, USN
Naval Medical Center San Diego

Purpose: We hypothesized that ipsilateral proximal hamate with volar capitohamate ligament autograft would provide a viable treatment option in an active military population.

Significance: The scaphoid's retrograde blood flow renders it vulnerable to fracture nonunion proximally. As proximal pole fragmentation occurs, reconstructive options become challenging. Fracture nonunion rates remain high, and little consensus exists regarding appropriate treatment.

Methods: 11 patients with proximal pole scaphoid fracture nonunion underwent open reduction and internal fixation with ipsilateral proximal hamate transfer from 2019-2023 by a single hand surgeon. Patient demographics, clinical parameters, return-to-duty rates, and QuickDASH scores were obtained. Descriptive statistics were utilized for analysis.

Results: All patients were active-duty male servicemembers in the United States Navy or Marine Corps, with average age of 23.7 years and average follow-up time of 616 days. All 11 patients demonstrated radiographic evidence of healing, and 6 returned to unrestricted active-duty military service. The average QuickDASH for ten patients was 15.7% at final follow-up.

Conclusion: Treating proximal pole scaphoid nonunion with ipsilateral proximal hamate autograft transfer results in reliable union, stable scapholunate alignment, and low levels of reported functional disability while avoiding risks and morbidity associated with other graft options. This technique can return servicemembers to military service.

Assessment of Push-ups as a Functional Outcome After Acute Scaphoid Fracture Fixation in a Military Population

Peter Baglien, MD
Naval Medical Center San Diego

Purpose: To determine whether scaphoid fracture fixation impacts post-injury upper body military physical readiness test (PRT) scores compared with pre-injury levels.

Significance: Due to the relatively high incidence of scaphoid fractures in the military, the effect of this injury on military performance can potentially influence both force and individual readiness.

Methods: Retrospective analysis of 2014-2020 data. Upper body PRT scores before and after scaphoid fixation (i.e., 4-8, 8-12, 12-18, 18-24 months) were assessed. Differences in pre- and post-scaphoid fixation upper body PRT scores were compared using statistical analysis.

Results: 153 Navy personnel had a scaphoid fracture fixation with pre- and post-surgery upper body PRT scores. On average, the post-surgery scores were lower than pre-surgery, with a mean difference of -3.48($p = 0.006$). After adjusting for age, mean difference in upper body score from pre- to post-surgery varied significantly ($p < 0.05$) by time since surgery. The age-adjusted mean difference in upper body score was -7.98 for those who completed a PRT 4-8 months after surgery, -1.33 for 8-12 months, -1.74 for 12-18 months, and +8.13 for 18-24 months.

Conclusion: Scaphoid fractures negatively impact upper body scores from the PRT, most notably in the first 4-8 months post-surgery.

A Community-Based Outreach Program Can Change Underrepresented Minority Student Perception of Orthopaedic Profession Fit and Attainability: Lessons from BONE Academy

Molly A. Hulbert, MD
University of California, San Diego

Purpose: To assess the impact of a local community outreach program on encouraging diverse communities to pursue orthopedic surgery (OS) and related occupations.

Significance: OS lacks diversity which is a barrier to providing care for and establishing trust with patients. BONE (Building Orthopaedic Networks for Everyone) Academy addresses this issue by inspiring students underrepresented in medicine to seek careers in OS and musculoskeletal health.

Methods: We executed OS-focused workshops in two SD high schools (HS1, HS2) identified within the California Healthy Places Index 1st percentile. Students completed anonymous questionnaires pre- and post-workshops focused on familiarity with OS and perception of fit within presented careers. Answers were evaluated using chi-square tests for categorical comparisons and Wilcoxon rank-sum tests for Likert scale responses.

Results: 68% of HS1 students were freshman. At HS2, 55% were juniors. Post-workshop, more students reported higher interest in orthopaedic-related subject matter (HS1 ($p=0.02$), HS2 ($p=0.86$)), had significantly higher familiarity with presented careers ($p<0.05$), and were more likely to see themselves in these careers (HS1 ($p=0.08$), HS2 ($p=0.30$)).

Conclusion: Programs like BONE Academy can change student perceptions of fit within OS. Younger students appear most receptive. Further studies need to focus on how to support student interest.

Efficacy of Dual Mobility Constructs Combined with Jumbo Cups in Revision Total Hip Arthroplasty

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Purpose: This study aims to assess the risk of re-revision due to instability in jumbo cup/dual mobility (DM) revision THA compared to regular-sized cups.

Significance: DM constructs and jumbo cups are both successful strategies for managing instability and bony defects in revision total hip arthroplasty (THA), respectively. It is unknown if the use of DM with jumbo cups has similar instability rates compared to regular revision cups.

Methods: This retrospective cohort study identified consecutive revision THA's performed with DM articulations at a single academic medical center from 2012-2021. Jumbo cups were defined as >62 mm in women and >66 mm in men. The risk of re-revision for instability was assessed via Student's t-test.

Results: 201 revision THA's with a mean follow-up of 4.6 years (range, 2-9.6 years) were included, with 44 patients (21.9%) receiving jumbo cup/DM and 157 (78.1%) receiving regular cup/DM. Overall risk of re-revision for instability was 4.5%. Re-revision risk in jumbo cup/DM was 6.8% compared to 3.8% in regular cup/DM ($p>0.05$). In females, re-revision risk was 8.7% in jumbo cup/DM compared to 4.3% in regular cup ($p>0.05$).

Conclusion: The use of jumbo cup/DM components in revision THA has similar risk of re-revision due to instability compared to regular cup/DM combination.

Hip Arthroscopy for Femoroacetabular Impingement Syndrome Restores Kinematics to the Contralateral Side by One Year After Surgery

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Purpose: This study aimed to assess the impact of hip arthroscopy on biomechanical function in patients with femoroacetabular impingement syndrome (FAIS) during gait, stair ascent and descent.

Significance: Femoroacetabular impingement syndrome (FAIS) is common in athletes, yet little is understood about the effect of biomechanics and how they alter after hip arthroscopy.

Methods: Ten patients undergoing hip arthroscopy for FAIS were included and completed PROMs as well as kinematic assessment at baseline and 1-year post operatively. 3D motion tracking was performed using a 10-camera system while performing gait, stair ascent and descent. Joint kinematics were calculated in the sagittal, coronal, and transverse planes. Peak and valley angles for each joint during each task were compared between limbs using linear mixed effects models. Significant changes in kinematics were corelated to PROMs.

Results: Preoperatively, the symptomatic hip demonstrated significant deficits in gait and stair ascent compared to the contralateral hip. During gait, hip kinematics improved compared to before surgery with respect to increased flexion (+7.7°, SD 7.3°), abduction (+2.4°, SD 3.2°), and external rotation (ER) (+3.0°, SD 4.9°) ($p<0.01$). During stair ascent hip abduction (+2.8°, SD 1.7°), and ER (+2.8°, SD 5.7°), were significantly improved ($p<0.01$). During stair descent, hip flexion (+2.5°, SD 6.4°), extension (+3.9°, SD 8.3°), abduction (+2.3°, SD 2.6°), and ER (+4.8°, SD 4.3°), were significantly improved ($p<0.01$). Significant improvements were seen in patient reported outcomes, but these did not correlate to hip kinematics.

Conclusion: Hip arthroscopy for FAIS restores hip flexion, abduction, and external rotation during dynamic tasks such as gait, stair ascent and descent to comparable states as the contralateral limb. Additionally, patients report significant improvement in function and pain at one-year post-operatively.

Changes in Orthopaedic Resident Education Following COVID-19: A New "Virtual" Era

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Purpose: In this study, we aimed to assess changes in 1) hours spent in didactics, 2) modalities used (i.e. in person versus virtual), and 3) changes in resident OITE performance following the COVID pandemic.

Significance: The coronavirus pandemic has significantly impacted resident education.

Methods: After obtaining IRB approval, a standardized anonymous survey was administered to program directors of ACGME accredited orthopedic surgery programs. Statistics were performed using t-tests for continuous variables and chi-square for categorical variables ($p < 0.05$).

Results: There were no differences in time spent in core curriculum didactics (5.0 hours on average pre- and post-pandemic, respectively; $p = 0.91$) or rotation specific didactics following the pandemic (2.3 vs. 2.5 hours on average pre- and post-pandemic, respectively; $p = 0.61$). In addition, a greater number of programs utilized virtual modalities for education following the pandemic (22% of programs prior to vs. 37% of programs following the pandemic; $p = 0.01$). There were no differences in OITE scores among programs in 2019 versus 2022 ($p = 1.0$).

Conclusion: The coronavirus pandemic has significantly altered the way residents learn. We identified changes that persisted even following the end of the COVID-19 PHE mandate, including an increased reliance on virtual modalities.

Reporting Bias in Significant P-values Across Abstracts and Full Texts in Clinical Trial on Mesenchymal Stromal Cells for Treatment of Knee Osteoarthritis

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Purpose: This study aims to investigate reporting bias in the distribution of significant p-values between abstracts and full manuscripts of clinical trials evaluating mesenchymal stromal cells (MSCs) for knee osteoarthritis (OA).

Significance: Randomized controlled trials (RCTs) and clinical trials (CTs) are critical for evaluating treatment effectiveness, with abstracts serving as primary summaries of study findings. Reporting biases in these summaries can markedly influence research interpretation and usage.

Methods: Searches were conducted on PubMed and Embase using relevant terms, filtering for RCTs and CTs. Two independent reviewers extracted study characteristics, primary outcomes, and all p-values in the full manuscripts and abstracts. Statistical analysis was used to compare the distribution of significant p-values, performed with Python 3.7.

Results: Findings revealed significant reporting bias: 79.3% of p-values in abstracts were significant, compared to 53.8% in full manuscripts ($p < 0.001$). Authors were over 3 times more likely to report significant p-values in abstracts compared to full manuscripts (OR=3.3). Primary outcomes were reported in 55 (90.2%) of abstracts, and not reported in 6 (9.8%). Primary outcomes varied, with the most common being functional and quality of life scores.

Conclusion: There is substantial reporting bias in RCTs and CTs evaluating MSCs for knee OA, especially in abstracts.

Generative AI (GPT-4o) to Predict Surgical Candidacy from Patient Questionnaire and MRI Data in Sports Medicine

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Purpose: Use language models to predict surgical candidacy for patients visiting a sports medicine clinic using pre-visit questionnaire and MRI data.

Significance: Prioritizing surgeon evaluation of patients with high likelihood of requiring operative management could decrease time to care and guide resource allocation.

Methodology: A generative pretrained transformer (GPT-4o, OpenAI) was instructed to predict whether new patients required surgical intervention based on 1. questionnaire responses alone, and 2. questionnaire responses *augmented with MRI reports*. This was compared to whether the patients were ultimately offered surgery by the orthopaedic surgeon.

Results: 2,073 patients were included (1,141 knee complaints and 932 shoulder complaints). Questionnaire data alone was unable to predict need for surgery (knees: sensitivity: 56%, specificity: 53%; shoulders: sensitivity: 57%, specificity: 49%). However, augmenting questionnaire responses with MRI reports substantially improved model accuracy (201 knees: sensitivity: 86.4%, specificity: 75.5%, TPR: 86%; 158 shoulders: sensitivity: 89%, specificity: 71%, TPR: 89%). The entire algorithm runtime elapsed 18 minutes and cost $1.89.

Conclusion: Using a pretrained AI language model, patients requiring surgery could be efficiently predicted from questionnaire and MRI data *a priori* with reasonable accuracy and performance.

The Impact of Early Sport Specialization on National Basketball Association Players' Injury Load Management and Athletic Success

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Purpose: Assess the effects of early sport specialization on athletes' ability to handle increased workloads and on professional athletic success.

Significance: With recent emphasis on the concept of "load management," it is important to determine the differences in workload resilience between players who were multisport athletes in adolescence and those who only played basketball.

Methods: First-round NBA draft picks from 2013 to 2023 who played at least one game were included. Data were collected for each player's first three seasons through publicly available records.

Results: 87(27.4%) athletes were multisport and 231(72.6%) were single sport. Multisport athletes played in significantly more games (148.9±67.1vs.125.8±63.8,$p<0.01$) and traveled greater total distances(436955.1±787149.0vs.242386.7±541646.8,$p<0.01$), but still had a significantly lower percentage of games missed due to injury(13.5%vs.16.9%,$p<0.001$). There are significant correlations between increased workload and number of injuries in single-sport athletes (Total Distance: $\rho=0.37$,$p<0.001$) but not in multisport athletes (Total Distance:$\rho=0.14$,$p=0.20$). Multisport players had significantly greater overall statistical success(Player Efficiency Rating:148.9±67.1vs.125.8±63.8,$p<0.01$) and award achievement likelihood (40.2%vs.19.0%,$p<0.001$).

Conclusion: NBA players who participated in multiple sports handle a higher workload while still having lower injury rates than players who only played basketball, with greater athletic success in their professional careers. Findings can educate youth athletes and parents/coaches to encourage delaying sport specialization to an older age.

Outcomes of Concomitant Patellofemoral Arthroplasty and Patellar Re-alignment Surgery

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Purpose: We present short-term complications and outcomes of patients who underwent single-stage patellofemoral arthroplasty (PFA) in combination with patellar re-alignment surgery, either medial patellofemoral ligament (MPFL) reconstruction or tibial tubercle osteotomy (TTO).

Significance: Isolated patellofemoral joint arthritis with patellar mal-alignment in young patients presents a challenging situation as these patients hope to avoid early total knee arthroplasty.

Methodology: A retrospective review of a consecutive series of patients who underwent single-stage PFA followed by a patellar re-alignment procedure with two specialty-trained surgeons was completed. All PFAs utilized a medial parapatellar arthrotomy, and all MPFL reconstructions utilized tibialis anterior allograft.

Results: Eleven knees in 9 patients were included. Five patients (55%) were female, median age was 41±13.4 years, and median BMI was 26±6.2. Six knees had failed previous patellar stabilizing surgeries. Mean clinical follow-up was 9.7±6 months. There was one complication, a peri-prosthetic patellar fracture ten months post-operatively. There were no identified re-dislocation events, mal-tracking, wound complications, infections, manipulations under anesthesia performed, or medical complications. Mean pre-operative KOOS JR scores were 60.3±13.7, with average improvement of 14.8±11 at last available post-operative follow-up.

Conclusion: Combined PFA and patellar re-alignment surgery can be done efficiently and is associated with improvement in patient-reported outcomes with a low complication rate.

Effectiveness of Non-operative Treatment in Patients with Glenohumeral Osteoarthritis: A Prospective Cohort Study

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Purpose: 1) To determine the effectiveness of non-operative treatment on PROs; and 2) to identify factors that could predict which patients would undergo TSA.

Significance: There is limited evidence supporting the use of non-operative strategies in the treatment of glenohumeral osteoarthritis (GHOA). Recent AAOS clinical practice guidelines have stated that it is unclear whether non-operative management would produce a clinically important difference in pain or function.

Methods: 62 patients were recruited. Patients could choose to receive or refuse different non-operative modalities, including physical therapy (PT) and corticosteroid injections, based on their preference. ASES questionnaires were administered up to 12-months to evaluate treatment response. Failure was defined as having undergone TSA.

Results: 14 (23%) patients underwent TSA at 7.7 months. Only 19 (31%) patients met MCID and 26 (42%) patients achieved PASS. There was no difference in the change in ASES between patients who did and did not undergo PT ($p = 0.524$). A lack of belief in PT, decrease in ASES score, female sex, and lower resilience were independently associated with failure of non-operative treatment.

Conclusion: Non-operative treatment can meaningfully improve symptoms in approximately 30% of patients. Despite this, patients elect to undergo TSA less than 25% of the time. PT is not beneficial in the treatment of GHOA.

Radiographic and Clinical Outcomes of Traumatic Subtrochanteric Femur Fracture Fixation and Reduction Methods

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Purpose: Assess radiographic and clinical outcomes of various reduction methods and implants for subtrochanteric femur fractures.

Significance: There is debate surrounding optimal reduction methods and implant choices for subtrochanteric femur fractures, given variable complication rates.

Methods: A retrospective review was conducted on patients aged ≥18 with traumatic subtrochanteric fractures at a Level-1 trauma center between 2014-2023. Patient, surgical, and outcome characteristics were collected. Maximum sagittal cortical displacement (MSCD) and modified radiographic union score of the tibia (mRUST) were measured on post-operative radiographs.

Results: Among 65 cases, 54 received intramedullary nailing (IMN), 8 plate osteosynthesis, and 3 a nail-plate combination. There were no differences in AO/OTA fracture patterns between groups. IMN patients had higher BMI. Open reduction was performed in 35 cases, closed/percutaneous reduction in 30. Closed reductions had significantly decreased surgery durations and estimated blood loss (EBL) than open reductions. MCSD was significantly increased in closed/percutaneously reduced fractures and in IMN patients. There were no differences in mRUST, pain, ambulation, or complication rates across reduction methods or implants.

Conclusion: Adequate reduction, high union rates and successful outcomes are possible across reduction methods or implants. Open reduction and plate osteosynthesis can improve sagittal alignment. Closed/percutaneous reduction decreases surgery duration and EBL.

Ballistic and Explosive Orthopaedic Trauma Epidemiology and Infection Rates in Low- and Middle-Income Countries

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Purpose: In low- and middle-income countries (LMICs), ballistic and explosive orthopedic trauma lead to longer surgical delays and higher infection rates compared to higher-resource settings.

Significance: Civilian casualties from conflicts continue increase, particularly in LMICs. Infection rates for ballistic injuries vary globally from 0.5%-15.7%, and the value of antibiotics remains debated with limited literature.

Methods: We analyzed the SIGN database, which includes over 100,000 fractures from 425 sites in 57 LMICs (2016-2023). The focus on surgical delays and infection rates with minimum 30 days follow-up.

Results: Of 117,729 cases, 5,256 had ballistic and 985 had explosive-related fractures. These cases experienced longer surgical delays, with 40% of explosive and 30% of ballistic cases waiting over 30 days ($p < 0.001$). Infection rates were 6.6% for ballistic and 7.6% for explosive injuries. Analysis showed increased infection risk for ballistic fractures with increasing days to surgery (OR = 1.004, 95% C.I. (1.00 - 1.007)) and explosive blast-related fractures had a decreased infection risk when given antibiotics (OR = 0.19, 95% C.I. (0.04 - 0.89)).

Conclusion: The study reveals significant surgical delays and higher infection rates for conflict-related fractures in LMICs. It highlights the need for improved surgical response times, infection prevention, and tailored interventions in these settings.

Comparing Approaches for Intramedullary Nailing of Tibial Shaft Fractures: Radiographic Trajectory and Clinical Outcomes

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Purpose: To compare effectiveness of the suprapatellar, parapatellar and infrapatellar approaches in achieving optimal entry point for tibial shaft fracture intramedullary nailing (IMN).

Significance: Optimal entry point is critical in tibial IMN. The suprapatellar, parapatellar and infrapatellar approaches each offer purported benefits for fracture reduction and insertion in the anatomical safe zone.

Methods: A retrospective review of tibial shaft IMN patients was conducted. Radiographic measurements on intraoperative fluoroscopy in the sagittal and coronal planes of the start point and clinical outcomes were collected.

Results: 90, 17, and 7 patients underwent the suprapatellar, parapatellar, and infrapatellar approaches, respectively. Distribution of open fractures and AO/OTA types were comparable. Start point parameters differed significantly ($p<0.01$): sagittal wire insertion angle (6.3°, 9.6°, 14.7°), reamer insertion angle (5.4°, 5.9°, 13.6°), coronal deviation from medial aspect of the lateral tibial eminence (1.8mm, 4.5mm, 0.8mm), coronal deviation from anatomic axis (1.5mm, 2.2mm, 3.8mm). No differences were observed in surgical or fluoroscopic duration, blood loss, complication or revision rates between groups.

Conclusion: The suprapatellar approach was associated with better wire and reamer insertion start points. Despite being the least frequently utilized in our cohort, the infrapatellar approach minimized coronal deviation the most compared to other approaches.

Laminectomy with Fusion for Cervical Spondylotic Myelopathy is Associated with Higher Early Morbidity and Risk of Perioperative Complications Compared to Laminectomy Alone

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Purpose: The purpose of this study was to evaluate differences in 30-day morbidity, mortality, and postoperative complications between decompression with fusion or decompression alone for management of cervical spondylotic myelopathy (CSM).

Significance: Multilevel laminectomy may lead to progressive kyphotic deformity and instability, resulting in late neurologic deterioration. Laminectomy with fusion is a more complex, costly procedure that may lead to decreased motion and implant-related issues.

Methods: A national database was queried for adults ≥ 18 years of age with CSM and who underwent laminectomy with or without fusion from 2015 to 2020. Estimated 30-day mortality and morbidity, complications, and ASA classification were evaluated through Chi-square and ANOVA, with stratification of results according to ASA classification.

Results: Of 6,412 patients, 3,355 (52%) underwent decompression alone and 3,057 (48%) underwent decompression and fusion. Fusion patients had higher mean morbidity ($p=<0.001$), unplanned reoperations ($p<0.002$) and readmissions ($p< 0.014$), mean length of stay ($p< 0.001$), deep wound infections ($p< 0.022$), and transfusion risk ($p< 0.001$). Increasing ASA score corresponded with a greater increase in complications in the fusion cohort.

Conclusion: Decompression with fusion is associated with higher rates of 30-day complications postoperatively. Decompression alone is an appealing treatment option for CSM patients with higher risk.

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