



FOURTH ANNUAL
OREF VIRTUAL NATIONAL
RESIDENT RESEARCH SYMPOSIUM

Wednesday, November 6, 2024

5:30 p.m. CST

OREF National Resident Symposium Grand Champions

The winner of this evening's symposium will be named the 2024 OREF National Resident Research Symposium Champion. The winner will attend the 2025 AAOS Annual Meeting in San Diego as OREF's guest where they will be presented with their award.

Past National Symposium winners appreciated the opportunity that attending the Annual Meeting gave them to meet OREF grant recipient alumna who offered insights into their research careers.



2021 Champion

Katherine Gerull, MD

Washington University in St. Louis

Attrition Among residents Entering US Orthopedic Surgery

Residency Programs: Analysis of National GME Census Data



2022 Champion

Kyle W. Morse, MD

The Hospital for Special Surgery

A Vertebral Stem Cell Mediating Spine Fusion



2023 Champion

Brendan Shi, MD

University of California, Los Angeles

Bisphosphonate Chaperones Effectively Target the Enthesis Without

Impairing Soft Tissue-to Bone Repair Integrity

Table of Contents

Resident Research Symposium Summary Agenda.....	4
Keynote Speaker	5
Judges and Moderator	6
Detailed Agenda.....	7
Abstracts.....	9
Corporate Recognition	23
Funding	24

About OREF:

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

Excited about today's research? Share it with your colleagues! Post on social media with [#orthosymposia](#) and tag [@OREFtoday!](#)

**OREF NATIONAL
RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA**

Wednesday, November 6, 2004

- 5:30 p.m. – 5:40 p.m. **Welcome and Introductions**
Joshua J. Jacobs, MD
President
Orthopaedic Research and Education Foundation
- Lee Grossman, MBA, ML
Chief Executive Officer
Orthopaedic Research and Education Foundation
- 5:40 p.m. – 6:15 p.m. **Session I – Resident Research Presentations and Discussion**
Moderator: Joshua J. Jacobs, MD
- Break - *Judges and Presenters – At this time, please finalize your scores for Session I*
- 6:20 p.m. – 6:55 p.m. **Session II – Resident Research Presentations and Discussion**
Moderator: Joshua J. Jacobs, MD
- Break – *Judges and Presenters – At this time, please finalize your scores for Session II*
- 7:00 p.m. – 7:30 p.m. **Session III – Resident Research Presentations and Discussion**
Moderator: Joshua J. Jacobs, MD
- Break – *Judges and Presenters – At this time, please finalize and submit your scores for all Sessions*
- 7:40 p.m. – 7:45 p.m. **Introduction of Keynote Speaker**
Joshua J. Jacobs, MD
- 7:45 p.m. – 8:10 p.m. **Keynote Speaker**
Nicholas Bernthal, MD
Professor and Chair, Executive Medical Director
Jeffrey J. Eckardt Endowed Chair
Department of Orthopaedic Surgery
David Geffen School of Medicine at UCLA
- 8:10 p.m. – 8:20 p.m. **Awards Presentation**
- 8:20 p.m. – 8:25p.m. **Closing Remarks**
Lee Grossman, MBA, ML

Excited about today's research? Share it with your colleagues! Post on social media with #orthosymposia and tag @OREFtoday!

KEYNOTE SPEAKER



Nicholas Bernthal, MD

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

Nicholas Bernthal, MD, is the Professor and Chair, and Executive Medical Director, Jeffrey J. Eckardt Endowed Chair in the Department of Orthopaedic Surgery at the David Geffen School of Medicine at UCLA. He graduated magna cum laude and phi beta kappa from Princeton University and received alpha omega alpha honors from Cornell University Medical School. He did his residency in orthopaedic surgery at UCLA and fellowships in orthopaedic research and musculoskeletal oncology at UCLA and the Huntsman Cancer Institute, respectively. His clinical interests are bone and soft tissue tumors, and his NIH-funded laboratory is pioneering new implant coatings to prevent surgical infections.

Judges

OREF Research Grants Committee Members

OREF President

Joshua J. Jacobs, MD
Rush University Medical Center

Marci Jones, MD
University of Massachusetts

Brian Snyder, MD
Boston Children's Hospital

Timothy Wright, PhD
The Hospital for Special Surgery

Moderator

Joshua J. Jacobs, MD
Rush University Medical Center

**OREF National Resident Research Symposium
DETAILED AGENDA**

Wednesday, November 6, 2024
Program commencing at 5:30 p.m. CST

5:30 p.m. – 5:40 p.m.

Welcome and Introductions

Joshua J. Jacobs, MD
President
Orthopaedic Research and Education Foundation

Lee Grossman, MBA, ML
Chief Executive Officer
Orthopaedic Research and Education Foundation

Session I – Resident Research Presentations & Discussion

Moderator: Joshua J. Jacobs, MD

5:40 p.m. – 5:45 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

5:45 p.m. – 5:50 p.m.

Your iPhone Knows How You Will Recover from Your Fracture
Brian Shear, MD, University of Maryland

5:50 p.m. – 5:55 p.m.

A Comparison of Total Knee Arthroplasty Outcomes Between Hemodialysis and Renal Transplant Patients
Seth Ahlquist, MD, University of California, Los Angeles

5:55 p.m. – 6:00 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

6:00 p.m. – 6:05 p.m.

Incision or Excision? What to do with the A1 Pulley for Trigger Finger: Results of a Multi-Surgeon Randomized Controlled Trial
Zaamin Hussain, MD – Emory University

6:05 p.m. – 6:15 p.m.

Question and Answers

6:15 p.m. – 6:20 p.m.

Break – **Judges and Presenters – At this time, please finalize your scores for Session I**

Session II – Resident Research Presentations & Discussion

Moderator: Joshua J. Jacobs, MD

6:20 p.m. – 6:25 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

6:25 p.m. – 6:30 p.m.

Can Hip and Knee Arthroplasty Surgeons Help Address the Osteoporosis Epidemic
Alex Gu, MD, George Washington University

6:30 p.m. – 6:35 p.m.

A Community-Based Outreach Program Can Change Underrepresented Minority Student Perception of Orthopaedic Profession Fit and Attainability: Lessons from BONE Academy
Molly A. Hulbert, MD, University of California, San Diego

Excited about today's research? Share it with your colleagues! Post on social media with [#orthosymposia](#) and tag [@OREFtoday!](#)

OREF National Resident Research Symposium
DETAILED AGENDA
Wednesday, November 6, 2024

6:35 p.m. – 6:40 p.m.	<i>Repair Technique and Fellowship Training Background Predict Major and Minor Complications after Achilles Tendon Repair</i> Benjamin Averkamp, MD, Carolinas Medical Center/OrthoCarolina
6:40 p.m. – 6:45 p.m.	<i>Osteochondral Allograft Reaming Significantly Affects Chondrocyte Viability</i> Tristan J. Elias, MD, University of Texas Medical Branch
6:45 p.m. – 6:55 p.m.	Question and Answer
6:55 p.m. – 7:00 p.m.	Break – Judges and Presenters – At this time, please finalize your scores for Session II
	Session III – Resident Research Presentations & Discussion Moderator: Joshua J. Jacobs, MD
7:00 p.m. – 7:05 p.m.	<i>Minimally Displaced Lateral Humeral Condyle Fractures: Optimizing Follow-up and Minimizing Cost</i> Denver B. Kraft, MD, MedStar Georgetown University Hospital
7:05 p.m. – 7:10 p.m.	<i>Correction of Fixed Knee Flexion Deformity in Patients with Cerebral Palsy Using Suture Anchors for Anterior Distal Femur Hemi-Epiphysiodesis</i> Thomas E. Olson, MD, University of California, Los Angeles
7:10 p.m. – 7:15 p.m.	<i>Conventional versus Robotic-Arm Assisted Medial Unicompartmental Knee Arthroplasty: A 20-Year Analysis of Radiographic and Clinical Outcomes</i> John T. Wilson, MD, University of South Florida
7:15 p.m. – 7:20 p.m.	<i>Rapid Sequence MRI vs CT Capsular Width Sign for Detection of Occult Femoral Neck Fractures Associated with Femoral Shaft Fractures</i> Wade Karam, MD, UTHealth Houston, McGovern Medical School
7:20 p.m. – 7:30 p.m.	Question and Answer
7:30 p.m. – 7:40 p.m.	Break - Judges and Presenters – At this time, please finalize and submit your scores for all Sessions
7:40 p.m. – 7:45 p.m.	Introduction of Keynote Speaker Joshua Jacobs, MD
7:45 pm – 8:10 p.m.	Keynote Speaker Nicholas Bernthal, MD Professor and Chair, Executive Medical Director Jeffrey J. Eckardt Endowed Chair Department of Orthopaedic Surgery David Geffen School of Medicine at UCLA
8:10 p.m. – 8:20 p.m.	Awards Presentation
8:20 p.m. – 8:25 p.m.	Closing Remarks Lee Grossman, MBA, ML

Excited about today's research? Share it with your colleagues! Post on social media with [#orthosymposia](#) and tag [@OREFtoday!](#)

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

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.

Your iPhone Knows How You Will Recover from Your Fracture

Brian Shear, MD
University of Maryland

Purpose: High-fidelity gait sensors in mobile phones continuously measure mobility, regardless of user setup, providing an expansive pre- and post-injury gait history. We assessed if pre-injury mobility combined with injury data reliably predicted post-fracture mobility.

Significance: These data provide personalized recovery models, augmenting fracture recovery expectations for patients.

Methods: This study enrolled 43 adult patients 6 months after surgery for a lower extremity fracture. Consenting patients securely exported their iPhone mobility metrics, including step count, walking speed, step length, walking asymmetry, and double support time. We integrated the mobility measures with demographic and injury data. Using mixed effects nonlinear modeling, we assessed whether pre-injury mobility metrics combined with injury and baseline data predicted post-fracture mobility.

Results: We fit post-fracture trajectory curves, demonstrating reliable mobility projections 6 months post-fracture ($p < 0.001$). Greater pre-injury mobility was associated with improved post-fracture function (1718 steps per day, $p < 0.001$). Tibia (-1270 steps per day, $p = 0.01$) and pelvic fractures (-1711 steps per day, $p = 0.03$) were associated with more mobility impairment than femur fractures.

Conclusions: The findings highlight the value of high-fidelity pre-injury mobility data in predicting recovery for each patient. Personalized recovery projections could support surgeons in establishing post-fracture expectations and modifying clinical care based on deviations from those projections.

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

Seth Ahlquist, MD

University of California, Los Angeles

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

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

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

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

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

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 ($\geq 12^\circ$). 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 transtubercl and infratubercl 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.

Conclusion: ACW-SRO can induce additional varus, particularly with larger PTS corrections and when the apex is at the tibial mid-axis. Technique selection is crucial, especially in patients with significant PTS corrections. Further validation in larger cohorts is needed.

Incision or Excision? What to do with the A1 Pulley for Trigger Finger: Results of a Multi-Surgeon Randomized Controlled Trial

Zaamin Hussain, MD
Emory University

Purpose: To compare pain and complication rates between incision and excision of the A1 pulley.

Significance: Trigger finger is caused by A1 pulley thickening, preventing smooth flexor tendon gliding. Open A1 incision is the gold standard but recurrence is common. Excising the entire pulley may reduce recurrence. We hypothesized that excision would result in lower recurrence rates, better symptom relief and higher patient reported outcome measures (PROMs).

Methods: A randomized controlled trial of consecutive patients undergoing first-time trigger finger release by five hand surgeons, where patients were randomly assigned to incision or excision. The primary outcome was VAS pain at the base of the digit. Other PROMs, complication and recurrence rates were secondary outcomes.

Results: Sixty patients were enrolled (30 per group). At minimum six months follow up, patients had significantly less pain ($p=0.011$) and greater pain reduction ($p=0.024$) after incision. There was no significant difference in other outcomes. Two excision patients needed irrigation and debridement, secondary to dehiscence and flexor tenosynovitis. Two incision patients had minor complications – stiffness and glue reaction. One patient in each group had recurrence.

Conclusion: At 6 months, incision and excision performed similarly, although incision did significantly reduce pain. Complications after excision require further exploration.

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

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.

Can Hip and Knee Arthroplasty Surgeons Help Address the Osteoporosis Epidemic?

Alex Gu, MD

George Washington University

Purposes (1) What proportion of patients who underwent THA or TKA met criteria for osteoporosis screening? (2) What proportion of these patients received a dual-energy x-ray absorptiometry (DEXA) study before arthroplasty? (3) What was the 5-year cumulative incidence of fragility fracture or periprosthetic fracture after arthroplasty of those at high-risk when compared to those at low-risk for osteoporosis?

Significance: As more than 50% of patients undergoing elective TJA should be screened for osteoporosis but less than 20% of these patients are screened, surgeon-initiated screening would have a high national impact.

Methods: In total, 710,097 and 1,353,218 patients who underwent THA and TKA, respectively, were captured in the PearlDiver database and included for analysis. Patients at high-risk for osteoporosis were filtered using demographic and comorbidity information as defined by national guidelines. The proportion of patients at high-risk for osteoporosis who underwent osteoporosis screening via DEXA scan within 3 years was observed and the 5-year cumulative incidence of periprosthetic fractures and fragility fracture was compared between the high-risk and low-risk cohorts.

Results: In total, 201,450 and 439,982 of patients who underwent THA and TKA, respectively, were considered at high-risk for osteoporosis. Of these patients, 12% (28,898) and 13% (57,022) of patients who underwent THA and TKA, respectively, received a preoperative DEXA scan. Within 5-years, patients at high-risk for osteoporosis undergoing THA and TKA had a higher cumulative incidence for fragility fractures (THA:HR2.1,95%CI:1.9-2.2; TKA:HR1.8,95%CI:1.7-1.9) and periprosthetic fractures (THA:HR1.7,95%CI:1.5-1.8; TKA:HR 1.6,95%CI:1.4-1.7) compared to those at low-risk.

Conclusions: The authors attribute the higher rates of fragility and periprosthetic fractures in those at high-risk compared with those at low-risk to an occult diagnosis of osteoporosis. Hip and knee arthroplasty surgeons can help reduce the incidence and burden of these osteoporosis-related complications by initiating screening and subsequently referring to bone health specialists for treatment.

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

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

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

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

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

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

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

Repair Technique and Fellowship Training Background Predict Major and Minor Complications after Achilles Tendon Repair

Benjamin Averkamp, MD
Carolinas Medical Center/OrthoCarolina

Purpose: The purpose of this study was to characterize the complication rate in acute Achilles tendon repair in a major metropolitan area.

Significance: Achilles tendon ruptures remain the most common tendon injury within the lower extremity with multiple surgical techniques, immobilization protocols, and surgical preferences commonly utilized.

Methods: 1036 Achilles tendon repairs performed from 1/1/2018 through 12/31/2022 were included. The primary outcome measure was major complication rate (reoperation, deep infection, tendon re-rupture, and loss of Achilles tension requiring re-operation). Minor complication rate (sural neuritis, superficial infection, delayed wound healing, heel pain, and loss of Achilles tension not requiring re-operation) was also documented. Complication rate by procedure type (open, percutaneous, suture anchor fixation), surgeon training, patient age, mechanism of injury, and rehabilitation protocol were recorded.

Results: The overall complication rate was 15.8%—with 3% (N=31) having major complications. Patients were 4.0 and 2.2 times more likely, respectively, to experience a major ($p=0.0152$) or minor complication ($p=0.0039$) with suture anchor fixation compared to open technique. There was no difference in complication rate by rehab protocol ($p=0.738$)

Conclusion: Patients undergoing suture anchor fixation of Achilles tendon injuries sustain major and minor complications at a significantly higher rate than percutaneous or open procedures.

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.

Minimally Displaced Lateral Humeral Condyle Fractures: Optimizing Follow-up and Minimizing Cost

Denver B. Kraft, MD
MedStar Georgetown University Hospital

Purpose: The purpose of this study was to evaluate nonoperatively treated lateral humeral condyle(LHC) fractures, determine the risk of subsequent displacement, analyze practice variability, develop an evidence-based protocol, and evaluate potential savings.

Significance: Minimally displaced LHC fractures may be treated nonoperatively in a long arm cast, but there is not a standardized evidence-based protocol.

Methods: We retrospectively reviewed all patients with LHC fractures treated nonoperatively at our institution from 2009-2015. We calculated the number of visits, casts, and radiographs and analyzed practice variation. The number of children with subsequent displacement needing operative fixation was determined. We also looked at the average duration for each follow-up visit and the charges/costs associated with casting and radiographs.

Results: There were 271 children with LHC fractures treated nonoperatively. In 4 weeks, the average number of visits was 2.6(range: 1-5), casts was 2.4(range: 1-4), and radiographs was 9.4(range: 2-31). Three patients required operative intervention.

Conclusion: Displacement in appropriately selected LHC fractures treated nonoperatively was rare(1.2%), and the data question the need for multiple visits and radiographs in the first 4 weeks. Optimal follow-up (follow-up 10-15 days after injury and 4-6 weeks) would be safe, minimize waste, and result in better value-based care.

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

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

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

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

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

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

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

Conventional versus Robotic-Arm Assisted Medial Unicompartmental Knee Arthroplasty: A 20-Year Analysis of Radiographic and Clinical Outcomes

John T. Wilson, MD
University of South Florida

Purpose: This project hypothesizes that failure rates and functional outcomes following robotic UKA versus conventional UKA will be equivalent.

Significance: Unicompartmental knee arthroplasty (UKA) is a treatment option for knee osteoarthritis, representing 5-8% of all knee replacements in 2022 (1). However, there have been disadvantages reported following UKA, namely, reduced long-term survivorship of UKA compared to TKA (4). UKA can be performed robotically or with conventional instruments.

Methodology:

This retrospective analysis compared the revision rate between conventional versus robotic assisted UKA. Secondary outcomes included radiographic parameters and outcome measurements.

Results:

719 patients were included in this study. 421 patients underwent a rUKA and 298 were in the cUKA group. We found a significant revision rate difference between cUKA and rUKA. We observed 27 revisions (9.06%) in the cUKA group and 15 revisions (3.56%) in the rUKA group. This paper also demonstrated significant differences in outcome scores and two radiographic parameters.

Conclusion:

It is crucial to determine the most effective way to perform UKA to maximize patient outcomes. While UKA has significant benefits and pitfalls (1-6), evidence supports a lower revision rate in the rUKA (12,13). There was an increased revision rate of 254% in the cUKA population compared to the rUKA population in this study.

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

OREF gratefully acknowledges sponsors of the
2024 Resident Research Symposia

**The Hark Family in
Memory of Dr. Fred Hark
And Dr. William Hark**

Smith+Nephew



ZIMMER BIOMET
Your progress. Our promise.™

For supporting the OREF Resident Research Symposia



oref.org

Now through December 31, Medacta USA
will match all gifts made by or for a
resident or fellow up to \$30,000!

Double your gift and help OREF fund
more resident research plus valuable
programs like these symposia.

A gift of any size is welcome and
appreciated, but we offer special recognition
for residents who choose to support our mission with a gift
of \$100 or more.

With your \$100 gift, you'll join the OREF Order of Merit,
a donor society normally reserved for donors
who give \$1,000 or more

**Visit oref.org/residents for more information or to
make your gift today.**



OREF Resident Research Funding

New Investigator Grant

Provides \$50,000 to advance the scientific training of the next generation of orthopaedic physician-scientists with seed and start-up funding for promising research projects. Residents, fellows, and orthopaedic surgeons having completed formal training within the last four years may apply.

OREF Resident Clinician Scientist Training Grant

Provides \$20,000 to prepare residents for a career with research as a major component.

OREF Resident Research Project Grant

Provides \$5,000 in funding to residents who are interested in research. Please note that these grants now require a Letter of Intent. They are offered twice each year, but you may submit only one application per grant year. Please apply during the time frame that most closely aligns with your research rotation in the labs.

Visit oref.org/grantprograms for current grant schedule.

[Sign up](#) to receive email notifications about OREF grants and awards.

