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OREF SOUTHWEST REGION
RESIDENT RESEARCH SYMPOSIUM
Friday, October 18, 2024

TMC3 Helix Center
7255 Helix Park Drive
2nd Floor, Hermann Hall
Houston, Texas

Co-Hosts:

Walter R. Lowe, MD
Professor and Chair, Department of Orthopaedic Surgery
McGovern Medical School at UT Health Houston

and

William C. McGarvey, MD
Professor and Vice-Chair, Department of Orthopaedic Surgery
McGovern Medical School at UT Health Houston

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OREF SOUTHWEST REGION RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA
Friday, October 18, 2024

Noon – 1:00 p.m.	**Registration and Lunch** TMC3 Helix Center 7255 Helix Park Drive, 2nd Floor, Hermann Hall Houston, Texas
1:00 p.m. – 1:05 p.m.	**Welcome and Introductions** Walter R. Lowe, MD Professor and Chair Edward T. Smith Endowed Chair Medical Director, Memorial Hermann Rockets Sports Medicine Institute Department of Orthopaedic Surgery McGovern Medical School at UTHealth Houston
1:05 p.m. – 1:10 p.m.	**OREF Welcome** Deborah Cummins, PhD Chief Executive Officer Orthopaedic Research and Education Foundation
1:10 p.m. – 1:45 p.m.	**Session I – Resident Research Presentations & Discussion** **Moderator: William C. McGarvey, MD**
1:45 p.m. – 2:25 p.m.	**Session II – Resident Research Presentations & Discussion** **Moderator: Wiliam C. McGarvey, MD**
	Break
2:35 p.m. – 3:10 p.m.	**Session III – Resident Research Presentations & Discussion** **Moderator: Stephen J. Warner, MD, PhD**
3:10 p.m. – 3:45 p.m.	**Session IV – Resident Research Presentations & Discussion** **Moderator: Stephen J. Warner, MD, PhD**
	Break
3:55 p.m. – 4:00 p.m.	**Introduction of Keynote Speaker** Walter R. Lowe, MD
4:00 p.m. – 4:45 p.m.	**Keynote Address** *Orthobiologics: An Update and Cautious Optimism in 2024* Asheesh Bedi, MD Vice Chairman of Research and Innovation, Director of Sports Medicine and Joint Preservation NorthShore Orthopedic and Spine Institute Adjunct Professor of Sports Medicine and Hip Preservation at The Hospital for Special Surgery/Weill Cornell Medical Center
4:45 p.m. – 5:00 p.m.	**Awards Presentation and Closing Remarks** Walter R. Lowe, MD
5:00 p.m. – 6:00 p.m.	**Reception**

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KEYNOTE SPEAKER

Asheesh Bedi, MD

Vice Chairman of Research and Innovation,
Director of Sports Medicine and Joint Preservation
NorthShore Orthopedic and Spine Institute
Adjunct Professor of Sports Medicine and Hip Preservation at
The Hospital for Special Surgery/Weill Cornell Medical Center

Dr. Asheesh Bedi is the Vice Chairman of Research and Innovation, and Director of Sports Medicine and Joint Preservation at the NorthShore Orthopedic and Spine Institute. He is an Adjunct Professor of Sports Medicine and Hip Preservation at the Hospital for Special Surgery/Weill Cornell Medical Center. He is also the chief medical officer for the National Basketball Players' Associations (NBPA), a consultant for the National Hockey League Players' Association (NHLPA), and specializes in both arthroscopic and open surgery for athletic injuries of the shoulder, elbow, hip, and knee. He is an orthopedic NFL team physician for the Chicago Bears.

Asheesh is the former Chief of Sports Medicine and Shoulder Surgery and was a Professor at the University of Michigan from 2009 to 2022. He was the Head Orthopedic Team Physician for University of Michigan Athletics and was the former Head Orthopedic Team Physician and Medical Director for the Detroit Lions (2017-2020).

Dr. Bedi completed his undergraduate training at Northwestern University where he graduated Summa Cum Laude. He graduated from the University of Michigan Medical School with AOA recognition and remained in Ann Arbor to pursue residency training in Orthopedic Surgery at the University of Michigan. After completing his training, Dr. Bedi completed a two-year fellowship in sports medicine and shoulder surgery at the Hospital for Special Surgery and Weill Cornell Medical College in New York.

He has also pursued additional dedicated training in arthroscopic hip surgery for young athletes. Dr. Bedi has authored over 390 articles, chapters, and peer-reviewed publications on shoulder, elbow, knee, and hip injuries in athletes. He has won numerous prestigious awards in the field, including the ASES Neer Award, AOSSM Cabaud and Excellence in Research Awards, and is a member of the Herodicus Society.

Judges

Catherine G. Ambrose, PhD
McGovern Medical School at UTHealth Houston

Lorenzo Deveza, MD, PhD
Baylor College of Medicine

John C. Hagedorn, MD
University of Texas Medical Branch

James F. Kellam, MD
McGovern Medical School at UTHealth Houston

Kevin J. Park, MD
Houston Methodist

Moderators

William C. McGarvey, MD
McGovern Medical School at UT Health Houston

Stephen J. Warner, MD, PhD
McGovern Medical School at UT Health Houston

OREF Southwest Region Resident Research Symposium
DETAILED AGENDA
Friday, October 18, 2024

1:00 p.m. – 1:05 p.m.	**Welcome and Introductions** Walter R. Lowe, MD Professor and Chair Edward T. Smith Endowed Chair Medical Director, Memorial Hermann Rockets Sports Medicine Institute Department of Orthopaedic Surgery McGovern Medical School at UTHealth Houston
1:05 p.m. – 1:10 p.m.	**OREF Welcome** Deborah Cummins, PhD Vice President Grants and Research Orthopaedic Research and Education Foundation
	Session I – Resident Research Presentations & Discussion **Moderator: William C. McGarvey, MD**
1: 10 p.m. – 1:15 p.m.	*Osteochondral Allograft Reaming Significantly Affects Chondrocyte Viability* Tristan J. Elias, MD, University of Texas Medical Branch
1:15 p.m.- 1:20 p.m.	*Rapid Sequence MRI vs CT Capsular Width Sign for Detection of Occult Femoral Neck Fractures Associated with Femoral Shaft Fractures* Wade Karam, MD, UTHealth Houston McGovern Medical School
1:20 p.m. – 1:25 p.m.	*Mitigating Post-Operative ED Visits: The Role of Mental Health Interventions in Joint Arthroplasty* Stephanie Price, MD, Dell Medical School at the University of Texas at Austin
1:25 p.m. – 1:30 p.m.	*Influenza Infection Has Higher Risk of Postoperative Complications Compared to COVID-19 in Shoulder Arthroplasty Patients: A Propensity Matched Cohort Analysis* Umar Ghilzai, MD, Baylor College of Medicine
1:30 p.m. – 1:35 p.m.	*Steroid versus Placebo Injections and Wrist Splints in Patients with Carpal Tunnel Syndrome: A Systematic Review and Network Meta-Analysis* Ebubechi Adindu, MD, Dell Medical School at the University of Texas at Austin
1:35 p.m. – 1:45 p.m..	**Questions and Discussions**
	Session II – Resident Research Presentations & Discussion **Moderator: William C. McGarvey, MD**
1:45 p.m. – 1:50 p.m.	*Radiation Monitoring Can Increase Radiation Safety Among Orthopedic Surgery Residents* Shrina Parikh, MD, UTHealth Houston McGovern Medical School
1:50 p.m. – 1:55 p.m.	*The Windshield Wiper Sign: An Instability-Related Osteochondral Defect of the Anterolateral Femoral Head* Nicholas Girardi, MD, University of Texas at Austin Dell Medical School

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1:55 p.m. – 2:00 p.m. *Biomechanical Analysis of Contact Pressures in Scaphotrapeziotrapezioid Arthritis*
Hayden Anz, MD, UTHealth Houston McGovern Medical School

2:00 p.m. – 2:05 p.m. *Social Work Interventions Improve Outcomes in Total Joint Arthroplasty: An Effort to Improve Equity at an Urban Musculoskeletal Integrated Practice Unit*
Ayane Rossano, MD, Dell Medical School at the University of Texas at Austin

2:05 p.m. – 2:10 p.m. *Comparison of Z-Lengthening to Fractional Lengthening of Forearm Flexor Tendons: A Biomechanical Cadaveric Analysis*
Angel Valencia, MD, UT Southwestern Medical Center

2:10 p.m. – 2:15 p.m. *Signaling: A Paradigm Shift in the Orthopaedic Surgery Application Process*
Patrick Ryan, MD, Baylor Scott and White Temple

2:15 p.m. – 2:25 p.m. **Questions and Discussions**

Break

Session III – Resident Research Presentations & Discussion
Moderator: Stephen J. Warner, MD, PhD

2:35 p.m. – 2:40 p.m. *Tendon Transfers to Restore Shoulder Function for Obstetrical Brachial Plexus Palsy: A Systematic Review of the Literature*
Semran Thamer, MD, University of Texas at Austin

2:40 p.m. – 2:45 p.m. *The Effect of Anterior Closing Wedge Slope Reducing Osteotomy on Coronal Alignment – Considerations with Regards to Osteotomy Technique and Degree of Slope Correction*
J. Matthew Helm, MD, UTHealth Houston McGovern Medical School

2:45 p.m. – 2:50 p.m. *Bipolar Disorder Medications, Not the Illness, Increase Risk of Nonunion*
Jared Wainwright, MD, University of Texas Medical Branch

2:50 p.m. – 2:55 p.m.. *Shoulder Arthroplasty Complications in Patients with Parkinson's*
Eileen N. Phan, MD, Baylor College of Medicine

2:55 p.m. – 3:00 p.m. *Comparative Outcomes Following Total Hip Arthroplasty for Pathological Versus Traumatic Hip Fractures*
Youssef M. Khalafallah, MD, Baylor College of Medicine

3:00 p.m. – 3:10 p.m. **Questions and Discussions**

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Session IV – Resident Research Presentations & Discussion
Moderator: Stephen J. Warner, MD, PhD

3:10 p.m. – 3:15 p.m.	*Effect of Thoracic Inlet Angle on Cervicothoracic Parameters and Patient-Reported Outcomes in Posterior Multi-Cervical Fusion* Qais Zai, MD, Dell Medical School at the University of Texas at Austin
3:15 p.m. – 3:20 p.m.	*Does Reduction Technique for Hip Fractures Matter? A Comparison of Closed, Open and Percutaneous Reduction Techniques in the Treatment of Intertrochanteric Femur Fractures* Guillermo R. Pechero Jr., MD, UTHealth Houston McGovern Medical School
3:20 p.m. – 3:25 p.m.	*Vascular Injury in Tibial Plateau Fractures: Incidence and Risk Factors* Kenneth Ford, MD, UTHealth Houston McGovern Medical School
3:25 p.m. – 3:30 p.m.	*Osteosarcoma Secondary to Bone Infarct with Lymph Node Metastases* Cody J. Perry, MD, John Peter Smith Hospital
3:30 p.m. – 3:35 p.m.	*Does Vitamin D Deficiency Play a Role in Scheuermann's Disease?* Nathan Redlich, MD, Louisiana State University, New Orleans
3: 35 p.m. – 3:45 p.m.	**Questions and Discussions**
3:45 p.m. – 3:55 p.m.	Break
3:55 p.m. – 4:00 p.m.	**Introduction of Keynote Speaker** Walter R. Lowe, MD
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4:45 p.m. – 5:00 p.m.	**Closing Remarks and Awards Presentation** Walter R. Lowe, MD
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Osteochondral Allograft Reaming Significantly Affects Chondrocyte Viability

Tristan J. Elias, MD
University of Texas Medical Branch

Purpose: To investigate the effect of osteochondral allograft (OCA) plug harvest on regional cell viability when using traditional handheld saline irrigation versus saline submersion.

Significance: Chondrocyte viability is associated with the clinical success of OCA transplantation.

Methods: For each of thirteen femoral hemicondyles, three cartilage samples were harvested: (1) 5mm Control cartilage, (2) 15mm OCA donor plug harvested with a powered coring reamer and concurrent handheld saline irrigation ("Traditional"), (3) 15mm OCA donor plug harvested while submerged under normal saline ("Submerged"). Samples were stained using Calcein and Ethidium, live/dead cell percentages were calculated and compared across groups.

Results: Compared to the Submerged group, Traditional plugs had significantly lower percentages of live cells across the entire plug (P=0.003), in the plug center (P=0.005), and the plug peripheries (P=0.003). The Traditional plugs had significantly fewer live cells in all regions compared to Control (P<0.0001 for all regions). There were no significant differences in cell viability between Control and Submerged plugs (whole: P=0.590; center: P=0.713; periphery: P=0.799).

Conclusion: There is a significant amount of chondrocyte death induced by donor OCA plug harvesting with a powered coring reamer with traditional handheld irrigation that is mitigated by harvesting the plug while the allograft is submerged under saline.

Rapid Sequence MRI vs CT Capsular Width Sign for Detection of Occult Femoral Neck Fractures Associated with Femoral Shaft Fractures

Wade Karam, MD
UTHealth Houston McGovern Medical School

Purpose This study compares the efficacy of CT Capsular Width Sign with Rapid Sequence MRI (RSMRI) in diagnosing ipsilateral femoral neck fractures to femoral shaft fractures (IFNF).

Significance Ipsilateral occult femoral neck fractures (IFNF) are an injury associated with high energy femoral shaft fractures. MRI currently has the highest sensitivity and specificity for diagnosis. The CT capsular sign is a greater than 1mm difference in hip capsule distention on an axial CT cut when viewed in a soft tissue window.

Methods There were 217 patients who met all inclusion/exclusion criteria, there were 21 patients with RSMRI positive for IFNF. CT capsular sign was measured using the technique outlined by Park et al. A difference of greater than 1 mm is considered positive.

Results Of the 21 RSMRI positive for IFNF, only 7 had a positive CT capsular sign (33%). 14 patients had a falsely negative CT capsular sign (66.7%). Two patients with false negative signs had a false positive on the uninjured side.

Conclusion When compared to RSMRI, CT capsular sign demonstrated a high rate of false negatives. This shows that this sign is not a reliable method to diagnose IFNF, and should not be used in isolation.

Mitigating Post-Operative ED Visits: The Role of Mental Health Interventions in Joint Arthroplasty

Stephanie Price, MD
Dell Medical School at the University of Texas at Austin

Purpose: We hypothesized that mental health (MH) factors increase the risk of unplanned 90-day global period (90DGP) ED visits in post Primary Total Joint Arthroplasty (pTJA), which social work interventions (SWI) could mitigate.

Significance: The ED is an avoidable readmission pathway after pTJA, imposing substantial healthcare burdens. Interventions aimed at mitigating unnecessary ED visits are valuable to understand.

Methods: A retrospective review of hip or knee pTJA patients (Jan 2017 - May 2021) at an Integrated Practice Unit included ED visits from affiliate hospital's EMR. Variables included Patient Reported Outcomes Measurement Information System Physical Function (PROMIS-PF CAT), Generalized Anxiety Disorder (GAD), and Patient Health Questionnaire (PHQ) testing. SWI claims for preoperative MH treatment were noted. Unplanned 90DGP ED visits were recorded.

Results: Among the 470 patients analyzed, 63 (13.4%) visited the ED within 90DGP. Patients with severe anxiety or depression were six times more likely to present (OR 6.05; 95% CI 3.5-10.6; $p<0.001$). Patients accepting SWI were four times less likely to present within the 90DGP (OR 4.38; 95% CI 1.99–9.63; $p=0.0002$).

Conclusion: Anxiety/depression are associated with increased risk of 90DGP ED-presentation. SWI reduced the likelihood of ED visits, underscoring the efficacy MH support in improving outcomes. These findings advocate integrating MH care into perioperative management to mitigate unnecessary ED presentations.

Influenza Infection Has Higher Risk of Postoperative Complications Compared to COVID-19 in Shoulder Arthroplasty Patients: A Propensity Matched Cohort Analysis

Umar Ghilzai, MD
Baylor College of Medicine

Purpose: This study aims to compare postoperative outcomes following shoulder arthroplasty in patients with influenza infection versus those with COVID-19 infection.

Significance: To evaluate the impact of viral infections on perioperative care for shoulder arthroplasty patients to optimize care and avoid complication.

Methods: The TrinetX database was queried to identify patients who underwent total and hemi shoulder arthroplasty between 1/1/2020 - 3/27/24. Patients were divided into two cohorts: (1) infected with influenza 14 days preoperatively and (2) infected with COVID-19 14 days preoperatively. 1:1 propensity score matching was performed and analysis was done on complications within 30 days of surgery.

Results: The matched cohorts both consisted of 3,232 patients. Patients in the influenza cohort, when compared to the COVID-19 cohort, had a notably significantly higher risk of sepsis (3.3 vs 1.9%, p=0.001), death (5.5% vs 3.7%, p=0.001), readmission (17.4 vs 11.3%, p<0.001) and ED visits (48.4 vs 43.1%, p<0.001) Patients in the COVID-19 cohort, when compared to the Influenza cohort, had a significantly higher risk of stroke (2.9 vs 0.08%, p=0.015) and use of opioid analgesics (69.9 vs 65.7%, p<0.001).

Conclusion: Patients with a preoperative Influenza infection undergoing shoulder arthroplasty have a higher risk of postoperative complications compared to patients with a preoperative COVID-19 infection.

Steroid versus Placebo Injections and Wrist Splints in Patients with Carpal Tunnel Syndrome: A Systematic Review and Network Meta-Analysis

Ebubechi Adindu, MD
Dell Medical School at the University of Texas at Austin

Purpose: This study evaluated whether there is any difference in symptom intensity or nerve conduction measures of median neuropathy following corticosteroid injection, placebo injection, or splinting for carpal tunnel syndrome (CTS).

Significance: The AAOS treatment guidelines indicate strong evidence that steroid injections alleviate CTS symptoms based on a single placebo-controlled randomized-controlled trial (RCT). However, it remains unclear whether corticosteroid injections are palliative (relieving symptoms) or disease-modifying (preventing sensory loss and thenar atrophy).

Methods: Following PRISMA guidelines, we performed a network meta-analysis of RCTs. Study quality was assessed using the Cochrane Risk of Bias tool. Mean differences quantified variations in PROMs.

Results: At 3 months, corticosteroid injection resulted in a modest, statistically significant improvement in symptom relief compared to placebo and wrist splints, though it did not meet the minimum clinically important difference. Corticosteroids slightly outperformed wrist splints in pain reduction, but this also failed to reach clinical significance. Electrodiagnostic assessments revealed transient improvements in distal motor and sensory latencies favoring corticosteroids at 3 months, but these were not sustained at 6 months.

Conclusion: Corticosteroid injections provide minimal, transient improvement in nerve conduction and symptom relief. Patients might mistake temporary relief for a cure, risking disease progression and potential permanent neuropathy.

Radiation Monitoring Can Increase Radiation Safety Among Orthopedic Surgery Residents

Shrina Parikh, MD
UTHealth Houston McGovern Medical School

Purpose: Evaluate radiation safety practices amongst orthopedic surgery residents.

Significance: Studies have found increased cancer rates in certain fields with higher radiation exposure and in orthopedics, newer techniques such as navigation and minimally invasive surgeries increases radiation exposure further. Orthopedic surgery residents specifically may be exposed to greater amounts as well due to the time spent in the emergency room performing reductions.

Methods: This was a prospective study. 25 residents were surveyed regarding radiation safety practices in the OR and ER. Afterwards, residents were given radiation dosimetry badges worn throughout the day. Residents were surveyed again after receiving their dosimetry readings over 3 months.

Results: After receiving badges. 3 residents (12%) increased lead usage in the emergency room while doing procedures, 7 (28%) changed how they use the C-arm during cases, and 6 (24%) changed how they wear lead during cases after receiving the badges.

Conclusion: After receiving radiation badges, radiation safety practices increased amongst residents. Changes included wearing additional lead protection, attempting to use less fluoroscopy during reductions, and changing positioning when using the C-arm. Future plans involve looking at the dosimetry reports over the resident class years and rotations and trying to develop ways to minimize exposure.

The Windshield Wiper Sign: An Instability-Related Osteochondral Defect of the Anterolateral Femoral Head

Nicholas Girardi, MD
University of Texas at Austin Dell Medical School

Purpose: To characterize a new radiographic finding indicative of hip instability and acetabular suction seal disruption, coined the "windshield wiper" (WSW) sign.

Significance: Hip instability pathogenesis is multifactorial and lacks independently reliable diagnostic measures.

Methods: We performed a retrospective review of 250 periacetabular osteotomy (PAO) cases with the senior author from 2021-2023. The WSW sign was identified on plain radiographs as a concave osteochondral defect over the anterolateral femoral head with resultant loss femoral head sphericity. Routine arthroscopy before PAO confirmed the presence of seal disruption and instability. We compared these patients with a control group of 50 arthroscopically treated hips without instability.

Results: A radiographic WSW sign was found in 19 hips (prevalence=7.6%), each with confirmation of suction seal compromise and hip instability during arthroscopy. The mean lateral center-edge angle (LCEA) was 14.3°. Dysplasia was present in 13 hips, borderline dysplasia in 4 hips, and normal acetabular coverage in 2 hips. All WSW hips without frank dysplasia (n=6) demonstrated femoral antetorsion abnormalities. The WSW sign was not identified within the control group.

Conclusion: The WSW sign is an uncommon radiographic finding indicative of substantial hip instability. When identified, this finding may provide diagnostic and treatment value, especially in hips with borderline or normal acetabular coverage.

Biomechanical Analysis of Contact Pressures in Scaphotrapeziotrapezioid Arthritis

Hayden Anz, MD
UTHealth Houston McGovern Medical School

Purpose: To evaluate the biomechanical effects of trapeziectomy with partial trapezoid excision for treating scaphotrapeziotrapezoid (STT) arthritis. We hypothesize that the current teaching for partial trapezoid excision would not prevent scaphotrapezoid (ST) joint impingement.

Significance: STT arthritis is the third most common hand arthritis in the United States. The treatment is partial trapezoid excision following thumb carpometacarpal arthroplasty. The standard practice of 2mm partial trapezoid excision has never been tested for adequacy biomechanically.

Methods: Eight fresh frozen cadaver upper extremities were included. A transradial amputation was performed, and specimens were secured for biomechanical testing. Each specimen was loaded in terminal flexion, extension, and radial deviation. Contact pressures at the ST joint were recorded. Sequential 2mm partial trapezoid resections were performed. The contact force was compared between resection groups.

Results: There was no significant ST joint contact in extension. Average contact pressure decreased with each resection in flexion and radial deviation. A significant decrease required 6mm of resection radial deviation and 4mm in flexion.

Conclusion: A 2mm partial trapezoid excision is not adequate to negate ST contact pressures for STT arthritis. This suggests that the pain relief following partial trapezoid excision may not correlate directly with ST contact.

Social Work Interventions Improve Outcomes in Total Joint Arthroplasty: An Effort to Improve Equity at an Urban Musculoskeletal Integrated Practice Unit

Ayane Rossano, MD
Dell Medical School at the University of Texas at Austin

Purpose: We hypothesize that socioeconomic disparities lead to unfavorable perioperative measures, which may be addressed through targeted social work interventions (SWI).

Significance: Socioeconomic factors affect total joint arthroplasty (TJA) outcomes.

Methods: A retrospective review was performed of TJA patients from January 2017 to May 2021. High Area Deprivation Index (H-ADI) was defined as >50th percentile for disadvantage. Linear and logistic regression models assessed SWI on H-ADI patient outcomes.

Results: 470 patients were included. Black patients presented with the highest Patient Health Questionnaire scores (7, $p = 0.005$) and lowest preoperative hemoglobin (12.7, $p = 0.013$). Hispanic patients had higher ADI (49th vs 33rd percentile, $p = 0.0000000056$) and lower baseline Patient Reported Outcome Measures (PROMs) (27.7 vs 35.7, $p = 0.001$). H-ADI patients were twice as likely to be anemic (OR 2.3, 95% CI 1.51-5.32, $p = 0.05$). H-ADI patients undergoing SWI had greater postoperative PROM changes (45.6 vs 33.4, $p = 0.017$) and shorter hospital courses (0.29 vs 1.09 days, $p = 0.011$).

Conclusion: H-ADI patients who underwent SWI had favorable postoperative results, highlighting the value of multidisciplinary IPU care in overcoming socioeconomic barriers and optimizing outcomes in TJA.

Comparison of Z-Lengthening to Fractional Lengthening of Forearm Flexor Tendons: A Biomechanical Cadaveric Analysis

Angel Valencia, MD
UT Southwestern Medical Center

Purpose: We aim to compare biomechanical properties of flexor tendons undergoing Z-lengthening versus fractional lengthening.

Significance: Z-lengthening and fractional lengthening are two common interventions to address flexion contractures, and their load to failure and extension at failure are not well established.

Methodology: Seventy-two cadaveric tendons were harvested, including FCR, FCU, FPL, and FDS2-4. The tendons were either Z-lengthened 20 mm and secured with two figure-of-8 sutures or fractional lengthened with a pair of transverse tenotomies 1cm apart at the musculotendinous junction. An Instron machine was used to load the tendons to failure. Mann-Whitney U tests compared the load and excursion at failure. Cohen's effect size (d) for tendon types were calculated and statistical significance was set at p-value <0.05.

Results: There was greater load to failure for FCR ($p=0.004$, $d=2.3$), FDS3 ($p=0.017$, $d=2.0$), FDS4 ($p=0.010$, $d=2.1$), and flexor tendons overall ($p=0.001$) with Z-lengthening, compared to fractional lengthening. Maximum tendon excursion at failure was greater for Z-lengthening compared to fractional lengthening for FCR ($p=0.002$, $d=2.4$), FDS3 ($p=0.009$, $d=0.8$), and flexor tendons overall ($p<0.001$).

Conclusion: When Z-lengthened, the FCR, FDS3, and FDS4 tendons had a greater load to failure and FCR and FDS3 had greater excursion at failure compared to fractional lengthening.

Signaling: A Paradigm Shift in the Orthopaedic Surgery Application Process

Patrick Ryan, MD
Baylor Scott and White Temple

Introduction/Significance: In the 2022-2023 application cycle, the implementation of the preference signaling program (PSP) from the Association of American Medical Colleges for orthopaedic surgery programs, applicants were able to “signal” 30 programs. With the implementation of “signaling “30 programs, the number of applications has now dropped for the first time in many years, indicating this may be a plausible solution to ease the application process.

Methods: A seven-question survey was sent to all contactable orthopaedic surgery programs who participate in the Electronic Residency Application Service this 2023-24 application cycle. Emails were publicly available through Accreditation Council for Graduate Medical Education residency website and program specific websites.

Results: 159 programs were sent a survey with 107 respondents (67.3%). 82 programs (78.8%) interviewed applicants who only signaled their program. 92.7% of current interns signaled the program where they matched, with 88 programs (84.6%) matching only applicants who signaled. 95 (89.6%) programs believe that implementing signaling has improved the application process.

Conclusion: Orthopaedic surgery applicants should highly consider only applying to 30 programs and use all 30 signals. The vast majority of programs are only interviewing applicants who signal and nearly all matched orthopaedic surgery applicants from the 2022-2023 cycle signaled their program.

Tendon Transfers to Restore Shoulder Function for Obstetrical Brachial Plexus Palsy: A Systematic Review of the Literature

Semran Thamer, MD
University of Texas at Austin

Purpose: The purpose of this study is to review the literature to compare outcomes of tendon transfers to the rotator cuff versus posterior humerus in patients with obstetrical brachial plexus palsy (OBPP).

Significance: Although several techniques for the surgical management of OBPP exist, it is unclear whether tendon transfers to the rotator cuff (RC) vs. posterior humerus (PH) yield different outcomes.

Methods: Relevant publications were classified by surgical technique of tendon transfers to the rotator cuff or posterior humerus. The standard mean difference (SMD) and 95% confidence intervals were calculated to compare preoperative and postoperative aggregate Mallet scores as well as abduction and external rotation scores using the Mallet scale.

Results: Data from 26 studies and 951 patients (mean age 68.9 months) were included. 830 patients underwent tendon transfer to the RC and 148 to the PH. Tendon transfer to the RC had a greater improvement in abduction (SMD = 1.90) than transfer to the PH (SMD = 1.32) while both techniques yielded similar improvements in external rotation ($p<0.001$).

Conclusion: Transfer of the latissimus dorsi and teres major to the RC compared with transfer to the PH results in greater improvement in abduction while both techniques have similar results in improving external rotation.

The Effect of Anterior Closing Wedge Slope Reducing Osteotomy on Coronal Alignment – Considerations with Regards to Osteotomy Technique and Degree of Slope Correction

J. Matthew Helm, MD
UTHealth Houston McGovern Medical School

Purpose: To assess the impact of Anterior Closing Wedge Slope Reducing Osteotomy (ACW-SRO) on coronal knee alignment and examine whether this is technique-dependent. We hypothesized that ACW-SRO would affect coronal alignment, particularly influenced by posterior tibial slope (PTS) correction and osteotomy start point.

Significance: ACW-SRO reduces anterior tibial translation and ACL graft failure risk but its effect on coronal alignment and influence of surgical technique is unclear. Techniques vary, especially regarding tibial tubercle management and osteotomy location.

Methods: We analyzed 11 tibias with elevated PTS (≥12°). Using 3-D software, six osteotomies were simulated, varying the start-point position. Coronal alignment changes were measured via medial proximal tibial angle (MPTA) before and after the osteotomy. PTS correction and tibial tubercle to trochlear groove (TT-TG) distances were recorded.

Results: Osteotomies with the apex at the tibial mid-axis introduced additional varus, especially in transtubercle and infratubercle techniques. MPTA changes strongly correlated with PTS correction ($r = 0.77$, $p = 0.005$) and weakly with TT-TG distance ($r = 0.64$, $p = 0.04$). Larger PTS corrections increased MPTA change.

Bipolar Disorder Medications, Not the Illness, Increase Risk of Nonunion

Jared Wainwright, MD
University of Texas Medical Branch

Purpose: To assess the risk of nonunion in patients with bipolar disorder (BD) and characterize any confounding effect of medication treatments.

Significance: Nonunion increases pain, impairment, and distress. Studies have found association of BD with poor orthopaedic outcomes and bone health; none have looked at nonunion.

Methods: Patients with extremity long-bone fractures with and without prior BD diagnosis and prior exposure to lithium, anticonvulsants, and antipsychotics were found using the TriNetX database. Risk of fracture nonunion of the observed groups were compared to the control groups using an odds ratio (OR) with 95% confidence interval (95%CI).

Results: A total of 1,824,610 patients with long-bone fractures were analyzed. Closed fractures had nonunion rates of 1.6-5.4%, with BD patients showing a 1.30 times higher risk (95%CI 1.21-1.41). In BD patients, medication exposure increased the risk of nonunion in closed fractures by 1.68 times (95%CI 1.50-1.88). When medications were removed, BD patients no longer had significantly different risk of nonunion in closed fractures (OR 1.07, 95%CI 0.95-1.21).

Conclusion: Pharmacological treatments for BD, but not BD itself, significantly increased the risk of nonunion in closed fractures. Surgeons should consider this when treating these patients and tailor fracture treatment strategies accordingly.

Shoulder Arthroplasty Complications in Patients with Parkinson's

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Purpose: To compare shoulder arthroplasty complications in patients with and without Parkinson's disease.

Significance: Patients with Parkinson's face unique challenges in recovery from shoulder arthroplasty due to rigidity, tremor, and bradykinesia. Comparing the differences in outcomes provides insight into patient counseling and expectations.

Methods: A national deidentified database was used identify patients older than 18 with and without Parkinson's who underwent shoulder arthroplasty for osteoarthritis from 2015-2024. 90-day wound and 5-year implant complications were assessed using Chi-square analysis and univariate regressions within matched cohorts, controlling for diabetes, tobacco use, obesity, osteoporosis, and alcohol-related disorders.

Results: Out of 2,011 patients with Parkinson's and 114,402 controls, 1,973 matched pairs were identified. There were no significant differences in 90-day infections (0.50% vs. 0.70%, p=0.420) or wound disruption (0.50% vs. 0.50%, p=0.989). At 5-years, patients with Parkinson's had a significantly higher risk of prosthetic dislocation (4.2% vs. 2.3%, p=0.001) but no increased risk of periprosthetic fracture (1.7% vs. 1.0%, p=0.051), mechanical loosening (2.2% vs. 2.0%, p=0.563), joint infection (0.9% vs. 0.9%, p=0.988), or revision arthroplasty (3.7% vs. 3.2%, p=0.383).

Conclusion: This study demonstrates that while patients with Parkinson's exhibit a significantly higher risk of prosthetic dislocation, overall complication rates did not differ significantly from patients without Parkinson's**.**

Comparative Outcomes Following Total Hip Arthroplasty for Pathological Versus Traumatic Hip Fractures

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Purpose: This study compares short and long-term outcomes of total hip arthroplasty (THA) in patients with pathological versus traumatic hip fractures.

Significance: The vulnerability of patients requiring THA for fractures is well recognized, with limited distinction in the literature between THA in traumatic vs pathological fractures. This study highlights the uniquely vulnerable pathological fracture population.

Methods: A retrospective cohort study assessed 7-day, 90-day, and 2-year postoperative complications, and 5-year survival in THA patients with pathological (n=3,047) or traumatic (n=7,706) fractures using the TriNetX database. Propensity score matching (1:1) controlled for demographics and comorbidities, resulting in 3,033 matched pairs.

Results: Pathological fracture (PF) patients had higher 7-day odds of sepsis (OR 3.30), pulmonary embolism (OR 2.91), and DVT (OR 2.23) (all $p<0.001$). At 90 days, PF patients had increased sepsis (OR 1.49), pulmonary embolism (OR 2.02), and pneumonia (OR 1.80) (all $p<0.001$). At 2 years, PF patients had more periprosthetic fractures (OR 1.36, $p=0.032$) and hardware revisions (OR 1.34, $p=0.012$). Five-year survival was lower for PF (62.24%) versus traumatic fractures (82.61%), with a hazard ratio of 2.69 ($p<0.001$).

Conclusion: THA for pathological fractures carries significantly higher risks of complications and mortality, underscoring the need for tailored and vigilant perioperative care.

Effect of Thoracic Inlet Angle on Cervicothoracic Parameters and Patient-Reported Outcomes in Posterior Multi-Cervical Fusion

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Purpose: To investigate the effect of TIA on cervicothoracic parameters and patient reported outcomes(PROs) in patients undergoing multi-level posterior cervical fusions

Significance: Thoracic Inlet Angle(TIA) is a constant radiographic parameter, independent of posture and has been correlated with cervical sagittal balance. It's relationship to other cervicothoracic parameters has not been studied

Methods: Retrospective, multi-center analysis of patients undergoing multilevel posterior cervical fusions. Basic demographic data, PROs(Oswestry Disability Index[ODI] and Visual Analog Scale[VAS] at intermittent intervals from preoperative to two years postoperative was collected. Radiographic parameters(TIA, Cervical Lordosis, T1 Slope, Cervical Sagittal Vertical Alignment[cSVA]) were also measured at these intervals. Pearson correlation coefficients were calculated to assess the relationship between the parameters

Results: 257 patients were included. There was a strong positive correlation between TIA and T1 slope at both pre(r^2=56.4) and 2 years postop(r^2=58.4). Similar findings were observed between TIA and cSVA at pre(r^2=58.3) and 2 years postop(r^2=63.4). Weak positive correlations were observed between TIA and cervical lordosis, and PROs(VAS and ODI) and TIA

Conclusion: Strong positive correlations were found between TIA and T1 slope and TIA and cSVA. These findings suggest that preoperative planning may benefit from inclusion of TIA measurements for posterior cervical fusions.

Does Reduction Technique for Hip Fractures Matter? A Comparison of Closed, Open, and Percutaneous Reduction Techniques in the Treatment of Intertrochanteric Femur Fractures

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Purpose: To compare closed (CR), open (OR), and percutaneous (PR) reduction techniques for intertrochanteric femur fracture postoperative complications and additional major surgery postoperatively.

Significance: There is current literature looking at the use of PR techniques, but none literature comparing OR (direct visualization), PR, and CR techniques for intertrochanteric femur fractures.

Methods: Data from level 1 trauma center was retrospectively reviewed. Patients with intertrochanteric femur fractures (AO/OTA 31A1-A3) treated between 2015 and 2019 were included. Exclusions included pathologic fractures, nonoperative treatment, or less than 3 months of follow up.

Results: 258 patients (144 CR, 62 OR, 52 PR) were included. 46.1% had postoperative blood transfusions (CR 46.1%, OR 43.8%, PR 48.6%) with no significance ($p = 0.84$). No difference in DVT/PE: CR 4.9%, OR 3.2%, PR 5.8% ($p = 0.55$), additional major surgery: CR 3.6%, OR 9.7%, PR 3.8% ($p = 0.12$) or loss of fixation and/or lack of healing: CR 9.0%, OR 11.3%, PR 15.4% ($p = 0.37$).

Conclusion: No difference was seen in postoperative complications or additional major surgery. Major surgery rates were approaching significance. However, this study supports recent literature of invasive approaches to reduction of intertrochanteric femur fractures having no difference in early outcomes.

Vascular Injury in Tibial Plateau Fractures: Incidence and Risk Factors

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Purpose: To determine the incidence of vascular injury in tibial plateau fractures and risk factors associated with vascular injury.

Significance: Tibial plateau fractures, a common fracture of the lower extremity, often have associated injuries. To our knowledge, no study has identified risk factors associated with vascular injuries in tibial plateau fractures.

Methods: This was a retrospective review of adult patients with operatively-treated tibial plateau fractures at a level one trauma center from 2021-2023. Patients were further differentiated by mechanism, open fracture, vascular injury, intervention performed, Schatzker type, AO/OTA type, fracture-dislocation, and fracture-subluxation.

Results: A total of 674 patients (53% male, 47% female) were identified during the study period. 18 patients (2.7%) were identified to have a vascular injury on either computed tomography angiography or angiogram. Risk factors found to be associated with vascular injury included open fracture ($p < 0.001$) and fracture dislocation ($p<0.001$). Schatzker type, AO/OTA type, and fracture subluxation were not associated with increased risk of vascular injury.

Conclusion: Vascular injury in tibial plateau fractures is a rare occurrence with even fewer requiring intervention. Both open fracture and complete fracture-dislocation of the knee were associated with increased risk of vascular injury.

Osteosarcoma Secondary to Bone Infarct with Lymph Node Metastases

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Purpose: To present a case of a unique orthopedic oncologic pathology.

Significance: Bone-infarct-associated osteosarcoma is a rare occurrence as is lymph node metastasis of osteosarcoma.

Methods: We describe a case of a 75-year-old female with high-grade osteoblastic osteosarcoma with inguinal and iliac lymph node metastasis which arose in a distal femoral bone infarct.

Results: Diagnosis was delayed as the knee pain was judged to be referred from the hip where femoral head osteonecrosis was present and the iliac lymph node metastases had been misinterpreted as benign calcification on prior pelvic CT imaging. Core needle biopsies of the distal femoral mass and a lymph node were non-diagnostic. Surgical incisional biopsy of the distal femoral neoplasm and excisional biopsy of an inguinal lymph node were necessary for accurate diagnosis.

Conclusion: Correlation of the clinical presentation and radiographic imaging was critical to avoiding a false-negative biopsy result. To our knowledge, this is the first report in the English language medical literature of osteosarcoma secondary to bone infarct with lymph node metastases.

Does Vitamin D Deficiency Play a Role in Scheuermann's Disease?

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Purpose: This study aimed to investigate the association between vitamin D levels and the clinical, radiographic, and biochemical characteristics of Scheuermann's disease.

Significance: Scheuermann's Disease is an osteochondrosis of the thoracic spine characterized by wedging or irregular endplates of vertebral bodies, increased kyphosis, Schmorl's nodules, and pain. One hypothesized risk factor that has received limited study is vitamin D deficiency.

Methods: This retrospective study included 155 patients diagnosed with Scheuermann's Disease at a tertiary, academic pediatric hospital. Patients were categorized into three groups based on vitamin D levels: deficient (<20 ng/mL), insufficient (20–30 ng/mL), and optimal (>30 ng/mL). Clinical characteristics, radiographic measurements, and mineral and hormone profiles were compared among the three groups.

Results: Significant differences were observed in weight, race, and insurance type among the groups. Radiographic measurements, including maximum kyphosis, thoracic kyphosis, lumbar lordosis, pelvic incidence, and coronal Cobb angle, did not differ significantly among the groups ($p \geq 0.056$).

Conclusion: Vitamin D deficiency and insufficiency were not associated with any of the radiographic features of Scheuermann's disease, suggesting that vitamin D levels may not play a substantial role in the severity or progression of Scheuermann's disease. We cannot recommend routine Vitamin D screening or supplementation as a targeted treatment for this condition.

OREF gratefully acknowledges sponsors of the 2024 Resident Research Symposia

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