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OREF NORTHEAST REGION
RESIDENT RESEARCH SYMPOSIUM
Monday, October 5, 2026

NYU Langone Health
Science Building 103 Seminar Room
435 E. 30th Street
New York, NY 10016

Hosted by:
Joseph D. Zuckerman, MD
Chairman
Department of Orthopedic Surgery
NYU Langone Health

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

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OREF NORTHEAST REGION RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA
Monday, October 5, 2026

Noon – 12:45 p.m.	**Registration and Lunch** NYU Langone Health Science Building 103 Seminar Room 435 E. 30th Street New York, NY 10016
12:45 p.m. – 12:50 p.m.	**Welcome and Introductions** **Joseph D. Zuckerman, MD** Chair Department of Orthopedic Surgery NYU Langone Health
12:50 p.m. – 1:00 p.m.	**OREF Welcome** **Lee Grossman, MBA, ML** Chief Executive Officer Orthopaedic Research and Education Foundation
1:00 p.m. -1:30 p.m.	**Session I – Resident Research Presentations & Discussion** **Spine**
1:30 p.m. – 2:00 p.m.	**Session II – Resident Research Presentations & Discussion** **Sports**
2:00 p.m. – 2:10 p.m.	*Break – please submit your scores from Sessions I and II to OREF Staff*
2:10 p.m. – 2:40 p.m.	**Session III – Resident Research Presentations & Discussion** **Adult Reconstruction**
2:40 p.m. – 3:10 p.m.	**Session IV – Resident Research Presentations & Discussion** **Hand**
3:10 p.m. – 3:20 p.m.	*Break – please submit your scores from Sessions III and IV to OREF staff*
3:20 p.m. – 3:46 p.m.	**Session V – Resident Research Presentations & Discussion** **General, Basic and Pediatrics**
3:46 p.m. – 3:56 p.m.	*Break – please submit your scores from session V to OREF staff*
3:56 p.m. – 4:00 p.m.	**Introduction of Keynote Speaker**
4:00 p.m. - 4:30 p.m.	**Keynote Speaker** ***"Being an Academic Orthopedic Surgeon: Professional and Personal Challenges"*** **Joseph D. Zuckerman, MD** Chair Department of Orthopedic Surgery NYU Langone Health
4:30 p.m. – 4:45 p.m.	**Keynote Question and Answer**
4:45 p.m. – 5:00 p.m.	**Closing Remarks and Awards Presentation**
5:00 p.m. – 6:00 p.m.	**Reception**

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KEYNOTE SPEAKER

Joseph D. Zuckerman, MD

Chairman of Orthopedic Surgery
NYU Langone Health

Dr. Zuckerman is the Walter A. L. Thompson Professor of Orthopedic Surgery at the NYU Grossman School of Medicine and Chair of the Department of Orthopedic Surgery at NYU Langone Health. He is a graduate of Cornell University and of the Medical College of Wisconsin where he was a member of the Alpha Omega Alpha Medical Honor Society. He completed his residency in Orthopedic Surgery at the University of Washington Affiliated Hospitals, a fellowship in Adult Reconstructive surgery and arthritis research at Harvard's Brigham and Women's Hospital and was a visiting clinician in shoulder surgery at the Mayo Clinic.

Dr. Zuckerman joined the faculty of the former Hospital for Joint Diseases (now NYU Langone Orthopedic Hospital) in 1984 and was appointed Chair of its Department of Orthopedic Surgery in 1994. Three years later, he became chair of the combined NYU-HJD Department of Orthopedic Surgery and initiated the successful merger of the two departments. He served as director of the orthopedic residency program, one of the largest in the country, from 1990 to 2006.

Dr. Zuckerman's dedication to orthopedic resident education is evident by the fact that he is a five-time recipient of the "Teacher of the Year" award from the NYU-HJD orthopedic residents. In 2011, he received the "Distinguished Teaching Medal" from New York University. In 2013, he received the Master Educator Award from the NYU School of Medicine and in 2015, received the Distinguished Educator Award from the American Orthopaedic Association (AOA).

Dr. Zuckerman is an internationally recognized expert in shoulder surgery and hip and knee replacement. He established the Hip Fracture Research Group and the Shoulder Research Group and is a design surgeon of a shoulder replacement system for the treatment of glenohumeral arthritis and proximal humerus fractures. Dr. Zuckerman has received the Clinical Research Award from the Orthopaedic Research and Education Foundation (OREF), the Mel Post Award from the American Shoulder and Elbow Surgeons (ASES), Alumnus of the Year from the Medical College of Wisconsin and the Lifetime Achievement Award from the Arthritis Foundation's New York Chapter. He was selected as an American-British-Canadian (ABC) Traveling Fellow by the AOA. He serves as a spokesman for the American Academy of Orthopedic Surgeons (AAOS), sits on the editorial board of several medical journals, and has authored 16 textbooks and over 600 scientific articles. He is former president of the ASES and former chair of the Council on Education for the AAOS, which is the largest professional orthopedic association in the world. He completed a four-year term as a member of the AAOS Board of Directors, serving as second vice-president, first vice-president and president from 2009-2010. The AAOS has honored Dr. Zuckerman with the William Tipton Leadership Award and the AOA recognized him as a "Pillar of the Orthopedic Profession."

Judges and Moderator

Tej Joshi, MD
NYU Langone Health

Philipp Leucht, MD, PhD
NYU Langone Health

Joseph D. Zuckerman, MD
NYU Langone Health

OREF Northeast Region Resident Research Symposium
DETAILED AGENDA
Monday, October 5, 2026

Noon – 12:45 p.m.	**Registration and Lunch** NYU Langone Health Science Building 103 Seminar Room 435 E. 30th Street New York, NY 10016
12:45 p.m. – 12:50 p.m.	**Welcome and Introductions** **Joseph D. Zuckerman, MD** Chair Department of Orthopedic Surgery NYU Langone Health
12:50 p.m. – 1:00 p.m.	**OREF Welcome** **Lee Grossman, MBA, ML** Chief Executive Officer Orthopaedic Research and Education Foundation
	Session I – Resident Research Presentations & Discussion **Spine**
1:00 p.m. – 1:04 p.m.	*Extended Length of Stay Despite Drain Compliance: The Influence of Surgical Complexity and Discharge Barriers in Lumbar Spine Surgery* Rebeca Landau, MD, Lenox Hill Hospital-Northwell Health
1:04 p.m. – 1:08 p.m.	*Standardized Frailty Measures and Length of Stay After Adult Spinal Deformity Surgery* David Kim, MD, Zucker School of Medicine at Hofstra/Northwell at Lenox Hill Hospital
1:08 p.m. – 1:12 p.m.	*Residual Foraminal Stenosis and Increasing Levels Decompressed are Risk Factors for Postoperative C5 Palsy* Steven Farrell, MD, NYU Langone Health
1:12 p.m. – 1:16 p.m.	*Assessment of an AI-Intraoperative Neuromonitoring Tool in Adult Cervical Spine Surgery* Varun Arvind, MD, Columbia University
1:16 p.m. – 1:20 p.m.	*The Natural History of Congenital Scoliosis Validation of Historical Classification and a Contemporary Risk Stratification Model* Priya Singh, MD, Montefiore Medical Center
1:20 p.m. – 1:30 p.m.	**Question and Answer**
	Session II – Resident Research Presentations & Discussion **Sports**
1:30 p.m. – 1:34 p.m.	*Ulnar Collateral Ligament Internal Brace Using a Deep Versus Superficial Humeral Sided Tunnel: A Biomechanical Analysis of Techniques* Bradley Lezak, MD, NYU Langone Health
1:34 p.m. – 1:38 p.m.	*Increased Risk of Fixation Failure with Two 3.5 versus 4.5 Millimeter Solid Bicortical Screws for Tibial Tubercle Osteotomy* Rajiv Reddy, MD, The Hospital for Special Surgery
1:38 p.m. – 1:42 p.m..	*A Deep Learning Model Enhances Prediction of Meniscal Allograft Size from a Standard Knee Radiograph* Abhinaba Chatterjee, MD, Lenox Hill Hospital-Northwell Health

OREF Northeast Region Resident Research Symposium
DETAILED AGENDA
Monday, October 5, 2026

1:42 p.m. – 1:46 p.m.	*Glycemic Control Prior to Total Joint Arthroplasty: New Updates to an Established Index* Thomas Bieganowski, MD, NYU Langone Health
1:46 p.m. – 1:50 p.m.	*Limb Dominance is Not Associated with Increased Reoperation or Reoperation Free Survival After Autologous Chondrocyte Implantation* Jacob Milner, MD, NYU Langone Health
1:50 p.m. – 2:00 p.m.	**Question and Answer**
2:00 p.m. – 2:10 p.m.	**Break - please submit your scores from Sessions I & II to OREF Staff**
	Session III – Resident Research Presentations & Discussion **Adult Reconstruction**
2:10 p.m. – 2:14 p.m.	*Preoperative Semaglutide Exposure and Postoperative Opioid Utilization Following Primary Total Hip Arthroplasty: A National Database Analysis* Rajiv Vasudevan, MD, Yale New Haven Health
2:14 p.m. – 2:18 p.m.	*Effort Required to Achieve Preoperative Patient Reported Outcomes Measures Completion in THA and TKA* Christopher Katchis MD, Zucker School of Medicine at Hofstra/Northwell at Lenox Hill Hospital
2:18 p.m. – 2:22 p.m.	*A Double-Hit Analysis: Evaluating the Nephrotoxicity of Dual Intravenous and Vancomycin Impregnated Cement Exposure* Garrett Esper, MD, NYU Langone Health
2:22 p.m. – 2:26 p.m.	*Demographic and Preoperative Predictors of Substantial PROM Improvement After Total Hip and Knee Arthroplasty* Reed Macey, MD, NYU Langone Health
2:26 p.m. – 2:30 p.m.	*Total Hip Arthroplasty After Hip Arthroscopy Does Not Compromise Clinical Outcomes* Branden Sosa, MD, The Hospital for Special Surgery
2:30 p.m. – 2:40 p.m.	**Question and Answer**
	Session IV – Resident Research Presentations & Discussion **Hand**
2:40 p.m. – 2:44 p.m.	*Radiographic vs Computed Tomography Characterization of the Metacarpal Isthmus for Intramedullary Screw Fixation* Sean Liu, MD, Zucker School of Medicine at Hofstra/Northwell at Lenox Hill Hospital
2:44 p.m. – 2:48 p.m.	*Optimizing Amyloidosis Screening Criteria for Tenosynovial Biopsy at Carpal Tunnel Release: Clinical Associations Stratified by Age* Kendall Derry, MD, New York University
2:48 p.m. – 2:52 p.m.	*Not Just Collateral Damage: A Proposal to Reconsider Surgical Thresholds for Thumb Radial Collateral Ligament (RCL) Injuries* Megan Donnelly, MD, NYU Langone Health

OREF Northeast Region Resident Research Symposium
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Monday, October 5, 2026

2:52 p.m. – 2:56 p.m.	*Early Patient-Reported Pain and Functional Outcomes Following Transhumeral Osseointegration: A Preliminary Case Series* Zachary Li, MD, NYU Langone Health
2:56 p.m. – 3:00 p.m.	*Excision of Distal Pole of Scaphoid and Triquetrum to Improve Radiolunate Arthrodesis* Rafa Rahman, MD, The Hospital for Special Surgery
3:00 p.m. – 3:10 p.m.	**Question and Answer**
3:10 p.m. – 3:20 p.m.	**Break – please submit your scores from Sessions III & IV to OREF Staff**
	Session V – Resident Research Presentations & Discussion General, Basic and Pediatrics
3:20 p.m. – 3:24 p.m.	*Burnout, Psychological Distress, and Relationship Quality Among Spouses and Partners of Orthopedic Surgery Residents, Fellows, and Attendings* Maxwell Trudeau, MD, NYU Langone Health
3:24 p.m. – 3:28 p.m.	*Trends in Publication Volume and Arms Race Control Score Among Orthopedic Surgery Matriculants at Top NIH-Funded Programs, Classes of 2027-2030* Matthew Johnson, MD, Maimonides Orthopedics
3:28 p.m. – 3:32 p.m.	*Ebf3 Governs Skeletal Progenitor Cell Fate During Injury Repair and Aging: A Therapeutic Target for Impaired Bone Healing* Lindsey Remark, MD, NYU Langone Health
3:32 p.m. – 3:36 p.m.	*Postoperative Follow-Up After Hemi Epiphysiodesis in a Low-Opportunity Urban Population: A Retrospective Quality Improvement Study* Rodney Arthur, MD, Montefiore/Einstein
3:36 p.m. – 3:46 p.m.	**Question and Answer**
3:46 p.m. – 3:56 p.m.	**Break – please submit your scores from Session V to OREF Staff**
3:56 p.m. – 4:00 p.m.	**Introduction of Keynote Speaker**
4:00 p.m. – 4:30 p.m.	**Keynote Speaker** ***"Being an Academic Orthopedic Surgeon: Professional and Personal Challenges"*** **Joseph D. Zuckerman, MD** Chair Department of Orthopedic Surgery NYU Langone Health
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Extended Length of Stay Despite Drain Compliance: The Influence of Surgical Complexity and Discharge Barriers in Lumbar Spine Surgery

Rebeca Landau, MD
Lenox Hill Hospital- Northwell Health

Background: Length of stay (LOS) after lumbar spine surgery is a key quality, efficiency, and value metric. Although institutional drain management protocols have been shown to reduce postoperative LOS, a subset of drain-compliant patients continue to experience prolonged hospitalizations. The drivers of these extended stays remain unclear. This study aimed to identify clinical and logistical factors contributing to extended LOS among drain-compliant patients, evaluate differences by surgical complexity, and assess the contribution of each delay category to total hospital days.

Methods: A retrospective analysis was conducted on 269 consecutive lumbar spine surgery patients at a single institution. Drain compliance was defined according to a previously validated institutional protocol, and extended LOS was defined relative to procedure-specific targets outlined in the protocol. Among 97 patients who were drain-compliant but exceeded target LOS, reasons for daily delay were prospectively categorized as medical clearance, pain, functional recovery, or logistical/administrative barriers. Comparisons of delay reasons across surgical groups (decompression, fusion 1-2 levels, fusion ≥3 levels) were performed using Chi-square tests and Kruskal-Wallis tests. Multivariable logistic regression was used to assess predictors of meeting target LOS.

Results: A total of 269 patients were included (60% female), with a median age of 68 years (IQR 56.5–73). Overall median LOS was 4 days (IQR 3–7), with significant variation across surgical complexity groups. While 81.4% of patients met the institutional drain guidelines, only 44.7% met the target LOS. Among drain-compliant patients with extended LOS, delay patterns evolved overtime: functional recovery predominated early (34% on POD1), whereas logistical barriers became the primary driver beginning on POD7 (Figure 1). Medical clearance remained a consistently cited reason for discharge delay throughout the hospitalization, and pain-related delays declined rapidly after POD3. Median LOS within this subcohort also varied by surgical complexity. Greater surgical complexity (fusion ≥3 levels) was associated with the highest rates of both medical clearance delays (81.3%, p=0.043) and logistical barriers (62.5%, p=0.026), as well as significantly more cumulative delay days attributable to medical clearance (p=0.004) and logistics (p=0.016) compared to less surgically complex groups (Table 1). Pain and functional recovery days did not differ significantly across groups (p=0.670 and p=0.899, respectively). Multivariable modeling demonstrated that in-hospital complications (p=0.009) and drain compliance (p=0.046) independently predicted meeting target LOS (AUC 0.621 ± 0.105), with an overall accuracy of 64%.

Conclusion: Among drain-compliant lumbar spine patients, extended LOS is initially driven by functional recovery in the early postoperative period but shifts to sustained medical clearance requirements and logistical or administrative barriers later in the hospital course. Surgical complexity significantly predicts the burden of these non-drain-related delays. Targeted system-level interventions addressing discharge planning workflows, medical optimization pathways, and administrative coordination may meaningfully reduce extended LOS in lumbar spine patients, particularly in those undergoing complex multilevel fusion.

Figure 1. The Distribution of Delay Reason by Post-Operative Day

Day-by-Day Breakdown

Count | % of N

POD	N PRESENT	MEDICAL CLEARANCE	PAIN	FUNCTIONAL RECOVERY	LOGISTIC/ADMIN
POD 1	97	18 19%	9 9%	33 34%	3 3%
POD 2	97	17 18%	8 8%	12 12%	3 3%
POD 3	94	16 17%	2 2%	12 13%	6 6%
POD 4	88	16 18%	5 6%	8 9%	11 13%
POD 5	70	13 19%	4 6%	4 6%	9 13%
POD 6	59	18 31%	7 12%	3 5%	13 22%
POD 7	48	15 31%	5 10%	11 23%	18 38%
POD 8	36	5 14%	2 6%	3 8%	19 53%
POD 9	24	5 21%	4 17%	2 8%	8 33%
POD 10	18	1 6%	1 6%	1 6%	5 28%
POD 11	11	2 18%	0 0%	0 0%	2 18%
POD 12	10	2 20%	0 0%	0 0%	2 20%
POD 13	8	2 25%	0 0%	0 0%	3 38%
POD 14	7	2 29%	1 14%	0 0%	3 43%
POD 15	7	3 43%	1 14%	0 0%	3 43%
POD 16	5	1 20%	0 0%	0 0%	3 60%
POD 17	5	0 0%	0 0%	0 0%	3 60%
POD 18	4	1 25%	0 0%	0 0%	1 25%
POD 19	4	1 25%	0 0%	0 0%	0 0%
POD 20	4	1 25%	0 0%	1 25%	1 25%
POD 21	1	0 0%	0 0%	0 0%	1 100%
POD 22	4	1 25%	0 0%	1 25%	1 25%
POD 23	1	0 0%	1 100%	0 0%	1 100%

Table 1. Number of Days Attributed to Each Delay Reason by Surgical Group (Kruskal-Wallis Analysis)

Delay Reason	Decomp. Median (IQR)	Fusion 1–2 Median (IQR)	Fusion ≥3 Median (IQR)	H statistic	p-value
Medical Clearance	0 (0–1)	1 (0–1)	2 (1–3)	11.084	0.004
Pain	0 (0–0)	0 (0–0)	0 (0–1)	0.800	0.670
Functional Recovery	0 (0–1)	1 (0–1)	1 (0–1.75)	0.213	0.899
Logistic/Admin	0 (0–0.5)	0 (0–1)	1 (0–3)	8.248	0.016

*Note. Data presented as median (IQR). IQR derived from Tukey's Hinges method. * $p<0.05$.*

Standardized Frailty Measures and Length of Stay After Adult Spinal Deformity Surgery

David Kim, MD
Zucker School of Medicine at
Hofstra/Northwell at Lenox Hill Hospital

Purpose: To quantify frailty using the Edmonton Frail Scale (EFS) and Clinical Frailty Scale (CFS) and evaluate its association with postoperative length of stay (LOS) after adult spinal deformity (ASD) surgery.

Significance: Most frailty evidence in ASD uses the disease-specific mASD-FI. Standardized instruments permit cross-specialty benchmarking and contextualization of perioperative risk.

Methods: Retrospective multicenter study of surgically treated ASD patients from 2019–2025. Published EFS and CFS thresholds classified patients as nonfrail, frail, or severely frail. Agreement, adverse events (AEs), and LOS were assessed using univariate and multivariable analyses.

Results: Total of 889 patients included. The EFS classified 80.8% as nonfrail, compared with 61.5% using the CFS. Classification agreement was 71.9% but only fair (κ=0.35). Frail patients had longer median LOS than nonfrail patients (9 [IQR, 7–14] versus 7 [IQR, 5–9] days; $P<0.001$). Overall AE rates did not differ; however, frail patients experienced more AEs requiring severe intervention ($P<0.05$). Both frailty instruments remained independently associated with LOS after adjusting for demographics, comorbidities, neurologic status, surgical factors, AEs, staging, weekday, and discharge disposition.

Conclusion: Standardized frailty measures identify vulnerability independently associated with hospitalization after ASD surgery. Their classification differences suggest complementary value for perioperative planning and resource allocation.

Residual Foraminal Stenosis and Increasing Levels Decompressed are Risk Factors for Postoperative C5 Palsy

Steven Farrell, MD
NYU Langone Health

Background: C5 palsy stands as a known but poorly understood complication of cervical spine surgery with rates reported as high as 30%. Although there are multiple studies presenting different risk factors, variability in findings has led to controversy in the etiology of postoperative C5 palsy. The purpose is to evaluate factors that predispose a patient to developing C5 palsy following cervical spine surgery.

Methods: This is a retrospective review of a large single center academic institution. This study included 239 cervical spinal procedures from 2012 to 2018. Patients ≥18 years of age who underwent cervical spinal surgery including the C4/C5 level, with minimum 1-year follow-up were included. C5 palsy was defined as deltoid +/- bicep weakness with Modified Rankin Scale grading at least 1 point below baseline (BL). Characteristics studied include demographics, surgical procedure and approach (decompression and/or fusion). Radiographic analyses of MRI and CT measurements of foramen dimensions and spinal cord drift at BL and follow-up were performed. Outcome measures were perioperative clinical characteristics, postoperative rate of C5 palsy, C5 palsy resolution, and radiographic outcomes. Statistical analyses included t-tests, chi-square analysis, and multivariate logistic regression to determine independent predictive factors. A receiver operating characteristic curve was run to determine the cutoff levels for predictive factors. Significance set at $p<0.05$.

Results: A total of 239 patients were included, with a C5 palsy rate of 6.3% for all cases. Subjects that developed C5 palsy were older (64.67±8.61 vs 57.56±11.61, $p=0.021$), had more levels decompressed posteriorly (3.20±1.82 vs 1.12±1.74, $p<0.001$), a higher rate of preoperative myelomalacia (60% vs 19.6%, $p=0.008$), and higher CCI (3.80±1.97 vs 2.35±1.95, $p=0.005$). Anterior cervical discectomy and fusion (ACDF) surgeries had a 2.4% rate of C5 palsy while the posterior approach rate was 11.9% ($p<0.007$). The highest rate was in laminectomy and posterior fusion at 15.2% ($p<0.001$). There were no significant differences in palsy resolution between those treated surgically compared to those not treated. Radiographically, C5 palsy patients had smaller postoperative foramen width measurements than those who did not develop C5 palsy (2.16±1.04 vs 3.31±1.25, $p=0.023$ on the right; 1.84±0.80 vs 3.02±1.25, $p=0.014$ on the left). When controlling for technique, CCI, age, BMI, and myelomalacia, multivariate regression analysis revealed increasing levels of laminectomy to be a significant independent predictor of C5 palsy (1.602 (2.258-1.136) for each additional level decompressed, $p=0.007$). The cut-off value for levels decompressed via laminectomy was determined to be 3.50 levels (≥0.7 AUC ≤0.8). Postoperative foramen width was also an independent risk factor for C5 palsy (0.009 (0.000-0.726), $p=0.035$), it was determined that risk of C5 palsy increases at <2.625mm foramen width (≥0.8 AUC ≤0.9).

Conclusions: C5 palsy following cervical spine surgery is correlated with residual postoperative foraminal stenosis and posterior surgery with increasing number levels decompressed. Patients undergoing more than 3.5 level laminectomy with less than 2.625mm foramen width postoperatively are at highest risk of developing C5 palsy.

Assessment Of An AI-Intraoperative Neuromonitoring Tool in Adult Cervical Spine Surgery

Varun Arvind, MD
Columbia University

Purpose: To evaluate whether machine learning (ML) can identify intraoperative motor evoked potential (MEP) changes during adult cervical spine surgery.

Significance: IONM interpretation depends on specialized staff and is semi-quantitative, variable, and vulnerable to human error. Automated, quantitative detection could standardize monitoring and strengthen decision-making.

Methods: MEPs were retrospectively collected from adults undergoing cervical spine surgery by a single surgeon at a high-volume academic center. The model compared sequential MEPs to pre-instrumentation baselines, generating risk scores and triggering alerts when a pre-specified threshold was exceeded. MEP changes were defined as IONM changes prompting a surgeon alert. Sensitivity, specificity, AUC, and accuracy were assessed.

Results: Eighty-one patients were included (mean age 58.6 ± 13.9 years; 43.2% female) with 50.6% anterior, 17.3% posterior, and 8.6% combined anterior-posterior fusions, and 23.5% motion-preserving surgery. Mean instrumented levels were 2.28 ± 0.91, 3.43 ± 2.15, and 5.43 ± 2.99, respectively. The model achieved 100% sensitivity, 72% specificity, 100% negative predictive value, 74% accuracy, with an AUC of 0.83.

Conclusion: ML is a powerful tool that can detect intraoperative IONM changes. Real-time, standardized detection of subtle changes may improve decision-making, enable quantitative assessment of neuromonitoring degradation and recovery, and support consistent evaluation across providers and centers.

The Natural History of Congenital Scoliosis: Validation of Historical Classification and a Contemporary Risk Stratification Model

Priya Singh, MD
Montefiore Medical Center

Purpose: To expand upon the natural history of congenital scoliosis described by McMaster/Ohtsuka and develop a clinically applicable model for early risk stratification.

Significance: McMaster/Ohtsuka described a classification system for congenital scoliosis, finding that type of structural anomaly was the strongest predictor of curve progression.

Methods: In this retrospective multicenter study, vertebral anomalies were classified using the McMaster/Ohtsuka and Kawakami systems. Kaplan-Meier survival analysis evaluated Cobb angle progression by patient characteristics, and a Chi-squared Automatic Interaction Detection decision tree identified progression predictors.

Results: Among 836 patients, 55.3% were female and the mean age was 4.3 years. Most underwent surgical correction (64.1%), followed by observation (25.4%) or casting/bracing (10.5%). Mean Cobb angles were 47° initially and 52° at latest follow-up. Kaplan-Meier analysis showed different progression rates across both classifications ($p<0.001$). Patients with unilateral unsegmented bars with or without contralateral hemivertebra and Kawakami Type 4 deformities had the highest progression risk. Thoracic and thoracolumbar curves and female sex were associated with progression. Baseline Cobb angle was the strongest predictor, with vertebral anomaly and sex further stratifying risk.

Conclusions: This study confirms the findings of McMaster/Ohtsuka while identifying individual risk factors for progression. These findings provide a clinical framework for early risk stratification.

Ulnar Collateral Ligament Internal Brace Using a Deep Versus Superficial Humeral Sided Tunnel: A Biomechanical Analysis of Techniques

Bradley Lezak, MD
NYU Langone Health

Purpose: The purpose of this biomechanical study was to evaluate humeral tunnel position (superficial versus deep) with respect to cyclic gapping, construct stiffness, and valgus torque to failure.

Significance: Ulnar collateral ligament (UCL) injuries of the elbow continue to rise in incidence among overhead throwing athletes at all levels of competition. Repair with internal brace augmentation has emerged as a viable surgical option, both as a standalone repair and as part of hybrid repair-reconstruction constructs. Two distinct humeral tunnel positions have been described, deep, at the lateral base of the medial epicondyle close to the trochlear articular surface, and superficial, at the medial aspect of the native UCL footprint. However, no biomechanical data exist to guide surgeons in choosing between them.

Methods: Nine matched pairs of fresh-frozen human cadaveric elbows (7 male, 2 female; age 55 ± 15 years; BMI 28.2 ± 7.0 kg/m²) were randomized to either deep or superficial humeral tunnel internal brace repair. Native UCL testing was performed first, followed by surgical repair and repeat testing within 48 hours. Specimens were mounted at 90° of elbow flexion on a uniaxial hydraulic test frame and subjected to 500 sinusoidal cycles between 0.5 and 5.0 Nm of valgus torque at 0.5 Hz, followed by load-to-failure at 2 mm/s. An optical motion capture system tracked valgus opening angle throughout testing. Primary outcomes included cyclic opening angle, construct stiffness (Nm/deg), and failure torque (Nm).

Results: No differences were observed between the deep and superficial constructs in cyclic opening angle ($p > 0.050$), construct stiffness (5.0 ± 1.4 vs. 5.2 ± 0.5 Nm/deg; $p = 0.797$), failure torque (21.5 ± 8.8 vs. 23.2 ± 4.5 Nm; $p = 0.619$), or failure opening angle (12.4 ± 3.6° vs. 14.1 ± 6.2°; $p = 0.459$). The only difference detected between groups was the proximal-distal construct length (Deep: 21.1 ± 3.1 mm, Superficial: 30.0 ± 2.6 mm; $p < 0.001$), reflecting the anatomic difference in tunnel location. Both constructs demonstrated reduced stiffness and failure torque compared to their respective native UCLs ($p \leq 0.015$). Failure modes were similar between groups, with anchor pullout and suture slippage accounting for the majority of failures in both cohorts.

Conclusion: Deep and superficial humeral tunnel positions for UCL internal brace repair show no differences biomechanically. Humeral tunnel location did not affect cyclic gapping, construct stiffness, or valgus torque to failure.

Increased Risk of Fixation Failure with Two 3.5 versus 4.5 Millimeter Solid Bicortical Screws for Tibial Tubercle Osteotomy

Rajiv Reddy, MD
The Hospital for Special Surgery

Purpose: To assess the association between screw size and fixation failure following tibial tubercle osteotomy (TTO).

Significance: Fixation failure is a devastating complication following TTO. Although both 3.5 mm and 4.5 mm screws are commonly used, comparative evidence guiding implant selection is limited.

Methods: Patients undergoing primary TTO fixed with two 3.5 mm or 4.5 mm solid bicortical screws from 2015-2024 by two patellofemoral surgeons were retrospectively compared. The primary outcome was fixation failure (fracture, nonunion, symptomatic delayed union). Multivariable analyses controlled for known risk factors for TTO complications.

Results: 398 patients (mean age 28.3±9.6 years; 74.4% female) with mean follow-up of 2.2 years were included. Fixation failure occurred in 2.0% of patients at mean 3.3±1.8 months. Patients with 3.5 mm screws had higher fixation failure rates than those with 4.5 mm screws (7.9% vs. 1.4%, p=0.03); particularly among female patients (7.9% vs. 0.78%, p=0.02). Results held when controlling for age, sex, smoking, concomitant procedures, and distalization. No other factors were associated with failure.

Conclusion: Compared with 4.5 mm screws, 3.5 mm screws were associated with an increased risk of fixation failure following TTO. Screw size may be a modifiable risk factor to reduce the risk of this devastating complication.

A Deep Learning Model Enhances Prediction of Meniscal Allograft Size from a Standard Knee Radiograph

Abhinaba Chatterjee, MD
Lenox Hill Hospital/Northwell Health

Purpose: To evaluate multimodal deep-learning models for predicting meniscal width and length.

Significance: A deep-learning model may allow patient-specific meniscus width and length estimates from a standard XR without requiring additional studies during prediction.

Methods: A deep-learning model that combined radiographic and anthropometric features was trained using Osteoarthritis-Initiative XR data from 1,472 knees in 736 patients. Patients with Kellgren-Lawrence grade>1 or any history of meniscal surgery were excluded. MRI-derived meniscal segmentations were used to obtain ground-truth width and length reference labels. Outcomes were mean absolute error (MAE), and the proportion of estimates within-10% of ground-truth.

Results: For medial and lateral width, the deep-learning model achieved MAEs of 1.22 and 1.39mm (Pollard/Yoon: 1.68 and 2.71mm; Contralateral MRI: 1.16 and 1.00mm). Within-10% rates were 94.6% and 91.0%, respectively (Pollard/Yoon: 80.7% and 72.2%; Contralateral-MRI: 92.2% and 96.7%). Contralateral-MRI had lower absolute error than deep-learning for all dimensions ($P<0.01$), but did not demonstrate statistically superior paired within-10% classification.

Conclusion: Multimodal deep-learning models had substantially improved accuracy compared to conventional radiographic sizing techniques. Although contralateral-MRI was more precise by continuous absolute error, it was not statistically superior for the paired within-10% endpoint. These findings support radiograph-based deep-learning as a potentially useful decision-support tool for meniscal allograft matching.

Glycemic Control Prior to Total Joint Arthroplasty: New Updates to an Established Index

Thomas Bieganowski, MD
NYU Langone Health

Purpose: This study sought to correlate preoperative fructosamine level to adverse outcomes in patients undergoing total joint arthroplasty (TJA).

Significance: The best methods for predicting glycemic control prior to TJA continues to be an area of debate. Several laboratory markers and cut-off values have been proposed to guide preoperative optimization goals and limit postoperative complications.

Methods: We conducted a retrospective review of all TJA procedures from February 18, 2014, to February 25, 2025. Receiver operating characteristic curve analysis was used to determine what values of fructosamine yielded a higher likelihood of prosthetic joint infection (PJI). Binomial logistic regressions were then used to determine risk of adverse outcomes.

Results: Fructosamine level of $\geq$310 µmol/L was the optimal cut-off when determining adverse outcomes following TJA. Patients whose preoperative fructosamine was at least 310 µmol/L were over 18 times more likely to develop PJI ($P<0.001$) and over five times more likely to undergo all-cause revision ($P=0.001$) compared to patients whose fructosamine was below this cut-off.

Conclusion: Our data suggest that current fructosamine parameters may be conservative when stratifying adverse postoperative outcomes. Moving forward, surgeons should consider higher preoperative fructosamine values when indicating patients for surgery.

Limb Dominance is Not Associated with Increased Reoperation or Reoperation Free Survival After Autologous Chondrocyte Implantation

Jacob Milner, MD
NYU Langone Health

Purpose: To determine whether dominant limb surgery is associated with differences in reoperation risk or reoperation-free survivorship after MACI/ACI.

Significance: The influence of limb dominance on postoperative outcomes following cartilage restoration remains unclear.

Methods: Retrospective cohort study of adults undergoing MACI or ACI. Limb dominance was determined by patient report and operative laterality. The primary outcome was ipsilateral knee reoperation, excluding ACL reconstruction, tibial tubercle osteotomy, and meniscal procedures. Graft failure was analyzed as a reoperation subset. Multivariable logistic regression and Kaplan–Meier analysis assessed reoperation risk and 5-year reoperation-free survival. PROMs and PASS achievement were compared using adjusted regression models.

Results: Among 157 patients, reoperation occurred in 14.1% of dominant and 24.1% of non-dominant cases. Dominant limb surgery was not significantly associated with reoperation (OR 0.49, 95% CI 0.20–1.17; p = 0.115). Graft failure rates were low and similar (2.6% vs 5.1%; p = 0.681). Hardware removal was less frequent in dominant limb procedures (0 vs 7; p = 0.014). Mean reoperation-free survival favored dominant limbs (9.04 vs 7.95 years; p = 0.093), with 5-year survival of 80.2% versus 57.9%. PROMs showed no significant differences; however, dominant limb surgery was associated with higher odds of achieving PASS for KOOS Pain (OR 3.07; p = 0.005) and KOOS Quality of Life (OR 2.79; p = 0.009).

Conclusion: Dominant limb MACI/ACI was not associated with increased reoperation risk or worse mid-term outcomes. Limb dominance does not adversely affect surgical or patient-reported results.

Preoperative Semaglutide Exposure and Postoperative Opioid Utilization Following Primary Total Hip Arthroplasty: A National Database Analysis

Rajiv Vasudevan, MD
Yale New Haven Health

Purpose: It was hypothesized that preoperative semaglutide exposure is associated with reduced postoperative opioid utilization among type 2 diabetes mellitus (T2DM) patients undergoing primary total hip arthroplasty (THA).

Significance: THA is a high-volume elective procedure and a substantial source of postoperative opioid exposure, and prolonged opioid use predicts worse outcomes. Semaglutide, a glucagon-like peptide-1 receptor agonist (GLP-1 RA), modulates opioid-related behaviors and analgesia preclinically, but this association has not been examined in a THA cohort.

Methods: T2DM patients undergoing primary THA were identified from a national claims database. Semaglutide-exposed patients (prescription within 12 months preoperatively) were 1:1 exact matched to unexposed patients across 10 covariates. The primary outcome was 90-day MME, with opioid duration secondary. Independent t-tests, Kruskal-Wallis testing, and multivariable regression (age, sex, ECI) were performed.

Results: After matching, 515 patients comprised each cohort. The semaglutide cohort filled fewer 90-day MME (497.1 vs 618.0, $p=0.027$), a 120.9 MME reduction (19.6%) preserved on Kruskal-Wallis testing ($p<0.001$). On regression, semaglutide remained associated with 159.2 fewer MME ($p=0.005$). Duration was shorter (11.2 vs 12.3 days, $p=0.021$).

Conclusion: Preoperative semaglutide exposure was independently associated with lower postoperative opioid utilization following primary THA, supporting prospective study of GLP-1 RAs as perioperative opioid-sparing agents.

Effort Required to Achieve Preoperative Patient Reported Outcomes Measures Completion in THA and TKA

Christopher Katchis, MD
Zucker School of Medicine at Hofstra/
Northwell at Lenox Hill Hospital

Purpose: To quantify the administrative effort and diminishing returns associated with preoperative and one-year patient-reported outcome measure (PROM) collection for primary THA and TKA.

Significance: PROMs increasingly influence quality assessment and CMS reimbursement, but automated collection often requires substantial supplemental outreach.

Methods: Retrospective analysis of PROMs collection workflow from a single institute. Automated PatientIQ or REDCap outreach was followed by phone, email, and paper outreach for nonresponders. Completion rates, outreach burden, and diminishing returns were analyzed.

Results: Among 798 patients, preoperative completion reached 92.5% (738/798). Automation yielded 470 completions (58.9% of the cohort), while manual outreach added 267, predominantly by phone, requiring 508 calls and 586 emails. The first three calls captured 94.6% of phone-based completions, and the first two emails captured 91.9% of email-based completions. Paper outreach had the lowest completion rate (41.9%). Completion varied by surgeon ($P<0.001$), and automated completers were younger ($P=0.008$). In the one-year subanalysis, 70.7% completed PROMs (140/198); automation captured 67.2% of completions, while 466 emails and 236 calls were required over three months.

Conclusion: High PROM completion requires substantial manual effort beyond automation. Three phone calls and two emails represent practical outreach thresholds, while one-year collection requires disproportionate effort despite lower completion.

A Double-Hit Analysis: Evaluating the Nephrotoxicity of Dual Intravenous and Vancomycin Impregnated Cement Exposure

Garrett Esper, MD
NYU Langone Health

Purpose: Evaluate whether postoperative intravenous vancomycin (IVV) in patients treated with vancomycin-impregnated cement (VIC) is associated with increased acute kidney injury (AKI) incidence compared with VIC alone.

Significance: The concomitant use of postoperative IVV in patients treated with VIC may represent a potential “double hit” contributing to nephrotoxicity, yet its impact on AKI remains unclear.

Methods: A retrospective cohort study was conducted on patients >18yrs undergoing VIC implantation for fracture-related infection. Patients were grouped by postoperative IVV exposure (IVV+VIC versus VIC alone). Primary outcome was AKI incidence, secondary outcomes included mean absolute and percent change in serum creatinine.

Results: 589 patients were included: 326 (55.4%) received IVV+VIC; 263 (44.6%) received VIC alone, with similar baseline characteristics. AKI incidence did not differ between groups. However, the IVV+VIC cohort demonstrated greater mean increases and percent change in serum creatinine. On multivariable analysis, IVV+VIC was not independently associated with AKI (OR=1.36,95%-CI=0.84-2.21,p=0.211).

Conclusion: Postoperative IV vancomycin in patients treated with VIC was not associated with increased AKI risk. While dual-antibiotic therapy resulted in greater creatinine elevations, AKI risk appeared driven primarily by underlying renal disease. These findings support cautious use of dual therapy with close renal monitoring, particularly in patients with pre-existing CKD.

Demographic and Preoperative Predictors of Substantial PROM Improvement After Total Hip and Knee Arthroplasty

Reed Macey, MD
NYU Langone Health

Purpose: The purpose of this study was to evaluate how baseline PROM scores and patient characteristics influence the likelihood of achieving substantial clinical benefit following total hip and knee arthroplasty.

Significance: Patient reported outcome measures (PROMs) are key endpoints for evaluating total hip (THA) and knee arthroplasty (TKA) under value-based care models. The impact of baseline PROMs and socioeconomic factors on achieving meaningful improvement remains unclear. This study identifies preoperative and demographic predictors of PROM improvement after total joint arthroplasty.

Methods: We retrospectively analyzed patients undergoing primary THA or TKA with preoperative and postoperative PROMs. Substantial clinical benefit (SCB) was defined as ≥22 point improvement in HOOS,JR or ≥20 points in KOOS,JR. Median household income (MHI) was estimated by ZIP code and stratified. ROC analysis determined optimal preoperative threshold for SCB achievement, and multivariable logistic regression identified predictors of SCB and of preoperative scores below identified thresholds.

Results: The cohort included 6,221 THA and 7,070 TKA patients. Patients in higher MHI quartiles were older, had lower BMI, and higher mean preoperative PROM scores. Optimal preoperative threshold scores for SCB were 50.95 (HOOS,JR) and 46.10 (KOOS,JR). SCB achievement rates were higher in lower MHI quartiles ($P<0.05$), however, MHI was not an independent predictor after adjustment. Preoperative scores below threshold were the strongest predictors of achieving SCB (THA OR 3.99; TKA OR 5.35; $P<0.001$). Black race and current smoking were associated with lower SCB achievement after THA, while Asian, Black, and Other/Unknown race, and lower BMI were predictors of lower SCB achievement after TKA.

Conclusion: Lower baseline HOOS,JR and KOOS,JR scores are strong predictors of achieving SCB, although certain demographic factors remain influential. Accurate preoperative PROM collection and outcome measures reflecting meaningful improvement are essential for evaluating arthroplasty success.

Total Hip Arthroplasty After Hip Arthroscopy Does Not Compromise Clinical Outcomes

Branden Sosa, MD
The Hospital for Special Surgery

Purpose: We hypothesized that prior hip arthroscopy (HA) does not compromise modified Harris Hip Scores (mHHS) following total hip arthroplasty (THA) and examined whether procedures performed at HA influence time to conversion.

Significance: Femoroacetabular impingement disrupts hip mechanics and may progress to osteoarthritis requiring THA. HA addresses chondrolabral pathology, but some patients ultimately require conversion. Literature conflicts on whether prior HA worsens THA outcomes.

Methods: This retrospective single-surgeon cohort included 106 patients undergoing THA after prior ipsilateral HA (conversions) and 105 primary THA controls. mHHS was collected at 1 and 2 years and compared using multivariable linear regression adjusted for age, sex, and BMI. Among conversions, Kaplan-Meier and adjusted Cox analyses assessed whether neck debridement at HA influenced time to THA.

Results: Conversions were younger (50.2±10.7 vs 58.2±9.5 years). mHHS was similar at 1 year (95.0 vs 96.6) and 2 years (93.9 vs 96.2). Neck debridement was associated with longer time to conversion THA (adjusted HR 1.67; 95% CI 1.08–2.59; p=0.021), with 5-year arthroplasty-free survivorship of 29% versus 15%.

Conclusion: Conversion THA achieved mHHS comparable to primary THA. Neck debridement at HA was associated with longer arthroplasty-free survival, supporting HA as a safe intervention should future THA be required.

Radiographic vs. Computed Tomography Characterization of the Metacarpal Isthmus for Intramedullary Screw Fixation

Sean Liu, MD
Zucker School of Medicine at Hofstra/
Northwell at Lenox Hill Hospital

Purpose: To compare radiographic and computed tomography (CT) measurements of the metacarpal isthmus and determine whether radiographs overestimate its narrowest diameter.

Significance: Accurate isthmus measurement is essential for intramedullary screw sizing, yet CT is not routinely obtained for metacarpal fractures. Radiographic overestimation may lead to oversized implant selection and cortical breach.

Methods: This IRB-approved retrospective study included 206 metacarpals (42 fractured, 164 uninjured) from 52 patients undergoing intramedullary screw fixation between 2015 and 2025. Two blinded, fellowship-trained hand surgeons independently measured the narrowest isthmus on three-view radiographs and CT. The smallest value across views represented the radiographic measurement. Paired t-tests, root-mean-square error, ANOVA with Tukey testing, and intraclass correlation coefficients (ICCs) were used.

Results: Radiographic measurements exceeded CT measurements (3.43 versus 2.76 mm; $P<0.001$), with a root-mean-square difference of 0.9 mm. Discrepancy was greatest in the small finger (1.14±0.65 mm) compared with the index (0.59±0.58 mm), middle (0.56±0.57 mm), and ring fingers (0.37±0.43 mm) ($P<0.001$). Discrepancy was larger in non-fractured fingers (0.73±0.63 vs 0.54±0.54, $P=0.048$). Reliability was good for radiographs (ICC=0.85) and CT (ICC=0.79).

Conclusion: Radiographs systematically overestimate metacarpal isthmus diameter, particularly in the small finger. Surgeons should account for this error and consider CT when canal size is uncertain.

Optimizing Amyloidosis Screening Criteria for Tenosynovial Biopsy at Carpal Tunnel Release: Clinical Associations Stratified by Age

Kendall Derry, MD
New York University

Purpose: We hypothesized that distinct clinical associations exist among patients <65 years with amyloid-positive tenosynovial biopsies during carpal tunnel release (CTR), which may guide tenosynovial biopsy decision-making in this younger cohort.

Significance: Tenosynovial biopsy during CTR enables early amyloidosis detection, though existing age-based screening algorithms may miss younger at-risk patients.

Methods: COSMOS, a nationwide Epic electronic health record database, was queried for adults who underwent CTR with tenosynovial biopsy and Congo Red staining between 2020-2025. Amyloid-positive patients were stratified by age (≥65 versus <65 years). Demographics, comorbidities, and musculoskeletal diagnoses and procedures were compared using t-tests and chi-square tests, with a Bonferroni correction ($p<0.0001$).

Results: Of 1,681 amyloid-positive patients, 20.1% were <65 years. Obesity and medial and lateral epicondylitis were significantly more prevalent in patients <65 years. A history of trigger finger release, rotator cuff repair, De Quervain's release, and irritable bowel disease were also associated with higher odds of amyloid positivity in patients <65 years. Cardiovascular, renal, and hematologic comorbidities were significantly more prevalent in amyloid-positive patients >65 years.

Conclusion: Incorporating musculoskeletal risk factors into amyloidosis screening criteria for patients <65 years may improve early detection and enable life-altering therapy before irreversible organ damage occurs.

Not Just Collateral Damage: A Proposal to Reconsider Surgical Thresholds for Thumb Radial Collateral Ligament (RCL) Injuries

Megan R. Donnelly, MD
NYU Langone Health

Purpose/Significance: To define clearer indications for operative intervention for thumb metacarpophalangeal joint (MCPJ) radial collateral ligament (RCL) injuries and to describe outcomes of RCL repair versus reconstruction.

Methodology: Patients who underwent RCL repair/reconstruction between 2012-2026 were identified using CPT codes. Demographic data, surgical variables including indications and postoperative outcomes data, were collected. Descriptive statistics for the entire cohort and for repair versus reconstruction cohorts were performed.

Results: 46 patients were included. The average age was 36 years. Most patients were male, worked a desk job, and injured their right side. Operative indications were both pain and instability. The average injury duration was 1 year. 7 patients had repair without augment, 29 patients had repair augmented by suture anchor, 6 repair augmented by internal brace and and 4 reconstruction with palmaris longus. Repair augmented by internal brace patients were older on average ($p=0.012$). Reconstruction patients had the highest rate of postoperative instability ($p=0.013$).

Conclusion: Pain alone without instability should not be considered an indication for RCL repair/reconstruction. The timing for surgery should be shortened, as delay may require reconstruction instead of repair, and reconstruction patients may have a risk of persistent instability.

Early Patient-Reported Pain and Functional Outcomes Following Transhumeral Osseointegration: A Preliminary Case Series

Zachary Li, MD
NYU Langone Health

Background: Osseointegration (OI) is an emerging surgical approach for individuals with transhumeral amputations, offering direct skeletal prosthetic attachment as an alternative to conventional socket-based systems[1]. While outcomes data are accumulating for lower extremity cohorts, patient-reported outcome measures (PROMs) following transhumeral OI remain limited[2, 3]. This case series reports preliminary pain and functional outcomes using validated PROMs in a single-institution cohort.

Methods: Six male patients (mean age 32.3 years, range 25–40) with unilateral transhumeral amputations underwent OI implantation. The predominant etiology was motor vehicle accident (n=5), with one work-related traumatic injury. Pre- and postoperative assessments included the quickDASH, OPUS Functional Status Scale, PROMIS Upper Extremity (UE) Function, PROMIS Pain Intensity, and PROMIS Pain Interference. Postoperative data were gathered from all six patients, with an average follow-up period of 5.0 months (ranging from 3 to 10 months), although the completeness of PROM data differed depending on the specific measure.

Results: Mean preoperative quickDASH was 50.0 (±18.5), with a postoperative mean of 50.6 (±5.1). Mean pain scores improved from 3.2 (±2.6) preoperatively to 2.2 (±2.0) postoperatively. PROMIS UE Function scores were stable (pre: 30.0 ± 8.0; post: 29.8 ± 4.3). OPUS Functional Status was similarly maintained (pre: 55.5 ± 17.4; post: 53.3 ± 5.0). PROMIS Pain Intensity was largely unchanged (45.8 vs. 44.8), while PROMIS Pain Interference showed a modest postoperative increase (47.8 vs. 56.7).

Conclusion: In this preliminary case series, transhumeral OI was associated with stable upper extremity functional scores and marginal pain reduction at short-term follow-up, though PROMIS Pain Interference increased in the early postoperative period. Rather than reflecting efficacy, these findings establish a PROM baseline for a procedurally rare patient population and highlight that meaningful functional gains may not be detectable at an early phase. Prospective studies with standardized PROM protocols and longer follow-up are needed to fully characterize the recovery trajectory following transhumeral osseointegration.

Excision of Distal Pole of Scaphoid and Triquetrum to Improve Radiolunate Arthrodesis

Rafa Rahman, MD
The Hospital for Special Surgery

Purpose: We hypothesize that distal pole of scaphoid excision (DSE) and triquetral excision (TE) will improve wrist range of motion (ROM) after radiolunate arthrodesis (RLA), without causing distal carpal row instability.

Significance: RLA is a time-honored solution for wrist arthritis and instability, but with major downsides. There is decreased in ROM in all planes, and techniques are technically demanding. Numerous fixation strategies have been described, some with high rates of nonunion, and no consensus on optimal technique.

Methods: Ten cadavers were tested in multiple states: 1) native, 2) RLA, 3) RLA+isolated DSE or TE, and 4) RLA+DSE and TE. Markers measured terminal ROM in loaded positions for flexion-extension, radial-ulnar deviation, and dartthrower's motion. RMANOVA compared arc of motion in each plane (alpha=0.05). Distal row stability was tested with a 40N dorsal-palmar and radial-ulnar force, and capitate translation of on the fixed lunate assessed.

Results: Stepwise DSE, TE, or both significantly improved motion after RLA in all tested planes (RMANOVA, $p<0.001$). No distal row dislocation was noted in any specimen.

Conclusion: DSE or TE in RLA increases ROM compared to RLA alone, without causing instability. This may provide improved outcomes and enhanced surgical access and fixation for those with debilitating arthritis or instability.

Burnout, Psychological Distress, and Relationship Quality Among Spouses and Partners of Orthopedic Surgery Residents, Fellows, and Attendings

Maxwell Trudeau, MD
NYU Langone Health

Purpose: To assess burnout, psychological distress, depression, and relationship quality in spouses and partners of orthopedic surgery residents, fellows, and attending surgeons.

Significance: Orthopedic surgeon burnout is well documented, but its impact on spouses and partners has received little attention.

Methods: Anonymous survey using validated instruments (MBI-HSS, GHQ-12, PHQ-9, Modified RDAS); demographic comparisons via Welch t-tests and chi-squared tests.

Results: 64 partners participated (mean age 38±11 years; 75% female; 83% employed; partner workweek 70±17 hours); 58% were partnered with residents/fellows, 41% with attendings. Burnout prevalence was 56%; 41% reported high emotional exhaustion (MBI-EE ≥27), 19% high depersonalization (MBI-DP ≥12), and 37% low personal accomplishment (MBI-PA ≤33). Probable psychiatric caseness (GHQ-12 ≥3) was present in 26% and moderate-to-severe depression (PHQ-9 ≥10) in 8%. Relationship distress (RDAS <48) affected 48%, more often in partners of attendings than residents/fellows (69% vs. 38%, p=0.01). Participants with children reported greater relationship distress (RDAS 48 vs. 40, p=0.01), and working partners had higher depersonalization (MBI-DP 8 vs. 5, p=0.03).

Conclusion: Partners of orthopedic surgeons report substantial burnout, psychological distress, and relationship distress—especially partners of attendings and those with children. Orthopedic wellness initiatives should include family-directed support across the training-to-practice continuum.

Trends in Publication Volume and Arms Race Control Score Among Orthopedic Surgery Matriculants at Top NIH-Funded Programs, Classes of 2027–2030

Matthew Johnson, MD
Maimonides Orthopedics

Purpose: We hypothesized that research output among residents entering the 40 most NIH-funded orthopaedic programs has increased across successive classes and persists when publications are weighted for authorship effort rather than counted equally.

Significance: Publication count is the strongest predictor of Match success after licensing scores, incentivizing accrual of low-effort output such as letters and commentaries. The Arms Race Control Score (ARCS), developed in neurosurgery, weights publications by study type and authorship position, excluding minimal-effort work. ARCS has not been evaluated longitudinally.

Methods: For 583 residents (Classes of 2027–2030) at 31 of these programs, total publications, ARCS, minimal-effort publications, and h-index, a citation-impact measure, were recorded. Given skewed distributions, classes were compared using nonparametric and trend tests.

Results: Mean publication count increased from 7.8 to 12.1 (+55.6%, $p<0.001$), mean ARCS from 12.8 to 19.2 (+50.2%, $p=0.006$), and substantive publications per resident from 4.8 to 7.1 (+47.0%). Residents with ≥5 publications increased from 40.0% to 69.3% ($p<0.001$). Minimal-effort proportion (39.7% versus 38.8%, $p=0.74$) and h-index ($p=0.87$) were unchanged.

Conclusion: Total, effort-weighted, and substantive output increased in parallel while the minimal-effort proportion remained stable, indicating genuine growth in scholarly contribution rather than proliferation of low-effort work. Citation impact has not yet been followed.

Ebf3 Governs Skeletal Progenitor Cell Fate During Injury Repair and Aging: A Therapeutic Target for Impaired Bone Healing

Lindsey Remark, MD
NYU Langone Health

Purpose: To determine whether Ebf3, a transcription factor that suppresses osteogenic differentiation of skeletal stem/progenitor cells (SSPCs) in homeostasis, governs SSPC fate during injury repair and is a therapeutic target for impaired healing with aging.

Significance: Aging shifts SSPCs from osteogenic toward adipogenic differentiation, impairing bone regeneration. We previously showed Notch signaling drives this fate switch and identified Ebf3 as a downstream Notch target enriched in SSPCs, making it a promising therapeutic target. Human data suggest Ebf3 functions downstream of teriparatide, supporting its clinical relevance.

Methods: A tibial defect was created in young mice; scRNA-sequencing and SCENIC regulon analysis occurred at baseline and postoperative days (POD) 5 and 10. Bulk RNA sequencing of young and aged mouse femur fractures compared Ebf3 expression.

Results: Ebf3 was expressed in SSPCs at baseline, declined by POD5 with a stress/metabolic regulon (Hif1a/Atf3/Myc), and began returning toward baseline by POD10 alongside an osteogenic regulon (Atf4/Jund/Smad1). Ebf3 was elevated in aged versus young SSPCs by bulk sequencing.

Conclusion: Ebf3 downregulation is required for osteogenic commitment during repair and may be dysregulated with aging, supporting it as a therapeutic target. Ongoing studies involve Ebf3 siRNA in a mouse tibial defect model to determine if knockdown enhances healing.

Postoperative Follow-Up After Hemi epiphysiodesis in a Low-Opportunity Urban Population: A Retrospective Quality Improvement Study

Rodney Arthur, MD
Montefiore/Einstein

Purpose: We hypothesized that patient socioeconomic factors are associated with postoperative follow-up after temporary hemiepiphysiodesis (THE) and that delayed follow-up increases the risk of adverse clinical outcomes.

Significance: THE reliably corrects lower-extremity angular deformity in skeletally immature patients but requires timely follow-up. Limited data exist regarding barriers to follow-up in underserved pediatric populations.

Methods: We performed an IRB-approved retrospective quality improvement study of patients <18 years who underwent knee or ankle THE at a single urban tertiary children's hospital (2015–2024). Follow-up adherence was categorized as on-time, delayed, or lost to follow-up relative to surgeon recommendations. Socioeconomic variables included insurance, interpreter use, MyChart status, Area Deprivation Index (ADI), and Child Opportunity Index (COI). Outcomes included overcorrection and unplanned surgery.

Results: Among 154 patients, 55% had on-time follow-up, 33% had delayed follow-up, and 13% were lost to follow-up. Interpreter use was associated with delayed follow-up ($p=0.03$), whereas insurance, ADI, COI, and MyChart status were not (all $p \geq 0.73$). Overcorrection occurred only after delayed follow-up ($p<0.001$), and unplanned surgery occurred only in the very delayed group ($p<0.001$).

Conclusion: Delayed follow-up after THE is associated with worse clinical outcomes. Interventions addressing language-related barriers may improve follow-up adherence and reduce preventable complications.

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MID-ATLANTIC

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University Hospitals/
Case Western Reserve University
Patients with Vitamin D Deficiency are More Likely to Develop Complex Regional Pain Syndrome After Extremity Fractures: A Large Database Propensity-Matched Cohort Study

Alexandra Baker Lutz, MD
University of Maryland
Impact of Obesity on Patient-Reported Outcomes Two Years After Multiple Ligament Knee Reconstruction

Margaret Sinkler, MD
Case Western Reserve University
To Fix or to Replace? An Analysis of Geriatric Periprosthetic Distal Femur Fractures Treated with Open Reduction Internal Fixation, Retrograde Intramedullary Nail, or Distal Femoral Replacement

Presenters' Choice

Alexander P. Hoffman, MD
University of Pittsburgh Medical Center
Intraoperative Evaluation of Sarcoma Surgical Margins with Indocyanine Green Fluorescence Imaging

MIDWEST

First Place

Katherine J. Montoya, MD
University of Arkansas for Medical Sciences
Ten Years of a Novel Telemedicine System for Management of Statewide Hand Trauma in Arkansas – A Decade in Review

Second Place

Bhargavi Maheshwer, MD
University Hospitals Cleveland Medical Center
Predictors of Anterior Cruciate Ligament Re-Injury and Return to Sports in Adolescent Athletes: Increased Risk in Younger Age and Earlier Time to Return to Sport

Erik Nakken, MD
University of Michigan
Optimizing Contact Pressures of the Posterior Heel During Lower Extremity Immobilization: A Biomechanical Study

Third Place

Apurva Choubey, MD
University of Illinois Chicago
Joint Arthroplasty in Breast Cancer: PE Risk and Thrombo-Prophylaxis Depend on Time Since Mastectomy

Kyleen Jan, MD
Rush University Medical Center
Midcarpal Stability Persists with ≤33% Distal Scaphoid Resection: A 3D Computational Analysis

Mark Plantz, MD
Northwestern University
Pre-Clinical Safety and Efficacy Assessment of a Novel 3D-Printed Hydroxyapatite Demineralized Bone Matrix (HA-DBM) Composite Scaffold Using a Rodent Posterolateral Fusion Model

Presenters' Choice

Jordan Serotte, MD
University of Chicago
AI-Assisted MRI Interpretation Improves Surgeon Performance in Diagnosing Bankart Lesions

NORTHEAST

First Place

Joshua T. Bram, MD
The Hospital for Special Surgery
Skeletal Age Assessment from Knee Radiographs Using Deep Learning

Second Place

Sreetha Sidharthan, MD
The Hospital for Special Surgery
Reverse-Anatomical Front and Back Reconstruction for Volar Intercalated Segment Instability Non-Dissociative: A Biomechanical Study

Nathan Varady, MD
The Hospital for Special Surgery
Low Complication Rate Following Contemporary Pure Anteriorization Tibial Tubercle Osteotomy for Patellofemoral Overload

Third Place

Aonnicha Burapachaisri, MD
Icahn School of Medicine at Mount Sinai Hospital
Does the Distal Tip Position of Long Cephalomedullary Nails Impact Mechanical Failure Rates?

Austin C. Kaidi, MD
The Hospital for Special Surgery
A Novel Clinical Calculator to Identify Patients at Risk for Ileus after Short-Segment Lumbar Fusion

Gergo B. Merkely, MD
Harvard Combined Orthopaedic Residency
AI-Driven Virtual Athlete Avatars for Injury Risk Stratification and Performance Analysis in Sports Medicine

Presenters' Choice

Rafa Rahman, MD, MPH
The Hospital for Special Surgery
Novel Scapholunate Bridge Augmentation to Treat Scapholunate Interosseous Ligament Injury

SOUTHEAST

First Place

Joseph Geller, MD
Jackson Memorial Hospital/University of Miami
Tracking Wearable Device Compliance in Total Knee Arthroplasty Recovery

Second Place

David S. Constantinescu, MD
University of Miami
When the Robot Fails Us: A Comprehensive Analysis of a United States Food and Drug Administration Database of Technology-Assisted Arthroplasty

Olivia de Araujo, MD
Jackson Memorial Hospital/University of Miami
Consideration of Updated Breast Cancer Screening in Female Orthopaedic Surgeons: A Comprehensive Review

Third Place

James Frix, MD
Atrium Health Carolinas Medical Center
Early Implementation of Virtual Reality Therapy for Phantom Limb Pain: A Feasible and Effective Adjunct to Traditional Interventions

Aneesh V. Samineni, MD
Jackson Memorial Hospital/University of Miami
Prediabetes as an Unrecognizable Risk Factor for Inpatient Postoperative Complications After Total Knee Arthroplasty

Ryan Serbin, MD
Atrium Health Carolinas Medical Center
Targeted Brain Rehabilitation: A Novel Virtual Reality Protocol for Phantom Limb Pain Following Upper Extremity Amputation

Presenters' Choice

Blake H. Hodgens, MD
Atrium Health Carolinas Medical Center
Weightbearing After Distal Femur Fractures: Does the Surgeons' Postoperative Protocol Matter?

WESTERN

First Place

Kyla Petrie, MD
University of California, San Francisco
Comparison of Retear Rates and All-Cause Reoperation Rates in Pediatric and Adolescent AL Reconstructions Using Bone Patellar Tendon and Quadriceps Tendon Grafts

Second Place

Grant Schroeder, MD
Stanford University
Shorter Relative Patellar Defect Length After Bone Patellar Tendon Bone Anterior Cruciate Ligament Reconstruction is Associated with Better Postoperative Patient-Reported Outcomes at 1-year Follow-up

Mathangi Sridharan, MD
University of California, Los Angeles
Predictive Factors of Having a Second UBC Related Pathologic Fracture

Third Place

Kelechi Nwachuku, MD
University of California, San Francisco
Osteoarthritis and Total Joint Arthroplasty in Housing Insecure Patients at a Safety-Net Hospital in a Major Urban City

Alexa K. Pius, MD
Stanford University
Navigated and Robotic Total Knee Arthroplasty (TKA) Do Not Confer Improved 5-Year Survivorship Compared to Conventional TKA: An Analysis from the American Joint Replacement Registry (AJRR)

Karch M. Smith, MD
University of California, San Diego
Combined Root and Body (CRAB) Lateral Meniscus Tears in the Adolescent Population: An Underrecognized and Underreported Tear Pattern

Presenters' Choice

Oliver Dong, MD
San Francisco Orthopaedic Residency Program at University of California,
San Francisco Health St. Mary's Hospital
Osteochondral Autograft from the Proximal Tibiofibular Joint for Reconstruction of Acute Tibial Plateau Fractures with Severe Chondral Defects

Nicole J. Newman-Hung, MD
University of California, Los Angeles
Characteristics and Recurrence Risk of Upper Extremity Soft Tissue Sarcoma

CALIFORNIA ORTHOPAEDIC ASSOCIATION OREF RESIDENT AWARD WINNER

Ryan Halvorson, MD
University of California, San Francisco
Evaluation of a Pretrained Large Language Model as a Clinical- decision Support Tool in Musculoskeletal Health

OREF EDWARD C. MCELFRESH AWARDS FOR BEST RESIDENT ABSTRACT

Hannah Levy, MD
Mayo Clinic
Lumbar Facet Arthroplasty for Spondylolisthesis and Stenosis: Interim Analysis of Four-Year Outcomes from a Prospective Randomized Clinical Trial

Chris Chermside-Scabbo, MD
University of Minnesota
Better Functional Scores in Arthroscopic Assisted Percutaneous Fixation Than Open Reduction Internal Fixation of Lateral Tibial Plateau Fractures