OREF ORTHOPAEDIC RESEARCH AND EDUCATION FOUNDATION®

Orthopedics

UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

OREF CENTRAL WEST REGION RESIDENT RESEARCH SYMPOSIUM

Wednesday, September 28, 2022

Fulginiti Pavilion Gossard Family Forum
13080 E. 19th Avenue
Aurora, CO 80045

Hosted by:
Evalina Burger-Van Der Walt, MD
Chair
Department of Orthopaedic Surgery
University of Colorado

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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 more than $147 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).

OREF CENTRAL WEST REGION
RESIDENT RESEARCH SYMPOSIUM
SUMMARY AGENDA
Wednesday, September 28, 2022

7:00 a.m. – 8:00 a.m.	**Registration and Breakfast** Fulginiti Pavilion Gossard Family Forum 13080 E. 19th Avenue Aurora, CO 80045
8:00 a.m. – 8:05 a.m.	**Welcome and Introductions** Evalina Burger-Van Der Walt, MD Chair, Department of Orthopaedic Surgery University of Colorado
8:05 a.m. – 8:10 a.m.	**OREF Welcome** Lee Grossman Chief Executive Officer Orthopaedic Research and Education Foundation
8:10 a.m. – 9:00 a.m.	Session I – Resident Research Presentations & Discussion
9:00 a.m. – 9:50 a.m.	Session II – Resident Research Presentations & Discussion
	Break
10:00 a.m.–10:50 a.m.	Session III – Resident Research Presentations & Discussion
10:50 a.m. –11:00a.m.	**Break**
11:00 a.m.-11:02 a.m.	**Keynote Speaker Introduction**
11:02 a.m.-11:47 a.m.	**Keynote Address** Francis Y. Lee, MD, PhD, honMBA Wayne O. Southwick Professor of Orthopaedics and Rehabilitation with Tenure, Biomedical Engineering, Graduate School of Arts and Sciences, Pathology Yale University School of Medicine
11:47 a.m. –11:49 a.m.	**Closing Remarks** Lee Grossman Chief Executive Officer Orthopaedic Research and Education Foundation
11:49 a.m.–1:00 p.m.	**Lunch Reception** Awards Presentation

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KEYNOTE SPEAKER

Francis Y. Lee MD, PhD, honMBA

Wayne O. Southwick Professor of Orthopaedics and Rehabilitation with Tenure;
Biomedical Engineering; Graduate School of Arts and Sciences; Pathology
Yale University School of Medicine

Francis Y. Lee, MD, PhD, is a professor with clinical expertise in metastatic bone cancers, bone & soft tissue tumors, and pediatric orthopaedic surgery at Yale New Haven Hospital in Stamford, Connecticut, and Yale New Haven Hospital in New Haven, Connecticut. He completed his musculoskeletal fellowship at the MGH/Boston Children's Hospital, Pediatric Orthopaedics at the Hospital for Sick Children, and Research Fellowship under Dr. Thomas Einhorn at Mount Sinai Hospital. He is one of a handful of orthopaedic surgeons with several NIH R01 research grants and conducts translational research in the field of bone regeneration, inflammation, and infection. He has served, or is currently serving, as NIH Skeletal Biology and Skeletal Regeneration (SBSR) Study Section Chair, AAOS Research Development Committee Chair, Musculoskeletal Tumor Society Research Committee Chair, and Orthopaedic Research and Education Foundation (OREF) Grant Committee Chair.
;
According to Dr. Lee, OREF is the most impactful organization that opened a door to develop him as an orthopaedic surgeon scholar. He followed a classic pathway of obtaining an OREF Resident Research Grant (1995) during residency. He subsequently received an OREF Research Grant (2004), OREF Career Development Award (2006-2009), Department of Defense Grant (2000-2014), Musculoskeletal Transplant Foundation Grant (2005; 2006-2009), and several NIH R01 Grants (2007-2024). It is a great privilege for Dr. Lee to share his failures and successes with aspiring young orthopaedic resident scholars at the Hospital for Special Surgery, the birthplace of the orthopaedic surgeon scholar incubator program and numerous innovations. He expresses deep gratitude to the Hospital for Special Surgery and OREF to provide a platform to share research passions among orthopaedic trainees despite interruptions caused by the Covid-19 pandemic.

Judges

Douglas Adams, PhD
University of Colorado

Michael Dayton, MD
University of Colorado

Karin Payne, PhD
University of Colorado

Michael Zuscik, PhD
University of Colorado

OREF Central West Region Resident Research Symposium
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7:00 a.m. – 8:00 a.m.	**Registration and Breakfast** Fulginiti Pavilion Gossard Family Forum 13080 E. 19th Avenue Aurora, CO 80045
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8:05 a.m. – 8:10 a.m.	**OREF Welcome** Lee Grossman Chief Executive Officer Orthopaedic Research and Education Foundation
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8:18 a.m. – 8:26 a.m.	*Compression of a Midfoot Osteotomy Using a Circular External Fixator: What is the Ideal Pin Configuration?* Tyler Freeman, MD, University of Colorado
8:26 a.m. – 8:34 a.m.	*Posterolateral Rotatory Instability Develops with the Kocher Approach and is not Detectable on Hanging Arm Test: A Cadaveric Analysis* Stephen Daniels, MD, University of Colorado
8:34 a.m. – 8:42 a.m.	*Clinical Outcomes Following Proximal Hamate Reconstruction of Proximal Pole Scaphoid Non-Unions: A Case Series* Francisco Rodriguez Fontan, MD, University of Colorado Anschutz Medical Campus, Aurora
8:42 a.m. – 8:50 a.m.	*The Importance of Patient Resilience on Outcomes Following Hip and Knee Arthroplasty* Zachary Clarke, MD, University of Colorado School of Medicine
8:50 a.m. – 9:00 a.m.	**Question and Discussions**

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9:08 a.m. – 9:16 a.m.	*A Randomized Trial Comparing Barbed to Traditional Sutures in TKA Closure* Tyler Scott, MD, University of Colorado
9:16 a.m. – 9:24 a.m.	*Outcomes of Extra-Articular Distal Femur Fracture Fixation: A Network Meta-Analysis and Probability-Based Projected Costs Comparing Different Intramedullary Nailing and Plating Techniques* Dylan Rakowski, MD, University of Colorado
9:24 a.m. – 9:32a.m.	*Biomechanical and Imaging Analysis of Arthroscopic Shoulder Stabilization Comparison of Repair in the Beach Chair versus the Lateral Decubitus Position* Alex Lencioni, MD, University of Colorado School of Medicine
9:32 a.m. – 9:40 a.m.	*Is a History of Pelvic Fracture an Indication for a Primary Elective Caesarean Section?* Katya Eve Strage, MD, University of Colorado
9:40 a.m. – 9:50 a.m.	**Question and Discussions**

Break

Session III – Resident Research Presentations & Discussion

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10:08 a.m.-10:16 a.m.	*A Novel Disaster Risk Reduction Protocol to Improve Orthopedic Surgical Outcomes During the First Peak of COVID-19 Pandemic* Joshua Mares, MD, University of Colorado
10:16 a.m.-10:24 a.m.	*Bioburden and Genetic Analysis of Bacteria Present in Open Fracture Wounds: A Pilot Study* Jason Koerner, MD, University of Colorado
10:24 a.m.-10:32 a.m.	*Two-Stage Revision Total Knee Arthroplasty for Chronic Histoplasma Capsulatum Prosthetic Joint Infection: A Case Report* Brady T. Williams, MD, University of Colorado

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10:32 a.m. – 10:40 a.m. *Patient-Reported Outcomes of Pain and Related Quality of Life One-Year Following Osseointegration in Patients with Lower-Extremity Amputations*
Kylie Shaw, MD, University of Colorado

10:40 a.m. – 10:50 a.m. **Question and Discussions**

10:50 a.m. – 11:00 a.m. **Break**

11:00 a.m. - 11:02 a.m. **Keynote Speaker Introduction**

11:02 a.m. – 11:47 a.m. **Keynote Address**
Francis Y. Lee, MD, PhD, honMBA
Wayne O. Southwick Professor of Orthopaedics and Rehabilitation with Tenure, Biomedical Engineering, Graduate School of Arts and Sciences, Pathology
Yale University School of Medicine

11:47 a.m. – 11:49 a.m. **Closing Remarks**
Lee Grossman
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Orthopaedic Research and Education Foundation

11:49 a.m.-1:00 p.m. **Lunch Reception**
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Benefits of Dual Attending Surgeons During Three-and Four-Ligament Reconstruction Knee Surgery

Ryan Price, MD
Univesity of New Mexico

Purpose: This study sought to evaluate the impact of dual versus single attendings during single-stage reconstruction of three or more primary knee ligaments. It was hypothesized that a dual attending approach would result in decreased surgical time and complication rates.

Significance: Multi-ligament knee injuries are devastating, and single-stage reconstruction surgery is a laborious process. Other surgical fields have investigated the dual attending model, finding it to be associated with reduced operative time, decreased blood loss, and fewer complications. The objective benefits of this model during complex knee surgery are unclear.

Methods: Retrospective chart review from 2007-2017 identified patients undergoing reconstruction of three primary ligaments. Demographics and outcomes were obtained. Continuous data was analyzed using T-tests, categorical data was analyzed using chi-squared analysis or Fisher Exact tests.

Results: Eighty-five patients were identified, 29 surgeries had dual attendings versus 56 which had a single attending. Tourniquet time was shorter at 111 vs. 123 minutes. Single attending surgeries were not associated with increased complication rates.

Conclusion: Employing dual attendings was associated with decreased tourniquet time, offering support for adopting the model in complex knee ligamentous reconstruction surgery. The authors discuss the perceived effect on operative efficiency, stress reduction, education, error identification, and camaraderie.

Compression of a Midfoot Osteotomy Using a Circular External Fixator: What is the Ideal Pin Configuration?

Tyler Freeman, MD
University of Colorado

Purpose/Significance: Midfoot osteotomy for foot deformity correction utilizing a circular ring fixator is useful for high-risk patients. Pins can be configured to apply compression at the osteotomy site, but the optimal pin configuration has yet to be determined.

Methods: Nine cadavers stabilized with circular external fixation frames underwent midfoot osteotomy through the transverse tarsal joint and custom force sensor inserted. Three parallel 1.8mm wires were placed distal to the osteotomy. After tensioning wires, pressure readings were recorded for each sequential wire tensioning at 2 different adjacent hole positions.

Results: Average compressive load at neutral hole positioning for wire #1, wire #1-2, and wire #1-3 was 382 N, 439 N, and 372 N, respectively. Similar trends were seen in proximal hole positioning. The proximal hole position 2 wire configuration was statistically greater than the 3 wire neutral hole positioning (P=0.035) and 1 wire neutral hole position configuration (P=0.049).

Conclusion: The greatest compressive force was achieved with 2 wires tensioned in the proximal hole position. Third wire addition led to force decrease likely due to off-axis forces that may distract the osteotomy site given the difficulty of passing all wires perfectly parallel in all planes.

Posterolateral Rotatory Instability Develops with the Kocher Approach and is not Detectable on Hanging Arm Test: A Cadaveric Analysis

Stephen Daniels, MD
University of Colorado

Purpose: We hypothesized that the Kocher interval would portend a greater incidence of posterolateral elbow instability (PLRI) compared to the extensor digitorum communis (EDC)-splitting approach.

Significance: The Kocher interval intimately overlies the lateral ulnar collateral ligament, injury to which may lead to iatrogenic instability.

Methods: Twenty cadavers were randomly assigned to undergo either Kocher or EDC-split approaches. Specimens underwent clinical and fluoroscopic evaluation with: (1) the hanging arm test, and (2) a 15-degree lateral elbow flexion assessment.

Results: All specimens (10/10, 100%) following the Kocher approach demonstrated clinical evidence of PLRI, whereas no specimens (0/10, 0%) following the EDC-split approach demonstrated clinical or radiographic instability at any of the testing conditions. All (10/10) Kocher-interval specimens demonstrated clinical and radiographic instability at 15 degrees of elbow flexion that was not evident during the true hanging arm test.

Conclusion: The Kocher approach imparted iatrogenic instability during dissection, whereas the EDC-split approach did not. The hanging arm test did not appear to be a reliable tool to identify the presence of PLRI in the setting of observed instability. Instead, radiographic evaluation with the elbow in 15 degrees of flexion demonstrated 100% sensitivity in identifying radiocapitellar instability.

Clinical Outcomes Following Proximal Hamate Reconstruction of Proximal Pole Scaphoid Non-Unions: A Case Series

Francisco Rodriguez Fontan, MD
University of Colorado Anschutz Medical Campus, Aurora

Purpose: This study reports the clinical outcomes of four patients treated with proximal hamate autograft for reconstruction of proximal scaphoid nonunion.

Significance: Osteochondral graft options for proximal scaphoid pole reconstruction include the medial femoral trochlea or the proximal hamate pole. The latter allows minimal donor site morbidity, no additional incisions, a sizeable graft that can be rigidly fixed, no need for microvascular technique, and the harvest of the stout volar capitohamate ligament to repair the dorsal aspect of the scapholunate ligament.

Methods: Primary clinical outcomes included: duration of nonunion prior to surgery, wrist and forearm range of motion (ROM), and time to radiographic union.

Results: Four patients were included with a mean age of 24 years old (range, 18-35), 3 males and 1 female. The mean interval from nonunion presentation to reconstruction was 3.9 years (range, 0.6-9). Two patients had a failed prior surgical intervention at an outside hospital. Union was achieved in all cases with no complications at 11.5 weeks (range, 10 to 12). The average ROM achieved on flexion/extension and supination/pronation was 59.5% and 100%, respectively, as compared to the contralateral side.

Conclusions:
All cases achieved union of the proximal scaphoid pole reconstruction with proximal hamate osteochondral autograft.

The Importance of Patient Resilience on Outcomes Following Hip and Knee Arthroplasty

Zachary Clarke, MD
University of Colorado School of Medicine

Purpose: 1) Use the PSEQ-2 to identify high resilience (HR) and low resilience (LR) patients undergoing hip and knee arthroplasty. 2)Compare preoperative patient resilience with validated patient reported outcome measures at different time points.

Significance: Recovery after hip and knee arthroplasty is challenging. There is limited data evaluating the effect of resilience on outcomes. The PSEQ-2 (Pain-Self Efficacy Questionnaire) is a validated measure of resilience via pain self-efficacy.

Methods: We used a PSEQ-2 score of >10 and <10 to create two cohorts: high resilience (HR) and low resilience (LR). PROMIS surveys were administered at pre-op, 3 months, and 12 months post-op. The data was evaluated using a Mann-U Whitney test.

Results: There was statistical significance for higher scores in the HR cohort for many of the surveys at various time points. HR patients scored better on all surveys at all timepoints.

Conclusion: HR patients go into surgery with better outcomes scores. The PSEQ-2 has a stronger predictive value for outcomes at 3 months than at 1 year after TKA. For THA, preoperative resilience has a stronger effect on outcomes at one year than TKA. The PSEQ-2 is a useful measure to set expectations before hip and knee arthroplasty.

Suture Tape Based Pulley Reconstruction: A Case Report

Renzo Laynes, MD
University of Colorado Anschutz Medical Campus, Aurora

Purpose: To describe a novel technique for A2 flexor pulley reconstruction using a non-absorbable synthetic suture instead of graft-based options.

Significance: The current case presents a detrimental outcome after an A1 pulley release due to apparent inadvertent A2 injury and demonstrates the use of a suture tape anchor in the reconstruction of the A2 pulley as a viable option for restoration of the pulley and to achieve early range of motion.

Methods: This is a case-report study involving a 59-year-old female who sustained an iatrogenic A2 pulley rupture as a complication from a left long finger A1 pulley release. The pre-operative, surgical and post-operative course, including technique for reconstruction, is described in this report.

Results: Six months after surgery, this patient was able to make a composite fist with only a 10-degree active extension lag at the proximal interphalangeal joint of the long finger. Sensation in the affected finger was intact except in the distal pulp. The patient returned to baseline activity.

Conclusion: Larger studies comparing suture and graft-based reconstruction techniques should be performed to elaborate on the difference in outcomes with each strategy.

A Prospective Randomized Trial Comparing Barbed to Traditional Sutures in TKA Closure

Tyler Scott, MD
University of Colorado

Purpose: To establish if arthrotomy closure with a running knotless bidirectional barbed suture provided a statistically significant faster time to closure than a traditional closure technique. Secondary measures evaluated patient-reported functional outcomes and associated complications between the two patient groups.

Significance: Minimal studies have established a link between postoperative functional outcomes and the use of running knotless bidirectional barbed suture.

Methods: A single-blinded prospective study using 76 match-controlled patients who underwent elective total knee arthroplasty (TKA) for osteoarthritis followed over 12 months. WOMAC and SF-36 scores were obtained preoperatively and at three-month and twelve-month postoperative follow-up appointments.

Results: Arthrotomy closure with a running knotless bidirectional barbed suture was statistically faster than closing with a traditional, interrupted suture (23.2 mins vs 27.6 mins, $p < 0.05$). There was no significant difference in WOMAC and SF-36 scores. Additionally, no statistically significant difference identified within the complication profiles of the two groups ($p > 0.05$).

Conclusion: Closing the arthrotomy of a TKA with a running Quill suture has a similar patient outcome and safety profile as a traditional interrupted knotted suture closer, with the added benefit of faster wound closure times.

Outcomes of Extra-Articular Distal Femur Fracture Fixation: A Network Meta-Analysis and Probability-Based Projected Costs Comparing Different Intramedullary Nailing and Plating Techniques

Dylan Rakowski, MD
University of Colorado

Purpose: We hypothesize IMN has the lowest complication rate, associated cost, and better outcome.

Significance: Patients sustaining a distal femur fracture have higher morbidity and mortality compared to those sustaining hip fractures. Currently, there are several methods of internal fixation: intramedullary nailing (IMN), plate osteosynthesis, and nail-plate combination constructs. However, there is still no consensus on the most cost-effective method of fixation.

Methods: The network meta-analysis of the subgroups was conducted to rank the risk differences, test for confounding factors across the studies, and appraise the methodological quality. The mean cost and probability were used to estimate projected added costs of surgical management for complications.

Results: Retrograde IMN (RE-IMN) demonstrated a lower rate of non-union (RD=-0.04, p=0.05), delayed union (RD=-0.06, p=0.05), implant failure (RD=-0.06, p=0.007), and lower complication costs compared to single locking plate (SLP). RE-IMN demonstrated a better functional outcome as compared to SLP (p= 0.005). This amounts to $2,834.44 surplus in SLP complication costs. The implant failure rate was higher with SLP when compared to double plating, bridge plates, and antegrade IMN (RD=0.03, p=0.05).

Conclusion: RE-IMN is the most cost-effective fixation method for extra-articular distal femur fracture fixation.

Biomechanical and Imaging Analysis of Arthroscopic Shoulder Stabilization: Comparison of Repair in the Beach Chair versus the Lateral Decubitus Position

Alex Lencioni, MD
University of Colorado School of Medicine

Purpose: To perform a cadaveric imaging analysis of arthroscopic anterior shoulder stabilization in the lateral decubitus and beach chair positions.

Significance: To demonstrate that the LD position may predict more accurate inferior anchor placement. Although, the accuracy of the BC position for the superior anchor suggests further insight and technical modification may be needed.

Methods: Nine matched pairs of cadaveric shoulders (18 total shoulders) underwent arthroscopic anterior inferior labral repair using 3 suture anchors placed in the 3:30, 4:30, and 5:30 positions. Repairs were performed by two expert surgeons each trained in a respective technique. CT scan analysis evaluated anchor positions and trajectories. One-tailed t-tests were used to compare anchor position deviation with target ideals.

Results: Inferior anchor (5:30) placement was found to be more accurate in the LD specimens while superior anchor (3:30) placement was found to be more accurate in the BC specimens. The LD group did not demonstrate statistically significant deviation from the target ideal for the 5:30 anchor ($p = 0.178$), while the BC group did not demonstrate statistically significant deviation for the 3:30 anchor ($p = 0.732$).

Conclusion: Both positioning techniques remain safe and efficacious. The LD position may offer improved inferior anchor placement.

Is a History of Pelvic Fracture an Indication for a Primary Elective Caesarean Section?

Katya Eve Strage, MD
University of Colorado

Purpose/Significance: Current literature reports higher rates of Caesarean sections (C-sections) in this cohort of women, ranging from 42% to 62% when compared to the national average rate of 32%. The purpose of this study was to compare rates of primary C-sections in women with a history of pelvic fracture.

Methodology: Retrospective review of female patients between ages of 18 and 45 years old who were admitted to a Level 1 trauma centre between 01/01/2005 and 01/01/2020 for a pelvic fracture and had a subsequent viable pregnancy.

Results: Thirty-five patients were identified. This cohort of women, compared to the institutional average, had 72% (26/36) vs. 87% vaginal deliveries and 28% (10/36) vs. 13% primary C-sections. Of the C-sections, 30% (2/8) were scheduled C-sections compared to institutional average of 8%, and 70% (7/10) were unscheduled C-sections compared to an institutional average of 92%.

Conclusion: Women with a history of pelvic fracture had a lower rate of primary C-sections (28%) compared to prior studies. In summary, our study showed similar rates of Caesarean sections in women with a history of a pelvic fracture compared to the general public, and therefore these women should be offered a trial of labour.

Total Joint Arthroplasty After Solid Organ Transplant— Is it Safe?

James Lendrum, MD
University of Colorado

Purpose: To produce data for solid organ transplant patients who have undergone total joint arthroplasty (TJA).

Significance: The perioperative medical and surgical risk profile is not well defined for this patient population and must be weighed against the potentially life-changing benefits of joint replacement.

Methodology: We retrospectively collected clinical data on 55 THA/TKA that had been performed in 49 transplant recipients. Patient reported outcomes (PROs) were obtained at pre-operative, 3-month, and 1+ year postoperative time points.

Results: Nine readmissions occurred within 90 days (16.3%). Medical complications included acute blood loss anemia (40.0%), renal impairment (20.0%), hypoxia (10.9%), DVT (3.6%), and 1-year mortality (10.9%). Four patients (8.2%) required revision surgery during follow-up (min. 2 year).

There was a significant decrease in operative joint pain ($p < 0.0001$) and an improvement in the timed functional testing ($p < 0.05$). HOOS/KOOS Jr. scores improved from 47.4 to 75.7 and 81.2 at respective follow-up timepoints ($p < 0.00001$). PROMIS-PF also improved over time from 38.9 to 44.9 and 44.0, respectively ($p < 0.01$).

Conclusion: While medical complications were frequent, surgical complications occurred at rates similar to the general population. Infection was uncommon (1.8%). Patients were quite satisfied with their joint replacement, obtaining improvements in pain relief, functional testing, and physical function scores.

A Novel Disaster Risk Reduction Protocol to Improve Orthopedic Surgical Outcomes During the First Peak of COVID-19 Pandemic

Joshua Mares, MD
University of Colorado

Purpose and Significance: A disaster protocol was developed and implemented by a level-1 trauma center in response to the COVID-19 pandemic to improve outcomes and minimize the provider infection rate.

Methods: Our protocol designating specific patient care roles to rotating, weekly orthopedic providers was implemented from March 16, 2020, to May 17, 2020. Weekly surveys were filled out by providers. Outcomes include: (1) provider infection rate, (2) patient outcomes. Hip fracture patient outcomes during the studied period, were compared with those from May 18, 2020, to December 14, 2020.

Results: 34 providers participated in our protocol. 79% underwent antibody testing two weeks after the end of the protocol. All tested providers were antibody negative. 184 orthopedic trauma cases underwent surgery. Postoperative complication and mortality rates at nine-months were 12% and 6%, respectively. Seven COVID-19 positive patients underwent orthopedic surgery with a 29% mortality rate due to COVID-19 related complications. 115 surgical hip fractures were hospitalized for an average stay of 6.6 days compared to 5.5 days before the pandemic. The 6-month mortality rate was 16% (3/19) during the studied period as compared to 10% after resumption of prior operations.

Conclusion: An effective disaster protocol to protect providers and maintain standards of care during pandemic was validated for future use.

Bioburden and Genetic Analysis of Bacteria Present in Open Fracture Wounds: A Pilot Study

Jason Koerner, MD
University of Colorado

Purpose: The purpose of this pilot study was to evaluate the concept and feasibility of collecting and analyzing a bacterial genomic library from patients with open fractures.

Significance: Current open fracture management with expedited systemic antibiotics continue to have infection rates ranging from 15-40%. Systemic IV therapy has sub-therapeutic levels in critically injured tissues. Antibiotic powder can decrease infection burden in a local manner with low systemic risk. To date, there is no known study evaluating the use of antibiotic powder in the emergent setting prior to operating room (OR) management.

Methodology: Patients at a level one trauma center were enrolled between ages 18-80 years old with Gustillo type II, IIIA, or IIIB open fracture requiring debridement and fixation. Intrawound swabs were obtained in both the emergency department and in the OR. Swabs were analyzed at a genomics laboratory where bacterial genetic material was extracted.

Results: Three patients were enrolled. We were able to extract enough genetic material to build a genomic library and analyze genetic sequencing.

Conclusion: We demonstrated a feasible method of collecting and extracting genetic material from swabs and tissue. We have begun enrolling patients in a RCT analyzing the effects of antibiotic powder in open fractures

Two-Stage Revision Total Knee Arthroplasty for Chronic Histoplasma Capsulatum Prosthetic Joint Infection: A Case Report

Brady T. Williams, MD
University of Colorado

Purpose: The purpose of this case report was to describe the diagnosis, surgical and medical treatment, and clinical outcomes following a histoplasma capsulatum total knee prosthetic joint infection in an immunosuppressed patient treated with a two-stage revision procedure.

Significance: This case highlights the importance of consideration of atypical organisms and corresponding diagnostic tests when treating patients with compromised immunity.

Methods: In this case, the diagnosis was made based on minor criteria, with the causative organism being identified from operative cultures taken at the time of the first stage procedure. The patient subsequently underwent antifungal induction with amphotericin B followed by oral antifungal therapy with itraconazole, and a successful second stage revision with a hinged knee prothesis.

Results: At the time of most recent follow up (1.5 years), the patient remained clear from infection with plans for lifetime antifungal oral azole suppression due to indefinite immunosuppression required for rheumatologic conditions.

Conclusion: This case reports provides a case example of the successful treatment of a histoplasma capsulatum total knee prosthetic joint infection with a two staged revision procedure.

Patient-Reported Outcomes of Pain and Related Quality of Life One-Year Following Osseointegration in Patients with Lower Extremity Amputations

Kylie Shaw, MD
University of Colorado

Purpose: Our aim is to evaluate differences in pain and quality-of-life one-year after osseointegration (OI) of bone anchored prostheses (BAP) for patients with transfemoral (TF) and transtibial (TT) amputations.

Significance: About 75% of patients with lower extremity amputations experience varying pain phenotypes. Osseointegration allows for prosthetic limb wear through a bone-anchored implant, eliminating the need for a socket-prosthesis and offering improved function/mobility. Patient-reported outcomes (PROs) following OI have not been well studied.

Methodology: We analyzed severity and phenotypes of pain as measured by prospectively collected data from validated PRO surveys (NRS, PROMIS global health, SF-36, Q-TFA). Data was compared between initial and one-year post-operative visits.

Results: 36 participants underwent OI. Both TF and TT patients demonstrated significant improvement in pain intensity as measured by NRS ($p=0.018$) and PROMIS ($p=0.04$), as well as residual limb pain when walking/standing ($p<0.001$) one-year post-OI. This improvement in residual limb pain significantly improved the quality-of-life in both populations ($p= 0.008$;$p= 0.0002$). The improvement in general body pain and back pain is positively correlated with the change in case-specific residual limb pain ($r= 0.87$, $p<0.0001$) and phantom pain. ($r= 0.44$, $p<0.039$).

Conclusion: Osseointegration improves patient-reported pain and quality-of-life in lower extremity amputees.

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