WELCOME

to the

42nd Annual Arkansas Orthopaedic Forum

November 13, 2026

Jackson T. Stephens Spine & Neurosciences Institute
Fred W. Smith Auditorium, 12th Floor,
Little Rock, AR

Sponsored by the UAMS College of Medicine
Department of Orthopaedic Surgery & Rehabilitation

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ACCREDITATIONS



Joint Accreditation Statement

In support of improving patient care, University of Arkansas for Medical Sciences is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.

AMA Designation Statement

The University of Arkansas for Medical Sciences designates this live activity for a maximum of 5.5 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

UAMS DISCLOSURE POLICY

It is the policy of the University of Arkansas for Medical Sciences (UAMS) to ensure balance, independence, objectivity, and scientific rigor in all directly or jointly provided educational activities.

All individuals who are in a position to control the content of the educational activity (course/activity directors, planning committee members, staff, teachers, or authors of CE) must disclose all relevant financial relationships they have with any commercial interest(s) as well as the nature of the relationship. The ACCME and ACPE describe relevant financial relationships as those in any amount occurring within the past 24 months that create a conflict of interest. *Individuals who refuse to disclose will be disqualified from participation in the development, management, presentation, or evaluation of the CE activity.*

PLANNER AND FACULTY DISCLOSURES

The following speakers of this CE activity have relevant financial relationships with ineligible companies to disclose:

David Collins, MD
- Royalties: Johnson & Johnson

Wes Cox, MD
- Ownership: Flexxline
- Consultant: Medacta
- Royalties: Medacta

Johnathan Goree, MD
- Consultant: Abbott St. Jude, Saluda Medical, Stratus Medical
- Stocks: VitalAudio
- Grant/Research: SPR Therapeutics, Mainstay Medical

Jay Keener, MD, PT
- Royalties: Stryker, Shoulder Innovations

Simon Mears, MD, PhD
- Stocks: Delta Orthopaedics

Lawrence O'Malley, MD
- Consultant: Stryker

Justin Rabinowitz, MD
- Consultant: Stryker

All potential conflicts of interest have been mitigated.

The remaining planners, speakers, moderators, and panelists of this CE activity have no relevant financial relationships with ineligible companies to disclose.

The accreditation compliance reviewer has no relevant financial relationships with ineligible companies to disclose.

Target Audience

This conference is designed for orthopaedic surgeons, residents, nurses, PAs, medical students and other healthcare professionals interested in orthopaedic-related concepts, techniques, surgical and nonsurgical treatment.

Course Objectives

Educational objectives will be fulfilled through lecture, presentation of scientific research, panel discussions, and case presentations. Ample opportunities will be available to express common concerns, share relevant experiences and provide alternative treatment approaches. At the conclusion of this activity, the participant should be able to:

- Discuss surgical techniques to improve orthopaedic surgeries.
- Discuss current practice topics related to operative and non-operative orthopaedic care.
- Discuss current orthopaedic research and its application to operative and non-operative orthopaedic care.

PROGRAM PLANNING COMMITTEE

R. Dale Blasier, MD, FRCS(C), MBA
Course Director
Professor, Pediatric Orthopaedics
Interim Chairman
UAMS Department of Orthopaedic Surgery & Rehabilitation

J. Ryan Hill, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

Simon Mears, MD, PhD
Professor, Adult Joint Reconstruction
UAMS Department of Orthopaedic Surgery & Rehabilitation

Corey O. Montgomery, MD
Associate Professor, Orthopaedic Oncology
UAMS Department of Orthopaedic Surgery & Rehabilitation
Associate Scientist, Winthrop P. Rockefeller Cancer Institute

John L. Vander Schilden, MD
Professor, Sports Medicine
Jackson T. Stephens Distinguished Professor
UAMS Department of Orthopaedic Surgery & Rehabilitation

Theresa Wyrick-Glover, MD
Associate Professor, Hand & Upper Extremity
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dana L. Garrison
Becky L. Wilson
Program Co-Coordinators
UAMS Department of Orthopaedic Surgery & Rehabilitation

COURSE FACULTY

KEYNOTE SPEAKER

Jay Keener, MD, PT
Professor, Orthopaedic Surgery, Division of Shoulder and Elbow Surgery
Fellowship Director, Shoulder & Elbow Reconstruction
Chief, Shoulder and Elbow Service
Washington University, St. Louis, Missouri

UAMS FACULTY PRESENTERS AND PANELISTS

Wes Cox, MD
Assistant Professor, Shoulder & Elbow

Mark Ellis, OTR/L, CHT
Occupational Therapist

Johnathan Goree, MD
Director of Chronic Pain Division
Program Director Chronic Pain Medicine Fellowship
Associate Professor of Anesthesiology

J. Ryan Hill, MD
Assistant Professor, Shoulder & Elbow

Sophie Hollenberg, MD
Assistant Professor, Hand & Upper Extremity

Larry O'Malley, MD
Assistant Professor, Sports Medicine

Justin Rabinowitz, MD
Assistant Professor, Shoulder & Elbow

Chad Songy, MD
Assistant Professor, Shoulder & Elbow

GUEST PANELISTS

David Collins, MD
Central Arkansas Veterans Healthcare System

Jeremy Swymn, MD
Jonesboro Orthopaedics & Sports Medicine

ORTHOPAEDIC RESIDENT PRESENTERS

Elizabeth Brown, MD – PGY-4
Kelsey Henderson, MD – PGY-4
Katherine Montoya, MD – PGY-5
Michael Nemec, MD – PGY-4
R. Hunter Rose, MD – PGY-4
Lauren Torrey, MD – PGY-4

RESIDENT RESEARCH COMPETITION JUDGES

Mark Feger, MD, PhD
Assistant Professor, Orthopaedic Spine
UAMS Department of Orthopaedic Surgery & Rehabilitation

Jay Keener, MD, PT
Professor, Orthopaedic Surgery, Division of Shoulder and Elbow Surgery
Fellowship Director, Shoulder & Elbow Reconstruction
Chief, Shoulder and Elbow Service
Washington University, St. Louis, Missouri

Ronald Robertson, MD
Dean, College of Medicine
Executive Vice Chancellor
Professor of Surgery
University of Arkansas for Medical Sciences

MODERATORS

R. Dale Blasier, MD
Course Director
Interim Chairman, UAMS Department of Orthopaedic Surgery & Rehabilitation

J. Ryan Hill, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

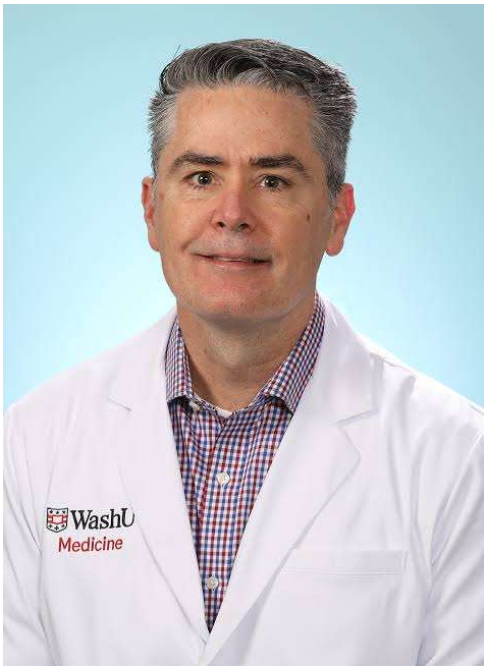
Theresa Wyrick-Glover, MD
Associate Professor, Hand & Upper Extremity
UAMS Department of Orthopaedic Surgery & Rehabilitation

2026 AGENDA

7:30-8:00am	Registration and Breakfast - VISIT EXHIBITORS	
8:00-8:15am	Welcome and Introduction	R. Dale Blasier, MD
The Carl L. Nelson Distinguished Visiting Professor		
8:15-8:45am 8:45-9:00am	*Anatomic Shoulder Arthroplasty - Still the Gold Standard for Cuff Intact Glenohumeral Joint Arthritis?* Q&A	Jay Keener, MD, PT
9:00-9:15am	BREAK – VISIT EXHIBITORS	
The James Aronson, MD PGY-4 Resident Research Competition		
9:15am	Introduction of Judges and Presentation of Resident Competition Theresa Wyrick-Glover, MD - MODERATOR	JUDGES: Mark Feger, MD, PhD Jay Keener, MD, PT Ron Robertson, MD
9:20-9:28am 9:28-9:30am	*Outpatient Management of Slipped Capital Femoral Epiphysis Is Common, Safe, and Saves Costs: A Single-Institution Analysis and Results From a National Database Survey* Q&A	Elizabeth Brown, MD Advisor: Scott Schoenleber, MD
9:30-9:38am 9:38-9:40am	*The Impact of Statewide Implementation of Pre-Hospital Antibiotic Administration Guideline on Open Long Bone Fractures* Q&A	Kelsey Henderson, MD Advisors: Regis Renard, MD and Scott Schoenleber, MD
9:40-9:48am 9:48-9:50am	*Retrospective Comparison of Reverse Sural Artery Flap with and without Venous Supercharge* Q&A	Michael Nemec, MD Advisor: John Bracey, MD
9:50-9:58am 9:58-10:00am	*Establishing Reference Values for CT-Based Assessment of Bone Density in the Shoulder Girdle* Q&A	R. Hunter Rose, MD Advisor: J. Ryan Hill, MD
10:00-10:08am 10:08-10:10am	*Cumulative Anesthetic Exposure in Early-Onset Scoliosis: Magnetically Controlled Growing Rods Versus Shilla Growth Guidance* Q&A	Lauren Torrey, MD Advisor: Matthew Landrum, MD
10:10-10:30am	• Judges' Conference • R. Dale Blasier, MD Teaching Award • Arkansas Traveler Presentation • General Announcements	
10:30am	**Resident Winner Announced**	
10:35-10:45am 10:45-10:50am	*Complex Regional Pain Syndrome* Q&A	Johnathan Goree, MD
10:55-11:05am 11:05-11:10am	*When Subcutaneous Contraceptive Implant Removal Requires Upper Extremity Surgery: A National Analysis of Risk Factors, Complications, and Healthcare Utilization* Q&A	Katherine Montoya, MD PGY-5
11:10-12:15pm	LUNCH BREAK– VISIT EXHIBITORS	

17TH Annual Panel of Experts – Upper Extremity		
12:15pm	Introduction of Experts and Topics J. Ryan Hill, MD - MODERATOR	
The Role of PT/OT in Upper Extremity Treatment		
12:20-12:30pm	*Journey from PT to MD*	Jay Keener, MD, PT
12:30-12:50pm	Question and Answer with Dr. Jay Keener	Mark Ellis, OT
Shoulder Arthroplasty	**Panel: Jay Keener, MD; David Collins, MD; Justin Rabinowtiz, MD**	
12:55-1:10pm 1:10-1:15pm	*The Valuation of Shoulder Arthroplasty* *Q&A*	R. Dale Blasier, MD
1:15-1:30pm 1:30-1:35pm	*The History of Reverse Total Shoulder Arthroplasty* *Q&A*	David Collins, MD
1:40-1:55pm 1:55-2:00pm	*Case Presentation* *Q&A*	J. Ryan Hill, MD
2:00-2:15pm	BREAK – VISIT EXHIBITORS	
The Sports Shoulder	**Panel: Jay Keener, MD; Wes Cox, MD; Larry O'Malley, MD**	
2:15-2:30pm 2:30-2:35pm	*Beyond the Calendar: Using Data to Guide Return to Play After Shoulder and Elbow Surgery* *Q&A*	Wes Cox, MD
2:35-2:50pm 2:50-2:55pm	*Case Presentation* *Q&A*	Justin Rabinowtiz, MD
Elbow	**Panel: Jay Keener, MD; Sophie Hollenberg, MD; Chad Songy, MD**	
3:00-3:15pm 3:15-3:20pm	*Posteromedial Rotatory Instability* *Q&A*	Chad Songy, MD
3:20-3:35pm 3:35-3:40pm	*Case Presentation* *Q&A*	Jeremy Swymn, MD
3:45-4:00pm	Closing Draw for Door Prizes – Must be present to win! See the last page of the program to enter. Adjourn	

The Carl L. Nelson Distinguished Visiting Professor



Jay D. Keener, MD, PT
Sam and Marilyn Fox Distinguished Professor of Orthopaedic Surgery
Division Chief, Shoulder and Elbow Surgery
Vice Chair, Department of Orthopaedic Surgery
Washington University School of Medicine, St. Louis, Missouri

Dr. Jay Keener is a nationally recognized orthopaedic surgeon specializing in shoulder and elbow reconstruction, sports-related injuries, and complex upper extremity conditions. He serves as the Sam and Marilyn Fox Distinguished Professor of Orthopaedic Surgery, Division Chief of Shoulder and Elbow Surgery, and Vice Chair of the Department of Orthopaedic Surgery at Washington University School of Medicine in St. Louis.

Dr. Keener earned his Bachelor of Science in Physical Therapy and medical degree from West Virginia University School of Medicine. He completed his orthopaedic surgery residency at the University of Iowa Hospitals and Clinics, followed by fellowship training in shoulder and elbow reconstruction at Washington University.

A leader in his field, Dr. Keener's clinical expertise includes arthroscopic shoulder surgery, rotator cuff disease and repair, shoulder instability, shoulder and elbow arthritis, joint replacement, fractures, and complex reconstructive procedures. His research focuses on improving outcomes in shoulder and elbow surgery, including rotator cuff repair, tendon transfers, arthroplasty, and surgical education.

Throughout his career, Dr. Keener has been recognized for excellence in patient care, education, and academic achievement, including receiving the Jerome J. Gilden Distinguished Physician Award for Compassionate Care and multiple teaching awards from Washington University's Department of Orthopaedic Surgery.

Dr. Keener is widely respected as an educator, mentor, surgeon, and innovator whose contributions continue to advance the field of shoulder and elbow surgery.

The James Aronson, MD Resident Research Competition

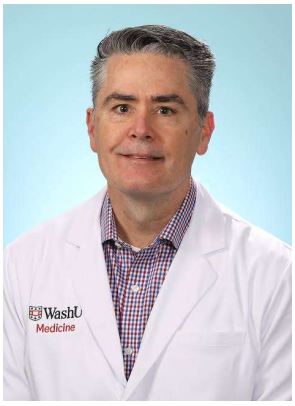
JUDGES



Mark Feger, MD, PhD
Assistant Professor, Orthopaedic Spine
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Mark Feger earned his PhD in Sports Medicine from the University of Virginia in 2015, where his research focused on neuromuscular and biomechanical adaptations following lower extremity injury. His dissertation was recognized with the National Athletic Trainers' Association Doctoral Dissertation Award. He then attended Virginia Commonwealth University School of Medicine, graduating as class valedictorian. Dr. Feger completed his orthopaedic surgery residency at Washington University in St. Louis, where he received the Chief Resident Research Award for his work examining the neuromuscular effects of nerve transection and repair in genetically modified rodents incapable of undergoing Wallerian degeneration. He subsequently completed a spine surgery fellowship at Emory University.

Dr. Feger is an active member of the AO Spine Lumbar and Cervical Degenerative Knowledge Forums and maintains a broad clinical interest in all aspects of spine surgery, with particular expertise in spinal deformity. Outside of his professional pursuits, he enjoys spending time outdoors with his wife, Hailey, and their two daughters, Maisyn and Adalynn.



Jay D. Keener, MD, PT
Sam and Marilyn Fox Distinguished Professor of Orthopaedic Surgery
Division Chief, Shoulder and Elbow Surgery
Vice Chair, Department of Orthopaedic Surgery
Washington University School of Medicine, St. Louis, Missouri

See Bio on page 10.



Ronald Robertson, MD
Dean, College of Medicine
Executive Vice Chancellor
Professor of Surgery
University of Arkansas for Medical Sciences

Dr. Robertson earned his undergraduate degree from the University of Arkansas at Fayetteville before completing medical school, his surgical residency, and his fellowship in trauma, critical care, and burn surgery at UAMS. In 1996, he joined the College of Medicine faculty as an assistant professor of surgery. In 2001, he was named an associate professor of surgery, and in 2008, he became a full professor. In 2019, he was named chair of the Department of Surgery.

Dr. Robertson has dedicated his career to improving trauma care in Arkansas. From 1995 to 2005, he served as the director of the Arkansas Children's Hospital Burn Unit. Dr. Robertson also played a pivotal role in the development of the Arkansas Trauma System, and as an Advanced Trauma Life Support (ATLS) course director since 1996, he has taught more than 300 ATLS courses, helping train more than 4,500 healthcare providers nationwide. His scholarly work has advanced both basic science and clinical research focused on improving outcomes for trauma patients.

Throughout his career, Dr. Robertson has held numerous leadership roles in surgery, clinical care, and trauma, including service on 71 UAMS hospital committees and nine national committees. In 2022, he was named the inaugural holder of The Gilbert S. "Gil" Campbell, MD, PhD, Endowed Chair in Surgical Leadership and Innovation.

A retired major in the U.S. Army National Guard, Dr. Robertson is married to Carla Lynn Robertson, BSN, RN, a clinical documentation specialist at UAMS. The couple has three children.

The James Aronson, MD Resident Research Competition

PGY-4 RESIDENT PRESENTERS

Outpatient Management of Slipped Capital Femoral Epiphysis Is Common, Safe, and Saves Costs: A Single-Institution Analysis and Results from a National Database Survey

Elizabeth Brown, MD

Advisor: Scott Schoenleber, MD

The Impact of Statewide Implementation of Pre-Hospital Antibiotic Administration Guideline on Open Long Bone Fractures

Kelsey Henderson, MD

Advisors: Regis Renard, MD and Scott Schoenleber, MD

Retrospective Comparison of Reverse Sural Artery Flap with and without Venous Supercharge

Michael Nemec, MD

Advisor: John Bracey, MD

Establishing Reference Values for CT-Based Assessment of Bone Density in the Shoulder Girdle

R. Hunter Rose, MD

Advisor: J. Ryan Hill, MD

Cumulative Anesthetic Exposure in Early-Onset Scoliosis: Magnetically Controlled Growing Rods Versus Shilla Growth Guidance

Lauren Torrey, MD

Advisor: Matthew Landrum, MD

Outpatient Management of Slipped Capital Femoral Epiphysis Is Common, Safe, and Saves Costs: A Single-Institution Analysis and Results from a National Database Survey

1st Author: Elizabeth Brown, MD
2nd Author: Destiny Wilson, MD
3rd Author: Hunter Lawrence, BS
4th Author: Randall Rainwater, BS
5th Author: Eric Siegel, MS
6th Author: Brien Rabenhorst, MD
7th Author: Scott Schoenleber, MD

Introduction:
Slipped capital femoral epiphysis (SCFE) is a condition requiring surgical fixation on a semiurgent basis. Although recent studies have evaluated the safety of outpatient SCFE management, none have examined cost in this population. Furthermore, it is unclear what percent of in situ SCFE fixation is done on an outpatient basis nationally.

Methods:
A retrospective chart review of patients treated between the years 2015 to 2024 was conducted at a large tertiary-care children's health system. Patients undergoing in situ fixation for stable SCFE and a minimum 90 days follow-up were included. Demographics, outcomes, and charges were compared between patients treated as outpatients or inpatients. A review of the national PearlDiver database was performed to determine frequency of inpatient versus outpatient settings for this procedure.

Results:
A total of 95 patients with stable SCFE were included. The mean age was 11.6 ± 1.9 years. Thirty patients were admitted through the emergency department, 19 of which underwent admission, surgery, and discharge on the same day. In total, 65 patients were scheduled as outpatients from clinic, 58 of which were true outpatient procedures. There was no difference in 90-day complications between groups. There was, however, a significant difference in patient charges for scheduled outpatients versus ED admissions ($10,052.40 vs $13,285.14; $P = 0.001$). In addition, scheduled outpatient surgery was less expensive than treatment through the ED, even if fixation and discharge occurred the same day ($9,669.90 vs $11,585.78; $P = 0.041$). On a national level, outpatient SCFE management is more frequent than inpatient management ($P = 0.0016$).

Conclusion:
This study suggests that stable SCFE can safely be an outpatient procedure with significant cost savings. A national trend toward outpatient SCFE management is evident, mirroring general healthcare trends.

The Impact of Statewide Implementation of Pre-Hospital Antibiotic Administration Guideline on Open Long Bone Fractures

1st Author: Kelsey Henderson, MD
2nd Author: Taylor Arnold, BS
3rd Author: Scott Schoenleber, MD
4th Author: Nathania Nischal, BS
5th Author: Regis Renard, MD, MS

Introduction:
The treatment of open long bone fractures involves both the appropriate surgical stabilization of the bony injuries but also critical attention to the soft tissue injury management with timely administration of antibiotics. Antibiotic administration within 120 minutes of injury is correlated with decreased risk of infection in this setting. This presents a challenge at our level 1 trauma center in rural Arkansas, as our patients face commute and medical access disparities that can increase the time of arrival at the treatment hospital. In 2020, the Arkansas Trauma Society published multidisciplinary guidelines for appropriate antibiotic use in trauma, which supported antibiotic delivery by Emergency Medical Services (EMS) personnel when there is clinical suspicion of an open fracture. These guidelines were published on the Arkansas Department of Health website and Arkansas Trauma Society website. Our study sought to evaluate if there was improved timing to antibiotic administration, decreased infection, and decreased re-operation within the cohort following publication and implementation of this policy.

Methods:
A retrospective comparative study was performed at a single Level I adult trauma center. Patients 18 years and older who underwent operative treatment for open long-bone fractures in 2017 to 2018 (pre-protocol), were compared with patients treated in 2022 to 2023 (post-protocol). The primary outcome was time from injury to first antibiotic administration. Secondary outcomes included antibiotic administration within 60, 120, and 180 minutes of injury; antibiotic administration before arrival at the definitive treatment trauma center; fracture-related infection; readmission; and hospital length of stay. Adjusted risk ratios were calculated for binary timing outcomes.

Results:
A total of 162 patients were included, with 75 in the pre-protocol group and 87 in the post-protocol group. Median injury-to-antibiotic time decreased from 119 to 89 minutes after protocol implementation, representing a 30-minute reduction (P = 0.032). After adjustment for age, sex, Injury Severity Score, and Gustilo-Anderson type, post-protocol patients were more likely to receive antibiotics within 120 minutes of injury (aRR, 1.31; 95% confidence interval (CI), 1.01–1.70; P = 0.045). FRI rates were similar between groups (8.0% vs. 9.2%; P > 0.999). The highest observed infection rate was among patients with type III tibia/fibula fractures, with infection occurring in 6 of 21 patients (28.6%).

Conclusion:
Implementation of a statewide civilian prehospital antibiotic protocol was associated with earlier antibiotic administration in operatively treated adult open long-bone fractures, with the clearest improvement occurring within 120 minutes of injury. Although infection rates were similar in pre- and post-protocol groups, larger multicenter studies are needed to determine whether earlier prehospital antibiotic delivery impacts infection rates or other clinical outcomes.

Retrospective Comparison of Reverse Sural Artery Flap with and without Venous Supercharge

1st Author: Michael Nemec
2nd Author: Jason Eckels
3rd Author: John Bracey
4th Author: Mark Tait

Introduction:
Management of wounds to the lower leg, ankle, and foot pose a significant challenge given the lack of soft tissue for coverage and poor blood supply. This anatomic region is prone to trauma and open fracture, leading to exposed bone and/or hardware, with inability to close wounds primarily or rely on secondary intention for healing. Additionally, large soft tissue defects may occur after tumor resection or from infectious etiology. As such, there is need for a reliable and versatile soft tissue flap for wound coverage when limb salvage is attempted. The reverse sural artery flap (RSAF) has previously shown to have a high frequency of venous congestion and flap necrosis, especially in the comorbid patient. Multiple modifications have been made to improve results, a promising option being supercharge (sRSAF), or venous anastomosis, to improve venous outflow and congestion. Our study seeks to add to the growing literature reporting outcomes of sRSAF in comparison to standard RSAF, especially in comorbid patients and those with very large soft tissue defects.

Methods:
This is a single center retrospective study which reviewed all RSAF cases performed by two reconstructive surgeons between 2016 to 2026. Exclusion criteria included any patient with less than 28 days follow up. Decision to supercharge was made intra-operatively based on flap size, location, and availability of a viable recipient vein. Patient medical charts were then reviewed to collect data including demographics, comorbidities, wound and surgical details, and outcomes. The primary focus of outcomes was to need for prolonged wound care, evidence of necrosis or deep infection, and unplanned reoperations related to the flap.

Results:
A total of 28 patients met criteria to be included in the study, 12 of which underwent venous supercharge. There was no significant difference in age, sex, wound etiology, or location. Larger median wound size was recorded in those who underwent supercharge (52 cm^2 vs 36 cm^2). Patients who underwent sRSAF were more often active smokers (75% vs 25%; $p = 0.02$) and had recorded alcohol/substance (50% vs 13%; $p = 0.04$) while a significantly higher BMI was recorded in those undergoing standard RSAF (33.1 vs 26.1; $p = 0.02$). Prolonged wound care was more common for standard RSAF (56% vs 43%). Post-operative necrosis or infection of any kind was similar (RSAF 50% vs 43%) but unplanned reoperation at the flap site or underlying bone was more common for RSAF (44% vs 17%). Failure of limb salvage requiring amputation was more common in RSAF (19% vs 0%).

Conclusion:
When technically feasible, performing venous supercharge at the time of reverse sural artery flap coverage of complex lower extremity wounds provides improved outcomes. In our study, patients undergoing supercharge more often had comorbidities of active smoking and alcohol/substance abuse with larger wounds. Even so, the supercharge group experienced a clinically significant lower frequency of prolonged wound care, deep

infection or necrosis requiring reoperations related to the flap, and failure of limb salvage resulting in amputation.

Establishing Reference Values for CT-Based Assessment of Bone Density in the Shoulder Girdle

1st Author: R. Hunter Rose, PGY-4
2nd Author: Madelyn Bowman, MS4
3rd Author: Mathew Landrum, MD
4th Author: Justin Rabinowitz, MD
5th Author: J. Ryan Hill, MD

Introduction:
Total shoulder arthroplasty (TSA) annual volume in the United States has increased substantially in recent years. This growth trajectory is projected to accelerate as the population ages. Increased demand of shoulder arthroplasty has led to increased focus on factors that affect outcomes. Bone mineral density (BMD) steadily decreases with age, and many patients undergoing TSA are at-risk for osteopenia and osteoporosis. Osteoporosis has been identified as a significant independent risk factor for adverse outcomes following TSA. The current gold standard for diagnosing osteoporosis and assessing bone quality is dual-energy x-ray absorptiometry (DEXA); however, this test provides no direct assessment of the shoulder girdle. As a result, for patients undergoing TSA, this data must be extrapolated from other skeletal regions which see different mechanical stresses and may therefore differ in bone remodeling processes. Recently, methods using computed tomography (CT) imaging to measure Hounsfield Units (HU) have provided site-specific BMD assessments in the shoulder that have been associated with peri-prosthetic fracture risk. However, in contrast to DEXA scans, which provide a T-score that compares osteoporotic bone to a healthy control with normal BMD, there is no established baseline value of normal bone density in a young, healthy population using HU measured on CT. This study aims to provide a benchmark value of BMD in a young, healthy population using HU based on CT scans obtained from patients that underwent surgery for traumatic shoulder instability.

Methods:
This study is a retrospective evaluation of surgical cases performed by two fellowship-trained shoulder and elbow surgeons at one institution. Patients selected had routine pre-operative CT scans before undergoing surgery for traumatic shoulder instability. Patients older than 49 and those with significant comorbidities that affect BMD were excluded. Hounsfield Units (HU) were measured on 2-dimensional (2D) CT scans by 2 independent observers in 3 anatomic locations including the proximal humerus, glenoid, and scapular spine/acromion (SSA) using previously validated methods. The SSA region was further subdivided into 3 regions as described by Levy et al. These measurements were averaged to determine a mean baseline value for each region. An inter-rater reliability assessment was performed between the measurements of the two observers. Secondary analysis was then performed on the cohort stratified by age into 3 subgroups using ANOVA analysis.

Results:
38 patients were identified from case logs that met inclusion criteria for analysis. The average patient age was 32 years old (mean 32.3, median 32.5, range 16-49), 85% were male, 51% white, with an average BMI of 28.2. Inter-relater reliability assessment on measurements between the two observers demonstrated acceptable association of measurements between patients (average Pearson coefficient $r = 0.86$) as well as agreement between absolute values (Intra-Class Correlation Coefficient ICC = 0.81). The average BMD in HU for the proximal humerus and glenoid were 205 and 351 respectively. Averages for SSA zones 1-3 were 240, 419, and 539. When stratified for age, BMD significantly decreased with increasing age in all 5 anatomic regions ($p < 0.001$). The proximal humerus demonstrated the greatest relative decrease in BMD between younger and

older groups (38%). No significant difference was found in BMD when stratified for gender using Welch's t-test ($p = 0.19$).

Conclusion:
This study provides reference values from a young, healthy patient population for CT-based bone mineral density assessments of the shoulder girdle. In this small retrospective cohort, HU values for all regions of the proximal humerus and scapula were inversely associated with increasing patient age. These values can be used as a reference when evaluating elderly patients at-risk for fragility or insufficiency fractures of the shoulder girdle, particularly as part of the preoperative assessment for TSA procedures.

Cumulative Anesthetic Exposure in Early-Onset Scoliosis:
Magnetically Controlled Growing Rods Versus Shilla Growth Guidance

1st Author: Lauren Torrey, MD
2nd Author: Braeden Eldred (MS3)
3rd Author: Richard McCarthy, MD
4th Author: Eric Siegel, MS
5th Author: David Bumpass, MD
6th Author: Matthew Landrum, MD

Introduction:
Early onset scoliosis (EOS) presents numerous treatment challenges, including choosing the appropriate implant construct. The Magnetically Controlled Growing Rod (MCGR) construct is a commonly used distraction technique, while the Shilla Guided Growth (SGG) construct relies on spinal growth to elongate the trunk. Cumulative anesthetic exposure can be an overlooked yet important measure of treatment burden. The objective of this study was to compare the frequency of anesthesia exposure and time under anesthesia between patients treated with the MCGR and SGG constructs.

Methods:
The Pediatric Spine Study Group (PSSG) database was queried for all initial SGG and MCGR constructs that have gone on to graduation, from database inception to December 24th, 2024. Graduation was defined as definitive fusion, reaching 18 years of age, or completion of the STOP questionnaire. Patient demographics, EOS etiology, total anesthesia events, total anesthetic time, and total procedure time were recorded.

Results:
After exclusion criteria were applied, there were 593 eligible patients. 490 patients had initial MCGR constructs and 103 underwent SGG. SGG constructs were implanted for an average of 2.18 years longer than MCGR constructs ($p<0.001$). SGG constructs had a mean number of 3.67 procedures compared to MCGR at 2.68, including index and definitive procedures ($p<0.001$). MCGR constructs had significantly fewer total minutes under anesthesia, 873.2, compared to SGG, 1,082.6 ($p<0.001$). MCGR had less total procedure time at 625 minutes, compared to SGG procedure time at 796 minutes ($p<0.001$).

Conclusion:
MCGR constructs had fewer procedures, less total time under anesthesia, and less total procedure time overall than SGG constructs. SGG constructs allowed later definitive fusion and were implanted for longer periods of time on average.

PANEL OF EXPERTS AND CASE DISCUSSION PRESENTERS



R. Dale Blasier, MD, FRCS(C), MBA
Professor, Pediatric Orthopaedics
Interim Chairman, UAMS Department of Orthopaedic Surgery & Rehabilitation

After graduation from medical school and orthopaedic surgery residency at Wayne State University in Detroit, Dr. Blasier completed a fellowship in children's orthopaedics at the University of Manitoba in Winnipeg MB, Canada. He has been at the University of Arkansas for Medical Sciences since 1989 practicing at the Arkansas Children's Hospital and was program director of the orthopaedic residency for 18 years.

He is active in Coding, Coverage, and Reimbursement issues for the American Academy of Orthopaedic Surgeons, the North American Spine Society and the American Foot and Ankle Society.



David Collins, MD
Central Arkansas Veterans Healthcare System

Raised in Iowa, Dr. Collins earned his medical degree from the University of Iowa before completing his orthopaedic surgery internship and residency at the University of Arkansas for Medical Sciences. He pursued advanced fellowship training in shoulder and elbow surgery, adult reconstruction, and sports medicine.

Over a career spanning academic medicine and private practice, Dr. Collins has cared for a wide range of patients while helping train future physicians. His connection to Veterans Affairs has been a constant throughout his professional life, serving as a student, provider, and educator within the VA system for more than 40 years.



Wes Cox, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Cox serves as Section Chief for UAMS Orthopaedics & Sports Medicine in Fayetteville, AR. He is a board certified, fellowship trained shoulder and elbow surgeon who also serves as the Medical Director and Head Team Physician for the University of Arkansas Athletic Department.

A Fayetteville native, Dr. Cox received his MS in Microbiology from Auburn University before coming back to Arkansas for Medical School and Orthopaedic Residency at UAMS. After completing

his fellowship in San Francisco, CA, he and his family returned to Fayetteville in 2009. Wes and his wife Alexis met at UAMS 27 years ago and have 3 children: Campbell (21), Marin (18), and Crawford (14).



Mark Ellis, OTR/L, CHT
University of Arkansas for Medical Sciences

Mark Ellis is a certified hand therapist and rehabilitation specialist with more than 30 years of experience treating hand and upper extremity injuries. He earned his degree from the University of Central Arkansas in 1991 and currently practices full-time in hand and upper extremity rehabilitation at the University of Arkansas for Medical Sciences (UAMS) in Little Rock, Arkansas.

A recognized leader in his field, Mark founded the Arkansas Hand Therapy Society and served as its president in 2022, followed by service as an advisory board member from 2023 to 2024. He is an active educator and frequent speaker, presenting annually at the UAMS Hand Therapy Forum, the Arkansas Hand Therapy Society, and the University of Central Arkansas Occupational Therapy Doctorate (OTD) Program, where he serves as an adjunct professor.



Johnathan Goree, MD
Neurosciences Service Line Director
Director of the Chronic Pain Division
Professor, Anesthesiology
University of Arkansas for Medical Sciences

Dr. Goree completed medical school and anesthesia residency at the Weill College of Medicine at Cornell University and chronic pain medicine fellowship at Emory University. Dr. Goree is a patient advocate, researcher, teacher, hospital executive, and leader. He has published over 60 peer reviewed publications and given over 100 national and international lectures in his 12 years in academic medicine. He also serves as a board member at large for the North American Neuromodulation Society.



J. Ryan Hill, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Hill earned his medical degree from the Keck School of Medicine at the University of Southern California, where he was awarded the university-wide Order of Areté honor and a Distinction in Research, and was inducted into the Alpha Omega Alpha Honor Medical Society. Following medical school, he completed his orthopaedic surgery residency at Washington University in St. Louis, where he was elected to the American Orthopaedic Association's Resident Leadership Forum and Emerging

Leaders Program, and served as the Administrative Chief Resident. Dr. Hill remained at Washington University to pursue a fellowship in the division of shoulder and elbow reconstruction.

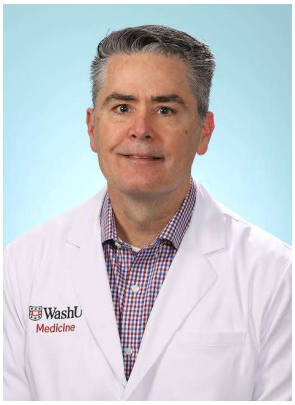
Dr. Hill is actively involved in national efforts for advancing shoulder and elbow care and bone health, as well as surgeon career development and leadership. Dr. Hill's research focuses on better understanding the bony changes of the shoulder girdle as the body ages, to improve patients' outcomes after shoulder replacements.



Sophie Hollenberg, MD
Assistant Professor, Hand & Upper Extremity
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Sophie Hollenberg earned her undergraduate degree from the University of Arkansas in Fayetteville and her medical degree from UAMS, where she also completed her orthopaedic surgery residency. She then pursued advanced fellowship training in hand and microsurgery at the University of Utah in Salt Lake City.

Now in her third year of practice, Dr. Hollenberg specializes in the care of conditions affecting the upper extremity, with a clinical focus spanning the elbow to the fingertips, including peripheral nerve disorders. In addition to her patient care responsibilities, she is actively involved in resident education and enjoys mentoring medical students as they explore careers in orthopaedic surgery and academic medicine.



Jay D. Keener, MD, PT
Sam and Marilyn Fox Distinguished Professor of Orthopaedic Surgery
Division Chief, Shoulder and Elbow Surgery
Vice Chair, Department of Orthopaedic Surgery
Washington University School of Medicine, St. Louis, Missouri

See Bio on page 10.



Katherine Montoya, MD
Orthopaedic Resident, PGY-5
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Montoya earned her Bachelor of Science in Exercise Science from the University of South Carolina Honors College and her medical degree from the University of South Carolina School of Medicine. Throughout her training, Dr. Montoya has been actively involved in orthopaedic research, authoring multiple publications and presenting her work at local, regional, national and international meetings. A dedicated leader and advocate, she has led quality improvement initiatives, developed policies to support bilingual patient care, and contributed to resident education. Fluent in Spanish, she is committed to expanding access to musculoskeletal care and has been recognized with the UAMS Phenomenal Woman in Medicine Award and multiple research honors. Following graduation from residency in June 2027, she will pursue a Hand & Upper Extremity Fellowship at the University of New Mexico in Albuquerque.



Larry O'Malley, MD
Assistant Professor, Sports Medicine Surgery
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. O'Malley is a board-certified orthopaedic sports medicine surgeon and has practiced at UAMS since 2017. He earned his medical degree with Highest Honors from the University of Tennessee Health Science Center College of Medicine and completed his orthopaedic surgery residency at Greenville Health System/Steadman Hawkins Clinic of the Carolinas. He then pursued advanced fellowship training in orthopaedic sports medicine through Mississippi Sports Medicine and Tulane University. Dr. O'Malley has extensive experience caring for athletes at all levels, serving as team physician for collegiate, professional, and high school sports programs.



Justin Rabinowitz, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

Dr. Justin Rabinowitz earned his undergraduate degree from Arizona State University, received his medical degree from Rush Medical College, and completed his Orthopaedic Surgery residency at the Medical University of South Carolina. He then completed a Shoulder and Elbow Fellowship at Washington University in St. Louis. Dr. Rabinowitz is actively involved in clinical research, education, and surgical training. Outside of medicine, he enjoys spending time with his wife, Hannah, and their three children.



Chad Songy, MD
Assistant Professor, Shoulder & Elbow
UAMS Department of Orthopaedic Surgery & Rehabilitation

A native of Baton Rouge, Louisiana, he graduated *summa cum laude* from Louisiana State University with a Bachelor of Science in Biology before earning his medical degree from Louisiana State University Health Sciences Center in Shreveport.

After medical school, he journeyed to Arkansas to complete his orthopaedic surgery residency at UAMS in Little Rock. Following residency, Dr. Songy completed his shoulder and elbow fellowship at Mayo Clinic in Rochester, Minnesota, with a focus on complex shoulder and elbow reconstruction in both adult and pediatric patients.

Dr. Songy has been in practice for more than seven years, with a practice dedicated exclusively to shoulder and elbow care, serving patients throughout Northwest Arkansas and the surrounding region.



Jeremy Swymn, MD
Jonesboro Orthopaedics & Sports Medicine

Dr. Jeremy Swymn is a graduate of Arkansas State University with a degree in Zoology. After graduating from medical school at UAMS, he completed his Orthopaedic Surgery residency training at Campbell Clinic in Memphis, TN. Dr. Swymn then completed his Sports Medicine fellowship at ASMI in Birmingham, AL under the mentorship of Dr. James Andrews, Lyle Cain, Jeff Dugas, and Bill Clancy. He then joined Jonesboro Orthopaedics and Sports Medicine and has practiced th ere since 2009. He has served as the head team physician for Arkansas State University since 2009.

Dr. Swymn specializes in ligament reconstruction of the knee, shoulder, and elbow. He also performs hip arthroscopy and cartilage transplant and performs shoulder and knee replacements.

Dr. Swymn has been married to Jennifer Swymn since 1999 and has two children. He is a AAOS fellow, a member of AOSSM and AANA. He has serviced as the AOS Secretary/Treasurer since 2024. He is an avid musician and enjoys travel, fitness, and literature.

Honors in Research, UAMS College of Medicine
Department of Orthopaedic Surgery & Rehabilitation

The Honors in Research (HiR) Program at UAMS allows medical students to pursue a significant research project while earning their medical degree. In the Department of Orthopaedic Surgery, the HiR program is a competitive opportunity that begins with a dedicated research experience during the summer between the first and second years of medical school.

Working closely with a faculty mentor, students gain hands-on experience in study design, data analysis, and scientific communication, while also participating in clinical and operating room shadowing with their advisor. Students who successfully complete all requirements graduate with an Honors in Research distinction.

The abstracts presented here and the posters featured in the slideshow highlight projects by some of the most recent cohort of orthopaedic HiR students.

Evaluation of AI-Generated Responses to Parental Questions on Early-Onset Scoliosis
Reghan Barnett (Advisor: Matthew Landrum, MD)

Preoperative GLP-1 Receptor Agonist Use and Outcomes After Spinal Fusion in Three Metabolic Cohorts
Avery Carter (Advisor: Mark Feger, MD, PhD)

Total Shoulder Arthroplasty Patients with Demyelinating and Neurodegenerative Disorders Experience Higher Rates of Complications and Reoperation
Emmanuel Cazano (Advisor: J. Ryan Hill, MD)

Resection of Preaxial Polydactyly with Duplication at the Level of the Tarsal Bones: A Case Report
Gisselle Hernandez (Advisor: Sean Parham, MD)

Steroid Usage Is a Key Driver for Osteonecrosis of the Femoral Head After Cancer Treatment
Thomas Needy (Advisor: Jeffrey Stambough, MD)

Robotic Screw Placement in Growth Guidance Surgery for Early Onset Scoliosis: A Pilot Case Series
Kolby Payne (Advisor: David Bumpass, MD)

Opioid Use in Pediatric Distal Humeral Fractures' Post-Operative Care
Rayan Shuja (Advisor: Scott Schoenleber, MD)

Readmissions Following Total Knee Arthroplasty Have Significantly Decreased Despite the Shift to Outpatient Surgery
Hogan Turner (Advisor: Jeffrey Stambough, MD)

Evaluation of AI-Generated Responses to Parental Questions on Early-Onset Scoliosis

1st Author: Julia Schneck
2nd Author: Reghan Barnett
3rd Author: Brien Rabenhorst, MD
4th Author: Matthew Landrum, MD
5th Author: David B. Bumpas, MD

Introduction: Early-onset scoliosis (EOS) is a complex spinal deformity diagnosed before 10 years of age that often requires prolonged monitoring and individualized treatment. As parents increasingly use artificial intelligence (AI) platforms to obtain medical information, the accuracy and clinical appropriateness of AI-generated responses are important considerations. This study evaluated the quality and safety of responses generated by ChatGPT and Grok to common parental questions regarding EOS.

Methods: Twenty common parent-focused questions addressing EOS diagnosis, progression, treatment options, risks, and long-term outcomes were submitted independently to publicly accessible versions of ChatGPT and Grok using a standardized prompt. Three fellowship-trained pediatric spine surgeons independently evaluated the 40 generated responses while blinded to the AI platform. Responses were rated on five-point Likert scales for medical accuracy, safety, parent appropriateness, empathy, and balance of tone. Reviewers also assessed overall clinical comfort and provided optional qualitative feedback.

Results: A total of 120 evaluations were completed, with 60 per AI model. Both models received favorable ratings across all five domains. ChatGPT and Grok received mean scores of 4.32 and 4.37 for medical accuracy, 4.55 and 4.50 for safety, 4.55 and 4.53 for parent appropriateness, 4.45 and 4.48 for empathy, and 4.37 and 4.48 for balance of tone, respectively. Reviewers indicated clinical comfort with 95% of evaluations for both models (57/60 each). Medical accuracy received the lowest mean score for both platforms. Responses addressing surgical treatment options generated notable concerns, particularly regarding implant selection and surgical staging. Additional concerns included casting and bracing recommendations, specialist follow-up, and overly reassuring statements. Differences between models were descriptively small; further statistical comparisons remain pending.

Conclusions: ChatGPT and Grok generally provided accurate, safe, and caregiver-appropriate responses to common questions regarding EOS, with high levels of clinical comfort among pediatric spine surgeons. However, concerns involving surgical decision-making and treatment recommendations highlight the limitations of AI-generated medical information. These findings suggest that AI platforms may serve as supplemental educational resources for families of children with EOS, but should not replace individualized guidance from pediatric spine specialists.

Preoperative GLP-1 Receptor Agonist Use and Outcomes After Spinal Fusion in Three Metabolic Cohorts

1st Author: Avery Carter
2nd Author: Nolen Bruffett
3rd Author: Tera Scott
4th Author: David Bumpass, MD
5th Author: Samuel Overley, MD
6th Author: Wayne Bruffett, MD
7th Author: Mark Feger, MD, PhD

Introduction:
Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have grown rapidly in popularity in recent years, largely due to their efficacy in glycemic control and weight management. Prior studies on GLP-1 RA use in spine surgery have focused mainly on diabetic and obese patients, and outcomes in non-diabetic, non-obese patients are unstudied. We evaluated the association between preoperative GLP-1 RA use and spinal fusion outcomes in three populations: diabetic; obese, non-diabetic; and non-obese, non-diabetic patients. To our knowledge, this is the first study to do so across all spinal levels and fusion approaches.

Methods:
A retrospective cohort analysis of GLP-1 RA users and nonusers undergoing spinal fusion surgery was conducted using the PearlDiver Mariner database (2014–2023). Adult patients were identified by CPT codes, and those with infection, tumor, or fracture were excluded. Patients were stratified into three mutually exclusive cohorts based on diabetes and obesity status: (1) diabetes mellitus cohort, (2) obese, non-diabetic cohort (BMI ≥30 kg/m²), and (3) non-obese, non-diabetic cohort (BMI <30 kg/m²). Within each cohort, patients with a GLP-1 RA prescription within the 180 days before surgery were matched 1:1 to nonusers on age, sex, Charlson Comorbidity Index, comorbidities, and instrumentation extent. The outcomes examined were 90-day complications, 90-day readmission, length of stay, postoperative opioid use, and reoperation and pseudoarthrosis at 1 and 2 years. To account for multiple comparisons, P values were adjusted using the Holm–Bonferroni step-down procedure within two prespecified outcome families (16 ninety-day outcomes and 4 two-year outcomes); adjusted $P<0.05$ was considered significant. All other outcomes, including opioid use, were considered exploratory.

Results:
The matched cohorts included 17,242 diabetic; 2,826 obese, non-diabetic; and 1,092 non-obese, non-diabetic patients. In the diabetic cohort, preoperative GLP-1 RA use was associated with lower 90-day rates of hematoma (1.0% vs 1.6%; OR 0.64, P=0.013), pneumonia (3.0% vs 4.1%; OR 0.71, P<0.001), anemia (17.8% vs 19.9%; OR 0.87, P=0.006), and readmission (13.7% vs 15.5%; OR 0.87, P=0.012). No 90-day or 2-year outcome differed between GLP-1 RA users and nonusers in the obese, non-diabetic or non-obese, non-diabetic cohorts. Pseudoarthrosis requiring reoperation did not differ at 2 years in any cohort (all P≥0.65). In exploratory analyses, GLP-1 RA users in all three cohorts were more likely to fill an opioid prescription within 90 days of surgery (OR 1.29–1.69, all P≤0.002); however, among patients who filled, total morphine milligram equivalents (MME) and days of opioid prescription were not higher in GLP-1 RA users in any cohort and were lower among diabetic users at 90 days and 1 year.

Conclusion:
Preoperative GLP-1 RA use was associated with fewer hematomas, pneumonias, and 90-day readmissions in diabetic patients. No differences were observed in non-diabetic patients. These findings support the perioperative safety of GLP-1 RA use in spinal fusion surgery across spinal levels, fusion approaches, and metabolic profiles.

Total Shoulder Arthroplasty Patients with Demyelinating and Neurodegenerative Disorders Experience Higher Rates of Complications and Reoperation

1st Author: Tera A. Scott, MS
2nd Author: Emanuel E. Cazano, BS
3rd Author: C. Lowry Barnes, MD
4th Author: Simon C. Mears, MD, PhD
5th Author: Jeffrey B. Stambough, MD
6th Author: Benjamin M. Stronach, MD
7th Author: J. Ryan Hill, MD

Introduction:
Preexisting neurologic disorders may adversely affect outcomes following total shoulder arthroplasty (TSA) through impaired motor function, altered proprioception, diminished bone quality, and reduced rehabilitation capacity. This study evaluated postoperative medical complications and healthcare utilization following TSA among patients with peripheral demyelinating disorders, central demyelinating disorders, and dementia/neurodegenerative disease.

Methods:
The PearlDiver database was queried to identify patients undergoing TSA. Patients were stratified into four cohorts: peripheral demyelinating disorders, central demyelinating disorders, dementia/neurodegenerative disease, and controls without neurologic disease. Ninety-day medical complications and 90-day and 2-year shoulder complications, revision procedures, and emergency department (ED) utilization were assessed. Multivariate logistic regression adjusted for age, sex, obesity, tobacco use, diabetes, peripheral vascular disease, and chronic obstructive pulmonary disease.

Results:
Among 246,964 TSA patients, 1,707 had peripheral demyelinating disorders, 1,510 had central demyelinating disorders, 5,970 had dementia/neurodegenerative disease, and 221,614 were controls. Peripheral demyelinating disorders were associated with higher rates of all-cause infection, prosthetic joint infection (PJI), dislocation, ED utilization, and revision surgery at 90-days, as well as higher rates of PJI, dislocation, ED utilization, and revision surgery at 2-years. Central demyelinating disorders were associated with increased rates of respiratory failure and implant loosening at 90-days and increased ED utilization at 2-years. Dementia/neurodegenerative disease was associated with increased rates of respiratory failure, periprosthetic fracture, implant loosening, dislocation, ED utilization, and revision surgery at both time points (all $p<0.05$).

Conclusion:
Patients with preexisting neurologic disorders undergoing total shoulder arthroplasty demonstrate postoperative complication profiles that vary by underlying neurologic disease. The most common adverse events at 90-days and 2-years were emergency department utilization, dislocation, and revision surgery, with the highest rates observed among patients with dementia and neurodegenerative disease. Recognition of these disease-specific risks may assist with preoperative planning, counseling, risk stratification, and postoperative management.

Resection of Preaxial Polydactyly with Duplication at the Level of the Tarsal Bones: A Case Report

1st Author: Gisselle Hernandez
2nd Author: Sean Parham, MD
3rd Author: Brien Rabenhorst, MD

Introduction:
Pre-axial polydactyly of the foot is a congenital anomaly that results in a supernumerary digit originating from the hallux. Of the three traditional classifications of polydactyly, the pre-axial type makes up 15% of cases with post-axial being the most common, making up 79% of cases[1]. There are a variety of further classification systems such as the Venn Watson classification that focuses on the morphology of the accessory digit[2]. The Watanabe classification uses both the shape of the accessory digit and the segments of the foot that may be involved[3]. Recently, a new classification system has been introduced that describes subtypes of preaxial polydactyly of the foot based on the segments duplicated and if there are abnormalities at any level of the duplication[4]. While polydactyly of the foot in its entirety is a common congenital foot abnormality, pre-axial polydactyly of the foot is rare, and the various subtypes and inconsistent classification systems make surgical planning difficult.

Case:
This report describes a male child that presented to clinic at 8 weeks of age for assessment of pre-axial polydactyly of the right foot. No other congenital anomalies were present with the exception of a sacral dimple that was further evaluated with a spine ultrasound that found no abnormalities. A bilateral hip ultrasound was also performed to rule out hip dysplasia due to his breech delivery.

Clinical examination of the right foot demonstrated pre-axial polydactyly with a well-formed accessory digit originating from the medial midfoot. The patient was able to actively extend the accessory digit, and it was well perfused with a brisk capillary refill. Otherwise, the right foot was normal and plantigrade.

Radiographs of the right foot revealed an accessory digit arising from the medial midfoot with a metatarsal and phalangeal component. A decision to wait to perform resection of the accessory digit until the patient was closer to a year of age was made to decrease anesthetic risks and allow for larger operative structures. The patient was seen in clinic two more times prior to surgical intervention, and the accessory digit remained stable with expected growth of the metatarsal and distal phalanx, but slight hypoplasia of the great toe.

Surgical intervention was performed at 15 months of age. A racquet type incision was made around the accessory digit. Dorsal dissection revealed a long extensor to the accessory digit while plantar dissection revealed the neurovascular bundle to the accessory digit. The long extensor was released and the accessory digit was amputated through the base of its phalanges. These was an accessory tarsal bone which articulated with the navicularr medially. This tarsal bone was skeletonized and excised. After this was accomplished, the medial border of the foot was straight and without prominence. Lastly, the extensor tendon was transferred to the medial cuneiform to assist with ankle dorsiflexion.

The patient was allowed to be weight bearing as tolerated in a walking boot immediately post-operatively. He was immobilized for a month. The patient most recently followed up four years post-operatively. He had no

pain or gait abnormalities and was ambulatory in regular shoes. The physical exam revealed a hypoplastic great toe but full, symmetric range of motion to the contralateral. Radiographs confirmed hypoplasia of the great toe and first metatarsal.

Discussion:

Pre-axial polydactyly of the foot with duplication at the level of the tarsals (a true prehallux), is an uncommon form of polydactyly, occurring in only 3% of cases[5]. For this reason, there are only a few isolated case reports and small series that focus primarily on or include the tarsal type of pre-axial polydactyly of the foot[4,5,6,7,8]. In addition, the long-term outcomes of surgical intervention are mostly unreported and limited to childhood outcomes[5,6]. A vital aspect of a successful outcome is proper soft tissue rebalancing to prevent the development of hallux varus or hallux valgus over time[8]. Surgical intervention is the only effective treatment management to improve foot pain and shoe wear fit, but the surgical plan must be individualized to the patient's deformity[9]. The timing of surgery for a more complex foot polydactyly is ideally performed after 1 year of age to decrease anesthetic risks, allow the deformity to fully present itself, and allow for larger anatomy[8].

Conclusion:

We report a case of a male infant who was born with pre-axial polydactyly of the right foot with duplication of a tarsal, metatarsal, and phalangeal components. Accurate diagnosis through radiographs and clinical examinations are vital for preoperative planning. The recommended treatment for pre-axial polydactyly of the foot, complete resection of the accessory digit, was successfully performed and improved both the function and cosmetics of the foot with a normal gait.

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Steroid Usage Is a Key Driver for Osteonecrosis of the Femoral Head After Cancer Treatment

1st Author: Thomas M. Needy
2nd Author: Randall R. Rainwater
3rd Author: Nolen J. Bruffett
4th Author: Simon C. Mears MD, PhD
5th Author: Jeffrey B. Stambough MD
6th Author: Benjamin M. Stronach MD
7th Author: C. Lowry Barnes MD

Introduction:
Osteonecrosis of the femoral head (ONFH) is a well-recognized complication of cancer treatment, particularly systemic corticosteroid exposure. Both ONFH and cancer may compromise bone quality, complicating postoperative outcomes following total hip arthroplasty (THA). While these effects have been analyzed individually, the relationship between cancer treatment, ONFH development, and postoperative THA outcomes remains incompletely characterized.

Methods:
In a retrospective database analysis using PearlDiver, this study compared rates of ONFH across hematologic and solid organ malignancies, and across corticosteroid, radiation, and chemotherapy cancer treatment exposures. Patients undergoing THA were then stratified by cancer and ONFH status. Aseptic loosening, periprosthetic fracture, dislocation, periprosthetic joint infection, and 90-day and 1-year revision rates were compared between cancer and non-cancer patients within each ONFH stratum.

Results:
ONFH occurred in 0.33% of patients with malignancy. Rates of ONFH were highest in patients with documented systemic corticosteroid exposure (2.99%) compared to those exposed to chemotherapy (0.54%) or radiation therapy (0.57%). This finding was particularly notable in hematologic malignancies, where ONFH prevalence among patients with documented corticosteroid exposure was 6.70% in leukemia, 3.48% in lymphoma, and 2.34% in multiple myeloma, compared with 1.42-2.26% across solid tumors. In THA patients with ONFH, cancer patients had lower rates of periprosthetic joint infection (1.46% vs 1.92%, p=0.00882) and 1-year revisions (2.93% vs 3.40%, p=0.0416) than those without cancer. In patients without ONFH, cancer patients had higher rates of periprosthetic fracture (0.88% vs 0.77%, p=0.000901) and dislocation (1.21% vs 1.11%, p=0.0183).

Conclusion:
Systemic corticosteroid exposure was associated with the highest ONFH rate among the cancer treatment exposures analyzed, particularly in hematologic malignancies, emphasizing corticosteroid exposure as an important risk factor for ONFH development in patients with cancer. In THA patients, with or without ONFH, a cancer diagnosis was not associated with clinically meaningful increases in postoperative complications.

Robotic Screw Placement in Growth Guidance Surgery for Early Onset Scoliosis: A Pilot Case Series

1st Author: David B. Bumpass, MD
2nd Author: Kolby Payne
3rd Author: Matthew Landrum, MD

Introduction:
Growth Guidance (GG) instrumentation placement for early-onset scoliosis (EOS) is predicated on minimal dissection for placement of the proximal and distal sliding screws. However, the pedicles in EOS patients are often quite small. Spinal robotics offers a new guidance technology for accurate placement of these screws in true trans-muscular fashion, with no dissection of the vertebrae to identify anatomic landmarks. This case series represents the first report of GG implantation using a robotic technique.

Aims/Objectives:
To describe our indication, technique, and early outcomes of the use of robotic screw placement in Growth Guidance surgery.

Methods:
We performed a retrospective chart review of the first four GG cases performed at our pediatric hospital using robotic screw placement. Demographic, intraoperative, and early postoperative data were recorded.
Our surgical technique was a standard GG method with short-segment apical fusion. The paraspinal muscles over the proximal thoracic and lumbar portions of the spine were left entirely intact. Robotic registration was performed using a "scan and plan" workflow, with intraoperative cone-beam CT. Pedical tracks were cannulated through the robotic arm, and guidewires placed; guidewire technique was needed because the FDA-approved GG pedicle screw implants do not have a screwdriver compatible with a robotic system. Screws were then placed over the guidewire. Intraoperative neuromonitoring was used throughout all cases, in standard fashion.

Results:
Four patients underwent index GG instrumentation implantation. Mean age at surgery was 7.5 years (range 6.1-8.6 years), and mean major coronal Cobb angle was 58 deg (range 56-62 deg). Three patients had idiopathic EOS and one had syndromic EOS (Prader-Willi syndrome). None had prior spine surgery; spinal casting had been attempted with 2 patients. Mean blood loss was 238 ml (range 100-450 ml), and mean surgical duration was 434 minutes (range 415-455 min). No allogeneic transfusions were given intraoperatively or during the hospital stay. There were no neurologic complications or spinal cord monitoring changes. No screws needed to be repositioned based on intraoperative or postoperative imaging studies. One patient (Prader-Willi) required I&D of a lumbar incisional dehiscence 3 weeks postop.

Conclusion:
Robotic screw placement in GG instrumentation implantation was safe, accurate, and successful in terms of total avoidance of dissection or exposure through the paraspinal musculature. Technical lessons learned included frequent anatomic accuracy checks on spinous processes, as well as use of spinous process clamps across multiple segments to provide additional spinal stability. As robotic techniques improve for pediatric

spine use, there is the potential to make GG utilization a more streamlined surgical option than with freehand or fluoroscopy-based techniques for placing the trans-muscular sliding screws.

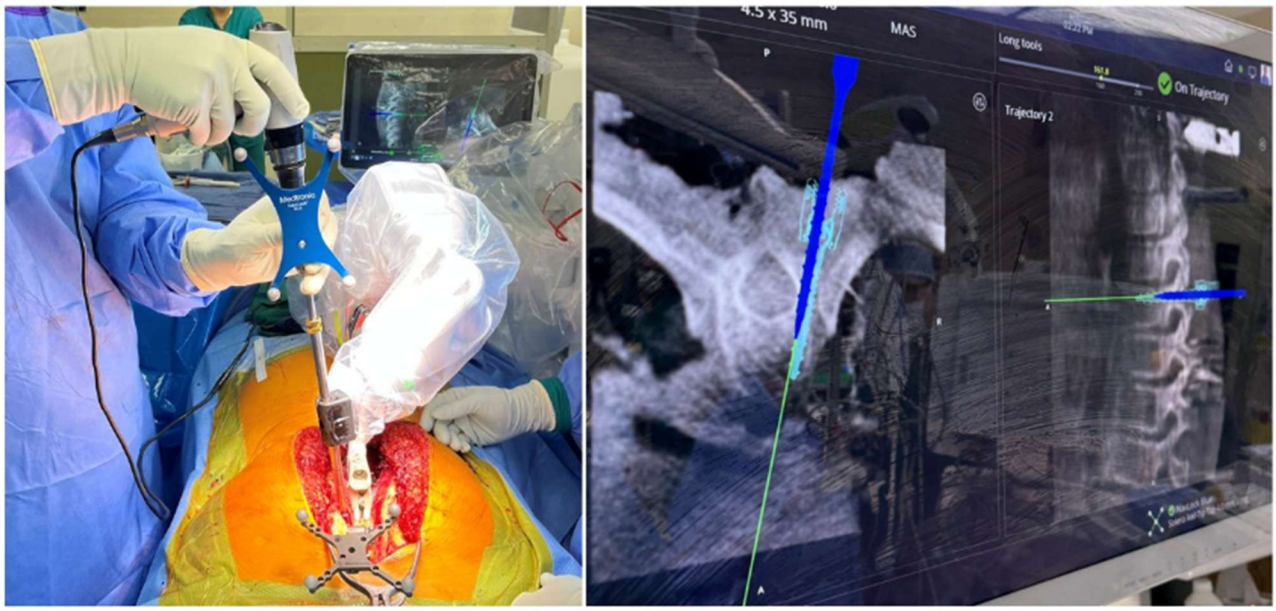


Figure 1. Trans-muscular pedicle tapping with robotic arm guidance; note the spinous process immobilization clamp in the midline.

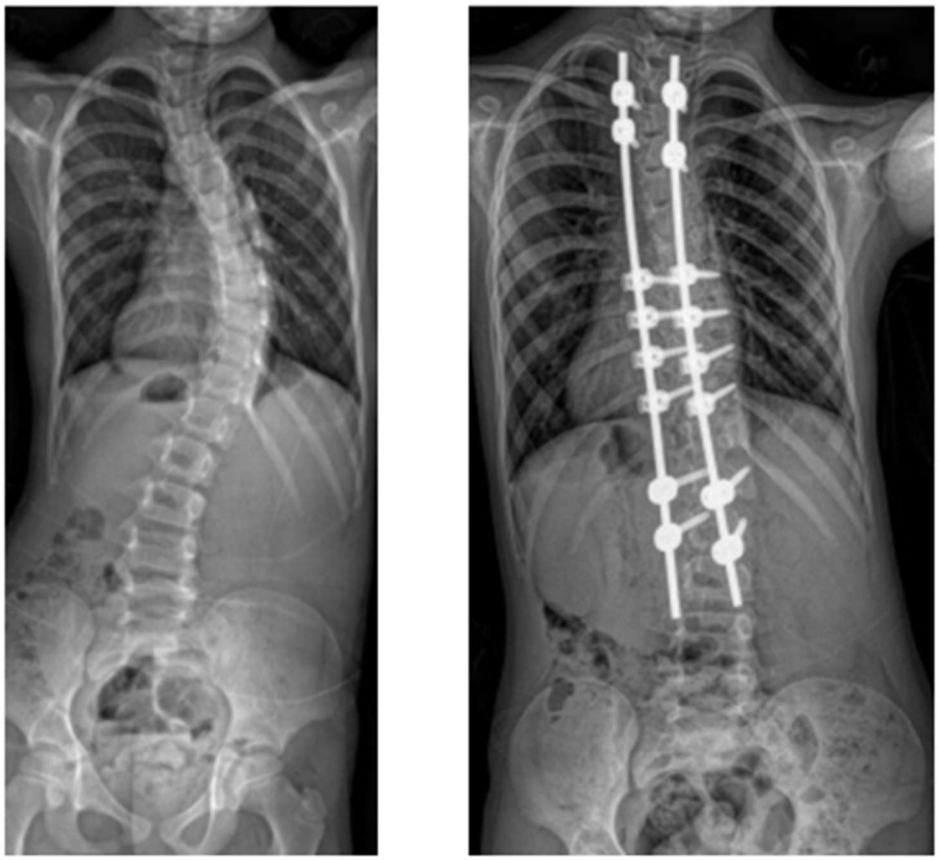


Figure 2. 7 yo female idiopathic EOS patient, with preop and 1-month postop upright PA radiographs.

Opioid use in Pediatric Distal Humeral Fractures' Post-Operative Care

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Introduction:
Distal humeral fractures are among the most common pediatric orthopedic injuries and frequently require postoperative analgesia, including opioid medications. Recent years have had greater scrutiny place upon opioid prescriptions and abuse, with particular attention being paid to pediatric usage. This study examines trends in post-operative opioid prescribing following distal humeral fractures to help draft guidelines based on normative practices.

Methods:
We performed a retrospective cohort study of pediatric distal humeral fracture patients (<13 yrs) using a national claims database (2010-2023). Data was divided into two cohorts (2010-2016 and 2017-2023), demarcated by the implementation of the Prescription Drug Monitoring Program (PDMP). Opiate prescriptions were quantified in the 90 days following operative fixation and was standardized as morphine milliequivalents (MME). Multivariable linear regression analyzed impact of fixation type, demographics and comorbidity on postoperative MME over the study period.

Results:
This study evaluates 68,947 distal humeral fracture repairs using Open Reduction Internal Fixation (ORIF) or Closed Reduction Percutaneous Pinning (CRPP) with 39,119 in the pre-PDMP era and 29,828 in the PDMP era. Compared to the pre-PDMP era, patients are marginally older, have a decreased comorbidity burden with equal representation of males and females. PDMP-era patients had increased rates of anxiety and autism. Mean 90-day postoperative opioid prescribing, measured in MME, decreased from 87.41 in 2011 to 58.97 in 2023 (slope = -3.63 MME/year, $r^2 = 0.83$, $P < 0.0001$)- a total decrease of 33%. When grouped by fixation type, CRPP 90 day postoperative MME decreased from 84.27 in 2011 to 54.41 in 2023 (slope = -3.55 MME/year, $r^2 = 0.88$, $P < 0.0001$)- a total decrease of 38%; ORIF 90-day postoperative MME decreased from 95.09 in 2011 to 81.20 in 2023 (slope = -3.47 MME/year, $r^2 = 0.62$, $P = 0.001$)- a total decrease of 14.6%. Multivariable linear regression demonstrated age as the strongest positive association with increased MME ($\beta = 13.26$, $p < 0.001$), but calendar year demonstrated progressive MME decline beginning in 2016 ($\beta = -13.33$, $p = 0.007$) and reaching maximal reduction in 2021–2022 ($\beta = -55.33$ to -53.31, $p < 0.001$).

Conclusion:
Opiate prescriptions following distal humeral fracture repair have decreased over time, highlighting the orthopedic adoption of PDMP practices. Our findings show support for Orthopedic surgeons shifting away from opioid pain management in pediatric patients, in favor of multimodal pain control.

Readmissions Following Total Knee Arthroplasty Have Significantly Decreased Despite the Shift to Outpatient Surgery

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Introduction:
Total knee arthroplasty (TKA) has transitioned from a primarily inpatient procedure to a predominantly outpatient procedure since removal of the Centers for Medicare & Medicaid Services (CMS) inpatient-only (IPO) designation in January 2018. Our study aims to characterize readmission trends over the past 12 years and evaluate changes in readmission rates following removal of the IPO designation.

Methods:
Patients who underwent primary TKA between 2010 and 2022 were identified using a large national insurance claims database. Annual all-cause readmission rates at 90 days following TKA were compared and stratified by inpatient versus outpatient surgical setting. Overall, 1,756,539 patients were included, comprising 1,220,060 inpatient TKAs and 536,479 outpatient TKAs. Multivariable analyses incorporating readmission outcomes, comorbidities, and demographic characteristics were performed.

Results:
All-cause 90-day readmissions after arthroplasty decreased from 10.52% in 2010 to 3.23% in 2022, a 7.29% decrease (slope -0.67%). Inpatient TKA readmission rates decreased from 10.52% in 2010 to 6.23% in 2022 (slope -0.44%), coinciding with a decline in inpatient TKA volume from 130,098 to 25,371 cases. In contrast, outpatient TKA volume increased substantially from 3,307 cases in 2010 to 165,921 in 2022, while outpatient readmission rates decreased from 11.97% to 2.86%, representing a 9.11% reduction (slope -0.95%) over the study period. Multivariable analysis demonstrated that postoperative complications like hematoma (OR 1.97), blood loss anemia (OR 1.69), kidney injury (OR 1.61), DVT (OR 1.36), and pulmonary embolism (OR 1.31) were consistently among the strongest independent predictors of 90-day readmission following TKA, all $p<0.001$.

Conclusion:
Despite the recent shift toward outpatient TKA, all-cause readmission rates did not increase relative to inpatient procedures. Predictors identified in multivariable analyses suggest that postoperative complications remained the strongest drivers of readmission regardless of TKA year. The significantly lower readmission rates observed likely reflect improvements in perioperative protocols, patient optimization, and prioritized home discharges.

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