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OREF MIDWEST REGION
RESIDENT RESEARCH SYMPOSIUM

Sponsored by the Hark Family in Memory of Dr. Fred Hark and Dr. William Hark
Friday, May 3, 2024

Orthopaedic Research and Education Foundation Offices
American Academy of Orthopaedic Surgeons Building
Orthopaedic Learning Center
9400 W. Higgins Road
Rosemont, IL

Co-Hosts:

Joshua J. Jacobs, MD

Chairman, Department of Orthopaedic Surgery
Rush University Medical Center

Alfonso Mejia, MD, MPH

Program Director, Orthopaedic Surgery Residency Program
Vice Chair, Department of Orthopaedic Surgery
University of Illinois at Chicago

***OREF Midwest Resident Research Symposium is Sponsored by the Hark Family
in Memory of Dr. Fred Hark and Dr. William Hark***

Thank you to the Hark Family for supporting the Midwest Resident Research Symposium and co-sponsoring additional symposia in 2024. The Hark Family's support of the 2024 Resident Research Symposia is made in memory of Dr. Fred Hark and his son, Dr. William Hark.

The Hark family has long been a champion of OREF. Their endowment made possible a lectureship grant established through OREF in 1982. Funding from this grant gave orthopaedic organizations the opportunity to enhance their educational programs with lectures on topics ranging from the physiology of leg lengthening to clubfoot surgery.

Dr. Fred Hark was a former Chair of Orthopaedic Surgery at Rush University and Clinical Professor of Orthopaedic Surgery at the University of Illinois. He served at Hines VA Hospital, Henrotin Hospital, and Mary Thomson (Women and Children's) Hospital, and he was president of the Chicago Orthopaedic Society. He and his wife, Dr. Florence Hark, established their legacy of philanthropy in memory of their son, William. After Fred's passing, Florence continued making charitable contributions in memory of her son and husband.

Dr. William Hark completed his residency training in Chicago after spending two years in the U.S. Navy, completing his active service as Lieutenant Commander. In 1962, he began his orthopaedic practice in association with his father and Rush Presbyterian St. Luke's Hospital and was also Clinical Professor of Orthopaedics Surgery at the University of Illinois. He was active in many institutions, including Shriners' Hospital for Crippled Children in Chicago, the Hines Veterans' Administration Hospital, the Municipal Tuberculosis and State Tuberculosis Sanitarium, the Spaulding School for Handicapped Children, and the Admiral Retirement Home for Geriatrics. Dr. Hark was greatly interested in residents' education and was a staunch supporter of the residency program at Rush-Presbyterian-St. Luke's Medical Center.

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About OREF:

The Orthopaedic Research and Education Foundation (OREF) was founded in 1955 to ensure an expanding base of knowledge and effective, evidence-based treatment protocols for orthopaedic surgeons to continually improve patient care. Since its founding, OREF has funded well over \$100 million in research and educational grants and awards that benefit all of orthopaedics. For more information about OREF grants and awards, please visit www.oref.org. Follow OREF on its Facebook page (OREFtoday) and on Twitter (@OREFtoday).

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SUMMARY AGENDA

Friday, May 3, 2024

Noon – 12:50 p.m.	Registration and Lunch American Academy of Orthopaedic Surgeons Orthopaedic Learning Center 9400 W. Higgins Road Rosemont, Illinois
12:50 p.m. – 1:00 p.m.	Welcome and Introductions Joshua J. Jacobs, MD Chair, Department of Orthopaedic Surgery Rush University Medical Center Alfonso Mejia, MD, MPH Program Director, Orthopaedic Surgery Residency Program Vice Chair, Department of Orthopaedic Surgery University of Illinois at Chicago
1:00 p.m. – 1:08 p.m.	OREF Welcome Lee Grossman, MBA, ML, CAE Chief Executive Officer Orthopaedic Research and Education Foundation
1:08 p.m. – 1:38 p.m.	Session I – Resident Research Presentations & Discussion Hand, Foot and Ankle
1:38 p.m. – 2:12 p.m.	Session II – Resident Research Presentations & Discussion Orthopaedic Trauma <i>Break</i>
2:22 p.m. – 2:48 p.m.	Session III – Resident Research Presentations & Discussion Sports Medicine
2:48 p.m. – 3:18 p.m.	Session IV – Resident Research Presentations & Discussion Shoulder <i>Break</i>
3:26 p.m. – 3:30 p.m.	Introduction of Keynote Speaker
3:30 p.m. – 4:15 p.m.	Keynote Address and Discussion Osteochondral Allograft Transplantation Brian J. Cole, MD, MBA Professor & Acting Chair Department of Orthopaedic Surgery The Dr. Ralph and Marian C. Falk Endowed Professorship of Biochemistry Chair of Surgery, Rush Oak Park Hospital Managing Partner, Midwest Orthopaedics at Rush Team Physician, Chicago White Sox and Bulls

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SUMMARY AGENDA

Friday, May 3, 2024

- | | |
|-----------------------|---|
| 4:15 p.m. – 4:45 p.m. | Session V – Resident Research Presentations & Discussion
Spine and General |
| 4:45 p.m. – 5:11 p.m. | Session VI – Resident Research Presentations & Discussion
Adult Reconstruction |
| 5:11 p.m. – 5:15 p.m. | Closing Remarks
Joshua Jacobs, MD and Lee Grossman, MBA
<i>Thank you to all sponsors and participants!</i>
<i>Closing of program to OREF TV audience</i> |
| 5:15 p.m. – 6:00 p.m. | Reception
Awards Presentation |

KEYNOTE SPEAKER



Brian Cole, MD, MBA

Professor & Acting Chair
Department of Orthopaedic Surgery
The Dr. Ralph and Marian C. Falk Endowed
Professorship of Biochemistry
Chair of Surgery, Rush Oak Park Hospital
Managing Partner, Midwest Orthopaedics at Rush
Team Physician, Chicago White Sox, and Bulls

Dr. Brian Cole is an orthopedic sports medicine surgeon at Midwest Orthopaedics at Rush and a Professor of Orthopaedics, Anatomy and Cell Biology at Rush University Medical Center. He is Managing Partner of Midwest Orthopaedics and is the Department's Chair and the Section Head of the Cartilage Research and Restoration Center

Dr. Cole is the Chair of Surgery at Rush Oak Park Hospital and leads the Rush Orthopaedic Master's Program. He was the 2020 President of the Arthroscopy Association of North America and holds several other leadership positions in national and international orthopaedic societies.

He has been awarded many honors, which range from the "Best Doctors in America" since 2004 and "Top Doctor" in Chicagoland since 2003. In 2006, he was featured on the cover of Chicago Magazine as "Chicago's Top Doctor." In 2009, he was selected as NBA Team Physician of the Year and *Orthopedics This Week* has named him as one of the top 20 sports medicine, knee and shoulder specialists repeatedly over the last five years as selected by his peers. His patients describe his practice as compassionate, available and willing to offer novel solutions to avoid surgery whenever possible. Testimonials to the surgical care that his team provides are frequently featured and shared.

Dr. Cole's research interests include Cartilage Restoration, OrthoBiologics, and minimally invasive surgical techniques for the treatment of the knee, elbow, and shoulder. He has published more than 1,000 articles and 20 textbooks on orthopaedic surgery and sports medicine, has lectured nationally and internationally on more than 2,000 occasions and has appeared as an expert on several TV documentaries. His published research is recognized as one of the most frequently referenced literature in the world, falling in the top 5% of the most read articles on Doximity.

He received an MD and MBA from the University of Chicago, completed his orthopaedic residency at the Hospital for Special Surgery at Cornell Medical Center and a Sports Medicine fellowship at the University of Pittsburgh. His professional career outside of academia includes serving as team physician for the Chicago Bulls, as incoming President of the NBA Team Physicians Society, co-team physician for the Chicago White Sox and as team physician for the Chicago Red Stars, Chicago Dogs, and DePaul University. He has served as co-host for 10 years on the radio talk show Sports Medicine originally on ESPN and 670TheScore – Chicago Sports Radio and is now the official host of his Sports Medicine Weekly Podcast. He is the founder and director of the annual Chicago Sports Summit since 2016.

Judges

Joshua J. Jacobs, MD
Rush University Medical Center

Monica Kogan, MD
Rush University Medical Center

Charles Lieder, DO
University of Illinois at Chicago

Alfonso Mejia, MD, MPH
University of Illinois at Chicago

Steven M. Mardjetko, MD
University of Illinois at Chicago

Moderators

Brian Cole, MD, MBA
Rush University Medical Center

Joshua J. Jacobs, MD
Rush University Medical Center

Charles Lieder, DO
University of Illinois at Chicago

Steven M. Mardjetko, MD
University of Illinois at Chicago

Alfonso Mejia, MD, MPH
University of Illinois at Chicago

OREF Midwest Region Resident Research Symposium
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DETAILED AGENDA
Friday, May 3, 2024

- 12:50 p.m. – 1:00 p.m. **Welcome and Introductions**
Joshua J. Jacobs, MD
Chair, Department of Orthopaedic Surgery
Rush University Medical Center
- 1:00 p.m. – 1:08 p.m. **OREF Welcome**
Lee Grossman, MBA, ML, CAE
Chief Executive Officer
Orthopaedic Research and Education Foundation
- Session I – Resident Research Presentations & Discussion**
Hand, Foot and Ankle
Moderator: Alfonso Mejia, MD-MPH
- 1:08 p.m. – 1:12 p.m. *Understanding Patient Knowledge of Provider Training Background and Preferences for Treatment of Foot and Ankle Disorders*
Alex Nielsen, MD – Medical College of Wisconsin
- 1:12 p.m. – 1:16 p.m. *A Changing Landscape in the Surgical Management of CMC Arthritis: Increased Rates of Denervation from 2016 to 2021*
Daniel Portney, MD – University of Chicago
- 1:16 p.m. – 1:20 p.m. *Acutely Performed Proximal Row Carpectomy for Perilunate & Lunate Dislocations*
Andrew Valiquette, MD – Medical College of Wisconsin
- 1:20 p.m. – 1:24 p.m. *Peroneal Tendon Dislocation After Talus Fracture*
Elizabeth Cho, MD – Loyola University Medical Center
- 1:24 p.m. – 1:28 p.m. *Biomechanical Performance of Headless Compression Screws in Medial Malleolar Fracture Fixation*
Taurean Baynard, MD – Medical College of Wisconsin
- 1:28 p.m. – 1:38 p.m. **Questions and Discussions**
- Session II – Resident Research Presentations & Discussion**
Orthopaedic Trauma
Moderator: Charles Lieder, DO
- 1:38 p.m. – 1:42 p.m. *Orthopaedic Injuries Due to Hoverboard Use, Reported in the NEISS Database, 2015-2022*
Brandon Zakeri, MD – Wright State University
- 1:42 p.m. – 1:46 p.m. *Time to Union in Ballistic vs. Blunt Pertrochanteric, Extra-Capsular Femur Fractures*
Jordan Serotte, MD – University of Chicago
- 1:46 p.m. – 1:50 p.m. *Early Outcomes Following Targeted Muscle Reinnervation Performed After Traumatic Amputations*
Conor McBride, MD – Medical College of Wisconsin

OREF Midwest Region Resident Research Symposium
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DETAILED AGENDA (Continued)

Friday, May 3, 2024

- 1:50 p.m. – 1:54 p.m. *The Effect of Perioperative Dexamethasone on Functional Outcomes of Lower Extremity Long Bone Fracture Fixation*
Lohith Vatti, MD – University of Chicago
- 1:54 p.m. – 1:58 p.m. *Sagittal Deformity of Garden Type I and II Geriatric Femoral Neck Fractures is Frequently Misclassified by Lateral Radiographs*
Madeline Tiee, MD – Loyola University Medical Center
- 1:58 p.m. – 2:02 p.m. *Virtual Reality Improves Confidence and Short-Term Retention During Tibial Intramedullary Nail Insertion: A Randomized Trial*
Matt Siegel, MD – University of Illinois at Chicago
- 2:02 p.m. – 2:12 p.m. **Questions and Discussions**
- 2:12 p.m. – 2:22 p.m. **Break**
- Session III – Resident Research Presentations & Discussion**
Sports Medicine
Moderator: Brian Cole, MD, MBA
- 2:22 p.m. – 2:26 p.m. *Risk Factors of Subchondral Insufficiency Fracture of the Knee in the Setting of Medial Meniscus Posterior Root Tears*
Myles A. Atkins, MD – Rush University Medical Center
- 2:26 p.m. – 2:30 p.m. *The Natural History of Ulnar Collateral Ligament Injuries in Professional Baseball*
Joseph Tanenbaum, MD – Northwestern McGaw Medical Center
- 2:30 p.m. – 2:34 p.m. *THA-10 Score Predicts Conversion to Total Hip Arthroplasty After Hip Arthroscopy for Femoroacetabular Impingement Syndrome at Minimum 10-Year Follow-Up*
Kyleen Jan, MD – Rush University Medical Center
- 2:34 p.m. – 2:38 p.m. *Comparing Surgical Techniques of Transtibial Pullout Repair on Outcomes of Medial Meniscus Posterior Root Tear Repair*
Johnathon R. McCormick, MD – Rush University Medical Center
- 2:38 p.m. – 2:48 p.m. **Questions and Discussions**
- Session IV – Resident Research Presentations & Discussion**
Shoulder
Moderator: Brian Cole, MD, MBA
- 2:48 p.m. – 2:52 p.m. *Position of the Axillary Artery Relative to the Inferior Glenoid in Shoulder Abduction*
Christopher Fox-Good, MD – Wright State University
- 2:52 p.m. – 2:56 p.m. *The Impact of External Beam Radiation Therapy (XRT) on Shoulder Surgical Outcomes*
Rami Beydoun, MD – Beaumont Royal Oak

OREF Midwest Region Resident Research Symposium
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DETAILED AGENDA (Continued)

Friday, May 3, 2024

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- 2:56 p.m. – 3:00 p.m. *The Changes in Cumulative Deltoid Force and Subacromial Contact Pressures in Lower Trapezius Tendon Transfer and Superior Capsule Reconstruction for Massive Rotator Cuff Tears: A Cadaveric Study*
Cody Lee, MD – University of Chicago
- 3:00 p.m. – 3:04 p.m. *Comparison of Blueprint, Signature One, and Musculoskeletal Radiologist Measurements of Glenoid Inclination, Glenoid Retroversion, and Posterior Humeral Subluxation*
Amir Boubekri, MD – Loyola University Medical Center
- 3:04 p.m. – 3:08 p.m. *Measuring Range of Motion in Reverse Total Shoulder Arthroplasties Using 3D CT Data*
Dustin Richter, MD – Medical College of Wisconsin
- 3:08 p.m. – 3:18 p.m. **Questions and Discussions**
- 3:18 p.m. – 3:26 p.m. Break
- 3:26 p.m. – 3:30 p.m. **Introduction of Keynote Speaker**
- 3:30 p.m. – 4:15 p.m. **Keynote Address and Discussion**
Osteochondral Allograft Transplantation
Brian Cole, MD, MBA
Professor & Acting Chair
Department of Orthopaedic Surgery
The Dr. Ralph and Marian C. Falk Endowed
Professorship of Biochemistry
Chair of Surgery, Rush Oak Park Hospital
Managing Partner, Midwest Orthopaedics at Rush
Team Physician, Chicago White Sox and Bulls
- Session V – Resident Research Presentations & Discussion**
Spine and General
Moderator: Steven M. Mardjetko, MD
- 4:15 p.m. – 4:19 p.m. *Anatomic Contributions to the Stability of the L5-S1 Segment Under Combined Shear and Compression: Implications to Isthmic/Lytic Spondylolisthesis*
Jason Meldau, MD – Loyola University Medical Center
- 4:19 p.m. – 4:23 p.m. *Evaluating AI Efficacy: A Comparative Study between ChatGPT-4's Treatment Recommendations and Orthopaedic Clinical Practice Guidelines*
Emma Dwyer, MD – University of Chicago
- 4:23 p.m. – 4:27 p.m. *Sequential Correction of Sagittal Vertical Alignment and Lumbar Lordosis in Adult Flatback Deformity*
Joseph Krob, MD – Loyola University Medical Center
- 4:27 p.m. – 4:31 p.m. *Risk of Subsequent Fusion After Isolated Decompression of Lumbar Facet Cysts*
Vincent Federico, MD – Rush University Medical Center

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DETAILED AGENDA (Continued)

Friday, May 3, 2024

- 4:31 p.m. – 4:35 p.m. *A Prospective, Randomized Clinical Trial of Pedicle Lengthening Osteotomy Versus Open Decompression with Transforaminal Lumbar Interbody Fusion for Lumbar Degenerative Spondylolisthesis with Stenosis*
Jonathan A. Ledesma, MD – University of Illinois at Chicago
- 4:35 p.m. – 4:45 p.m. **Questions and Discussions**
- Session VI – Resident Research Presentations & Discussions**
Adult Reconstruction
Moderator: Joshua J. Jacobs, MD
- 4:45 p.m. – 4:49 p.m. *Knee Arthroplasty Reimbursement Dynamics: Inflation-Adjusted Analysis from 2006-2022*
Luke Zabawa, MD – University of Illinois at Chicago
- 4:49 p.m. – 4:53 p.m. *Impact of Travel Distance on Primary Total Hip Arthroplasty: A Single-Center Retrospective Review*
Conor Jones, MD – Rush University Medical Center
- 4:53 p.m. – 4:57 p.m. *Impact of Body Mass Index Severity and Preoperative Nutrition Status on Total Knee Arthroplasty Complications*
Ye (Crystal) Lin, MD – University of Illinois at Chicago
- 4:57 p.m. – 5:01 p.m. *Impact of Antipsychotic Delivery Methods on THA Outcomes: A Nationwide Study*
Apurva S. Choubey, MD – University of Illinois at Chicago
- 5:01 p.m. – 5:11 p.m. **Question and Discussions**
- 5:11 p.m. – 5:15 p.m. **Closing Remarks**
Joshua Jacobs, MD and Lee Grossman, MBA
Thank you to all sponsors!
Closing of program to OREF TV audience
- 5:15 p.m. – 6:00 p.m. **Reception**
Awards Presentation

Understanding Patient Knowledge of Provider Training Background and Preferences for Treatment of Foot and Ankle Disorders

Alex Nielsen, MD
Medical College of Wisconsin

Introduction: Differences exist in the training backgrounds of various professionals who treat foot and ankle disorders. The purpose of this study is to determine which factors are important to patients when selecting a provider and to assess patient understanding of the professional skillsets and training backgrounds of various foot and ankle providers.

Methods: A 27-question survey was administered to new patients who were referred to the foot and ankle service in an orthopedic department at Froedtert Memorial Lutheran Hospital and the Mayo Foundation for Medical Education. Univariate and multivariate regressions were used to characterize the study population and determine provider preference.

Results: Of the 169 patients who completed the entire survey, 99 chose “orthopedic surgeon” as their provider of preference for any foot or ankle injury—22 chose DPM (Doctor of Podiatric Medicine) and 43 were indifferent. For patients who listed DPM as their preference, they were less likely to expect their doctor to have completed residency (76.2% vs. 90.7-94.9%, $p=0.03$). Patients preferred an orthopedic surgeon over a DPM for ankle (63.3% vs. 9.5%, $p<0.001$) and knee injuries (82.8% vs. 5.8%, $p<0.001$), while they preferred a DPM for toe pain (42.6% vs. 27.8%, $p<0.001$).

Conclusions: When choosing a specialist, the average patient is either not well-informed on, or indifferent to, the training backgrounds and skill sets of podiatric vs. orthopaedic surgeons. Availability is the most important factor that a patient considers when selecting a specialist.

A Changing Landscape in the Surgical Management of CMC Arthritis: Increased Rates of Denervation from 2016 to 2021

Daniel Portney, MD
University of Chicago

Purpose: To quantify the incidence of CMC denervation (CMC D) on a population level. We hypothesized that, there will have been a significant increase in the incidence of CMC denervation in the past five years.

Significance: CMC Denervation offers a less invasive alternative to CMC arthroplasty, but there is still much to be learned about the patients who receive this surgery and their outcomes.

Methods: We queried the PearlDiver database from 2016 to 2021 to identify patients treated surgically for CMC OA. The incidence of each surgery was collected and normalized to the 2016 level. Multiple variable logistic regression was used to identify factors associated with higher rates of CMC denervation.

Results: The rate of all surgical treatment for CMC OA decreased by 3.0% over the years 2016-2021, but the rate of CMC D increased by 166%. CMC D only made up 1% of all surgeries whereas trapeziectomy with suspension (T+S) made up 90% of all surgeries. CMC D was associated with male gender and wrist arthritis but was not associated with age.

Conclusion: In this large database, denervation made up only 1% of all CMC OA surgery but it's incidence increased by 166% over the years 2016 to 2021, whereas the overall rate of surgery decreased by 3%.

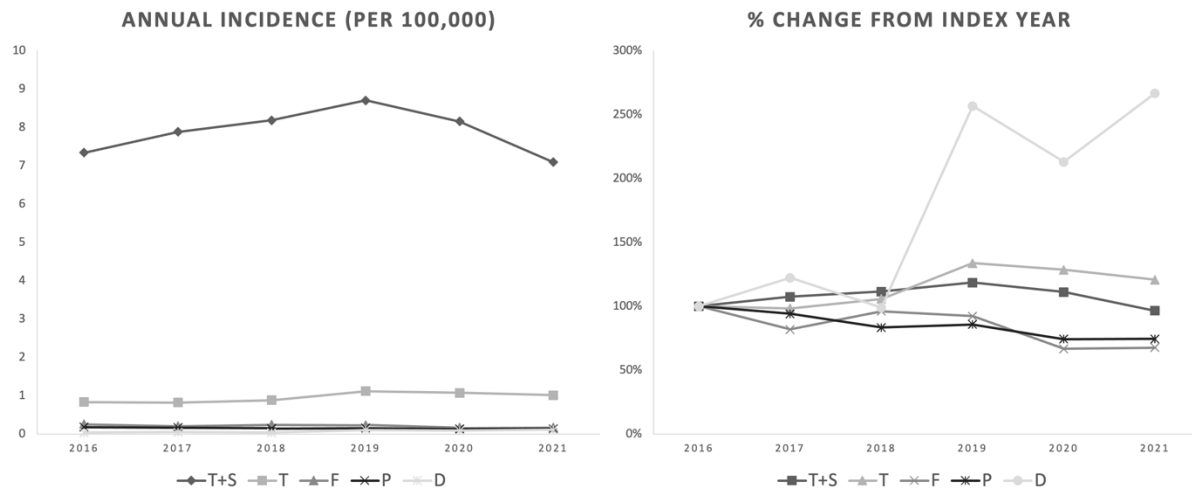


Figure 1. Annual incidence of surgical treatment for CMC OA. T+S is trapeziectomy with suspension; T is trapeziectomy alone, F is CMC fusion, P is prosthetic arthroplasty, and D is denervation

Acutely Performed Proximal Row Carpectomy for Perilunate & Lunate Dislocations

Andrew Valiquette, MD
Medical College of Wisconsin

Purpose: To determine if acutely performed PRC is a reasonable treatment option for perilunate & lunate dislocations.

Significance: The utilization of PRC offers an advantageous alternative to standard practice open reduction internal fixation (ORIF) for treatment of perilunate and/or lunate dislocations.

Methods: A retrospective chart review was conducted on patients with acute PRC for PLDs & PLFDs. Patients >18 years old, and PRC performed within 21 days of injury were included. 14 patients met the criteria for inclusion in our study. Patient-reported outcomes (PROs) were collected through phone surveys and final clinic visits.

Results: Our cohort had an average age of 48.8 years, the dominant injury mechanisms were motor vehicle collisions (62%) and falls (38%). The application of acutely performed PRC was performed within an average of 5.6 days post-injury, and patients were contacted an average of 68.5 months post-surgery. 38.4% returned to work without restrictions and 30.8% with restrictions. VAS (1.31), QuickDASH (20.8), PRWE (25.3), collectively demonstrated favorable results.

Conclusion: In comparison to traditional interventions such as open reduction internal fixation (ORIF), our study highlights the comparable efficacy of acutely performed PRC while showcasing potential advantages, such as shorter operative times and reduced postoperative immobilization, adding a layer of evidence to guide treatment decisions.

Peroneal Tendon Dislocation After Talus Fracture

Elizabeth Cho, MD
Loyola University Medical Center

Background: Peroneal tendon dislocation (PTD) has been described in association with fractures of the pilon and calcaneus, however, the incidence of PTD after fractures of the talus has not been previously reported in the U.S.

Methods: This was a retrospective review of adult patients with operatively treated talus fractures at a level I academic trauma center between 2007 and 2021. Charts, radiographs, and advanced imaging, when available, were reviewed for patient and injury characteristics, and complications including diagnosis of peroneal tendon dislocation.

Results: 126 patients with 128 talus fractures were included. Incidence of peroneal tendon dislocation was 21.1% (n=27). Peroneal rupture was found separately in 3 instances (2.3%). Among 27 cases of PTD, 14 (51.9%) were diagnosed based on advanced imaging, 7 (25.9%) by review of the operative report, and 6 (22.2%) based on both. 89.3% (n=25) of PTDs were diagnosed at time of injury, whereas 7.4% (n=2) were diagnosed several months after. Three patients underwent delayed surgical intervention due to delayed diagnosis (n=1), or missed dislocation by the surgeon, although evident on injury scans (n=2). Lateral process fractures had increased odds of PTD (OR 3.4, 95% CI: 1.3-8.9, p=0.012), as well as fractures with a positive fleck sign on radiographs (OR 14.3, 95% CI: 4.0-50.7, p=0.0001).

Conclusion: Peroneal tendon dislocation with talus fracture is relatively common and was identified in one out of five fractures. Surgeons and radiologists should be cognizant of this injury, especially in the setting of a lateral process fracture or positive fleck sign.

Biomechanical Performance of Headless Compression Screws in Medial Malleolar Fracture Fixation

Taurean Baynard, MD
Medical College of Wisconsin

Purpose: To compare headless compression screws to partially threaded screws for surgical fixation of medial malleolus fractures.

Significance: Ankle fractures are a very common fracture and often involve the medial malleolus. These fractures have been treated with partially threaded screws. Recently, surgeons have begun using headless compression screws. Biomechanical studies have shown either no statistical difference or superior fixation with headless compression screws, however, studies under loading conditions that more closely simulate the normal motion and loading of the ankle are still needed.

Methods: Using 5 pairs of cadaveric ankle specimens, transverse osteotomies were performed, with specimens randomly assigned screw types. Torsional load and axial compression simulated normal motion and loading of the ankle, while motion analysis evaluated inter-fragment movement.

Results: There was statistically significant less sagittal and frontal plane movement with headless compression screws. There was also higher stiffness with headless screws, though linear displacement did not differ. Older specimens showed greater differences, suggesting potential benefits for elderly patients.

Conclusion: Enhanced stability with headless compression screws could facilitate early ankle motion and weight bearing, potentially aiding fracture healing and postoperative recovery. These findings highlight the advantages of headless compression screws, especially for older patients with medial malleolus fractures.

Orthopaedic Injuries Due to Hoverboard Use, Reported in the NEISS Database, 2015-2022

Brandon Zakeri, MD
Wright State University

Purpose: Provide insight into hoverboard injury epidemiology; test the hypotheses that injury rates have changed over time and are associated with patient age and gender.

Significance: Hoverboards are a popular means of recreation in the US associated with significant injury risk. Previous studies on injuries were conducted prior to implementation of safety regulations, warranting updated epidemiology and assessment of chronological change.

Methodology Retrospective analysis of 2015-2022 data from the NEISS database, limited to relevant entries with hoverboard-related product codes, including age, gender, injury type/anatomic location, ED disposition. National estimates (NE) were calculated using survey methods. One-way ANOVA and chi square tests were used to test for changes over time in injuries, age, and gender.

Results: 4,717 injuries were reported, for a NE of 154,121 over the sample period. Injuries peaked from 2018-2020 but declined by 2022. Most occurred in pediatric patients, and mean age declined over time. Males/females were injured roughly equally but the female proportion increased during the peak. Orthopaedic injuries accounted for 72.4% of injuries, with fractures and forearm/wrist the most common injury type/location.

Conclusion: Hoverboard-related injuries continue to be a common presentation in US EDs, though incidence has declined in recent years possibly due to regulation implementation.

Time to Union in Ballistic vs. Blunt Pertrochanteric, Extra-Capsular Femur Fractures

Jordan Serotte, MD
University of Chicago

Purpose: To compare union time between blunt vs. ballistic extra-capsular, pertrochanteric femur fractures.

Significance: Ballistic fractures have unique complications given the degree of soft tissue trauma, associated cavitation, and blast which may affect time to union.

Methods: Retrospective chart review of 27 ballistic fractures matched to 35 blunt fractures all treated operatively. Time to union and complications were recorded. Union was defined as mRUST of 11. mRUST was measured at 6 weeks, 3 and 6 months.

Results: Average time to union was 90.52 days for the ballistic cohort and 114.9 days for the blunt cohort ($p=0.029$). Loss to follow up was similar (15% ballistic and 17% blunt). Non-union occurred in 1 ballistic subject. There were 6 complications: 3 broken interlocks, 1 varus malalignment, 1 superficial infection, and 1 infection requiring an antibiotic spacer.

Conclusion: The time to union for ballistic pertrochanteric femur fractures was significantly less than that for the blunt cohort. There was no significant difference in complications or nonunion. Both subgroups achieved union in 3 months, which is less than previously reported. Time to union may be quicker in ballistic fractures due to the enhanced and widened inflammatory response or the blast effect which may inoculate osteogenic material into the soft tissues.

Early Outcomes Following Targeted Muscle Reinnervation Performed After Traumatic Amputations

Conor McBride, MD
Medical College of Wisconsin

Purpose: Targeted muscle reinnervation improves patient reported outcomes when performed following traumatic amputations.

Significance: Targeted muscle reinnervation (TMR) shows promise in reducing residual limb pain (RLP) and phantom limb pain (PLP) after amputation. Further assessment of patient-reported outcomes after TMR is needed.

Methodology: Self-reported outcome data was obtained from 17 adult traumatic amputees who were over 1-year post-treatment using a numerical rating scale (NRS) and The Patient-Reported Outcomes Measurement Information System (PROMIS) survey tool. For context, this data was compared to results published in a 2019 randomized control trial by Dumanian et. al. which assessed TMR versus standard care (without TMR) after major limb amputation.

Results: There was a statistically significant reduction in this cohort of post-TMR amputees' RLP worst-pain scores relative to amputees who received standard care (without TMR) in the comparison study's control group.

Conclusions: These findings support the use of TMR for reducing RLP in traumatic amputees. Relative to a similar group treated without TMR in the comparison study, this cohort's residual limb pain was significantly improved. Future studies should aim to recruit more amputees to allow for analysis of functional outcomes, especially in upper limb amputees.

The Effect of Perioperative Dexamethasone on Functional Outcomes of Lower Extremity Long Bone Fracture Fixation

Lohith Vatti, MD
University of Chicago

Purpose: To evaluate the effects of perioperative dexamethasone on trauma patients undergoing femoral/tibial intramedullary nailing (IMN).

Significance: Corticosteroids are frequently administered perioperatively for arthroplasty due to reported reductions in LOS, postoperative pain & nausea scores, and opioid consumption.

Methods: A retrospective cohort study was conducted of 201 patients aged 16-65 with isolated femur or tibia fractures treated with full-length femoral or tibial IMN from 5/2018-5/2022. After exclusion, LOS postoperatively was compared between patients who received dexamethasone perioperatively (Dex, n=88) and those who did not (NoDex, n=113). Secondary outcomes pertained to inpatient admission parameters, time to healing, nonunion, and 90-day surgical site infection rate.

Results: There was no statistically significant difference in LOS between groups (Dex 2.0 ± 1.6 days, NoDex 2.1 ± 1.3 days, $p=0.2$). The dexamethasone group had lower rates of superficial infection (Dex 0% [0/43], NoDex 13.5% [5/37], $p=0.02$), opioid consumption (morphine milligram equivalent [MME]) on postoperative day (POD) 0 (Dex 16.7 ± 16.1 , NoDex 21.1 ± 17.4 , $p=0.02$), and MME daily average (Dex 24.5 ± 16.5 , NoDex 30.5 ± 18.3 , $p=0.03$). There were no significant differences in time to healing, pain scores, average blood glucose, and complication rates.

Conclusion: Dexamethasone does not impact LOS after IMN but may provide short-term benefits without increasing the risk for adverse events.

Sagittal Deformity of Garden Type I and II Geriatric Femoral Neck Fractures is Frequently Misclassified by Lateral Radiographs

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Purpose: Determine the validity and interrater reliability of radiographic assessment of sagittal deformity of geriatric Garden type I/II femoral neck fractures.

Significance: Posterior tilt of the femoral neck fracture $\geq 20^\circ$ or anterior tilt $> 10^\circ$ has previously been associated with higher risk of fixation failure in Garden type I/II femoral neck fractures. This study determines if lateral radiographs are able to accurately classify fractures as “high-risk”.

Methods: This retrospective cohort study compared sagittal tilt of femoral neck fractures as measured on lateral radiographs to the tilt measured on advanced imaging.

Results: Of 31 Garden type I/II femoral neck fractures, advanced imaging identified 10 (32.3%) “high-risk” fractures. Overall, there was good agreement between raters in their measurements (ICC 0.79, $p < 0.01$). For “high-risk” fractures, raters underestimated the tilt on average by 5.2° (95% CI [-18.68, 8.28]) on lateral radiographs when compared to CT/MRI. This led to raters misclassifying “high-risk” fractures as “low-risk” in most cases (averaging 6.3 of 10, 63%, range 6–7) when using lateral radiographs while “low-risk” fractures were rarely misclassified as “high-risk” (averaging 1.7 of 21, 7.9%, range 1–3), $p = 0.01$.

Conclusions: Lateral radiographs frequently lead surgeons to misclassify “high-risk” sagittal tilt of low energy femoral neck fractures as “low-risk”.

Virtual Reality Improves Confidence and Short-Term Retention During Tibial Intramedullary Nail Insertion: A Randomized Trial

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Purpose: We sought to study how the usage of Virtual Reality (VR) impacts the confidence of a naive trainees during intramedullary tibial nail insertion.

Significance: Surgeon self-confidence is a valued trait that may foster an improved learning environment in medical students and junior orthopaedic trainees.

Methods: 25 first- and second-year medical students were recruited to compare methods of preparation for intramedullary tibial nail insertion. Participants were randomized into groups that used a technique guide, VR simulation, or both. Each completed an assessment of confidence and retention before and after preparation.

Results: Procedural confidence was significantly higher in the VR and combined groups in three of the four parameters evaluated: confidence with steps, confidence with a compact bone model, and confidence performing the surgery with an attending present ($P < 0.01$). Retention of procedural steps was significantly higher in the VR and combined groups compared to technique guide ($p = 0.011$ and $p = 0.009$, respectively).

Conclusion: A trainee's confidence and short-term retention of a procedure can be improved through virtual reality simulations. Improved confidence may foster improved autonomy and improve trainee education.

Risk Factors of Subchondral Insufficiency Fracture of the Knee in the Setting of Medial Meniscus Posterior Root Tears

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Purpose: Evaluate risk factors for subchondral insufficiency fracture of the knee (SIFK) in patients with medial meniscus posterior root tears (MMPRT). We hypothesized that greater age and meniscal extrusion would increase risk.

Significance: SIFK is associated MMPRTs but limited studies have evaluated risk factors.

Methods: Patients with primary isolated MMPRTs were included, with their demographic, medical, surgical history, and imaging data analyzed as risk factors. Demographic comparisons utilized t-tests and chi-square tests, while multivariable logistic regression identified SIFK risk factors. Receiver operating characteristics (ROC) analysis, with the Youden index, established the optimal preoperative joint space threshold for predicting SIFK.

Results: Among 153 patients (average age 56.15 ± 9.07 years), 90 did not have SIFK and 63 had SIFK, with no significant demographic differences between groups. SIFK patients showed higher rates of previous knee injections ($p=0.047$), lower tibiofemoral joint space ($p<0.001$), and greater meniscal extrusion ($p=0.041$). Mean time between x-ray and MRI was 53.89 ± 73.04 , ($p=0.404$). Reduced joint space was the only significant risk factor (OR 0.41, $p=0.017$). ROC analysis identified a <3.93 mm joint space threshold with a 0.766 area under the curve.

Conclusion: Reduced tibiofemoral joint space significantly increases risk of SIFK in patients with MMPRTs, especially under 3.93 mm.

The Natural History of Ulnar Collateral Ligament Injuries in Professional Baseball

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Purpose: The recurrence rate of ulnar collateral ligament (UCL) injuries is unknown among baseball players. Addressing this literature gap is important because a survey of Major League Baseball (MLB) team physicians found that 60% of team physicians rate prior UCL injury (regardless of injury severity or treatment modality) as “moderate risk” for future injury. We hypothesized that recurrence rates of UCL injuries would be below 20%.

Significance: If the recurrence rate of UCL injuries is low, then players and teams may be inappropriately weighting prior injury as a predictor of future injury risk.

Methodology: MLB supplied a comprehensive list of UCL injuries for the 2010-2021 seasons. We calculated the number of UCL injuries in each season of 2010-2016 and determined the five-season recurrence rate. We chose the five-season time point because the median professional baseball career length is five seasons.

Results: We found a 10% 5-season recurrence rate across all UCL injuries, with recurrence most commonly occurring within two seasons. Among injuries initially treated non-operatively, 13.3% recurred within five seasons.

Conclusion: These results highlight the importance of understanding the natural history of common injuries among athletes across all levels of competition and can inform risk reduction plans for athletes across the competitive landscape.

THA-10 Score Predicts Conversion to Total Hip Arthroplasty After Hip Arthroscopy for Femoroacetabular Impingement Syndrome at Minimum 10-Year Follow-Up

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Purpose: Identify predictors of total hip arthroplasty (THA) conversion at minimum 10-years after hip arthroscopy (HA) for femoroacetabular impingement syndrome (FAIS) and create a THA prediction scoring system.

Significance: Certain patients still convert to THA after HA despite contemporary surgical technique, and 10-year conversion predictors remain unknown. Identifying THA predictors can enhance patient selection and THA-free survivorship.

Methodology: Patients undergoing primary HA with minimum 10-year follow-up were retrospectively reviewed. THA-converted patients were compared to THA-free patients. Identified THA predictors were weighted to formulate the THA-10 Score. Threshold score with greatest sensitivity and specificity to predict THA was calculated.

Results: 280 patients were included with 21 (7.5%) undergoing THA. THA patients had older age (45.4 ± 11.3 vs. 33.2 ± 12.1 years, $p < 0.001$), greater body mass index (BMI) (28.0 ± 5.2 vs. 24.8 ± 4.7 kg/m², $p = 0.011$), greater Tönnis Grade 1 prevalence (42.9% vs. 14.3%, $p = 0.003$), and greater acetabular (61.9% vs. 12.7%, $p < 0.001$) and femoral (33.3% vs. 7.3%, $p < 0.001$) chondral defects. These factors comprised the THA-10 Score which demonstrated significant diagnostic value (area under receiver operating characteristic curve = 0.823). THA-10 ≥ 4 points was associated with 13.2x higher THA risk ($p < 0.001$).

Conclusion: Increased age, BMI, Tönnis grade, and chondral defects are THA risk factors at 10 years after HA. THA-10 has significant diagnostic utility, with ≥ 4 points associated with 13.2x higher THA risk.

Comparing Surgical Techniques of Transtibial Pullout Repair on Outcomes of Medial Meniscus Posterior Root Tear Repair

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Purpose: Examine the effect of tunnel and suture number on outcomes following transtibial medial meniscus posterior root tear (MMPRT).

Significance: Transtibial MMPRT repair techniques are highly variable and lack comparative clinical outcome studies. The optimal technique is yet unknown.

Methods: Patients with primary isolated MMPRTs were included. Data on demographics, medical and surgical history, imaging, and intraoperative information were collected. Cohorts were matched by age, sex, BMI, and Kellgren-Lawrence grade. Patient reported outcomes, revision surgery rates, and osteoarthritis progression were evaluated. Fisher's Exact and χ^2 tests were utilized for categorical data; unpaired t-tests for continuous data.

Results: Among 89 patients (46 with 1 tunnel, 43 with 2 tunnels), the only significant baseline differences were shorter post-operative follow-up ($p < 0.01$) and greater pre-operative meniscal extrusion ($p < 0.05$) in the 2-tunnel group. No significant differences in outcomes was seen. 65 patients received 2 sutures, 24 received 3 sutures. The only significant baseline difference was greater pre-operative meniscal extrusion in the 2-suture group ($p = 0.003$). The 2-suture group demonstrated higher KOOS Jr score improvement ($p = 0.033$) and greater PASS achievement ($p = 0.014$), with no other significant differences in outcomes.

Conclusion: Transtibial MMPRT repair utilizing 1 or 2 tunnels, and 2 or 3 sutures result in comparable outcomes.

Position of the Axillary Artery Relative to the Inferior Glenoid in Shoulder Abduction

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Purpose: To evaluate the position of the axillary artery in relation to the inferior glenoid in varying degrees of shoulder abduction.

Significance: Iatrogenic injury of the axillary artery is a rare, but potentially devastating, complication of shoulder surgery. Previous literature has yielded conflicting results regarding the relationship between shoulder abduction and axillary artery position, warranting further investigation.

Methodology: 12 cadaveric shoulders were dissected via the deltopectoral approach with the specimen in supine position. Axillary artery position was measured at a perpendicular angle from the inferior glenoid, in a downward direction, at each of three frontal plane shoulder positions: 0°, 60°, and 90° of abduction.

Results: Mean axillary artery-inferior glenoid distances were as follows: 0°: 11.0±1.0 mm; 60°: 9.2±1.4; 90°: 4.5±1.1 mm. All pairwise comparisons of mean distance at different positions were statistically significant (for each, $P<0.001$).

Conclusion: The axillary artery moves significantly closer to the inferior glenoid as the arm is placed in increasing degrees of abduction. Surgeons may use this information to place the extremity in favorable positions during surgery to minimize risk of iatrogenic injury.

The Impact of External Beam Radiation Therapy (XRT) On Shoulder Surgical Outcomes

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Purpose: To assess whether prior history of breast cancer treated with XRT has an impact on outcomes following shoulder surgery

Significance: Long-term effects of XRT on complications and outcomes following shoulder surgery are largely unknown.

Methods: 20-year single institution retrospective chart review. Inclusion criteria: patients with history of breast cancer treated with XRT and a subsequent ipsilateral shoulder surgical procedure. Demographics, comorbidities, and postoperative outcomes including ROM and VAS pain scores were collected.

Results: 18 female patients (average age 66.3 years) were identified. 10 underwent rotator cuff repair, 7 shoulder arthroplasty (3 reverse), and 1 arthroscopic labral repair. Four patients treated with RCR and two with arthroplasty experienced complications. ROM across all groups improved, primarily forward flexion and internal rotation among RCR patients ($p < .01$). A significant improvement in VAS scores was achieved in each group ($p < .01$).

Conclusion: Although our cohort experienced higher complication rates relative to national averages, several of these were independent of XRT history and most resolved with appropriate therapy. Importantly, ROM and pain scores showed appropriate improvement similar to baseline populations. Our results suggest that shoulder surgery after ipsilateral XRT for breast cancer is likely safe without increased complication rate.

The Changes in Cumulative Deltoid Force and Subacromial Contact Pressures in Lower Trapezius Tendon Transfer and Superior Capsule Reconstruction for Massive Rotator Cuff Tears: A Cadaveric Study

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Purpose: To provide a dynamic biomechanical comparison between lower trapezius tendon transfer (LTTT), superior capsule reconstruction (SCR), and LTTT+SCR for massive posterosuperior rotator cuff tears.

Significance: SCR combined with LTTT may be considered to optimally address massive posterosuperior rotator cuff tears.

Methods: A custom-made shoulder system was used to test 8 fresh-frozen cadaveric shoulders mounted as a hemithorax for the following conditions: (1) intact shoulder; (2) massive posterosuperior rotator cuff tear (supraspinatus and infraspinatus removed); (3) SCR using the dermal allograft; (4) LTTT; and (5) SCR combined with LTTT. The cumulative deltoid force and peak subacromial contact pressure were evaluated during shoulder abduction.

Results: Cumulative deltoid force significantly decreased following a massive posterosuperior rotator cuff tear. LTTT alone significantly improved deltoid force versus its combination with SCR, and outperformed SCR alone and the intact condition. Subacromial contact pressure significantly increased in the massive cuff tear state over the intact shoulder. LTTT, SCR, and LTTT+SCR all significantly decreased subacromial contact pressure when compared to the massive cuff tear state, and were not statistically different from the intact state.

Conclusion: LTTT alone showed improved cumulative deltoid force, and subacromial contact pressures were restored in all treatment conditions.

Comparison of Blueprint, Signature One, and Musculoskeletal Radiologist Measurements of Glenoid Inclination, Glenoid Retroversion, and Posterior Humeral Subluxation

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Purpose: 3D Computed tomography (CT) pre-operative templating software does not provide accurate glenoid version, inclination and posterior humeral subluxation measurements when compared to 2D CT measurements performed by fellowship-trained musculoskeletal radiologists.

Significance: Pre-operative templating software in shoulder arthroplasty is a popular tool utilized by surgeons for pre-operative planning. Differences between proprietary 3D CT auto-segmented and manually segmented software measuring techniques is not well understood.

Methodology: Two radiologists used 2D CT scans to measure glenoid parameters and posterior humeral subluxation. Measurements were compared to 3D reconstructions using Signature One (manual segmentation) and Blueprint (auto-segmentation) software. Interobserver reliability was assessed using intraclass correlation coefficients, and differences were tested with Wilcoxon signed-rank tests.

Results: Blueprint software underestimated glenoid inclination by 2.8 to 3.6 degrees ($p < .001$) and overestimated glenoid retroversion by 3.8 to 4.2 degrees ($p < .001$) and posterior humeral subluxation by 14.3 to 16.6% ($p < .001$). Signature One underpredicted glenoid inclination by 10.1 to 10.9 degrees ($p < .001$) but was accurate for glenoid version ($p = .480$).

Conclusion: Both software types underestimated glenoid inclination, with auto-segmentation also overestimating glenoid retroversion and posterior humeral subluxation. Manual segmentation showed higher accuracy in estimating glenoid version. These findings should be considered when templating for shoulder arthroplasty cases.

Measuring Range of Motion in Reverse Total Shoulder Arthroplasties Using 3D CT Data

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Medical College of Wisconsin

Purpose: This study's purpose was to measure the degree to which preoperative, computer-predicted range of motion (ROM) correlates with actual postoperative ROM.

Significance: Reverse total shoulder arthroplasties (RTSA) can significantly improve symptoms of pain, function, and quality of life in patients with osteoarthritis (OA) of the shoulder. Previous studies have identified patient factors that affect the postoperative range of motion (ROM) such as BMI and pre-operative ROM. Nonetheless, no study has investigated the true accuracy of CT 3D planning software in predicting post-operative outcomes.

Methods: We performed a retrospective chart review including 51 patients who underwent a RTSA. Patient information including demographics and comorbidities, as well as both preoperative and postoperative range of motion was collected. The Tornier BLUPRINT software was utilized to calculate predicted post-operative range of motion as well for comparison to values measured clinically.

Results: Positive predictive values for three ROM values were calculated using linear regression. We found forward flexion and abduction to have significant negative correlations with p-values of 0.0128 and 0.00663, respectively.

Conclusion: The negative correlation indicates that patients' postoperative ROM is often greater than 3D software predicts, likely as it relies on osseous anatomy and does not take soft tissue factors into consideration

Anatomic Contributions to the Stability of the L5-S1 Segment Under Combined Shear and Compression: Implications to Isthmic/Lytic Spondylolisthesis

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Purpose: Investigate the role of anatomic contributors to resisting anterior listhesis at L5-S1 under combined compression and shear forces. We hypothesize that under progressive disruption, the L5-S1 segment would demonstrate more severe anterior slip, exacerbated by an increasing shear to compression force ratio.

Significance: Quantifying the relative anatomic contributions to segment stability can aid in understanding the pathogenesis and progression of isthmic spondylolisthesis.

Methods: Seven L1-Sarcum spine specimens underwent 3D kinematic assessment. Specimens were tested intact and after stepwise anatomic disruptions. Specimens were subjected to pure compression and increasing degrees of shear force after each disruption. The stability of the L5-S1 segment was quantified in terms of the anterior slip of L5 on S1.

Results: Under pure compressive forces, less than 1 millimeter of translation occurred regardless the degree of anatomic instability. As an increased shear force was applied to the segment, a listhesis was found, even in the completely intact specimen. The slip progressed following sequential anatomic disruptions including the L5 facetectomy and limited posterior de nucleation.

Conclusions: The facet joints contribute significantly to vertebral body translation, and an intact and non-attenuated disc aids in helping prevent this sublaxation. Shear forces must be present to create listhesis.

Evaluating AI Efficacy: A Comparative Study Between ChatGPT-4's Treatment Recommendations and Orthopaedic Clinical Practice Guidelines

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Purpose: To investigate the ability of ChatGPT-4 to generate accurate treatment recommendations for common orthopedic conditions, as determined by American Academy of Orthopaedic Surgeons Clinical Practice Guidelines (CPG).

Significance: Artificial Intelligence (AI) is engineered to emulate tasks that have historically required human interaction and intellect, including pattern recognition, decision-making, and problem-solving. AI models, such as ChatGPT-4, have demonstrated satisfactory performance on medical licensing exams, suggesting a potential for supporting medical diagnostics and decision-making.

Methods: Ten orthopaedic conditions with associated CPG were identified. For each of the 10 conditions, 10 patient cases were selected from real patient cases. Cases were presented to ChatGPT-4 alongside a representative X-ray. The model was then prompted to provide a single treatment plan.

Results: ChatGPT-4 provided recommendations in accordance with CPG in 91% of patient cases. There was 77% concordance between the ChatGPT-4 generated plan and the plan recommended by the clinical provider. One hundred percent of recommendations for fractures as well as hip and knee arthritis aligned with CPG, while the model struggled most with recommendations for carpal tunnel syndrome.

Conclusion: ChatGPT-4 has the potential to generate treatment recommendations for common orthopaedic conditions that are in alignment with established orthopaedic clinical practice guidelines.

Sequential Correction of Sagittal Vertical Alignment and Lumbar Lordosis in Adult Flatback Deformity

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Purpose: To delineate the efficacy of sagittal vertical alignment (SVA) and lumbar lordosis (LL) correction procedures.

Significance: Hypolordotic flatback deformity leads to progressive clinical debilitation. Surgical correction can restore sagittal alignment. However, biomechanical data on the effective correction of each technique is lacking.

Methods: Thirteen fresh-frozen human specimen were assigned to degenerative or iatrogenic protocols. Degenerative protocol: anterior lumbar interbody fusion (ALIF) at L5-S1, then L4-5, lateral lumbar interbody fusion (LLIF) at L2-3 and L3-4, and LLIF+posterior column osteotomy (PCO) at L2-3 and L3-4. Iatrogenic protocol: posterior in situ hypolordotic fusion at L4-S1, LLIF then LLIF+PCO at L2-3 and L3-4. LL, and L1-S1 and T10-S1 SVA were recorded at each stage.

Results: Degenerative group: statistically significant corrections in SVA and LL after the L5-S1 ALIF, L4-5 ALIF, and PCO, as well as pre to final states. Iatrogenic group: LLIF at L2-3 and L3-4 did not show significant improvement in alignment. With PCO at L2-3 and L3-4, final alignment parameters approached preoperative values ($P>0.01$).

Conclusion: ALIFs significantly improved sagittal alignment in degenerative flatback deformity. LLIFs in isolation were not effective in correcting sagittal alignment. LLIFs with PCOs improved the sagittal alignment in both degenerative and iatrogenic flatback deformities.

Risk of Subsequent Fusion After Isolated Decompression of Lumbar Facet Cysts

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Purpose: This study was performed to determine the incidence of and potential risk factors for subsequent lumbar fusion after isolated facet cyst removal.

Significance: The risk of lumbar fusion following isolated decompression and facet cyst excision has yet to be elucidated.

Methods: PearlDiver database was reviewed for patients undergoing isolated laminectomy for lumbar facet cyst using CPT codes. Patients undergoing concomitant fusion or additional decompression, as well as those diagnosed with pre-existing spondylolisthesis or without a minimum of 5 year follow up, were excluded. Rates of subsequent lumbar fusion and potential risk factors for subsequent fusion were identified. Statistical analysis included descriptive statistics, chi-squared test, multivariate logistic regression.

Results: 10,707 patients were ultimately included for analysis. At 5-year follow-up, 727 (6.79%) of patients underwent subsequent lumbar fusion after initial isolated decompression. Of these, 301 (2.81% of total patients, 41.4% of fusion patients) underwent fusion within the first year after decompression. Multivariate analysis identified chronic kidney disease, hypertension, and osteoarthritis as risk factors for requiring subsequent lumbar fusion at 5 years following the index decompression procedure ($p < 0.033$; all).

Conclusion: Patients undergoing isolated decompression for lumbar facet cysts undergo subsequent lumbar fusion at a 5-year rate of 6.79%, with several risk factors identified.

A Prospective, Randomized Clinical Trial of Pedicle Lengthening Osteotomy Versus Open Decompression with Transforaminal Lumbar Interbody Fusion for Lumbar Degenerative Spondylolisthesis with Stenosis

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Purpose: To compare a novel pedicle lengthening osteotomy (PLO) technique with open decompression and for treatment of lumbar spinal stenosis with degenerative spondylolisthesis (LSDS).

Significance: PLO offers a motion-sparing, minimally invasive alternative approach to the treatment of LSDS.

Methods: 19 patients with symptomatic LSDS were prospectively randomized (1:1) to PLO or open decompression and TLIF. PROMs (ODI, ZCQ, VAS, EQ-5D, SF-12) operative data, and radiographic parameters were compared.

Results: There were no significant differences in patient demographics or preoperative symptom severity between groups. Comparing surgical variables for PLO to TLIF, blood loss was 44 ± 29 vs. 246 ± 199 ml, $p=0.042$, operative time was 108 ± 32 vs. 152 ± 33 minutes, $p=0.022$, hospital stay was 4.29 ± 1.63 vs. 7.80 ± 2.59 days, $p=0.015$, mean fluoroscopy time was 85.0 ± 14.1 vs. 33.2 ± 34.2 seconds, $p=0.004$. ZCQ Physical Function demonstrated significant improvement from baseline in both groups, but the PLO group achieved the benefit by three months whereas the TLIF group demonstrated the benefit only after the 6-month time point. VAS revealed significant improvements from baseline in the PLO group whereas the TLIF group improved but did not reach statistical significance compared to baseline.

Conclusion: Patients who received PLO for LSDS had favorable surgical parameters in comparison to TLIF including less blood loss, shorter hospitalization, and shorter surgery but required more fluoroscopy usage. PROMs demonstrated better pain and physical function in the PLO group at earlier time points in comparison to TLIF.

Knee Arthroplasty Reimbursement Dynamics: Inflation-Adjusted Analysis from 2006-2022

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Purpose: We hypothesize that reimbursements for knee arthroplasty have declined moderately since 2006.

Significance: Total knee arthroplasty (TKA) has evolved significantly since its inception decades ago. Despite advancements in care, orthopaedic surgeons face declining compensation for primary and revision TKA procedures. Understanding reimbursement dynamics is crucial amidst changing healthcare demographics and models.

Methods: Data from the American College of Surgeons National Surgical Quality Improvement Program from 2006-2022 were analyzed. Current Procedural Terminology (CPT) codes identified primary and revision TKA surgeries. Reimbursement trends were examined using Relative Value Units (RVUs) and inflation-adjusted dollars per case.

Results: Medicare reimbursements per RVU declined by 43.5% for primary TKA since 2006, with all 3 assessed CPT codes showing decreased reimbursements. Compound Annual Growth Rate for primary TKA was negative 3.5% year-over-year, indicating decreasing returns. If these rates continue, the reimbursements for TKA will have decreased by 57% in the year 2030.

Conclusion: Projected reimbursements for 2030 suggest further declines, potentially hindering surgeon incentives for revision surgeries. Surgeons' incomes have remained stagnant, despite increased workload. Medicare reimbursement policies should adjust for inflation to ensure fair compensation. Amidst economic shifts exacerbated by the COVID-19 pandemic, TKA reimbursement trends underscore the need for policy reform. These findings should be considered when templating for shoulder arthroplasty cases.

Impact of Travel Distance on Primary Total Hip Arthroplasty: A Single-Center Retrospective Review

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Purpose: The purpose of this study is to evaluate the impact of travel distance on patient reported outcomes (PROs) and 90-day complication rates of patient undergoing total hip arthroplasty (THA). We hypothesize that travel distance will not impact these outcomes.

Significance: THAs are increasingly performed at high-volume centers, causing patients to travel further distances to receive care. Concerns remain that increased travel distance limits follow-up, which may impact outcomes.

Methods: Patients undergoing primary THA at a single center between 2017-2021 were reviewed. Patients who lived ≥ 40 miles to operative location were labeled as “travelers” and those < 40 miles were “locals”. Primary outcomes included PROs measured by VR-12, HHS, and HOOS JR. Secondary outcomes included 90-day medical complications, readmissions, and reoperations.

Results: A total of 500 patients were analyzed including 110 travelers. There were no significant differences in the percentage of patients achieving minimal clinically important differences in HOOS JR (travelers=85.9%, locals=89.2%, $p=0.438$), HHS (travelers=86.2%, locals=91.5%, $p=0.309$), or VR-12 (travelers=66.7%, locals=66.7%, $p=1$). There was a low incidence of 90-day medical complication rates (travelers=1.8%, locals=3.3%, $p=0.411$), readmissions (travelers=2.7%, locals=3.59%, $p=0.660$), and reoperations (travelers=1.8%, locals=1.5%, $p=0.836$).

Conclusion: Increased travel distance to treatment centers does not significantly impact outcomes following primary THA.

Impact of Body Mass Index Severity and Preoperative Nutrition Status on Total Knee Arthroplasty Complications

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Purpose: We hypothesized that patients with a BMI>40 and those who are malnourished would have a greater risk of complications.

Significance: Postoperative complications are more prevalent in obese patients and malnourished patients undergoing total knee arthroplasty (TKA). Prior studies proposed that utilizing BMI cut-offs may decrease complications following TKA. Our results indicate that BMI alone may limit TKA access. Considering nutritional status may optimize care and broaden access.

Methods: Using the NSQIP database, patients undergoing TKA from 2012-2021 were stratified into five BMI categories and hypoalbuminemic and normoalbuminemic cohorts. Multivariate analysis was conducted adjusting for demographic factors and comorbidities.

Results: 502,376 patients were included. Relative to normal weight patients, all overweight/obese patients had higher rates of PE, while patients with a BMI>40 had higher rates of wound dehiscence and PJI. Patients with a BMI between 25-49.99 had lower rates of readmission and reoperation while those with a BMI>50 had greater rates. Within the same BMI class, those with preoperative hypoalbuminemia had greater rates of bleeding, wound dehiscence, PJI, readmission, reoperation, and death.

Conclusion: Only patients with a BMI>50 had an increased risk of major complications while across BMI classes, preoperative hypoalbuminemia increased the risk of nearly all complications assessed.

Impact of Antipsychotic Delivery Methods on THA Outcomes: A Nationwide Study

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Purpose: We hypothesize that patients receiving long-acting injectable (LAI) antipsychotics will have better post-operative outcomes than patients receiving oral antipsychotics after total hip arthroplasty (THA).

Significance: Post-THA complications are more prevalent in psychiatric. This study stratifies outcomes by delivery method of antipsychotic medications. LAIs do not require daily dosing and increase adherence. Assessing outcomes may improve orthopaedic care for psychiatric patients.

Methods: A nationwide claims database was queried from 2010-2022 to assess demographics and outcomes after THA in 3 patient cohorts: no psychiatric history, use of oral antipsychotics, and use of LAIs. T-tests and Chi-squared tests were used to analyze demographic and 90-day post-operative complications.

Results: 882,963 patients were included in the analysis. Relative to patients receiving oral antipsychotics, those receiving LAIs were younger ($P < 0.001$), had higher rates of comorbidities like diabetes (OR: 1.51, $P < 0.001$) and COPD (OR: 1.20, $P < 0.001$), and greater rates of complications like prosthetic joint infection (OR: 1.74, $P = 0.019$) and ED Visits (OR: 2.01, $P < 0.001$).

Conclusion: LAI patients had poorer post-operative outcomes relative to the other 2 groups. While LAIs improve adherence, they are typically reserved for more severely ill patients. A matched cohort comparison is needed to assess the impact of LAIs vs oral antipsychotics.

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