

ANNUAL MEETING





Shaping the Future of Arthroplasty

Oct. 23-26

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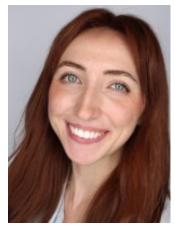


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EDUCATIONAL ACTIVITY SCOPE

The 2025 AAHKS Annual Meeting is designed to provide practicing orthopaedic surgeons with research-based, state-of-the-art information on diagnosis, surgical and non-surgical treatment options and overall management of hip and knee conditions. This educational activity includes the review of the most current scientific research study findings, faculty and participant discussions and interactive symposia. It covers multiple clinical topics such as primary and revision total hip arthroplasty, primary and revision total knee arthroplasty, non-arthroplasty, infection, complications other than infection as well as health policy. It is aimed at improving overall surgeon competence related to the care of patients with arthritis and degenerative diseases.

OBJECTIVES

Upon completion of this educational activity, participants will be able to:

- Synthesize the most current research study findings in hip and knee condition management
- Evaluate various surgical and non-surgical treatment options (e.g., primary total joint arthroplasty, revision total joint arthroplasty, non-arthroplasty) in hip and knee condition management
- Assess the efficacy of new treatment options through evidence-based data
- Interpret relevant health care policy



ACCREDITATION AND CME CREDIT

The American Association of Hip and Knee Surgeons (AAHKS) is accredited by the Accreditation Council for Continuing Medical

Education (ACCME) to provide continuing medical education for physicians.

AAHKS designates this live activity for a maximum of 18 AMA PRA Category 1 Credits $^{\text{TM}}$. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CLAIM CME CREDITS

Once the meeting concludes, AAHKS will send an email and an app notification with a link to the Annual Meeting evaluation. At the end of the evaluation, you will be redirected to claim CME credit. It is the meeting attendee's responsibility to claim credits based on the hour-for-hour participation in the educational activity.

DISCLAIMER

The material presented at this 2025 Annual Meeting has been made available by AAHKS for educational purposes only. This content is not intended to represent the only method or practice appropriate for the medical situations discussed; it is intended to present a balanced and scientifically sound view, approach, statement or opinion of the faculty, which may be helpful to others who face similar situations, or afford a forum to discuss, debate and explore new and evolving topics. The presentation of topics and any data about clinical practices should not be interpreted as advocating for, or promoting, practices that are not, or not yet adequately based on current science, evidence and clinical reasoning.

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By attending the Annual Meeting, participants acknowledge and agree that AAHKS and/or its agents may record the Program and related events, use audio and video recordings, photographs, and presentation materials such as slides and abstracts for AAHKS's purposes, including but not limited to other educational products, news, advertising and promotional purposes, without compensation.

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Some pharmaceuticals and/or medical devices demonstrated or discussed at the Annual Meeting have not been cleared by the US Food and Drug Administration (FDA) or have been cleared by the FDA for specific purposes only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each pharmaceuticals and/or medical device he or she wishes to use in clinical practice. The AAHKS policy provides that "off label" status of the device or pharmaceutical is also specifically disclosed (i.e. that the FDA has not approved labeling the device for the described purpose). Any device or pharmaceutical is being used "off label" if the described use is not set forth on the product's approved label.

DISCLOSURE

Each planner, presenter or contributor to the Annual Meeting has been asked to disclose if they have received something of value from a commercial company or institution, which relates directly or indirectly to the subject of their presentation.

AAHKS does not view the existence of these disclosed interests or commitments as necessarily implying bias or decreasing the value of the author's participation in the course. Note that AAHKS takes measures to mitigate all relevant financial relationships.

For the most up to date disclosure list, please visit www.AAHKS.org/Meeting.



Presenting the 2025 Lawrence D. Dorr, MD Humanitarian Award to Mark W. Woolf, MD



AAHKS is proud to present the 2025 Lawrence D. Dorr, MD Humanitarian Award to Mark W. Woolf, MD. An accomplished orthopaedic surgeon, Dr. Woolf has served consistently with Faith In Practice since 2006 as a mission team leader and lead surgeon on more than 25 surgical mission teams.

Through Faith In Practice, Dr. Woolf has participated in many short-term medical missions to Guatemala providing knee replacement surgery to underserved patients over the last 20 years. That consisted of two or three trips each year, recruiting 40+ volunteers of orthopaedic surgeons, anesthesiologists, nurses, physical therapists and support staff. Generating monetary and in-kind donations in excess of 1.5 million dollars, the funds were used for implants, medicines and supplies. It's estimated that Dr. Woolf has performed more than 500 total knee replacement surgeries and cared for 700+ patients in the screening clinics of Guatemala.

Although Dr. Woolf retired in 2023, that didn't end his service with Faith In Practice. This new journey created an opportunity for Dr. Woolf to serve Guatemalan patients in a different way. Today, he's providing patient care by serving the medical clinic missions. With this transition, Dr. Woolf is able to continue his passion of serving patients in Guatemala while also expanding his impact within Faith In Practice. He also continues to serve as a board member and sits on several Faith In Practice committees.

Dr. Woolf doesn't think of the past 20 years as just time spent but refers to it as a spiritual journey. One that gave him purpose and meaning. One that taught him to step out on faith and saying "yes" when called to do so.

Dr. Woolf graduated from the University of Texas Medical Brand in Galveston and completed his residency at the Fort Worth affiliated hospital program.

The Lawrence D. Dorr, MD Humanitarian Award recognizes AAHKS members who have distinguished themselves by providing humanitarian medical services and programs with a significant focus on musculoskeletal diseases and trauma including the hip and knee in the United States or abroad.

For more information on the Lawrence D. Dorr, MD Humanitarian Award, please go to **www.AAHKS.org/Humanitarian.**



Presenting the 2025 Presidential Award to Adam J. Rana, MD



Each year, the AAHKS Presidential Award is presented to an AAHKS member who exemplifies exceptional service to AAHKS and the profession. This year, AAHKS President R. Michael Meneghini, MD is proud to bestow the 2025 Presidential Award on Adam J. Rana, MD, for his many contributions to the organization.

A committed member of AAHKS since 2011, Dr. Rana served as the 2012-2013 Health Policy Fellow and then joined the Advocacy Committee in 2013. Dr. Rana currently serves as chair of the Health Policy Council and the Advocacy Committee. Dr. Rana's diligent work as an advocate for AAHKS has consisted of tireless work in developing health policy resources, advocating for AAHKS with CMS and in Congress. His contributions have had great impacts for both patients and physicians in hip and knee surgery. His devotion to the field consistently furthers arthroplasty surgery, education and practice.

In honoring Dr. Rana with the 2025 Presidential Award, President Meneghini stated "Dr. Rana has served AAHKS and our members for over a decade in Advocacy, which is one of our most intellectually and time-consuming missions. Advocacy can be stressful, frustrating and exhausting, yet Dr. Rana has persevered with tireless commitment, perseverance and dedication to maintain access to our members and their patients with hip and knee disease. As the current Health Policy Council Chair and Advocacy Committee Chair, along with his decade of service to AAHKS, I cannot think of another person more deserving of the Presidential Award."

AAHKS acknowledges not only his extensive list of accomplishments in advocacy but also the embodiment of leadership and education. Dr. Rana's scientific contributions have included a vast amount of published material that have improved the practice of hip and knee surgery.

Dr. Rana currently serves as Arthroplasty Director at Maine Medical Center in Portland, Maine and Associate Clinical Professor at Tufts School of Medicine. He graduated from Colby College with a bachelor's degree with honors in economics and biology. He attended SUNY Downstate for medical school and Boston University Medical Center for internship and residency. Dr. Rana continued his training at the Hospital for Special Surgery with a Fellowship in adult reconstruction, arthritis and joint replacement surgery.

It is with great pleasure that we recognize Dr. Rana as this year's Presidential Award recipient, an honor bestowed upon a dedicated member who has made significant contributions and created a lasting legacy in the field.



Presenting the 2025 Diversity Award to Audrey K. Tsao, MD



AAHKS and the Diversity Advisory Board are proud to present the 2025 AAHKS Diversity Award to Audrey K. Tsao, MD. This award is bestowed upon a recipient who has demonstrated an exceptional commitment to making the practice of hip and knee arthroplasty more diverse and more accessible to all patients, while working diligently to eliminate disparities in arthroplasty care through education, research and community engagement. Dr. Tsao easily embodies it all.

Aside from being an accomplished arthroplasty surgeon, she uses her gifts to mentor up and coming surgeons, empowering and increasing the number of women and underrepresented minorities in orthopaedics. She has been recognized by the Ruth Jackson Orthopaedic Society for her outstanding commitment to mentoring and empowering women in orthopaedics, always a tireless advocate for equity and inclusion.

Also, something very dear and passionate to Dr. Tsao is her humanitarian efforts. She is a co-founder and volunteer with Women Orthopaedist Global Outreach (WOGO), an organization comprising female arthroplasty surgeons that perform free knee replacements nationally and internationally. Dr. Tsao understands the unique needs of women who develop knee arthritis more frequently and experience more advanced stages of joint disease but, as a woman, she knows her assignment has been to lend her expertise to make a lasting impact and difference on a global scale for all women.

Dr. Tsao's impact within AAHKS is equally profound. She served as the inaugural Chair of the Women in Arthroplasty (WIA) Committee, which she structured to be more inclusive of both formal and informal volunteers. She has led programming on critical issues like work-life balance and ergonomics, championed outreach partnerships with like-minded organizations and inspired a culture of collaboration and sponsorship within AAHKS leadership. During her time with AAHKS, Dr. Tsao has served as the chair of the AAHKS Membership Committee, currently serving as the Associate Editor for the *Journal of Arthroplasty* and as a Member-at-Large for the AAHKS Board of Directors. In recognition of her leadership, dedication and mentorship, Dr. Tsao was previously honored with the 2020 AAHKS Presidential Award.

Please congratulate Dr. Audrey K. Tsao on her extraordinary leadership, mentorship and lifelong dedication to advancing diversity in arthroplasty. The recipient of the 2025 AAHKS Diversity Award truly exemplifies the spirit of this award through her excellence, advocacy and commitment to lifting others.

Symposium I

Dogma Under the Knife: Challenging the Status Quo in Primary TKA

Moderator: Charles P. Hannon, MD, MBA

This symposium will critically examine long-held beliefs in primary total knee arthroplasty, offering a fresh look at the evolving science behind alignment strategies, fixation methods, bearing surface designs and patellar resurfacing. Through focused presentations by leading experts, including video tips and tricks and an interactive case-based discussion, attendees will explore how emerging evidence is reshaping surgical norms. The session is designed to provoke thought, challenge dogma and equip surgeons with the knowledge to deliver more individualized, evidence-driven care in primary TKA.

Learning Objectives:

- 1. Describe the rationale, techniques and clinical implications of individualized alignment strategies in primary TKA, including mechanical, kinematic and functional approaches.
- 2. Analyze the kinematic principles and clinical outcomes associated with various bearing surface designs, including posterior stabilized, cruciate retaining and other conforming bearings.
- **3.** Critically evaluate the current evidence comparing cemented and cementless fixation techniques in primary TKA.
- **4.** Discuss the indications, controversies and outcomes related to patellar resurfacing in primary TKA.

Outline:

Introduction of Symposium and Faculty Charles P. Hannon, MD, MBA

The Evolving Alignment Target in Primary TKA: No Longer a One-Size Fits All Approach
Mark W. Pagnano, MD

Kinematic Claims and Clinical Realities: Navigating Bearing Surface Options in Primary TKA

E. Bailey Terhune, MD

Cemented Minds, Cementless Future: Rethinking Fixation in Primary TKA
Charles P. Hannon, MD, MBA

Resurface or Regret: The Data and Controversy of
Patellar Resurfacing in Primary TKA
D to D Obologo MD

Brian P. Chalmers, MD

Q&A with a Case-Based DiscussionAll Faculty

Notes		

Robotic-Assisted Surgery and Kinematic Alignment in TKA: The RASKAL Registry-Nested Randomized Trial

Motos

Samuel J. MacDessi, FRACS, Gregory C. Wernecke, FRACS, Carl Holder, MB, Khashayar Ghadirinejad, PhD, Michelle Lorimer, PhD, Ian Harris, PhD

Introduction: There is uncertainty on whether robotic-assisted surgery (RAS) or kinematic alignment (KA) improve outcomes in total knee arthroplasty (TKA). This study assessed the individual and combined effectiveness of RAS and KA to improve clinical, operative and functional outcomes when compared to computer-assisted surgery (CAS) and mechanical alignment (MA).

Methods: We performed a registry-nested, multi-center, blinded, 2x2 factorial, randomized trial in 303 patients undergoing primary TKA. Patients were randomized to RAS or CAS, with KA (functional positioning) or MA. The primary outcome was the between-group differences in Postoperative change over one year in the mean Knee injury and Osteoarthritis Outcome Score (KOOS-12), comparing technology used and alignment strategy. Secondary outcomes included other patient-reported outcomes, operative and functional outcomes and adverse events.

Results: No interactions between technology and alignment strategies were found for any outcomes. There were no differences comparing RAS to CAS in KOOS-12 at three months, six months, and one year (mean difference 0.6 over one year; 95%Cl; -2.9,4.1;p=0.73), and no differences comparing KA to MA at three months, six months and one year (mean difference 2.4 over one year; 95%CI; -1.3,6.1;p=0.21). No differences in Oxford Knee Score, Forgotten Joint Score, EQ-5D-5L, satisfaction, jointrelated improvement, pain, OMERACT-OARSI responder criteria and PASS thresholds were found comparing technology or alignment groups. RAS had a shorted mean operative time of 11.5 minutes (95% CI; 7.3,15.9; p< 0.001) and better mean PCL macroscopic soft tissue injury score (mean difference 0.7, 95% CI; 0.3,1.1; p=0.001) compared to CAS. MA had higher rates of soft tissue releases than KA (44.8% versus 8.1%; odds ratio 9.2 (95% CI; 4.6,18.3); p< 0.001). Surgeons preferred use of robotics and KA in most cases.

Conclusion: Robotic-assisted surgery and kinematic alignment were not superior to computer-assisted surgery and mechanical alignment in improving clinical and functional outcomes at up to one-year post-TKA.

Does Changing the Native CPAK Affect Clinical Outcomes in Mechanically or Functionally Aligned TKA?

Kohei Kawaguchi, MD, PhD, Mei Lin Tay, PhD, Rupert van Rooyen, FRACS, Matthew L. Walker, FRACS, William Farrington, FRCS, **Simon W. Young, MD, FRACS**

Notes

Introduction: Changes to native Coronal Plane Alignment of the Knee (CPAK) phenotypes following total knee arthroplasty (TKA) may influence outcomes, particularly with mechanical alignment (MA). This relationship has not been evaluated with functional alignment (FA). This study compared the magnitude of coronal alignment change between MA and FA, and whether this influenced patient-reported outcomes.

Methods: This sub-study analyzed data from a prospective, single-center, single-blinded randomized controlled trial involving 236 patients (119 FA, 117 MA). Long-leg radiographs were used to calculate the arithmetic hip-knee-ankle angle (aHKA), joint line obliquity (JLO) and CPAK phenotype pre- and postoperatively. Alignment change was assessed using absolute differences (Δ aHKA, Δ JLO), and a dose-response analysis was conducted. Clinical outcomes included the Forgotten Joint Score (FJS) at two-year follow-up.

Results: FA resulted in smaller changes in alignment compared to MA (Δ aHKA p = 0.01; Δ JLO p< 0.01) and more frequent restoration of the preoperative CPAK phenotype (42.9% vs. 10.3%, p< 0.01). In the MA group, restoration of CPAK phenotype was associated with significantly higher FJS, while no such relationship was observed in the FA group. A dose-response relationship was identified in the MA group: greater changes in JLO were negatively correlated with FJS. This correlation was not seen with FA.

Conclusion: Functional alignment more closely preserved native coronal alignment and restored CPAK phenotypes compared to mechanical alignment. In MA cases, larger deviations from native JLO and CPAK phenotypes were associated with poorer patient-reported outcomes. These findings suggest anticipating alignment changes may support optimal strategy selection in TKA.

Be Wary of Severe Tibial or Femoral Component Varus in TKA: Long-Term Analysis of Over 19,000 Cases

Notes

Moein Bonakdarhashemi, MD, Niall H. Cochrane, MD, Adrian E. Gonzalez-Bravo, BS, Cody C. Wyles, MD, Michael J. Taunton, MD, Mark W. Pagnano, MD, Matthew P. Abdel, MD, **Charles P. Hannon, MD, MBA**

Introduction: Alignment in total knee arthroplasty (TKA) is increasingly debated, and its impact on long-term outcomes remains unclear. This study evaluated the impact of pre- and postoperative coronal and sagittal alignment, including changes between them, on implant survivorship and clinical outcomes in primary TKA.

Methods: We identified 19,379 primary TKAs at a single academic institution from 2000 to 2022. A deep learning model was trained to calculate coronal and sagittal alignment parameters including hip-knee axis (HKA), posterior tibial slope, posterior condylar offset, medial proximal tibial angle (MPTA) and lateral distal femoral angle (LDFA). Alignment congruence was evaluated and correlated with implant survivorship and Knee Society scores. Mean was age 68 years, 58% of patients were female and mean BMI was 33 kg/m2. Mean follow-up was eight years.

Results: Overall, the 15-year survivorship free of any aseptic revision was 95%. When analyzed by postoperative alignment, preoperative valgus knees that remained in valgus postoperatively had substantially lower 15-year survival at 84%. Femoral component varus with a LDFA>90° (HR 2; p=0.02) or tibial component varus with a MPTA< 85° (HR 1.3; p< 0.01) were associated with an increased risk of aseptic revision. Tibial component varus with a MPTA< 85° was also associated with increased risk of revision for aseptic loosening (HR 1.9; p< 0.01). Postoperative Knee Society Scores were substantially improved from preoperative scores at 2, 5 and 10 years (p< 0.01).

Conclusion: The 15-year survivorship of over 19,000 primary TKAs was excellent regardless of alignment strategy. However, severe varus positioning of the femoral component (LDFA>90°) or tibial component (MPTA< 85°) was associated with an increased risk of aseptic revision. Preoperative valgus knees left in valgus postoperatively were also at increased risk of revision. As alternative alignment strategies emerge, surgeons should consider boundaries in implant positioning to decrease revision risk.

US Trends in Utilization and One-Year Revision Rates of Cementless Total Knee Arthroplasty

Henry Hilow, MD, Joseph E. Tanenbaum, MD, PhD, Isabella Zaniletti, PhD, Gregory Versteeg, MD, David Manning, MD, **Adam I. Edelstein, MD**

Notes

Introduction: Cementless total knee arthroplasty (TKA) has emerged as an alternative to cemented fixation. We used the American Joint Replacement Registry (AJRR) to assess trends in cementless TKA utilization and associated one-year revision rates.

Methods: We analyzed all primary TKAs recorded in the AJRR from 2012 to 2024 with available fixation data. Annual proportions of cementless fixation were calculated, and trend analysis was performed using Kendall's Tau-b. One-year revision risk was evaluated in cases linkable to Centers for Medicare and Medicaid Services (CMS) data among patients aged ≥65 years with ≥2 years of potential follow-up. A multivariable generalized linear model was used to estimate one-year revision risk, adjusting for patient and hospital characteristics and clustering by institution. A sub-analysis examined specific reasons for revision.

Results: Of 1,507,780 primary TKAs from 2012–2024, 127,781 (10.8%) were cementless. Use increased from 1.6% to 19.0% across all regions (p< 0.002). In the CMS-linked cohort (n=685,274), 52,742 (7.7%) were cementless. One-year revision rates were 1.61% for cementless and 1.53% for cemented TKAs (p=0.162). After adjustment, cementless fixation was associated with increased revision risk (aOR=1.12; 95% CI: 1.00–1.25; p=0.05). Revision risk was more strongly associated with age >75 (aOR=0.76), male sex (aOR=1.49), BMI >40 (aOR=1.64), Charlson Comorbidity Index >5 (aOR=2.66) and hospital versus ambulatory surgery center (aOR=4.78). Sub-analysis revealed higher risk of revision with cementless fixation for aseptic loosening (0.11% vs. 0.06%; aOR=2.37) and instability (0.14% vs. 0.09%; aOR=1.64).

Conclusion: Cementless TKA utilization has grown in the AJRR. While associated with a modestly higher one-year revision risk, the absolute difference is small and may not be clinically meaningful.

Kneeling After Total Knee Arthroplasty: Does Resurfacing the Patella Affect the Ability to Kneel?

Alexandra L. Hohmann, MD, Hannah D. Bash, BA, Andrew Fraval, MBBS, Jess H. Lonner, MD

Notes

Introduction: Difficulty and pain with kneeling is a common postoperative complaint after TKA, but the cause of this issue has not been identified. The purpose of this study was to investigate the effect of patella resurfacing on a patient's ability to kneel after TKA with consideration of preoperative presence of patellar osteoarthritis (P-OA).

Methods: This was a single-center study of patients who underwent TKA at least one year prior to survey administration. Among included cases, patellar resurfacing was routinely performed in the presence of patellar arthritis that included the lateral facet; whether to resurface a patella without arthritis was based on surgeon equipoise. Patients were surveyed on pre- and postoperative ability to kneel and satisfaction with ability to kneel using a Likert scale, and KOOS-JR scores were collected preoperatively and with survey distribution.

Results: There were 132 knees in the no P-OA, unresurfaced group; 110 in the P-OA, resurfaced group; and 121 in the no P-OA, resurfaced group. Preoperative and postoperative KOOS-JR were equivalent across groups. More patients in all cohorts reported worsening of their kneeling ability after TKA than reported equivalence or improvement, with no differences in difficulty in kneeling across cohorts. Patients without resurfaced patellae reported non-significantly lower mean pain scores for kneeling on different surfaces. With respect to their ability to kneel postoperatively, patients in all groups were more likely to report being very satisfied or satisfied, but patients without P-OA were more likely to be dissatisfied or very dissatisfied if their patellae was resurfaced.

Conclusion: TKA patients without preoperative P-OA that undergo patella resurfacing report greater dissatisfaction with kneeling postoperatively than patients with unresurfaced patellae. Despite patients reporting worsening of their ability to kneel postoperatively regardless of preoperative P-OA presence or use of patella resurfacing, patient satisfaction with their kneeling ability remained high.

Is Patella Resurfacing an Absolute Indication in Total Knee Arthroplasty for Inflammatory Arthritis?

Notes

Bryant M. Song, MD, Caleb A. Ford, MD, PhD, Lane H. McCoy, BS, Andrew M. Schneider, MD, Ryan M. Nunley, MD, Robert L. Barrack, MD, **Ilya Bendich, MD, MBA**

Introduction: Inflammatory arthritis (IA) is considered an absolute indication for patellar resurfacing (PR) in total knee arthroplasty (TKA), yet limited contemporary data exists to support this. The purpose of this study was 1) to determine if clinical outcomes of TKA without PR differ between IA and osteoarthritis (OA) and 2) to compare outcomes of TKA for IA with and without PR.

Methods: A retrospective review of all primary TKAs at a large academic institution between May 2017 to May 2024 was performed. We identified 348 TKAs without PR performed for IA. This cohort was matched by demographics to 348 TKAs without PR performed for OA. A secondary comparison of 38 TKAs for IA with PR (IA-PR) during the same time period was performed. Outcomes included reoperation, revision and survey of anterior knee pain (AKP). Mean follow-up was 24 months. T-tests and Fisher's Exact tests were performed.

Results: Among TKA without PR, 20 (5.7%) IA and 13 (3.7%) OA patients underwent reoperation (P=0.28); 2 (0.6%) patients in each group underwent revision (P=1.0). There were no differences in aseptic (3.4% IA vs. 2.3% OA; P=0.50) or septic (2.3% IA vs. 1.4% OA; P=0.58) reoperations. Four (1.1%) IA vs. 0 OA patients underwent secondary PR (P=0.12). Among TKA without PR, there was no difference in AKP between IA (4.9%) and OA (7.8%) (P=0.16). Among TKA for IA, there were no differences in AKP (4.9% IA vs. 5.3% IA-PR; P=0.58). The PR group had more aseptic reoperations (3.4% IA vs. 13.1% IA-PR; P=0.02) and revisions (0.6% IA vs. 13.2% IA-PR; P<0.01).

Conclusion: There were no differences in reoperations, revisions or AKP in TKA without PR for IA compared to OA. Additionally, PR did not have improved outcomes in IA. Our data suggests IA should not be an absolute indication for PR in TKA.

Higher Viscosity and Antibiotic Cement are Linked to Increased Mechanical Failure in Primary Total Knee Arthroplasty

Andrew B. Harris, MD, Namrah Mirza-Haq, MPH, Jason M. Jennings, MD, John R. Martin, MD, Harpal S. Khanuja, MD, Vishal Hegde, MD

Notes

Introduction: The mechanical properties of polymethylmethacrylate (PMMA) cement in TKA can be influenced by both viscosity and the addition of antibiotics. The independent and combined effects of viscosity and antibiotic additives on revision risk remain subject to debate. Thus, this study sought to evaluate the impact of antibiotic additives and cement viscosity on the risk of revision surgery after primary cemented TKA, with a focus on mechanical loosening and periprosthetic joint infection (PJI).

Methods: A retrospective analysis was performed using the American Joint Replacement Registry (AJRR) for all patients undergoing cemented TKA between 2012 and 2021 in patients ≥65 years old. Patients were categorized by cement type (antibiotic vs. non-antibiotic) and viscosity (low-, medium- or high-viscosity cement (LVC/MVC/HVC)). Cox proportional hazards models were used to evaluate the risk of revision surgery, adjusting for age, sex, BMI, operative time, Charlson Comorbidity Index (CCI), implant constraint, viscosity and antibiotic use.

Results: A total of 472,922 TKAs were included. Antibiotic cement was used in 90,958 cases (22.4%). Compared to non-antibiotic cement, antibiotic cement was associated with a significantly higher risk of all-cause revision (HR 1.21, 95% CI 1.11-1.32; p< 0.0001) and revision for mechanical loosening (HR1.35, 95% CI 1.18–1.54; p< 0.0001), with no difference in infection-related revision (p=0.5381). Compared to LVC, both HVC (HR 1.27, 95% CI 1.12–1.44; p=0.0002) and MVC (HR 1.98, 95% CI 1.70–2.31; p< 0.0001) were associated with increased risk of revision for mechanical loosening. HVC was also associated with increased all-cause revision (HR 1.13, 95% CI 1.05–1.22; p=0.0016). No differences were observed in infection-related revision across viscosity groups.

Conclusion: In this large national registry study, both antibiotic use and higher cement viscosity were independently associated with increased risk of revision for mechanical loosening in primary TKA. Importantly, antibiotic cement was not associated with decreased rates of infection-related revision.

Preoperative Subcutaneous Cryoneurolysis Increases Pain Post Total Knee Arthroplasty

John C. Grady-Benson, MD, Matthew Mitchell, MD, Durgesh Nagarkatti, MD, Sara E. Strecker, PhD, William Stuart, MD, John Tiernan, MD, Pranjali Kainkaryam, MD, Robert J. Carangelo, MD

Notes

Introduction: The volume of total knee arthroplasties (TKA) has risen significantly in the past decade and strategies are needed to improve postoperative analgesia in this population. Ultrasound-guided percutaneous cryoneurolysis, branded iovera°, is indicated for prehabilitation and TKA rehabilitation and recovery for up to 90 days. By applying cryoneurolysis prior to TKA, patients are expected to experience better postoperative pain control, improved functional outcomes, and reduced opiate consumption.

Methods: Preoperative cryoneurolysis targeted the infrapatellar branch of the saphenous nerve (ISN) as well as subcutaneous branches of the anterior femoral cutaneous nerve (ACFN). iovera° was applied approximately 14 days before TKA, with 28 patients receiving cryoneurolysis and 97 patients acting as a control. Patients from two surgeons were pooled and self-reported pain levels and narcotic usage were measured during the postsurgical period; at 1 week, 3 weeks, 4 weeks, 8 weeks and 12 weeks. Statistical significance was defined as p< 0.05.

Results: Cryoneurolysis patients experienced significantly more pain at 1 week (6.14 vs. 5.02, p=0.024) than those who did not receive a block. No significant differences in pain were reported at later time points, but the cryoneurolysis group trended higher throughout the time course (e.g. 8 weeks; p=0.108, 12 weeks, p=0.055). The percentage of patients using narcotics was similar across all groups, peaking at 1 week post surgery and falling swiftly thereafter.

Conclusion: Preoperative cryoneurolysis tended to increases pain in TKA patients in the early postoperative period, in direct contrast to what has been reported in previously published company funded studies. Patients also reported unpleasant numbness in the distributions of the ACFN after iovera° treatment. As a result of the increased pain and reported side effects, this prospective study was halted prematurely. Future studies will examine the use of a preoperative geniculate nerve block to reduce pain and opiate consumption in TKA.

Symposium II

Navigating the ASC Setting: How to Go from Operating in the ASC to Thriving

Moderator: R. Michael Meneghini, MD

This symposium will help hip and knee surgeons thrive in the ambulatory surgical center (ASC) setting and will focus on patient selection, patient care, efficiency, financial profitability and enabling technology. Faculty will highlight how to safely increase the volume of surgical candidates through proper screening and protocols; describe how to optimize types of patients not previously considered ASC candidates and transition them into the ASC setting; and discover methods to optimize perioperative and clinical throughput and surgical efficiency. Attendees will discover how time transparency and defined staff roles can remove waste, enhance patient care and ASC profitability. Lectures will discuss contracts, negotiation, implants, and how to maximize profits and minimize costs without disrupting care, diving into how to manage finances and to develop partnerships. Finally, the symposium will address robotics and enabling technology in the ASC and how to utilize technology in a cost-efficient manner to limit inventory and create efficiency in the operative suite.

Learning Objectives:

- **1.** Understanding proper candidates for outpatient surgery.
- 2. Understanding surgeon and team member roles.
- **3.** Learning how to create efficiency in the ASC setting.
- **4.** Increasing surgical volume while maintaining quality and patient care.
- **5.** Understanding basics of finances in the ASC setting.
- **6.** Gaining insight on improving margins and maintaining profitability.
- Learning about creating protocols and standardization.
- **8.** Understanding the role of robotics in the ASC.
- **9.** Learning how to create standardization and utilize space.

Outline:

Introduction

R. Michael Meneghini, MD

Everyone is an ASC Candidate: Expanding the ASC Candidate Pool

Adolph V. Lombardi Jr., MD

The Value of Time in the ASC

Charles A. DeCook, MD

Making Your ASC Profitable: The Business Side of Owning an ASC

Michael P. Ast, MD

Robotics in the ASC: How to Create Efficiency and Standardization

John M. Dundon, MD

Discussion

All Faculty

Notes			

Effect of Concomitant Use of Potent Anticoagulation and Anti-Inflammatories on Early Outcomes of THA

Alexis G. Gonzalez, MS, Aaron I. Weinblatt, BA, Agnes Jones, MS, Stephen Lyman, PhD, Richard Hwang, MD, Alex J. Anatone, MD, Carlo Marega, MD, **Alejandro Gonzalez Della Valle, MD**, Brian P. Chalmers, MD

Notes

Introduction: The use of non-steroidal anti-inflammatory drugs (NSAIDs) in patients receiving potent anticoagulation (AC) following THA may increase risks of bleeding and related complications. We evaluated early postoperative pain, opioid consumption and complications in patients undergoing primary THA with and without concomitant NSAID use.

Methods: We retrospectively identified 5.881 consecutive patients who underwent primary THA for osteoarthritis between 2016-2023 and received postoperative anticoagulation (apixaban, rivaroxaban, warfarin, heparin, and/or enoxaparin). Of these, 4,867 patients (83%) were concomitantly prescribed NSAIDs; 1,040 (17%) patients received AC alone. Outcomes included change in VAS pain score and total 90-day opioid consumption (inpatient, discharge and outpatient morphine milligram equivalents [MMEs]), bleeding complications and PJI. Multivariable linear regression compared opioid consumption, adjusting for age, sex, BMI, ASA, CCI, race, ethnicity, chronic pain opioid use, preoperative opioid use, fibromyalgia, anxiety, depression, anesthesia type, peri-articular injection, inpatient status and length of stay. Univariable logistic regression calculated secondary outcomes.

Results: The mean ± standard deviation changes in VAS pain scores six weeks postoperatively were -45.5±26.9 for the AC group and -47.2±27.6 for the NSAID group. Mean total 90-day opioid consumption was 560±557 MME in the AC and 596±710 MME in the NSAID group. After adjusting, this difference was not significant (4.7 MME [95% CI -39.7-49.2]). Similarly, there was no evidence of a difference in 90-day local complication rates between AC vs. NSAID groups, respectively: prolonged wound drainage (1.3% vs. 1.7%, odds ratio (OR) 0.7 [95CI 0.4-1.3]), hematoma formation (0% vs. 0.2%), and PJI (0.1% vs. 0.6%, OR 0.2 [95% CI 0.02-1.3]).

Conclusion: NSAIDs are frequently used in patients undergoing elective primary THA to improve pain, prevent heterotopic ossification and provide cardiovascular benefits. Our findings suggest that its use in AC patients may not increase the risk of wound-related bleeding complications or PJI.

A Synthetic Form of Cannabinoid Does Not Decrease Opioid Use After Total Knee Arthroplasty

Notes

Jason M. Jennings, MD, Douglas A. Dennis, MD, Todd M. Miner, MD, Charlie C. Yang, MD, Makenna R. Hemmerle, MS, Roseann M. Johnson, BS

Introduction: Self-reported cannabis use in patients undergoing total knee arthroplasty (TKA) has increased since its legalization. Despite its endorsement, its efficacy has never been studied in a prospective randomized study in orthopaedic surgery. Therefore, the purpose of this study was to determine whether a synthetic delta-9-tetrahydrocannabinol (sTHC), dronabinol, decreases opioid use after TKA.

Methods: 157 patients undergoing primary unilateral TKA were prospectively randomized into receiving dronabinol (2.5 mg BID, n=79) vs. a placebo pill (2.5 mg BID, n=78) as an adjunct to pain management. Patients, providers, our statistician and the research team were blinded of the groups. All patients were cannabis naïve and had drug screening prior to surgery. All patients received our standard perioperative multimodal pain regimen (including opioids) regardless of their randomization. The primary outcome was opioid morphine milligram equivalents (MME) at two weeks. Secondary outcomes included self-reported pain, sleep scores, nausea/vomiting after surgery, range of motion (ROM) and PROMS. Patients were followed for six weeks after surgery. Significance for all statistical tests was accepted at p≤0.05.

Results: There were no differences for in-hospital MME consumed (sTHC 40+/-75.5 vs. placebo 39.3 77.8, p=0.1). No differences in total MME were noted at two weeks (sTHC 370.9+/-302.6 vs. placebo 372.6+/-248.8, p=0.1). Self-reported pain (p=0.769), hours of sleep per night (p=0.1) and nausea/vomiting (p=0.7) showed no differences between the groups at two and four weeks. No differences in patient reported outcomes at six weeks (ROM, KOOS, KSS, VR-12 MCS, VR-12 PCS) were noted between the groups. No drug or placebo related complications were noted in either group.

Conclusion: Despite the enthusiasm for different forms of cannabis after orthopaedic surgery procedures, this s-THC does not appear to limit opioid intake after primary TKA. Based on these data, THC may offer no benefit for patients after TKA.

Cementless Ceramic Hip Resurfacing: Minimum Three-Year Follow-Up of a 250 Patient Multicenter Study

Notes

Justin P. Cobb, FRCS

Introduction: The aim of this study was to report the safety and effectiveness of a contoured cementless anatomic ceramic hip resurfacing device.

Methods: A single arm multicenter study was designed for adult patients between the ages of 18 and 70. The procedure was undertaken at five sites by seven surgeons between 2017 and 2022. Outcome measures included all cause revision, Oxford Hip Score, Modified Harris Hip Score and radiographic analysis of serial imaging.

Results: Eight revisions have taken place out of 250 cases, with a minimum follow-up of three years. Five of these were for femoral neck fractures. Hip scores reached a median of 100% within 12 months of surgery. Female hips and those with small implants have clinical results indistinguishable from the large men for whom hip Metal-on-Metal hip resurfacing is currently indicated. Radiographically good bone-implant interface stability was observed on the acetabular side. Femoral subsidence was observed in 46 cases, strongly correlated with poor femoral implant orientation. With four years of further follow up, subsidence appears to be clinically benign.

Conclusion: This first in-human study of a cementless ceramic hip resurfacing device with between three and seven years of follow up has a Kaplan Meier all-cause revision rate of 2.8% at seven years. Most revisions occurred for periprosthetic femoral neck fractures. The incidence of femoral subsidence is closely linked to varus orientation of the femoral component - a technical error which is well described in the literature but overlooked by the senior author. Valgus orientation seems to prevent it. The functional outcome of H1 appears to be equivalent to other resurfacing devices. Both safety and effectiveness appear to be independent of patient sex or implant size.

Triple Taper Stems in Obese THA Patients: Complication and Revision Rates from a US Registry

Notes

Tanmaya D. Sambare, MD, Kathryn E. Royse, PhD, Sung Jun Son, MD, Brian H. Fasig, PhD, Elizabeth W. Paxton, PhD, Eric Eisemon, MD, **Matthew P. Kelly, MD**

Introduction: Obesity is a known risk factor for complication and revision following THA, potentially due to increased torque at the implant-bone interface. Femoral stem geometry, particularly triple taper designs, may improve metaphyseal engagement and rotational stability. This study investigated revision risk and short-term outcomes in obese patients undergoing cementless primary THA by stem design.

Methods: We identified 25,112 obese patients (BMI ≥30 kg/m2) ≥18 years old from a US-based total joint registry who underwent primary, unilateral, cementless THA for osteoarthritis between 2018-2024. Patients were categorized by stem type: Type 1 (single taper), Type 2 (dual taper) and type 3C (triple taper), and stratified by obesity class (Class I: BMI 30.0-34.9; Class II-IV: BMI ≥35.0). Multivariable Cox proportional hazard models assessed cause-specific revision risk (aseptic, infection, peri-prosthetic fracture (PPF), instability, loosening, other), adjusting for confounders and surgeon clustering. Odds ratios (OR) were used for 90-day readmission and ED visits.

Results: Utilization of 3C stems increased from 25.4% in 2018 to 58.3% in 2024. Among Class I patients, 3C stems were associated with lower risk of aseptic revision (HR=0.47; p=0.0004 vs. Type 1) and PPF (HR=0.24; p=0.0002 vs. Type 1; HR=0.39; p=0.029 vs. Type 2). Class II-IV patients demonstrated similar statistically significant reductions in aseptic revision and PPF with 3C stems. However, in Class I patients, 3C stems were associated with increased infection risk (HR=1.73; p=0.035) and 90-day ED visits (OR=1.35; p< 0.0001). No differences were observed for instability or aseptic loosening.

Conclusion: Triple-taper (3C) stems are increasingly utilized in obese THA patients and associated with reduced aseptic revision and PPF risks compared to Type 1 and 2 stems, suggesting a biomechanical advantage. However, increased infection risk and 90-day ED visits in Class I obesity patients highlight a need for careful perioperative management in this subgroup.

Cemented Femoral Stem Design Is Not Associated with Revision Risk in THA for Femoral Neck Fracture

Charles Gusho, MD, Wayne T. Hoskins, FRACS, PhD, Connor Riley, MPH, Mackenzie Kelly, MD, Vishal Hegde, MD, Ryland P. Kagan, MD, **Elie S. Ghanem, MD**

Notes

Introduction: Cemented femoral stem fixation in total hip arthroplasty (THA) for femoral neck fracture (FNF) has increased in utilization within the United States. Although cemented stems can reduce the revision risk for fracture, it is unclear whether revision risk varies by stem design in this cohort. We compared taper-slip to composite beam designs among FNF patients undergoing THA with cemented femoral stem fixation based on a modern classification system.

Methods: Patients >/=65 years of age undergoing primary THA for FNF between 2012 and 2021 with minimum two-year follow-up were identified in the American Joint Replacement Registry. A total of 3,479 cases were included. The primary analysis compared all-cause revision and revision for fracture between taper-slip (n=599; 17.2%) and composite beam (n=2880; 82.3%) stems. The secondary analysis compared revision for aseptic loosening. Cox proportional regression analyses with competing risk of death were used to evaluate the association of risk for revision with cemented stem design adjusted for age, Charlson Comorbidity Index, sex, year of procedure, region and institution type.

Results: Taper-slip stems had an all-cause revision rate of 1.8% (n=11) and composite beam stems had an all-cause revision rate of 3.2% (n=92; p=0.07). Using taper-slip stems as a referent, composite beam stems demonstrated no differences in all-cause revision (HR 1.81; 95% CI 0.96-3.40; p=0.06), revision for fracture (HR 0.90; 95% CI 0.29-2.73; p=0.86), nor revision for aseptic loosening (HR 1.77; 95% CI 0.39-8.04; p=0.46).

Conclusion: There are no differences in revision risk between taper-slip and composite beam cemented femoral stems for patients undergoing THA for FNF. Orthopedic surgeons should be aware that the selection of specific cemented stem designs may not necessarily reduce risk of revision.

Symposium III

Solving Intraoperative Challenges of Total Hip Arthroplasty: A Video-Based Symposium

Moderator: William G. Hamilton, MD

Surgeons commonly encounter intraoperative challenges during total hip arthroplasty. The ability to work through these occurrences safely and efficiently helps to optimize outcomes and avoid catastrophe. This symposium will focus on common areas where surgeons experience these challenges, including exposure, acetabular-sided, femoralsided, leg length, offset and stability. Exposure can be one of the challenging steps of a successful hip replacement, with good exposure allowing for an uncomplicated procedure. Our faculty are widely experienced in both anterior and posterior approaches and will present practical solutions to obtaining great exposure in the toughest cases. On the acetabular side, common problems that surgeons experience include inability to gain good fixation, acetabular fracture or reaming misadventures, like reaming through the anterior or medial walls. A roadmap to avoiding but more importantly getting out of these predicaments will be presented. On the femoral side, surgeons encounter femoral fracture, perforation or difficulty in obtaining good fixation with suboptimal bone quality or compromised anatomy. Lastly, the proper restoration of leg length, offset, and maximizing hip stability are keys to patient satisfaction. We'll present an algorithm for surgeons to use and techniques to ensure proper restoration of anatomy and stability. The faculty will use video-based presentations to review these most common challenges encountered and describe a stepwise approach to safely dealing with each.

Learning Objectives:

- **1.** Outline the most common challenges encountered in primary THA.
- **2.** Using video-based presentations, present attendees with pragmatic solutions to each of these intraoperative hurdles.
- **3.** Describe evidence-based solutions with associated data to inform attendees of the outcomes of each scenario.
- **4.** Leave attendees with practical solutions they can immediately implement when returning to their practice.

Outline:

Introduction

William G. Hamilton, MD

I Can't Get the Exposure I Need: Tips and Tricks for Enhanced Exposure in the Most Complicated THA Patients

MIchael J. Taunton, MD

Acetabular Mishaps and How to Fix them: Inadequate Fixation, Reaming Errors and Acetabular Fractures Cameron K. Ledford, MD

Femoral Sided Speed Bumps: What to Do if I Experience a Femoral Fracture, Perforation or Suboptimal Fixation

William G. Hamilton, MD

Solving Problems with Hip Stability, Length and Offset: An Evidence-Based Algorithm to Get It Right Every Time

Eric M. Cohen, MD

Discussion

All Faculty

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No One-Size-Fits-All: Surgical Approach Dictates Optimal Bearing Choice in 30,000 THAs Over 25 Years

Notes

Niall H. Cochrane, MD, Joseph A. Panos, MD, Mark W. Pagnano, MD, Michael J. Taunton, MD, Cody C. Wyles, MD, Matthew P. Abdel, MD

Introduction: Dislocation remains a common and consequential complication following primary THA. While both surgical approach and bearing surface individually influence dislocation risk, few studies have evaluated their combined impact. This study assessed the long-term dislocation risk stratified by surgical approach and bearing construct to develop approach-specific recommendations for bearing selection.

Methods: We identified 30,246 primary THAs performed from 1998-2022 at a single academic institution. Hips were stratified by bearing surface including standard polyethylene (PE), elevated rim/face-changing PE, and dual-mobility (DM) constructs. There were 14,611 posterior (8587 standard, 5207 elevated rim/face-changing, 816 DM), 8968 anterolateral (AL; 7433 standard, 1358 elevated rim/face-changing, 171 DM), and 6667 direct anterior (DA; 6541 standard, 91 elevated rim/face-changing, 35 DM). The 10-year absolute and relative risks of dislocation controlling for demographics, femoral head size, select comorbidities and surgical indication were evaluated. Mean age was 65 years, BMI was 30 kg/m2 and 52% of patients were female. Mean follow-up was 6 years.

Results: The absolute risks of dislocation at 10 years in posterior, AL and DA THAs were 4%, 2% and 1%, respectively. In posterior THAs, DM constructs significantly reduced relative dislocation risk (RR< 0.5, p< 0.01) compared to standard PE liners. In AL THAs, standard PE liners had the lowest absolute dislocation risk (1%), whereas elevated rim/face-changing PE liners were associated with double the relative risk of dislocation (RR 2, p< 0.01). In DA THAs, bearing surface had no impact on dislocation risk.

Conclusion: A one-size-fits-all approach to bearing surface is suboptimal, and surgical approach should guide bearing selection in primary THAs. For posterior approach, DM constructs significantly reduced the relative risk of dislocation and should be considered in high-risk cases. For AL approach, standard PE liners had the lowest absolute dislocation risk. Finally, all DA THAs had a lower dislocation risk regardless of bearing selection.

Posterior Approach Hip Precautions and Dislocation Risk After Primary Total Hip Arthroplasty

Notes

Aditya S. Yadav, MS, Ajay S. Potluri, BS, Siddhartha Dandamudi, BS, Harmanjeet Singh, BS, Anne DeBenedetti, MS, Omar A. Behery, MD, MPH, **Brett R. Levine, MD, MS**

Introduction: The effectiveness of posterior hip precautions in preventing dislocation after primary posterior approach total hip arthroplasty (THA) remains uncertain. Such precautions may delay patients' return to daily activities and functional recovery. This study aimed to determine whether postoperative THA hip precautions impacted hip dislocation rates.

Methods: We conducted a prospective, randomized study evaluating the effect of hip precautions on the risk of dislocation after primary THA. A total of 1,130 patients were enrolled and underwent posterior approach primary THA by multiple fellowship-trained surgeons at a single academic center between January 2016–May 2025. Patients were randomized to either a restricted group and instructed to avoid hip flexion beyond 90°, adduction past midline and internal rotation for 6 weeks postoperatively, or to an unrestricted group. Demographics, surgical indications and prosthesis data were recorded. The primary outcome was dislocation; secondary outcomes included perioperative complications and patient-reported outcomes. Statistical analysis used Fisher's exact test and t-tests.

Results: The unrestricted and restricted groups included 522 and 535 patients, respectively, with no significant demographic or surgical differences (all P>0.245). Follow-up was similar between groups (mean 1.3 ± 1.4 years; range 0.62-102.9 months; P=0.645). Overall, ten dislocations (0.94%) were reported at 9.1 ± 10.5 months postoperatively, with 6 in restricted and 4 in unrestricted patients, showing no significant difference (OR: 0.60; 95% CI: 0.17-2.17; P=0.753). At 6-weeks, Hip Disability and Osteoarthritis Outcome Scores (HOOS) were higher in the unrestricted group (77.7 vs. 73.9, P=0.001), with no significant difference in baseline scores (52.5 vs. 51.7, P=0.517). No differences were observed in 90-day complications or revisions (all P>0.209).

Conclusion: Routine use of strict hip precautions following posterior approach THA does not significantly reduce early dislocation risk. These precautions may unnecessarily limit early functional recovery, increase patient anxiety and negatively impact patient-reported outcomes.

Dual-Mobility Femoral Heads in Patients at High Risk for Dislocation: A Randomized Controlled Trial

Ajay S. Potluri, BS, Aditya S. Yadav, MS, Matthew T. Weintraub, MD, Anne DeBenedetti, MS, Craig J. Della Valle, MD, **Ran Schwarzkopf, MD, MSc**, P. Maxwell Courtney, MD, Nathanael D. Heckmann, MD, Denis Nam, MD, MSc

Notes

Introduction: This multicenter randomized controlled trial (RCT) sought to determine if dual-mobility bearings (DM) reduce dislocation risk in patients at high-risk for instability undergoing primary THA compared to standard bearings (SB).

Methods: A total of 555 patients undergoing primary THA via posterior approach were randomized to DM (n=271: 42mm mean effective head, range 36-55mm) or SB (n=284; head sizes: 28mm [n=2], 32mm [n=42], 36mm [n=168], 40mm [n=61], 44mm [n=11]). Stratified randomization was based on high-risk criteria: 1) prior lumbosacral fusion (n=170) 2) other inclusions; (age ≥75, preoperative combined flexion-adduction-internal rotation ≥115°, substance abuse, inflammatory arthritis. neuromuscular disorder, removal of hardware, cognitive impairment, acute displaced femoral neck fracture, and kyphosis/scoliosis; n=385). A priori power analysis determined 206 patients were required per group (alpha=0.05; power=0.80) to show a reduction in the risk of dislocation from 8% to 2%. Twenty-eight patients (5.0%) were lost to follow-up before 90 days, leaving 527 patients followed for a median of 23 months (range, x to Y months).

Results: There were six dislocations in the SB group and two in the DM group (2.1% vs. 0.7%). There was no difference in two-year dislocation-free survivorship between cohorts (SB: 97.6% vs. DM: 99.0%; p=0.63). Sixteen hips were revised (SB: 3.5% vs. DM: 2.2%; p=0.45), with no difference in 2-year all-cause revision-free survivorship (SB: 96.4% vs. DM: 97.5%; p=0.53). Infection was the most common revision indication (5 SB [1.8%] and 2 DM [0.7%]). There were no differences in HHS or HOOS JR at any time point (p>0.05). Mean effective head size was larger in the DM cohort (42mm vs. 36mm, p< 0.001).

Conclusion: In this multicenter RCT, DM did not significantly reduce dislocations in high-risk primary THA patients versus SB, although the dislocation rate was lower than anticipated. Additional follow-up is required for a minimum of two years.

Long-Term Follow Up of Thin Polyethylene Liners in Total Hip Arthroplasty

Notes

Jessica H. Leipman, BA, Neeku Salehi, BS, Camilo Restrepo, MD, Eric B. Smith, MD, James J. Purtill, MD, Yale A. Fillingham, MD

Introduction: Using thin polyethylene liners with large diameter femoral heads in total hip arthroplasty (THA) may decrease the risk of instability. The purpose of this study was to investigate the long-term survivorship of thin highly crosslinked polyethylene (HXLPE) liners.

Methods: This was a retrospective cohort study of patients who underwent primary THA for osteoarthritis at a single institution. Patients who received an HXLPE liner with a thickness of 3.9, 5.9 or 7.9 mm and a variety of femoral head and cup sizes were included. Demographic, surgical information, patient-reported outcome measures and long-term outcomes were collected.

Results: Of the 4,951 cases included, 92 utilized a 3.9 mm liner, 2,690 utilized a 5.9 mm liner, and 2,169 utilized a 7.9 mm liner, with respective mean length of follow up of 4.48 (range 1.23 – 12.17), 6.13 (range 1.0 – 12.12), and 6.05 years (range 1.0 - 12.35). There was no significant difference in revisions or reoperations between the cohorts. Among those revised, 7.9 mm liners were more likely to have the indication of instability when compared to 5.9 mm liners (0.092% vs. 0.038%), while the 3.9 mm group had no revisions for instability. No 3.9 mm liners were revised for polyethylene wear. At 6 months postoperatively, HOOS-JR was significantly greater in patients with a 3.9 mm liner (P=0.004). At 2, 5, and 10 years postoperatively, HOOS-JR was equivalent across all groups (P=0.76, P=0.098, P=0.685, respectively). At 5 years postoperatively, the 3.9 mm group had a significantly lower improvement in HOOS-JR (P=0.036), but this difference equalized between groups at 10 years.

Conclusion: Thin and standard size HXLPE liners in THA have similar long-term functional and clinical outcomes. Liners of 3.9 mm may safely be used while providing the benefit of reduced revision for instability.

Leg Length Discrepancy and its Relationship to the Forgotten Joint Score in Total Hip Arthroplasty

Notes

Ria M. Desai, BS, Isaac Sontag-Milobsky, BS, Theran J. Selph, BS, Alexandra Fink, BS, Adam I. Edelstein, MD, **David W. Manning, MD**

Introduction: Leg length discrepancy (LLD) following THA may negatively influence patient satisfaction. We aimed to compare patients with and without perceived LLD (P-LLD) and examine the impact of P-LLD on Forgotten Joint Score (FJS).

Methods: We performed retrospective analysis of elective, primary THA patients within our institution from 2016-2020. We included patients ≥18 years old and 6-12 months post THA, with available leg-length radiographic imaging. Patients were excluded for prior or revision hip surgery, postoperative infection or periprosthetic fracture, or no six-week follow up EOS. P-LLD and FJS were gathered via questionnaires 6-12 months post THA. We defined two cohorts: patients with P-LLD and patients without P-LLD. Univariate analyses were performed between groups, and multivariate regression analyses were used to compare FJS adjusting for age and BMI.

Results: We included 110 patients, 32 of whom (29%) had a P-LLD. The cohorts did not show differences in age (64±8.59 vs. 62±11.27, p=0.363), BMI (29.21±6.03 vs. 28.26±5.46, p=0.449), sex distribution (43.8% female vs. 43.6% female, p=0.982) or race (91% White, 9% Black, 0% Asian vs. 96% White, 3% Black, 1% Asian p=0.287). Additionally, cohorts did not show any difference in postoperative measured leg length discrepancies: inter-teardrop line to greater trochanter (5.83±4.91mm vs. 4.93±4.08mm, p=0.401), inter-ischial tuberosity to lesser trochanter (3.48±2.66mm vs. 4.07±3.01mm, p=0.33), teardrop to tibial eminence (3.93±4.49 vs. 3.67 ± 3.62 , p=0.908), teardrop to tibial platond (2.91 ± 2.07 vs. 3.25±3.25, p=0.77). Univariate analysis showed significantly lower FJS (63.90±26.08 vs. 79.35±23.89, p=0.003) in P-LDD patients. Multivariate analyses revealed significantly lower FJS in P-LDD patients (OR 0.98, 95% CI: 0.96-0.99, p=0.007). There was no correlation between perceived and measured LLD.

Conclusion: These results state that P-LDD has a clear negative relationship to FJS. Surgeons should counsel patients who are at risk for P-LDD, such as those with contractures and scoliosis, prior to THA.

On-Site Dilution of Povidone-Iodine: 0.10% and Sterile Water Is Superior to 0.35% and Normal Saline

John P. Meehan, MD, Zachary C. Lum, DO, Chris Moses, BA, Ilker Bayer, PhD, Jack Kessler, PhD

Notes

Introduction: The morbidity and mortality associated with PJI and the global increase in antibiotic resistance has led to a renewed interest in antiseptic principles of infection prevention. On-site dilutions of povidone-iodine (PI) with normal saline (n.s.) have increased substantially, but little information exists regarding the concentration of the singular active biocidal agent, i.e., molecular (free) iodine, in these formulations. The purpose of this study was to measure and compare the concentration of molecular iodine in on-site dilutions of 10% povidone-iodine with normal saline vs. sterile water to determine the optimal dilutant and concentration that maximized its antimicrobial activity and potency.

Methods: Potentiometric analysis of commercial solutions used iodine-selective electrode with Ag/AgCl reference and platinum working electrodes. Calibration was conducted with 0. 345 g/L aqueous iodine solutions. Samples were diluted with relevant solvents. Upon electrode equilibration, electrochemical potentials were recorded. Six different measurements were taken from each dilution rate and free iodine levels were measured. Two-way ANOVA statistical analysis was performed to determine significance of dilution rate and solution type.

Results: Increased dilutions of 0.35%PI, 0.22%PI, 0.10%PI in n.s. resulted in statistically significant increases in the measured values of molecular iodine (p< 0.001). There was also a statistically significant effect from type of dilutant, with sterile water producing higher measurements of molecular iodine vs. n.s. in all dilution rates (P< 0.001).

Conclusion: In chemistry and microbiology literature, molecular iodine is the only species in iodophor solutions with a proved correlation between equilibrium concentrations and bactericidal activity. By using an on-site dilution of 0.10% PI in normal saline or sterile water we confirmed a statistically significant, paradoxical increase in the concentration of the bactericidal molecular iodine. This study supports a 0.10% on-site dilution of PI in sterile water to achieve a larger therapeutic index and enhanced antimicrobial rate of kill.

Too Late to Matter? Time-to-Positivity Beyond Five Days Still Identifies Clinically Relevant PJI

Notes

Alisina Shahi, MD, PhD, Kenneth B. Mathis, MD, **Adam M. Freedhand, MD**, David Rodriguez-Quintana, MD, Ali Oliashirazi, MD

Introduction: The conventional five-day incubation threshold for diagnosing periprosthetic joint infection (PJI) may miss slow-growing organisms, leading to culture-negative diagnoses and empiric treatment. This study evaluates whether culture positivity beyond five days remains clinically meaningful and compares outcomes across early-positive, late-positive and culture-negative PJIs.

Methods: We retrospectively reviewed 4,127 patients diagnosed with PJI by MSIS criteria between 2014–2024. Among these, 3,125 were culture-positive and stratified by time-to-positivity into: Early-positive (≤5 days), Late-positive (>5 days) Culture-negative cases were analyzed separately. The primary outcome was failure, defined as infection-related reoperation or the need for chronic suppressive antibiotics within one year. Multivariate logistic regression adjusted for organism type, host status, Charlson Comorbidity Index and surgical strategy.

Results: Among culture-positive PJIs, 42.3% turned positive after day five. Commonly identified slow-growing organisms included Cutibacterium acnes, anaerobes and coagulase-negative staphylococci. Failure rates were similar between late- and early-positive groups (p = 0.78), and on adjusted analysis, delayed positivity was not associated with increased failure (OR: 1.1, 95% CI: 0.7–1.7, p = 0.82). The overall failure rate among culture-positive PJIs was 31.4%, compared to 60.1% in culture-negative cases (p < 0.001).

Conclusion: Nearly half of culture-positive PJIs declared after day five, yet outcomes were equivalent to early-positive cases. In contrast, culture-negative infections had nearly double the failure rate. These findings strongly support extending incubation protocols and caution against initiating definitive therapy before cultures have fully matured—especially when slow growing organisms are suspected.

What Culture Can't See: NGS Identifies Pathogens in 80% of Culture-Negative PJIs

Notes

Alisina Shahi, MD, PhD, **Kenneth B. Mathis, MD**, Adam M. Freedhand, MD, David Rodriguez-Quintana, MD, Ali Oliashirazi, MD

Introduction: Culture-negative periprosthetic joint infections (PJI) remain one of the most challenging scenarios following total hip and knee arthroplasty. Without pathogen identification, surgeons are forced to use empiric antibiotic regimens that may be inadequate or overly broad. Next-generation sequencing (NGS) offers a novel, culture-independent method to detect microbial DNA directly from clinical specimens. This study evaluates the diagnostic yield, clinical impact and validity of NGS in a large cohort of culture-negative PJI cases.

Methods: We retrospectively reviewed 131 patients with culture-negative PJI, defined using MSIS criteria, who underwent NGS testing on synovial fluid or periprosthetic tissue between 2020–2024 using a validated commercial platform. Outcomes included NGS positivity, organism profile, changes in antibiotic selection and 1-year clinical outcomes. A matched culture-positive PJI cohort was used for benchmarking.

Results: NGS identified at least one organism in 81.8% of culture-negative PJIs. In 68% of these, the NGS result directly altered the antibiotic regimen. Frequently identified pathogens included Cutibacterium acnes, Finegoldia magna, and coagulase-negative staphylococci—organisms commonly missed by standard cultures. NGS demonstrated a median turnaround time of 3.4 days, significantly faster than culture (5.74 days, p < 0.01). At one year, reinfection and reoperation rates were comparable to the culture-positive cohort (p > 0.05), validating the clinical utility of NGS-guided management.

Conclusion: Based on the findings of this study, NGS identified pathogens in the majority of culture-negative PJIs and directly influenced treatment in two-thirds of cases. With superior diagnostic yield and faster results, NGS offers a powerful adjunct to standard culture and should be considered a frontline tool when conventional methods fail.

Wanding Protocol May Lead to Increased Patient Risks in Arthroplasty Cases: Single Center Evaluation

Michael P. Bolognesi, MD, **Sean P. Ryan, MD**, Samuel S. Wellman, MD, Thorsten M. Seyler, MD, PhD, William A. Jiranek, MD

Notes

Introduction: The Joint Commission defines a sentinel event for unintended retention of a foreign object as the object being discovered after the completion of final skin closure, even if the patient is in the operating room under anesthesia. At the investigating institution, an RFID wanding policy was implemented to be performed before the final suture was placed to attempt to prevent this sentinel event definition from occurring. We evaluated the periprosthetic joint infection (PJI) rate in the setting of wanding over an unclosed wound during primary total joint arthroplasty (TJA) procedures.

Methods: Institutional wanding policy took effect July 1, 2023. Patients undergoing primary total joint arthroplasty were included in the analysis. For 6 months the policy was in effect, at which point it was phased out and ultimately changed in April 2024. Patients from January 2022 – December 2024 were included. Patients from January – April 2024 during policy wind-down were excluded. Multivariate logistic regression models controlling for age, gender, BMI and ASA score were created to evaluate the wanding policy durations impact on the primary outcome of interest: PJI.

Results: 3,457 primary hip and 3,727 primary knee arthroplasty procedures were included in the analysis. The PJI rate during the 6-month period of investigation was 1.3% compared to 0.6% during the control period. In multivariate regression, surgery during the wanding over unclosed wounds protocol was significantly associated with PJI: OR 2.093, 95% CI 1.124-3.897, p=0.020. It represented the strongest predictive variable for PJI in the multivariate regression model.

Conclusion: The introduction of wanding over unclosed wounds in response to the joint commissions sentinel event definition was associated with increased PJI risk. While no causation can be determined in this retrospective review, we caution the incorporation of any additional variables prior to wound closure that may contribute to surgical site contamination.

Reduced Reinfection Rate with IO Vancomycin at Reimplantation in Two-Stage Revision TKA

Jennifer W. Liu, MD, Colin A. McNamara, MD, Thomas C. Sullivan, BS, Austin E. Wininger, MD, Timothy S. Brown, MD, Terry A. Clyburn, MD, Stephen J. Incavo, MD, **Kwan "Kevin" J. Park, MD**

Notes

Introduction: Recurrent prosthetic joint infection (PJI) after two-stage exchange total knee arthroplasty (TKA) is a devastating outcome that can lead to additional surgical treatments and mortality. Recent publications have shown that intraosseous (IO) vancomycin administration reduces PJI rates after primary and aseptic revision TKA. However, there are no studies on the efficacy of IO vancomycin in two-stage infection treatment. The purpose of this study was to investigate the recurrence of infection with IO vancomycin versus intravenous (IV) antibiotics during reimplantation revision knee arthroplasty.

Methods: This was a retrospective cohort study of 254 infected TKA that underwent two-stage revision for infection (excluding fungal PJIs) at a single-institution from 7/2016 to 3/2025. Included were patients with prior failed infection surgery at outside institutions (no significant differences between groups). Demographics, BMI, medical comorbidities, and surgical history were recorded for all patients. Reinfection rates of patients who received IO vancomycin during reimplantation were compared to those that received IV antibiotic prophylaxis.

Results: There were 254 patients with 102 patients in the IO group and 152 patients in IV group. The IO vancomycin group had more McPherson host grade C patients (37.3% versus 21.7%, P=0.007), more extremity grade 1 patients (25.5% vs. 13.8%, P=0.018), and fewer extremity grade 3 patients (15.7% vs. 27.6%, P=0.026). There were trends with no significant difference in PJI recurrence at 30 (IO 0% vs. IV 3.3%, P=0.085) and 90 (3.2% vs. 8.1%, P=0.172) day follow-up. There were significant reductions in recurrent PJI between IO and IV groups at one (6.1% vs. 14.9%, P=0.049), two (9.9% vs. 23.0%, P=0.023), and three (17.5% vs. 32.7%, P=0.039) year follow-up.

Conclusion: Intraosseous vancomycin administration during reimplantation for two-stage revision TKA led to a reduced rate of recurrent PJI at one-year, two-year and three-year follow-up compared to IV antibiotic prophylaxis alone.

Which DAIRs Are Doomed? Predicting Failure in Acute PJI

Alisina Shahi, MD, PhD, Kenneth B. Mathis, MD, Adam M. Freedhand, MD, Ali Oliashirazi, MD

Notes

Introduction: Debridement, antibiotics and implant retention (DAIR) remains an appealing strategy for acute PJI, but outcomes are heterogeneous and patient selection remains controversial. This study aims to identify independent predictors of DAIR failure following total hip and knee arthroplasty and to develop a validated multivariable risk model to guide clinical decision-making.

Methods: We retrospectively reviewed 1,090 patients who underwent DAIR for acute PJI (< 4 weeks from index arthroplasty or symptom onset) between 2012–2024 at a single tertiary care center. DAIR failure was defined as the need for subsequent surgical intervention, chronic suppressive antibiotics or persistent drainage within one year. Multivariate logistic regression was performed to identify independent predictors of failure. Model performance was assessed using the area under the receiver operating characteristic curve (AUC) and Hosmer-Lemeshow goodness-of-fit.

Results: The overall DAIR failure rate was 47.3%. The following factors were independently associated with failure: Time to DAIR >10 days (OR: 2.9, 95% CI: 1.7–4.8, p< 0.001), Polymicrobial infection (OR: 2.5, 95% CI: 1.4–4.3, p=0.003), CRP >100 mg/L at time of DAIR (OR: 1.8, 95% CI: 1.1–3.0, p=0.02), Positive concurrent blood culture (OR: 2.6, 95% CI: 1.3–5.1, p=0.006), Coagulase-negative Staphylococcus as index organism (OR: 1.9, 95% CI: 1.1–3.4, p=0.03), Enterococcus species as index organism (OR: 2.8, 95% CI: 1.3–6.0, p=0.007) The predictive model demonstrated strong discrimination (AUC: 0.82) and acceptable calibration (Hosmer-Lemeshow p=0.67).

Conclusion: Based on the findings of this study, DAIR failure in acute PJI is independently associated with delayed intervention, systemic bacteremia, elevated inflammatory markers and low-virulence organisms including Enterococcus and coagulase-negative staphylococci. These data support a more selective approach to DAIR, prioritizing early intervention and heightened caution in the presence of high-risk microbial and systemic profiles.

Changing Surgical Approach During PJI Treatment Does Not Increase Risk of Eradication Failure

Notes

Tom Schmidt-Braekling, MD, Farouk Khury, MD, Daniel Waren, MPH, Hesham Abdelbary, MD, FRCSC, Anzar Sarfraz, MD, Simon Garceau, MD, Ran Schwarzkopf, MD, MSc, George Grammatopoulos, MD, FRCS (ORTHO)

Introduction: Hip approach discordance in aseptic revision total hip arthroplasty (THA) is not associated with increased dislocation or re-revision risk. Whether the same holds true for the treatment of periprosthetic joint infection (PJI) is unknown. This study aims to report the rate of hip approach discordance that occurs during PJI treatment, identify factors associated with approach discordance and test for possible association with outcome (septic and aseptic failures).

Methods: This is an IRB-approved, multicenter, consecutive case series of 521 primary THAs (age: 65±12 years, BMI:31±7, 53% females) treated for PJI at two, academic, tertiary-referral centers. Most index approaches were posterior (PA:303, 58%), followed by lateral (LA:112, 22%) and anterior (AA:106, 20%). Acute PJI was seen in 41% of cases. Initial treatment was DAIR (61%), followed by 1st- (34%) and single-stage- (5%) revisions. Patients were followed up for minimum one-year (8±4 years). Outcomes of interest included PJI success (MSIS tiers 1/2) and aseptic (dislocation, fracture, aseptic loosening) complications.

Results: Change of approach was seen in 23%, mostly occurring at first PJI surgery (20%). Approach discordance was more common with AA (49%), followed by LA (44%) and PA (1%) (p< 0.001). Approach discordance was more common with First-Stage revisions (31%) compared to DAIR (17%) and Single-Stage (11%) revisions (p< 0.001). No patient factors were associated with approach discordance. Success of PJI treatment by latest follow-up was 89% and not associated with approach change (p=0.34). Aseptic complications were seen in 7% of cases, with dislocation being most common (4%). There was no difference in overall complication or dislocation rates when approach was changed (p=0.45-0.72).

Conclusion: Comparable outcomes are seen in PJI treatment with concordant and discordant approaches between primary and PJI treatment. This data provides reassurance to surgeons that change of approach is safe and efficacious in PJI treatment without increased septic or aseptic risk.

Unexpected Positive Cultures in 230 Aseptic Revision THAs: High Midterm Survivorship Free of PJI

Notes

Niall H. Cochrane, MD, William R. Schulz, MD, Elie Berbari, MD, Nicholas A. Bedard, MD, Charles P. Hannon, MD, MBA, **Bryan D. Springer, MD**, Matthew P. Abdel, MD

Introduction: Unexpected positive cultures in aseptic revision THA are frequently reported in the literature. However, their risk of subsequent PJI remains unclear. The goals of this study were to determine the management strategies of unexpected positive cultures after aseptic revision THA, midterm survivorship free of PJI and risk factors for infection after index revision.

Methods: We retrospectively identified 230 aseptic revision THAs with unexpected positive cultures performed from 2009 to 2022 at a single academic institution. At the time of index aseptic revision THA, all patients had an MSIS score of < 2 based on 2011 criteria. The most common isolated unexpected positive culture was Cutibacterium (19%). The median number of positive intraoperative cultures was 1 (range, 1-5), and 17% were grown in broth only. The mean age was 67, 40% were female and mean BMI was 31 kg/m2. Mean follow-up was four years.

Results: Of the 230 revision THAs with unexpected positive cultures, 68% received postoperative antibiotics, with 65% prescribed two weeks or less of oral antibiotic therapy. The five-year survivorship free of PJI was 96%. There were nine subsequent revisions for PJI. One of the nine hips had multiple positive cultures isolated at index revision, and four of the nine (44%) had the same organism isolated during both aseptic revision and subsequent PJI. Postoperative antibiotic therapy and the number of positive cultures at index revision were not associated with infection risk.

Conclusion: In this series of 230 aseptic revision THAs with unexpected positive cultures, the five-year survivorship free of PJI was excellent at 96%. Nearly half of hips with subsequent PJI had the same organism isolated during both the index revision and subsequent PJI. However, there was no association between antibiotic therapy or number of positive cultures during index revision and infection risk.

Symposium IV

Practice Management Strategies Among Attendees of the 2025 AAHKS Annual Meeting

Moderator: Jay R. Lieberman, MD

A survey will be conducted regarding practice management strategies at the 2025 AAHKS Annual Meeting of AAHKS members and arthroplasty professionals. The live and virtual meeting audiences will be polled at the Annual Meeting using an audience response system (ARS) available in the AAHKS Mobile App, and the results will be reviewed in real time. The results of the survey will be compared to prior membership surveys to determine if there have been changes in practice patterns.

Learning Objectives:

- **1.** To learn the present practice strategies of AAHKS members and other arthroplasty surgeons.
- **2.** To identify any changes in practice patterns compared to prior surveys.

Outline:

Introduction

Jay R. Lieberman, MD

Survey of Members

Jay R. Lieberman, MD

Discussion

Jay R. Lieberman, MD

votes		

Symposium V

PJI Power Hour: Surgical Tips, Tricks, and Can't-Miss Video Clips

Notes

Moderator: Matthew P. Abdel. MD

This high-impact, video-based symposium will deliver the most current strategies and real-world surgical insights for managing periprosthetic joint infection (PJI). Through expert-led presentations, practical pearls and controversydriven case discussions, attendees will gain actionable knowledge on DAIR, intraosseous antibiotics and complex one- and two-stage exchange techniques of the hip and knee. A must-attend for any surgeon managing PJI today.

Learning Objectives:

- 1. Review the latest evidence and evolving best practices for managing acute and chronic PJI in THA and TKA.
- 2. Understand indications, techniques and outcomes associated with DAIR and intraosseous antibiotic delivery.
- 3. Explore technical execution of one- and twostage exchanges, including spacer construction, timing and reimplantation, with video-based demonstrations from experienced surgeons.

Outline:

Introduction of Symposium and Faculty Matthew P. Abdel, MD

DAIR and IO Antibiotics in Acute PJI: When, Who and How

Elizabeth B. Gausden, MD, MPH

One-Stage Exchange Arthroplasty: How to Get It **Right the First Time**

Bryan D. Springer, MD

Two-Stage Exchange of the Hip: My Articulating **Spacer and Reimplantation Tips and Tricks**

Matthew P. Abdel, MD

Two-Stage Exchange of the Knee: My Articulating **Spacer and Reimplantation Technique**

Craig J. Della Valle, MD

Interactive Case-Based Panel with Video Highlights and Controversy Discussion

Matthew P. Abdel, MD

The James A. Rand, MD, Young Investigator's Award

Synovial Metal Ions in "Nickel Free" vs. Standard Cobalt-Chrome Containing Total Knee Replacement

Michael E. Neufeld, MD, MSc, FRCSC, Gerard A. Sheridan, MD, Arsh Sidhu, MD, Lisa C. Howard, MD, FRCSC, Nelson V. Greidanus, MD, Bassam Masri, MD, Donald S. Garbuz, MD

Notes

Introduction: Metal allergy and adverse reaction to metal debris may both be modes of failure in total knee arthroplasty (TKA). Yet, the intraarticular synovial fluid metal ion levels in well-fixed implants beyond the first postoperative day remain unknown. The aim of this study was to compare intraarticular synovial fluid levels of metal ions in patients who underwent cemented primary TKA with a hypoallergenic implant vs. a matched cohort of standard cobalt-chromium (Co-Cr) containing implants at minimum two-year follow-up.

Methods: A retrospective, matched, case-control study was performed using prospectively collected data from a single institution. A total of 22 cases (metal allergy/sensitivity with hypoallergenic TKA implants) and 18 controls (standard Co-Cr TKA implants) were included, with a median follow-up of 4.9 (IQR 4.0 to 5.2) years. Cases and controls where matched for age, sex, BMI, ASA, indication, component design, patellar resurfacing and follow-up (P>0.05). Synovial fluid aspirations of the study knees were analyzed for metal ion levels of cobalt (Co), chromium (Cr), nickel (Ni), and titanium (Ti). Well-fixed implants were confirmed radiographically.

Results: The median Ni ion level in the synovial fluid of the hypoallergenic cases was 3.6 times higher than the controls (1.0 vs. 0.28 ug/L, P< 0.001). Co ion levels in the hypoallergenic cases were 17.7 times lower vs. the controls (0.07 vs. 1.24 ug/L, P< 0.001). Similarly, the synovial Cr ion levels of the hypoallergenic cases was 3.2 times lower vs. controls (0.39 vs. 1.26 ug/L, P< 0.001). The OKS (P=0.577) and FJS (P=0.675) were similar between cohorts.

Conclusion: Patients with hypoallergenic implants had intraarticular synovial Ni ion levels 3.6 times higher vs. standard implant controls, contesting the use of this hypoallergenic implant for Ni allergy/hypersensitivity. Conversely, the hypoallergenic implant had lower levels of synovial Co and Cr. Our novel results reveal that definitive study on the subject matter is necessary.

AAHKS Surgical Techniques and Technologies Award

What Is the Ideal Technique and Construct in Aseptic Revision Total Knee Arthroplasty?

Wayne T. Hoskins, FRACS, PhD, Charles Gusho, MD, Michael J. McAuliffe, FRACS, Chris Wall, MD, Qunyan Xu, MS, Kelly G. Vince, MD

Notes

Introduction: Revision TKA (RTKA) involves various techniques, constructs and fixation strategies. This study assessed re-revision outcomes based on what components were revised, implant choice and construct fixation.

Methods: A national registry-based retrospective cohort study was performed. Aseptic RTKAs (excluding infection) from September 1999 to December 2023 were included. The components exchanged (femur, tibia and/or liner) and revision constructs used (stems and/or cones/sleeves) were recorded. Comparisons among RTKA constructs were performed, with comparison to revision of the femoral and tibial component with the use of stems and cones/sleeves. The primary outcomes were (1) re-revision for all-causes, and (2) re-revision for component loosening. Age, sex, BMI, ASA, bearing surface and surgeon-volume were adjusted as covariates in a Cox proportional hazards model.

Results: A total of 21,499 aseptic RTKAs were identified. with 2,345 having both the femoral and tibial component revised with stems and cones/sleeves (mean age 70.2 (SD9.4); follow-up 4.3 (SD3.5) years. This construct was compared to other constructs. When the femur and tibia were revised with stems but without cones/sleeves (n=4128; mean age 69.4 (SD9.2); follow-up 5.6 (SD4.0) years), there was no difference in all-cause re-revision but higher rates of component loosening (1.5 year+ HR 1.82 (95%Cl 1.17-2.83), p=0.01). Higher all-cause re-revision and component loosening occurred with total revision with only a tibial stem and without sleeves/cones; when no stems or sleeve/cones were used; and when partial revision of the tibia or femur occurred (all p< 0.05). Higher allcause re-revision (HR 1.41; 95% CI 1.21-1.64; p< 0.001) and component loosening (HR 1.60; 95% CI 1.17-2.20; p=0.003) occurred with isolated liner-exchanges, the most common revision procedure (n=8027; mean age 68.0 (SD9.4); follow-up 5.9 (SD4.7) years).

Conclusion: In aseptic RTKA, exchange of both femoral and tibial components with stems and cones/sleeves in the revision construct has the lowest re-revision and component loosening rates.

AAHKS Clinical Research Award

Maximizing Bearing Diameter Markedly Lowers Dislocations in Primary Total Hip Arthroplasty

Eric Wang, BA, Theodor Di Pauli von Treuheim, MD, Catherine Di Gangi, BS, Ran Schwarzkopf, MD, MSc, Morteza Meftah, MD, **Matthew S. Hepinstall, MD**

Notes

Introduction: Modern polyethylene allows larger bearings in fixed-bearing THA, but any stability benefits of fully maximizing bearing diameter (e.g. 36-mm in 48/50-mm cups) are not well established. We hypothesize that maximizing bearing diameter reduces odds of dislocation in primary fixed-bearing THA.

Methods: We retrospectively reviewed all patients who underwent fixed-bearing THA at a large, urban, academic institution between 2016-2022. We noted cases receiving the largest bearing available from any manufacturer for the acetabular diameter: 28-mm in 40/42-mm, 32-mm in 44/46-mm, 36-mm in 48/50-mm or 40-mm in 52/54/56-mm. Larger cups were excluded because proportionately larger bearings were unavailable. Multivariate analyses using least-absolute-shrinkage-and-selection-operator (LASSO) logistic regression were performed to explore the association between maximized bearing diameter and 90-day dislocation risk while controlling for confounders.

Results: Bearing diameter was maximized in 835 (9.8%) of 8,607 patients, whereas 7,309 received the secondlargest bearing available. There were 79 dislocations (0.9% overall); none occurred with maximized bearing diameters (P=0.003). On univariate analysis, dislocation risk also varied with intraoperative technology use, surgical approach and liner geometry (P=0.017, P=0.008, P=0.007, respectively). On LASSO regression including these variables, along with age, sex and body-massindex, maximized bearing diameters heavily protected against dislocation (OR=0.14). Robotic surgery (OR=0.35), computer navigation (OR=0.90), lateral (OR=0.48) and anterior (OR=0.62) approaches were also protective. Lipped (OR=1.2) and offset (OR=1.4) liners were associated with slightly higher odds of dislocation but were commonly used with posterior approach and non-maximized bearing diameters. Sub-analysis of 4,185 patients with smaller bearings and posterior approach revealed that liner geometry did not impact dislocation odds within this sub-group, nor did receiving the second-largest available bearing demonstrably reduce dislocation odds compared to smaller bearings.

Conclusion: Fully maximizing bearing diameter markedly reduced dislocation odds in primary fixed-bearing THA. The magnitude of this effect was substantially larger than for other variables under surgeon control.

Greater Propulsive Joint Moments Following Unicompartmental Compared to Total Knee Arthroplasty

Notes

Gregor Kuntze, PhD, Gregory Abelseth, MD, Robert Korley, MD, Janet Ronsky, PhD, **Kelly D. Johnston, MD**

Introduction: Total knee arthroplasty (TKA) is widely used for end-stage knee osteoarthritis (OA), yet up to 20% of patients remain dissatisfied postoperatively. Unicompartmental knee arthroplasty (UKA) preserves native anatomy and may enhance gait biomechanics. This study assessed whether UKA results in more physiological Postoperative joint mechanics than TKA.

Methods: This single-center randomized controlled trial (REB14-0741) enrolled 38 patients (UKA n=17, TKA n=21) aged 45–77 years. Inclusion criteria: isolated anteromedial OA, intact anterior cruciate ligament, correctable deformity <15° and no prior knee surgery (except arthroscopy). Patients were randomly allocated to UKA (Oxford Partial Knee) or TKA (Persona CR). Instrumented gait analysis was performed Preoperatively and one year Postoperatively. Primary outcomes: changes in sagittal ankle, knee and hip moments and coronal knee and hip moments. Secondary outcomes: Patient reported outcomes (PROMs: OKS, WOMAC) at baseline, six weeks, three months and one year. Data analyses included MANOVA and linear regression (α-adjusted) for joint moments, and linear mixed-effects models for PROMs.

Results: Twenty-eight patients (UKA n=11, TKA n=17) completed gait analysis. Surgical technique significantly affected sagittal ($F_{3,24}$ =4.769, P=0.010) and coronal ($F_{3,24}$ =7.323, P=0.003) moments. UKA patients displayed greater increases in knee [0.05 (0.00 to 0.11) Nm/kg*height, P=0.014] and hip [0.11 (0.02 to 0.20), P=0.006] extension moments. Coronal knee moment changes were smaller in UKA than TKA [-0.12 (-0.21 to -0.04), P=0.001], suggesting preservation of native knee joint alignment. Both groups, regardless of surgical technique, showed significant improvements in all PROMs (P<0.001).

Conclusion: Larger postoperative knee and hip extension moments indicate greater propulsive force generating ability of UKA compared to TKA patients. Smaller changes in coronal knee moment changes demonstrate more physiological Postoperative gait biomechanics for UKA patients. These findings support the use of UKA in appropriately selected patients to enhance functional gait recovery, without compromising perceived outcomes.

A Randomized Clinical Trial to Compare the Safety and Efficacy of the Oxford Cementless Partial Knee

William G. Hamilton, MD, Mark A. Klaassen, MD, Keith R. Berend, MD, Wesley G. Lackey, MD, Michael E. Berend, MD, Adolph V. Lombardi Jr., MD, Scott D. Anseth, MD, Roger H. Emerson, MD, Richard D. Reitman, MD, Roberta E. Redfern, PhD

Notes

Introduction: Cementless implants have been developed for use in arthroplasty to improve long term bone fixation, which is particularly salient in the context of unicompartmental knee arthroplasty (UKA). The purpose of this study was to report the results of the first randomized controlled trial of the Oxford cementless partial knee implant in the United States.

Methods: A single-blind, multicenter, randomized controlled trial was conducted to demonstrate non-inferiority of the cementless partial knee implant compared to the cemented variant. Patients seeking unilateral or bilateral UKA were allocated 2:1 to receive the cementless or cemented device between November 2013 and November 2018. Four primary endpoints were identified to demonstrate non-inferiority of the cementless device in terms of survivorship, radiographic results (no evidence of osteolysis, subsidence/migration, or component fracture) and function (Knee Society Scores).

Results: Three hundred seventy-eight patients were randomized: 241 received the cementless implant and 137 the cemented. Two-year implant survivorship was similar between the cementless (94.0%, 95%Cl 89.9 – 96.8) and cemented cohort (97.5%, 95%Cl 93.0 – 99.5, p=0.19); Kaplan-Meier analysis demonstrated this was maintained at five years (91.7%, 95%Cl 86.4 – 95.0 vs. 95.6%, 95%Cl 88.4 – 98.4, p=0.128). Examination of radiographic success revealed non-inferior performance of the cementless prosthesis (93.8% vs. 97.4%, p=0.19). Mean difference in Knee Society Function (89.9±13.0 vs. 89.8±14.0, p=0.95) and Knee Society Assessment (95.5±8.5 vs. 95.6±6.9, p=0.92) Scores were excellent with no differences between fixation approaches at two years.

Conclusion: The cementless variant of this partial knee implant demonstrated non-inferior survivorship, radiographic and clinical outcomes in the first cohort of patients to receive the device in the United States. Cementless fixation may be an attractive option for patients with adequate bone quality.

Robotic UKA Demonstrates Better Early Recovery Than Robotic TKA: A Remote Monitoring Study

Andrew M. Schneider, MD, Ilya Bendich, MD, MBA, Charles P. Hannon, MD, MBA, Jacqueline King, NP, Venessa Riegler, BA, Robert L. Barrack, MD, **Ryan M. Nunley, MD**

Notes

Introduction: Unicompartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA) have been compared in clinical studies for decades. However, prior comparisons rely upon manual surgical techniques and subjective outcome measures, collected at discrete time points, limiting the ability to detect meaningful differences during early recovery. The purpose of this prospective study was to compare early recoveries following robotic-assisted UKA (rUKA) and robotic-assisted TKA (rTKA) utilizing continuous remote patient monitoring for the first 90 days after surgery.

Methods: We prospectively enrolled 80 patients undergoing rUKA and 94 patients undergoing rTKA, all with isolated medial compartment osteoarthritis. Procedures were performed using the same robotic platform. Patients utilized Fitbit devices, digital knee sleeves and a smartphone app for two weeks preoperatively and 90 days postoperatively. Data collected included daily pain scores, patient-reported outcome measures, step counts, opioid consumption and range of motion. Demographics were similar between groups. Independent sample t-tests, Chisquared and Fisher's exact tests were used for statistical analysis.

Results: rUKA patients experienced greater improvement in pain compared to rTKA (mean change in VAS pain from preoperative to 90 days: -2.7 vs. -1.6; p=0.004). At 30 days, UKA patients had better Forgotten Joint Scores (37 vs. 25; p=0.015), Oxford Knee Scores (33 vs. 29; p=0.003), and Normal Knee scores (64 vs. 50; p=0.002). rUKA patients also had higher daily step count at all time points, with a smaller decline from preoperative levels (94.5% of preoperative steps vs. 73.6% of preoperative steps at 30 days; p< 0.001). rUKA patients discontinued walking aids earlier (19 days vs. 32 days; p< 0.001) and had consistently greater knee flexion at all time points. Opioid consumption was similar between groups.

Conclusion: Using a continuous remote monitoring methodology, rUKA demonstrated superior early subjective and objective recovery metrics compared to rTKA in patients with isolated medial compartment osteoarthritis.

Shared Decision-Making Using Digital Twins in Knee Osteoarthritis Care: A Randomized Clinical Trial

Prakash Jayakumar, MBBS, Eugenia A. Lin, MD, Zoe Trutner, MD, Lauren Uhler, MPH, John Andrawis, MD, Karl M. Koenig, MD, MS, Paul Rathouz, PhD, Joel Tsevat, MD, **Kevin J. Bozic, MD, MBA**

Introduction: Patient decision aids (DAs) improve decision quality during shared decision-making (SDM) for patients seeking care for knee osteoarthritis (OA). However, few DAs incorporate "digital twin" simulations using artificial intelligence (AI) to facilitate a more personalized SDM experience. We assessed the impact of an AI-enabled DA (AI-DA) on patient- and process-level outcomes in people with knee OA considering TKA.

Methods: We performed a randomized clinical trial involving patients with knee OA over an 18-month period receiving a full Al-DA incorporating patient education, preference assessment and person-specific benefit:risk predictions of TKA (intervention group) or patient education only (control group). Outcomes included the Knee OA Decision Quality Instrument (K-DQI) (primary outcome), CollaboRATE SDM survey, Decision Conflict Scale (DCS), Decision Regret Scale (DRS) and Knee Injury and Osteoarthritis Outcome Score Joint Replacement (KOOS JR) for knee-specific health, satisfaction, appointment duration and TKA rates.

Results: The analytic sample comprised 101 patients [mean [SD], 64.9 [10.1] years; 54 [54%] women]) in the intervention group and 100 patients (mean [SD] age 63.4 [8] years; 60 [60%] women) in the control group. The intervention group reported higher decision quality (mean [SD] K-DQI: 84.4 [25.2] vs. 71.4 [29.8], P=0.0011), lower decision conflict (DCS: 1.0 [3.1] vs. 3.3 [5.8], P=0.0029), lower decision regret at 6-9 months (DRS: 18.2 [19.5] vs. 27.2 [24.2], P=0.0051), better knee-specific health (KOOS JR: 69.5 [17.3] vs. 47 [18.4], P< 0.0001) at 6-9 months, and greater treatment concordance (91% vs. 76%, P=0.0043). SDM scores, knee health at three months, patient and clinician satisfaction, appointment duration, TKA rates and decision regret at three months were similar between groups.

Conclusion: AI-DAs provide a more personalized, data-augmented approach to SDM that can improve decision quality and health-related outcomes in patients with knee OA considering TKA.

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Do TJA Patients Need to Stop NSAID Use Prior to Surgery? A Prospective, Blinded, Randomized Controlled Trial

Jared R.H. Foran, MD, **Peter A. Gold, MD**, Davina F. Lopez, BS, Janine Castro, BS, Tara J. Lang, PA-C, Jillian Crema, PA-C

Notes

Introduction: Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used in both pre- and postoperative settings for TJA. Despite their efficacy, NSAIDs are routinely held seven days before surgery for concerns of perioperative bleeding and related complications. The purpose of this study was to challenge this dogma and investigate the safety of continuing NSAID use prior to TJA.

Methods: Prospective, single-blinded, randomized controlled trial of 137 patients undergoing primary THA and total/unicompartmental knee arthroplasty (TKA/UKA). Patients were randomized to either stop NSAIDs seven days prior (N=69, Control group) or continue NSAIDs until the day before surgery (N=68, NSAID group). The primary outcome was change in preoperative hemoglobin compared to postoperative day 0 (POD0) and two weeks. Secondary outcomes included intraoperative blood loss, surgical exposure score, tourniquet/operative time, range of motion (ROM), patient-reported outcomes (HOOS-JR/KOOS-JR) and complications, including transfusions, wound complications and return to the operating room, including manipulation under anesthesia (MUA).

Results: There were no statistically significant differences in hemoglobin reduction between NSAID and Control groups at POD0 (-0.52 +/- 1.32 vs. -0.38 +/- 1.21; p=0.52) or two weeks (0.33 +/- 1.66 vs. 0.16 +/- 1.76; p=0.56). There were no statistically significant differences in intraoperative blood loss, surgical exposure score, operative time, ROM or six-week PROMs (p>0.05). No patients required a blood transfusion. Two control patients and one NSAID patient experienced bleeding from the incision on POD0/1, which resolved with staple application. Four control patients returned to the OR (four MUAs) vs. three NSAID patients (two MUAs, one infection at six weeks). This was not statistically significant (P=1).

Conclusion: These findings challenge the current dogma of discontinuing NSAIDs before TJA. Continuing NSAIDs prior to surgery did not increase blood loss, blood transfusion requirements, exposure difficulty or bleeding-related complications. NSAIDS can be safely continued prior to TJA.. The term "BCIS' itself may be a misnomer. Until there is stronger evidence to establish a causal link between cement use and BCIS, avoidance of BCIS does not appear to be a strong argument against cementation.

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Postoperative Swelling Did Not Return to Preoperative Levels in Most Patients Two Years after TKA

Kristen I. Barton, MD, PhD, Nina Carson, PT, Jason M. Jennings, MD, Douglas A. Dennis, MD, Jeri Forster, PhD, Craig A. Hogan, MD, Jennifer E. Stevens-Lapsley, PT, Michael J. Bade, PT

Notes

Introduction: Swelling post-total knee arthroplasty (TKA) can result in pain, decreased range of motion, muscular inhibition, limitations in function, and negative perception of recovery. The objectives of this study were to determine how swelling changes post-TKA and if swelling is associated with patient reported outcomes, functional outcomes, or impairment measures.

Methods: Participants (n=138) were assessed pre-TKA, 10 weeks, six months, and two years post-TKA as part of a randomized controlled trial (mean age 64.2±7.2 years, 60% female, mean body mass index 28.7±4.9kg/m2). Demographic information was collected at the Preoperative visit. Patient reported outcomes, functional outcomes, and impairment measures were collected at each clinic visit. Swelling was assessed using bioelectrical impedance analysis (BIA) and quantified post-TKA. Significance for all statistical tests was accepted at p≤0.05.

Results: Mean swelling pre-TKA was 2.06±7.8% and then 15.3±10.6%, 9.6±7.3%, and 5.4±7.1% at 10 weeks, six months, and two years, respectively, after TKA. Post-TKA, 5% of patients returned to pre-TKA swelling at 10 weeks, 12% of patients returned to pre-TKA swelling at six months, and 28% of patients returned to pre-TKA swelling at two years. In comparison to pre-TKA swelling, swelling at 10 weeks, six months, and two years post-TKA was significantly higher (all p< 0.0001). BIA ratio was significantly correlated to WOMAC function pre-TKA (0.19, p=0.03). BIA ratio was significantly correlated to 6-minute walk test (6MWT) at 10 weeks post-TKA (0.24, p=0.007). BIA ratio was not correlated to WOMAC, patient satisfaction, 6MWT, 30s sit-to stand test (30STS), quadricep strength, pain during functional measures, and knee range of motion at six months post-TKA or two years post-TKA (p=0.10-0.95).

Conclusion: In most patients, Postoperative swelling did not return to pre-TKA levels by two years after TKA. Further to this, swelling remained elevated six months and two years post-TKA, it is not associated with recovery of impairments and function.

Revision TJA at the Ambulatory Surgery Center: Comparable Outcomes to Inpatient Procedures

Notes

Alexander J. Acuña, MD, Ajay S. Potluri, BS, Aditya S. Yadav, BS, Samuel Alfonsi, MD, Enrico M. Forlenza, MD, Craig J. Della Valle, MD

Introduction: The safety and efficacy of outpatient primary TJA in appropriately selected patients has been established. As rates of revision TJA (rTJA) continue to increase, there is growing interest as to whether these procedures can be safely performed in the outpatient setting. The purpose of this study was to compare outcomes of inpatient revision TJA procedures to those performed at an ambulatory surgery center (ASC).

Methods: A retrospective review of patients undergoing rTJA at an ASC or an inpatient hospital between 2002-2024 at a single large academic referral center was performed. Revisions for periprosthetic joint infection (PJI) were excluded. All patients had minimum 90-day follow-up. Multivariable logistic regression was conducted to compare rates of medical and surgical complications at 90-days while controlling for age, sex, body mass index (BMI), comorbidity burden, revision etiology, anatomic location and the number of components revised. A total of 813 patients were included in our analysis (ASC: n=245, Inpatient: n=568).

Results: Patients undergoing rTJA at an ASC had an increased risk of mechanical complications (OR: 3.08; 95% CI: 1.01-9.39; p=0.049) relative to inpatient controls. However, these patients had a lower risk of hip instability (OR: 0.14, 95% CI: 0.02-0.81; p=0.028), reoperation (OR 0.14, 95% CI: 0.05-0.41; p<0.001), and medical complications (OR 0.04, 95% CI: 0.01-0.31; p=0.002). ASC patients who underwent modular component exchange had a reduced risk of any complication (OR: 0.45, 95% CI: 0.22-0.92; p=0.028). No differences were seen for the remaining outcomes.

Conclusion: Despite an increased risk of mechanical complications, our study found that patients undergoing outpatient rTJA had a lower risk of various complications in the Postoperative period relative to inpatient controls. These findings suggest that with careful patient and procedure selection, revision TJA may safely be performed at an ASC.

Single- vs. Dual-Component Revision Following TKA Failure for Isolated Tibial and Femoral Loosening

Tobenna N. Nwankwo, MS, Nicholas R. Olson, BS, Jacqueline R. Ray, BS, Christopher Jaicks, MS, **Robert A. Sershon, MD**

Notes

Introduction: Aseptic loosening is a leading cause of failure in total knee arthroplasty (TKA), frequently necessitating revision surgery. When limited to either the femoral or tibial component, the choice between isolated and dual-component revision remains debated.

Methods: A retrospective review was conducted of 297 first-time revision TKAs performed for isolated aseptic component loosening between February 2005 and December 2024 by nine high-volume arthroplasty surgeons. Patients were stratified by revision strategy: isolated (single-component) or complete (dual-component). The primary outcome was re-revision rate. Secondary outcomes included complications, postoperative range of motion (ROM) and patient-reported outcome measures (PROMs), including Knee injury and Osteoarthritis Outcome Score, Knee Society Score, and Patient-Reported Outcomes Measurement Information System Global Physical and Mental Health scores. A multivariable Cox regression evaluated the association between re-revision risk and factors including age, patient gender, body mass index, cement use, AORI bone defect grade, use of stems/ augments/grafts, time to revision, surgeon and revision strategy (single vs. dual component).

Results: At 10 years, re-revision occurred in 9.7% (15/154) of isolated and 11.2% (16/143) of complete cases (P=0.413). There were no differences in surgical or medically related complication rates (P>0.05). Both cohorts demonstrated significant improvements in ROM and PROMs postoperatively. ROM was significantly greater in the isolated group pre- and postoperatively (P<0.05), while PROMs were comparable between groups (P>0.05). Cox regression identified no independent predictors of rerevision, including revision strategy (P>0.05).

Conclusion: In patients with isolated femoral or tibial loosening, both isolated and dual-component revision TKA offer comparable re-revision rates and functional outcomes. These findings support the use of surgeon discretion in determining component retention during revision TKA.

Is Corrosion at the Modular Junction of Revision Total Knee Arthroplasty Actually a Problem?

Notes

Deborah J. Hall, BS, John Wong, BA, Jennifer Wright, MS, Julia Hochstatter, BS, Amy Miller, BS, Robert A. Burnett, MD, Robin Pourzal, PhD, Brett R. Levine, MD, MS, **E. Bailey Terhune, MD**

Introduction: Corrosion at modular junctions in revision TKA is recognized but poorly understood in relation to implant failure. The purpose of this study was to evaluate the junctions of modular revision TKA components for corrosion and assess the correlation with clinical failure.

Methods: We evaluated 82 retrieved revision TKA component/stem couples from 12 manufacturers with two designs: tapered (n=57) and threaded (n=25). Median time in situ was 25 months (range, 2-184) for tapered and 15 months (range, 2-158) for threaded junctions (p=0.21). Mean age at explant was 68 years and 48% were female. Most common indications for explant were periprosthetic joint infection (n=41) and aseptic loosening (n=28). Tribocorrosion was analyzed qualitatively with the modified Goldberg Score (mGS) and quantitatively with an optical coordinate-measuring machine. Radiographs were evaluated for changes around the modular junction. Statistical analyses included Mann-Whitney U and Spearman's correlation tests.

Results: Tapered junctions demonstrated significantly more fretting corrosion than threaded designs (p< 0.001). Median mGS for tapered components were 4 (femoral component), 3 (femoral stem) and 2 (tibial component and stem). Threaded junctions showed minimal damage across all interfaces (median score=1). Junction damage was characterized by fretting wear, fretting corrosion features and dark deposits. The median (min., max) material loss for female junctions with mGS of 4 was 0.54 (0.0, 27.7) mm3. The corresponding material loss from the male stem extension junction was 0.14 (0, 1.2) mm3. Corrosion severity did not correlate with localized radiographic findings and reason for explant.

Conclusion: In modular revision TKA components, tapered junctions exhibited significantly more corrosion than threaded junctions. However, no direct association was observed between corrosion severity and radiographic findings. Corrosion products different from those typically observed in THA, indicating potentially different corrosion mechanisms. Further research is required to determine the clinical consequences of corrosion at this junction.

Distal Femoral Replacement in Complex Primary and Revision TKAs: 10-Year Survivorship of 292 Cases

Notes

Niall H. Cochrane, MD, Anthony C. DeNovio, MD, Brandon Yuan, MD, Cody C. Wyles, MD, Robert T. Trousdale, MD, Daniel J. Berry, MD, **Matthew P. Abdel, MD**

Introduction: Distal femoral replacements (DFRs) are a salvage option for complex total knee arthroplasties (TKAs). There is a paucity of data correlating methods of femoral component fixation to long-term implant survivorship. This study evaluated implant survivorship, femoral component fixation methods and radiographic results of TKAs with DFRs in the largest series to date with long-term follow-up.

Methods: We identified 292 primary and revision TKAs performed with a DFR for non-oncologic indications from 2000 to 2022 at a single academic institution. The most common indication for DFR was reimplantation after periprosthetic joint infection (PJI; 27%). The mean number of prior arthroplasties was three. The mean age was 72 years, mean BMI was 33 kg/m2, and 63% of patients were female. The mean follow-up was four years.

Results: The 10-year survivorships free of revision for aseptic femoral loosening, any femoral revision, any revision and any reoperation were 87%, 79%, 60% and 46%, respectively. Modular component exchange (53%) was the most common revision performed. An increase in ratio of femoral component length to femoral stem length (p=0.03), prior femoral canal instrumentation (p=0.05) and cementless femoral fixation (p< 0.01) were associated with higher risk of any femoral revision. As our technique evolved, 16 patients had impaction grafting at the time of index DFR, and only one underwent subsequent femoral component revision. Femoral cones were not protective of revision surgery. Radiographic loosening was observed in 17 unrevised DFRs (6%).

Conclusion: DFRs are a salvage reconstructive option and had a high 10-year cumulative probability of reoperation (54%). However, the 10-year survivorship free from femoral revision for aseptic loosening was 87%, demonstrating failure modes other than aseptic loosening (most commonly PJI) are common in this population. Enhanced femoral fixation with an increase in ratio of femoral stem to component length was protective of femoral revision.

DFR Downgrade: Bicondylar Femoral Cones with a Hinge-Style TKA Revision in Massive Femoral Bone Loss

Notes

Pravjit Bhatti, MD, Alex J. Anatone, MD, Jason L. Blevins, MD, Eytan M. Debbi, MD, PhD, Peter K. Sculco, MD, **Brian P. Chalmers, MD**, Elizabeth B. Gausden, MD, MPH

Introduction: Distal femoral replacement (DFR) salvages cases of massive distal-femoral bone loss, but carries high rates of infection, loosening and re-revision. Porous bicondylar metaphyseal femoral cones achieve reliable biologic fixation and may permit a hinge revision total knee arthroplasty (rTKA) construct in cases that previously would have required DFR. We evaluated outcomes following the combined use of a contemporary bicondylar femoral cone with a hinge rTKA, which we refer to as a "DFR downgrade."

Methods: Twenty patients (mean age 69.8 years; 65% male) who underwent hinge-style rTKA with bicondylar femoral cones at a single institution with ≥6 months of follow up between 2016-2024 were identified. Demographics, perioperative variables, radiographic outcomes, complications and PROMS (KOOS-JR, PROMIS-10, VR-12) were collected.

Results: Preoperative femoral defect AORI bone loss classification: IIA in 2 (10%), IIB in 6 (30%), and III in 12 (60%) cases. Revision indications leading to the DFR downgrade included aseptic loosening of one or more components in 15 (75%), infection in 2 (10%), instability in two (10%) and arthrofibrosis in 1 (5%) case. Mean follow up was 18 months, with survivorship free from reoperation of 95% at two years. Patients with retained bicondylar metaphyseal femoral cone (19/20) demonstrated stable osseointegration without subsidence or aseptic loosening at most recent follow up. There were two reoperations: one requiring femoral component revision to a DFR due to periprosthetic fracture non-union (eight months postop) and one reoperation for patellar button recall (n=1) (bicondylar femoral cone retained) (26 months postop). KOOS-JR improved from 46±15 preoperatively to 62±20 at one year.

Conclusion: Bicondylar cones combined with a hinge revision TKA provide a viable option for massive distal femoral bone loss without resorting to DFR. Early results with this "DFR downgrade" combination demonstrate encouraging early survivorship compared to historical DFR outcomes.

Flexible Metaphyseal Cones in Revision Total Knee Arthroplasty: Minimum Two-Year Follow-Up

John B. Meding, MD, R. Michael Meneghini, MD, Lindsey K. Meding, MS, Evan R. Deckard, BS, Leonard T. Buller, MD

Notes

Introduction: Porous metal cones are commonly utilized in revision total knee arthroplasty (rTKA) to manage severe bone loss. Flexible metaphyseal cones (FMCs) allow for macrodeformation, a more uniform stress distribution and diminishing peak stresses to the compromised cortical bone, potentially reducing fracture risk during impaction. This study aimed to evaluate the early outcomes of FMCs used to treat severe bone loss in rTKA.

Methods: Two-hundred forty-one FMCs were inserted during 200 rTKAs. A combination of femoral and tibial FMCs was used in 41 knees. The most common reasons for revision were flexion instability (90 cases), aseptic loosening with or without osteolysis (55 cases) and reimplantation post-infection (27 cases). The mean age at operation was 68 years (range, 37-82 years). The AORI bone loss classification was used. Serial radiographs were reviewed for evidence of loosening or osseointegration and survivorship was determined. The mean follow-up was three years (range, 2-4.5 years).

Results: At final follow-up, no radiolucent lines were identified around the FMCs. Survivorship was 98% for any revision and 99% for aseptic revision, but no cones required revision. Excluding infection, all remaining FMCs (240 cones) demonstrated evidence of stable fixation. Two intraoperative fractures (1%) occurred (one femur and one tibia), both in knees with type 2B defects, and both healed and osseointegrated without additional intervention. There were three re-revisions (1.5%). One knee (0.5%) was explanted for a recurrent infection at six months, one knee underwent irrigation and debridement with polyethylene exchange for infection (post reimplantation) and one knee was revised with polyethylene exchange for arthrofibrosis.

Conclusion: To our knowledge, this is the first study evaluating the clinical results of non-customized, off-the-shelf FMCs in rTKA. FMCs provide stable fixation at early follow-up, and their ability to deform during impaction appears advantageous with low rates of intra-operative fracture.

Symposium VI

The Multiply Revised Knee: Video-Based Techniques for What to Do Next

Moderator: Jeremy M. Gililland, MD

Failed total knee arthroplasty is a growing problem with devastating implications, and the revision TKA burden is rising. Using more metal may or may not be the answer. Preservation of remaining bone stock, mechanical stability, zonal fixation and respect for bony biology are critical to a successful outcome. In this symposium, we will utilize video-based techniques to provide a roadmap and tips and tricks for the latest novel techniques in revision total knee arthroplasty to allow for durable fixation and improved outcomes in these complex patients.

Learning Objectives:

- 1. Understand a systematic approach to appropriate exposure techniques and soft tissue reconstructive options for multiply revised TKAs.
- **2.** Video-based education on advanced techniques for impaction bone grafting of the canals and reconstructing severe bone loss.
- **3.** How to manage the patella in multiply revised knees to maximize function and preserve bone stock.

Outline:

Introduction

Jeremy M. Gililland, MD

Exposure, Exposure, **Exposure**

Joshua C. Rozell, MD

How to Maximize Success with Impaction Bone Grafting

Nicholas A. Bedard, MD

Structural Augmentation: Stacked Cones and More

Peter K. Sculco, MD

Don't Forget the Patella! Or Should We?

Jesse I. Wolfstadt, MD, MSc, FRCSC

Discussion

All Faculty

Notes		

When a Primary Isn't a Primary: An Evaluation of Variations in TKA and Associated Cost Consideration

Claire Althoff, BA, Simon C. Mears, MD, PhD, **Benjamin M. Stronach, MD, MS**, C. Lowry Barnes, MD, Jeffrey B. Stambough, MD

Notes

Introduction: All primary TKAs have the same CPT code (27447), though complexity varies significantly. Some TKAs require additional components, yet reimbursement remains unchanged. As outpatient TKAs gain popularity, this mismatch can lead to discrepancies in costs and compensation. Our study evaluates variability in primary TKAs in an academic practice and assesses predictors for more complex procedures.

Methods: 1177 TKAs from 6/1/2020 to 6/1/2024 were retrospectively reviewed. Patients were grouped into standard or atypical TKA based on utilization of additional components. Atypical TKAs were further subcategorized based on procedure extensiveness: hinge, additional screws, augments, CCKs and conversions from unicompartmental TKA. Cost data was obtained and converted into a ratio with standard TKA=1. Statistical analysis included Chi-Square test, Fisher's exact test and t-test.

Results: Of 1177 TKAs (1060 patients), 1088 were standard and 89 atypical (7.5%). There were no significant differences between the group demographics (p>0.05). ASA scores differed significantly between groups (62.9% standard vs. 51.1% atypical, p=0.03). Atypical TKAs had significantly longer operative times (116.9 minutes vs. 67.9 minutes) and hospital stays (27.3 hours vs. 15.2 hours) (p< 0.0001). Both preoperative and postoperative KOOS scores were lower in the atypical group: (39.5 vs. 48.1; p< 0.0001) and (58.5 vs. 62.9; p=0.03) respectively. 45.5% of standard TKAs met the KOOS pass threshold of 63.7 vs. only 31.5% of atypical (p=0.01). Atypical had a relative cost ratio of 2.5 compared to standard (p< 0.0001). Within the atypical subcategories, the hinge TKAs had the highest mean cost ratio at 5.15 while TKAs with stabilizing screws were closest to the standard cost at 1.05.

Conclusion: In a time of expansive growth in outpatient TKA surgery in ambulatory centers, our findings suggest further CPT code differentiation is required for non-standard TKAs to avoid prohibitive costs in care given the 2.5x relative additional implant cost.

Preoperative Contralateral Joint Pain and/or Back Pain Impact Achieving the SCB for HOOS-JR

Notes

Khaled A. Elmenawi, MD, Shujaa T. Khan, MD, Ignacio Pasqualini, MD, Yuxuan Jin, MS, Viktor E. Krebs, MD, Robert M. Molloy, MD, Matthew E. Deren, MD, **Nicolas S. Piuzzi, MD**

Introduction: CMS has identified contralateral joint and back pain as risk factors that may influence achieving substantial clinical benefit (SCB)—defined as a 22-point improvement on the Hip injury and Osteoarthritis Outcome Score for Joint Replacement (HOOS-JR)—following primary THA. We aimed to compare baseline PROMs and one-year SCB achievement among Medicare patients undergoing primary THA with and without preoperative contralateral joint and/or back pain.

Methods: A prospective cohort of Medicare beneficiaries who underwent primary THA between 2016-2023 (n=4,412) was analyzed. Patients were grouped using the Total Painful Joints and Oswestry Disability Index questions into: both contralateral joint and back pain (n=1,670), contralateral joint pain only (n=274), back pain only (n=1,678) and neither (n=790). Median baseline PROMs and phenotype distributions were compared. Multivariable regression models assessed the association between pain group and SCB achievement, adjusting for demographics, surgical variables and baseline PROMs.

Results: Patients without any pain had higher median baseline HOOS-Pain (50.0 vs. 38.9), HOOS-Physical Function Shortform (HOOS-PS) (58.0 vs. 48.8), Veterans RAND 12-Item Health Survey Mental Component Summary (57.1 vs. 48.6), and HOOS-JR (52.5 vs. 42.3) scores compared to those with both pain types (all p< 0.001). They were more likely to present with the favorable PROM phenotype (Pain+, HOOS-PS+, MCS+; 43.5% vs. 15.7%, p< 0.001) and less likely to exhibit the least favorable phenotype (Pain-, HOOS-PS-, MCS-; 10.6% vs. 33.2%, p< 0.001). At 1-year, back pain (odds ratio [OR]=1.55, p< 0.01), contralateral joint pain (OR=1.73, p=0.01), and both pain types (OR=3.11, p< 0.001) were associated with the risk of failure to achieve SCB-JR.

Conclusion: Preoperative contralateral joint and/or back pain were associated with worse baseline function and decreased likelihood of meaningful improvement after THA. These findings support integrating musculoskeletal comorbidity assessment into preoperative planning, particularly under the CMS PROMs mandate.

Safety of Ketorolac in Primary THAs: An Analysis of over 7,000 Case

Nils Meissner, MD, Moein Bonakdarhashemi, MD, Nelson Leung, MD, Christopher Duncan, MD, Charles P. Hannon, MD, MBA, Matthew P. Abdel, MD

Notes

Introduction: Ketorolac is commonly utilized perioperatively in primary THA, either intravenously (IV) or via local infiltration analgesia (LIA). While effective for pain control, concerns remain regarding its potential to cause acute kidney injury (AKI), particularly in patients with chronic kidney disease (CKD). This study evaluated the association between perioperative ketorolac administration and postoperative AKI, stratified by baseline renal function and administration route.

Methods: We retrospectively analyzed 7,211 inpatient THAs performed between 2011-2021. AKI was defined according to KDIGO criteria. Multivariable logistic regression evaluated the association between perioperative ketorolac administration and in-hospital AKI, adjusting for demographic and clinical covariates. Subgroup analyses were conducted for patients with (15%) and without (85%) preexisting CKD. Ketorolac was administered perioperatively in 34% of cases (25% LIA, 7% IV, 3% both) with a median cumulative dose of 30mg (range, 15–90 mg). Mean age was 66 years, mean BMI 31kg/m² and 52% were female.

Results: AKI occurred in 3.4% of cases. Ketorolac use was not associated with increased AKI risk (OR 0.8, p=0.08), regardless of administration route (all OR < 1; all p>0.05). CKD was an independent risk factor for the development of AKI (OR 4.1; p< 0.001). In patients without CKD, ketorolac use was associated with a decreased risk of AKI (OR 0.6; p=0.03) and not associated with an increased or decreased risk in those with CKD (OR 1.1; p=0.80). Additional independent risk factors for AKI included intraoperative transfusion (OR 4.4; p< 0.001), new onset atrial fibrillation (OR 3.0; p< 0.001), history of hypertension (OR 2.2; p< 0.001), male sex (OR 1.4; p=0.047) and elevated BMI (OR 1.04 per unit-increase, p< 0.001).

Conclusion: Perioperative ketorolac use does not elevate the risk of postoperative AKI, regardless of administration route. Risk factors for AKI include preexisting CKD, male sex, elevated BMI, need for intraoperative transfusion, and history of hypertension.

CMS' Substantial Clinical Benefit After TKA Is Too High: An Analysis Using the AJRR

Notes

Abdul K. Zalikha, MD, Alexandra K. Pius, MD, Marcel Sanchez, MD, Isabella Zaniletti, PhD, James I. Huddleston III, MD

Introduction: The Centers for Medicare and Medicaid Services has set the substantial clinical benefit (SCB) for the Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS-JR) after primary total knee arthroplasty (TKA) at 20 points. We aimed 1) to compare the percentage of patients who achieved minimal clinically important difference (MCID) and SCB for KOOS-JR at one year following TKA and 2) to evaluate factors associated with benchmark achievement.

Methods: We queried the American Joint Replacement Registry (AJRR) and identified 1,206,697 patients who underwent primary TKA from 2018 to 2023. We determined attainment on KOOS-JR at 12 months of 1) distribution-based MCID (7.5), 2) anchor-based MCID (14) and 3) substantial clinical benefit (20). Association of each factor with achievement of MCID and SBC was evaluated using a generalized linear model for binary outcomes that accounted for clustering within institutions. Unadjusted and adjusted odds ratios (OR) for the outcomes of interest with 95% confidence intervals (CI) were reported. Covariates included preoperative KOOS-JR score, sex, race/ethnicity, body mass index (BMI), Charlson Comorbidity Index (CCI), fixation type, use of technology, year of procedure, region, institution type, teaching status and bed size.

Results: Linked scores were recorded by 64,773 patients. Eighty-seven percent achieved the calculated distribution-based MCID. Seventy-seven percent achieved the anchorbased MCID. Sixty-six percent achieved the SCB. Patients with higher preoperative scores (OR 0.93, CI 0.92-0.93, p<0.001), males (OR 0.89, CI 0.85-0.94, p<0.001), increasing BMI (OR 0.93, CI 0.87-0.99, p=0.25) and increasing CCI (OR 0.89, CI 0.81-0.97, p=0.012) were less likely to achieve MCD/SCB. None of the other co-variates were found to be associated with the achievement of MCID/SBC, with the numbers available.

Conclusion: CMS' relatively arbitrarily defined substantial clinical benefit is too high for an operation that routinely yields >80% patient satisfaction.

How Accurate Is the CMS Definition of Success for Patients Undergoing Total Knee Arthroplasty?

Notes

Mohamed Yousef, MD, PhD, Hua Zheng, PhD, Arlene S. Ash, PhD, David C. Ayers, MD

Introduction: TKA is a highly effective treatment for patients with advanced arthritis. The U.S. Centers for Medicare & Medicaid Services (CMS) defines a successful TKA as achieving a minimum 20-point improvement in the KOOS-JR score. However, the accuracy of this criterion and how it correlates with patient satisfaction remains unclear. This study aimed to evaluate the validity of the CMS success criteria following primary TKA.

Methods: A multicenter cohort of 8,444 patients undergoing primary TKA was prospectively enrolled. Patient demographics, comorbidities and KOOS-JR scores were collected preoperatively and at one year. Patient satisfaction was assessed using the International Society of Arthroplasty Registries (ISAR) scale. Patients were categorized as successful or unsuccessful based on CMS criteria and as satisfied or not satisfied based on the ISAR scale. Univariate analysis compared satisfied and successful groups. Cross-classification of outcomes was performed, and a multivariate logistic regression model was used to identify factors associated with patients satisfied after TKA yet labelled as "unsuccessful" by the CMS-definition.

Results: At one-year post-op, 84% of patients reported satisfaction; however, only 64% met the CMS criteria for success. Among satisfied patients, just 71% were classified as successful by CMS standards. Discordance between success and satisfaction was strongly associated with baseline KOOS-JR scores. Among satisfied patients with low baseline scores (KOOS-JR < 40), 91% met the CMS success definition. Conversely, only 39% of satisfied patients with higher baseline scores (KOOS-JR ≥60) were deemed successful. Predictors of satisfied patients classified as unsuccessful based on the CMS-definition include younger age, lumbar spine pain, contralateral knee pain, limited health literacy, diabetes and poorer mental health.

Conclusion: A substantial discrepancy exists between patient satisfaction and CMS definition of success following TKA. A more nuanced, risk-adjusted success metric that accounts for preoperative baseline scores may better align with patient satisfaction.

Duloxetine Does Not Reduce Opioid Use Following Total Knee Arthroplasty: A Randomized Trial

Notes

Ajay S. Potluri, BS, Aditya S. Yadav, MS, JaeWon Yang, MD, Anne DeBenedetti, MS, Craig J. Della Valle, MD, **Denis Nam, MD, MSc**

Introduction: Duloxetine, a serotonin and norepinephrine reuptake inhibitor, may serve an analgesic role in multimodal pain regimens following TKA, particularly for patients with central sensitization, which may lower pain thresholds. This study evaluated the effect of duloxetine on opioid consumption, sleep and outcomes following primary TKA.

Methods: A total of 241 patients were randomized to receive either 30 milligrams of duloxetine (n=126) or placebo (n=115) daily, starting one week prior to surgery and six weeks after surgery. Stratified randomization was based on presence (n=114) or absence (n=127) of central sensitization. As-treated analysis excluded 31 patients who did not adhere to the medication regimen (duloxetine n=108, placebo n=102). Daily morphine milliequivalents (MME), sleep duration and quality were assessed for two weeks following surgery while KOOS JR and VAS pain scores were assessed at six weeks. A priori power analysis revealed that 100 patients in each cohort were required to detect a two-point difference in VAS pain scores. Fourteen patients (5.8%) were lost to follow-up prior to 90 days, leaving 227 followed for a mean of 12.0 months (range 3.0-42.4).

Results: MME requirements (977.1 vs. 1,028.3; p=0.462) and sleep duration (6.6 vs. 6.5; p=0.726) at two weeks postoperatively, as well as KOOS JR (14.4 vs. 14.3; p=0.952) and VAS pain scores (2.6 vs. 2.4; p=0.482) at six weeks, were similar between groups. However, patients taking duloxetine reported higher well-restedness (6.9 vs. 6.4 out of 10; p=0.018). Among centrally sensitized patients, those receiving duloxetine reported being more well-rested (6.8 vs. 6.2; p=0.030). No significant differences in opioid requirements, sleep duration or postoperative pain were observed in the centrally sensitized cohorts (all p>0.05).

Conclusion: Perioperative administration of duloxetine did not impact postoperative pain, opioid requirements or sleep duration. However, improvements in sleep quality were observed, indicating potential utility in postoperative recovery.

The Addition of Regional Blocks Does Not Improve TKA Early Recovery: A Prospective Randomized Trial

Andrew M. Schneider, MD, Caroline J. Granger, MD, Jacqueline King, NP, Venessa Riegler, BA, Ilya Bendich, MD, MBA, Robert L. Barrack, MD

Notes

Introduction: The relative efficacies of regional blocks, including adductor canal (ACB) and infiltration between popliteal artery and capsule of knee (IPACK), and periarticular injection (PAI) in TKA are unknown. Therefore, this study examined the effect of regional blocks (ACB + IPACK) and PAI vs. PAI alone on TKA early recovery using continuous remote patient monitoring.

Methods: Primary TKA patients were randomized to receive preoperative regional blocks (ACB + IPACK) and intraoperative PAI (n=70) or intraoperative PAI-only (n=70). Patients were blinded to their group assignment. The same amount and content of local anesthesia (80cc 0.25% bupivacaine with epinephrine and 30mg ketorolac) was administered and the same multimodal analgesia protocol was followed. A smartphone app was used for two weeks pre and postoperatively to collect daily pain scores, morphine milligram equivalents (MME), Oxford Knee scores (OKS) and satisfaction ratings. Preoperative demographics, pain scores and OKS were similar between groups. A priori power analysis determined 70 patients per group were needed to identify visual analog scale (VAS) pain difference >1.0. Linear mixed-models, chi-square tests and t-tests were used for analysis.

Results: Pain scores peaked on postoperative day (POD)3 in both groups and declined thereafter. The PAI-only group reported lower POD1 VAS pain (3.24 vs. 4.01, p=0.019); scores were otherwise comparable. Peak opioid use occurred on POD3 in both groups, but the PAI-only group consumed less MME on days 2 and 10 (33 vs. 38, p=0.046 and 23 vs. 28, p=0.034, respectively). OKS was improved for PAI-only at POD7 (p=0.037) but did not achieve the minimal clinically important difference. Satisfaction with pain and function was similar between groups.

Conclusion: PAI alone offers similar TKA early recovery compared to multiple regional blocks (ACB + IPACK) and PAI. These level 1 data call into question the long-accepted role of regional blocks in TKA.

Obesity and Chronic Opioids Do Not Prevent THA Patients From Achieving CMS Mandated HOOS JR Scores

Notes

Leonard T. Buller, MD, Tianyi D. Luo, MD, PhD, Evan R. Deckard, BS, John B. Meding, MD, R. Michael Meneghini, MD

Introduction: The Centers for Medicare and Medicaid Services (CMS) will begin mandating improvement thresholds for the Hip Disability and Osteoarthritis Outcome Score, Joint Replacement (HOOS JR) following total hip arthroplasty (THA) starting in 2026. They have established a 22-point improvement target. Data from surgeons and institutions will be publicly reported, which may inadvertently limit patient access if surgeons avoid patients with risk factors for poor outcomes. The purpose of this study was to identify predictors of HOOS JR improvement based on the upcoming CMS-mandated improvement thresholds.

Methods: 1,682 consecutive primary THAs were retrospectively reviewed. Patient data including the presence of fibromyalgia, autoimmune disease, avascular necrosis, depression, chronic narcotic usage and lumbar spine disease were manually extracted from a state-wide healthcare system. Predictors of improvement in HOOS JR scores were evaluated accounting for the minimal clinically important difference (MCID) and substantial clinical benefit (SCB) thresholds. Multivariate statistical analyses were performed with P<0.05 considered significant.

Results: At mean follow-up of 22 months, mean improvement in HOOS JR score from preoperative baseline was 36.0 points (range, -44 to 100). 76.8% of patients met the HOOS JR SCB of 22 suggested by CMS, and 95.5% met the MCID threshold of six. In multivariate analysis, only increasing body mass index was associated with greater improvement in HOOS JR scores (P=0.006). Interestingly, chronic narcotic use was not associated with achieving HOOS JR SCB, MCID, or improvement scores in HOOS JR (P≥0.336, power≥91.6%).

Conclusion: This study demonstrated that patients with characteristics traditionally associated with poorer outcomes were still able to achieve meaningful improvement in HOOS JR scores following THA. Furthermore, based on the variables collected in this study, very few patient characteristics were significantly associated with meeting the CMS-defined improvement threshold, calling into question the appropriateness and validity of the proposed benchmark.

Symposium VII

A Concise Update on Decision Making and Optimal Techniques in Revision THA

Moderator: Fares S. Haddad, MD, FRCS (ORTHO)

This symposium will address Implant removal made easy, covering topics including new techniques to facilitate acetabular explantation, when to ETO, removal of ingrown femoral components and disaster scenarios to avoid. It will provide an algorithm for acetabular reconstruction, discussing bone loss pre-operatively and intraoperatively, when to use a hemisphere and when not to, the role of augments and cages in 2025 and the absolute indications for custom components. Learners will also hear an algorithm for femoral reconstruction, including how to evaluate the available femoral bone, reconstruction options with or without extended trochanteric osteotomy, when modularity is a must and various salvage options. Finally, faculty will cover optimizing stability in revision THA, addressing decision-making in single component revision, head size, indications and concerns for dual mobility. constrained cups and when abductor reconstruction is necessary.

Learning Objectives:

- **1.** To help surgeons choose the optimal approach and technique.
- **2.** To provide strategies to avoid unexpected challenges in revision.
- **3.** To help surgeons deliver the best outcomes.

Outline:

Introduction

Fares S. Haddad, MD, FRCS (ORTHO)

Exposure and Implant Removal: Setting the Scene Andrew R.J. Manktelow, MBBS

An Algorithm for Femoral ReconstructionNathanael D. Heckmann, MD

An Algorithm for Acetabular Reconstruction Fares S. Haddad, MD, FRCS (ORTHO)

Optimizing Stability in Revision THA

Anna R. Cohen-Rosenblum, MD, MSc

Discussion

All Faculty

Notes		

Subsidence Starts Distally: Scaffolding vs. Reconstitution Closure of an ETO in Revision THA

Josef E. Jolissaint, MD, Leonardo A. Sanchez, BA, Samuel Rodriguez, MD, Travis R. Weiner, BS, Elizabeth B. Gausden, MD, MPH, Brian P. Chalmers, MD, Jose A. Rodriguez, MD, Peter K. Sculco, MD

Notes

Introduction: Extended trochanteric osteotomy (ETO) facilitates safe removal of well-fixed femoral stems during revision total hip arthroplasty (rTHA). The optimal ETO closure method—"scaffolding" (open ETO during canal preparation) or "reconstitution" (ETO reduced prior to preparation)—remains unclear, especially regarding subsidence of tapered splined titanium stems (TSTS). We evaluated the impact of ETO closure technique on postoperative TSTS subsidence, hypothesizing no significant difference.

Methods: We retrospectively reviewed 66 rTHAs (2016–2020) performed with ETO and TSTS implantation. Thirty-five cases used reconstitution and 31 used scaffolding. Subsidence was measured radiographically from immediate postoperative to final follow-up. Subsidence >5 mm was deemed clinically significant. Statistical analyses included Mann-Whitney U, Chi-square and multivariable logistic regression.

Results: Average subsidence was higher in the reconstitution group (6.0 \pm 3.6 mm) than scaffolding group $(4.3 \pm 2.9 \text{ mm}, p = 0.995)$. Rates of significant subsidence (>5mm) were similar (31.4% vs. 32.3%, p = 0.958). Scaffolding achieved greater distal bicortical contact (50 \pm 5.4 mm vs. 28 \pm 4.8 mm; p=0.002), which inversely correlated with subsidence (r = -0.26, p = 0.037). Contact length within the ETO was not predictive of subsidence (p = 0.359). Logistic regression identified distal bicortical contact >30 mm below the ETO as protective against significant subsidence (OR 0.12, p < 0.001). Subgroup analysis revealed lower subsidence in reconstitution cases with a healed ETO (e.g., staged periprosthetic joint infection revisions) than in fresh ETOs closed with reconstitution (4.0 \pm 1.1 mm vs. 9.1 \pm 2.4 mm). ETO union rates were high (94.0%) in both groups.

Conclusion: Both closure techniques are viable; however, scaffolding offers superior distal fixation and reduced subsidence in fresh osteotomies. Reconstitution yields similar outcomes when the ETO is healed. Ensuring >30 mm of bicortical contact below the ETO is key to minimizing stem subsidence, regardless of closure technique.

Unrestricted Weight Bearing Does Not Impact Subsidence After Femoral Revision THA with Modern Stems

Notes

Nicholas Sauder, BA, Michael Meghpara, MD, MBA, Neeku Salehi, BS, Gabriel L. Furey, BA, Trevor McBroom, MD, Raghav Narravula, MS, Hany S. Bedair, MD, P. Maxwell Courtney, MD, **Christopher M. Melnic, MD**

Introduction: Tapered, fluted stems are commonly utilized in revision total hip arthroplasty (THA). Patients are often restricted to touch-down weight-bearing (TDWB) due to concerns about stem subsidence. Yet TDWB may impede postoperative recovery. Safely transitioning additional patients to weight-bearing as tolerated (WBAT) may improve functional rehabilitation. We compared femoral stem subsidence between TDWB and WBAT femoral revision THA patients treated with modern revision stems.

Methods: This was a multicenter retrospective analysis, with data sourced from two longitudinally maintained institutional arthroplasty registries. At Institution 1, consecutive series of TDWB and WBAT femoral component revision THAs from 2016-2022 were reviewed. At Institution 2. a randomized selection of 5 TDWB and 5 WBAT cases from 2017-2019 were reviewed. Patient weight-bearing status, demographics, and perioperative variables were collected. Femoral stem subsidence was measured at three months, one year and two years. A power analysis revealed that the present sample size (41 WBAT vs. 41 TDWB) could detect a difference in subsidence of 0.63 mm between cohorts (power=80%; alpha=0.05). Stem subsidence and all-cause re-revision within three years were compared. To isolate the independent contribution of weight-bearing status to subsidence in heterogeneous cohorts, we utilized forward conditional multivariable linear regression.

Results: Femoral stem subsidence did not differ between TDWB and WBAT cohorts at three months $(4.0\pm3.4 \text{ mm vs.} 2.6\pm2.7 \text{ mm}$; p=0.09), one year $(6.2\pm4.7 \text{ mm vs.} 5.1\pm4.0 \text{ mm}$; p=0.35) and two years $(7.6\pm4.5 \text{ vs.} 7.0\pm4.5 \text{ mm}$; p=0.70). Weight-bearing status was not independently associated with variation in subsidence after controlling for other factors (p=0.28). All-cause re-revision at three years also did not differ (p=0.26).

Conclusion: Following femoral component revision THA with modern revision stem designs, we found no clinically relevant difference in subsidence between WBAT and TDWB patients. To our best knowledge, this is the first study reporting this finding. The present study supports assigning additional select patients to WBAT following femoral revision THA.

Higher BMI but not Stem Fill Is Associated with Subsidence of Modular Fluted Tapered Stems in rTHA

Michael S. Ramos, MS, Khaled A. Elmenawi, MD, Shujaa T. Khan, MD, **Matthew E. Deren, MD**, Anabelle Visperas, PhD, Peter Surace, MD, Viktor E. Krebs, MD, Robert M. Molloy, MD, Nicolas S. Piuzzi, MD

Notes

Introduction: Modular fluted tapered (MFT) stems have become the workhorse in aseptic revision total hip arthroplasty (rTHA). While aseptic loosening remains a leading cause of rTHA failure, studies investigating risk factors of stem subsidence in the revision setting are notably lacking. This study aimed to identify risk factors for stem subsidence >5 mm among patients who underwent rTHA with an MFT stem.

Methods: A retrospective cohort study of 256 patients who underwent aseptic rTHA with an MFT stem between June 2015 and March 2024 was performed. Mean radiographic follow-up was 2.9±2.5 years. Clinical information was collected via a validated, prospective data collection system. Radiographic outcomes included stem subsidence, cortical bone index, modular body canal fill and femoral stem canal fill. A multivariable logistic regression modeled risk factors of stem subsidence >5 mm. An alpha value of 0.05 was considered statistically significant.

Results: The mean stem subsidence of all patients was 3.2±3.4 mm [range, 0.17–37.2]. 42 patients (16.4%) experienced stem subsidence >5 mm. No patient required re-revision for aseptic loosening. Body mass index (BMI) was associated with stem subsidence >5 mm, such that for every 1 kg/m2 increase in BMI, the odds of subsidence >5 mm increased by 5.5% (95% CI: 1.004–1.11, P=0.03), controlling for sex and stem canal fill at 50 and 100 mm distal to the modular junction.

Conclusion: To the best of our knowledge, this is the largest study to evaluate stem subsidence of MFT stems in aseptic rTHA. The results suggest that a mean femoral stem canal fill of 76% across the stem's length may be adequate for construct stability. A higher BMI increased the odds of stem subsidence >5 mm. More cautious weight-bearing protocols after aseptic rTHA with an MFT stem may be warranted in patients with elevated BMIs.

184 Revision THAs with Pelvic Discontinuity: Advancements with Cup-Cage and Custom Triflanges

Aaron G. Chen, MD, MSc, Robert T. Trousdale, MD, Rafael J. Sierra, MD, David G. Lewallen, MD, Daniel J. Berry, MD, Matthew P. Abdel, MD

Notes

Introduction: Historic series have demonstrated the importance of construct rigidity in the treatment of pelvic discontinuities, but there remains limited data comparing different constructs, especially contemporary cup-cages and custom triflange components. The aim of this study was to evaluate reconstructive constructs with emphasis on implant survivorship, radiographic results, complications and clinical outcomes.

Methods: We reviewed 184 revision THAs with unilateral pelvic discontinuity at a single institution between 1998-2022. Mean age was 66 years, 83% were female and mean BMI was 29 kg/m2. Constructs included uncemented cup and plating (n=66, 36%), cup-cages (n=59, 32%), jumbo uncemented acetabular components (n=30, 16%), conventional antiprotrusio cages (n=16, 9%) and custom triflanges (n=13, 7%). Since 2013, 73% of cases were treated with either a cup-cage or custom triflange. Acetabular distraction (n=36, 20%) and porous augments (n=33, 18%) were used as adjuncts. Mean follow-up was eight years.

Results: The five-year survivorships free of revision for aseptic loosening, any revision and any reoperation were 92%, 79% and 75%. Of 43 revisions, the most common indications were aseptic loosening (n=15) and dislocation (n=15). For each construct, the five-year survivorships free of revision for aseptic loosening were 100% (triflange), 94% (cup-cage), 92% (uncemented jumbo acetabular component), 90% (plating) and 86% (conventional anti-protrusio cage). Radiographic analysis demonstrated discontinuity healing in 85% of unrevised patients. Of the 15 re-revisions for aseptic loosening, 92% involved loss of fixation from inferior hemipelvis. There were 63 complications with dislocation (n=32), nerve palsy (n=10), and wound problems (n=9) most common. Mean Harris hip scores improved from 51 to 70 at five years.

Conclusion: In this series, the five-year survivorship free from aseptic loosening was very good (92%), especially with contemporary techniques like custom triflange (100%) and cup-cage constructs (94%). Survivorship free from any revision (79%) and reoperation (75%) remain lower due to dislocation and infection.

"Two Strikes, You're Out": Natural History of Instability after Posterior and Anterior Approach THA

Notes

Daniel A. Driscoll, MD, Delano R. Trenchfield, MD, Michael Viggiano, BS, Carmelo Burgio, MD, Tsion Yared, BA, Peter K. Sculco, MD

Introduction: Historical studies suggest that (1) ~30% of THA patients who experience instability require revision THA (rTHA) and (2) ≥3 dislocations indicate necessity for rTHA. We used a modern cohort of posterolateral (PL) and direct anterior (DA) approach THA patients to analyze rates of dislocation and revision.

Methods: There were 40,315 patients who underwent primary THA at our institution from 2016-2024. Among these patients, those who sustained a dislocation event were included. Keyword and diagnosis code search was performed to identify patients, and chart review confirmed dislocation. Comparisons were performed using Chi-square or independent t-test.

Results: There were 285 patients with at least one dislocation (0.7%; mean follow-up 5.7 years). PL patients had higher rates of dislocation (0.87% vs. 0.22%; P< 0.00001), recurrent dislocation (76.9% vs. 40.1%; P=.01) and revision for instability (84.9% vs. 68.2%; P=0.02) than DA patients. Among all patients, 35.1% dislocated exactly once, 41.3% dislocated exactly twice and 23.6% dislocated 3+ times. Revision rate increased with number of dislocations (69.1%, 93.9% and 98.5% for 1, 2 and 3+ dislocations respectively; P< 0.00001). Revised patients had higher mean number of dislocations (2.1 vs. 1.2; P< 0.0001) and longer time from THA to first dislocation (311.6 vs. 96.4 days; P< 0.0001) than non-revised patients. Late dislocators (first dislocation >90 days from THA) were more likely than early dislocators (first dislocation ≤90 days) to undergo revision (97.0% vs. 74.9%; P< 0.0001). Among one-time dislocators, late dislocators were revised more frequently than early dislocators (86.4% vs. 57.3%; P=0.01).

Conclusion: PL patients were four times more likely to dislocate and nearly twice as likely to dislocate recurrently than DA patients. Rate of revision for instability was more than double previously reported rates. One late dislocation (>90 days after THA) or recurrent dislocation (2+ dislocations) at any time point are highly predictive of subsequent rTHA.

Revision Total Hip Arthroplasty for Instability: 10-Year Survivorship and Risk Factors for Failure

Liam Z. Yapp, FRCS, **Lisa C. Howard, MD, FRCSC**, Nelson V. Greidanus, MD, Bassam Masri, MD, Donald S. Garbuz, MD, Michael E. Neufeld, MD, MSc, FRCSC

Notes

Introduction: Recurrent instability remains a leading cause of failure after revision THA (rTHA). This study aims to assess the 10-year survivorship of the first rTHA when undertaken for instability and identify factors associated with failure.

Methods: We retrospectively identified all consecutive rTHA performed for instability at our institution between 2000-2022. Of the 678 rTHA identified, 290 (42.8%) were the first revision procedure and included in the study. Rerevisions and oncology cases were excluded. The mean age at revision was 65 years and 63.2% were female. The mean follow-up was 11.4 years (range: 2-22) and 82 (28.3%) died during the study period. Survival free from instability-related and all-cause re-revision at 10 years was calculated using Kaplan-Meier analysis. Multivariable Cox proportional hazard regression modelling was used to assess factors associated with 10-year survival.

Results: A total of 84 (29%) hips underwent at least one re-revision. Ten-year survivorship was 80.9% for instability and 72.4% for all-cause re-revision. Dual mobility (DM) components had higher 10-year instability-free survival than both standard bearings and constrained liners (p=0.04), However, when considering 'large' (>36mm) femoral heads, there was no difference in the revision rate when compared to DM components (p=0.59). Isolated modular component exchange was associated with re-revision THA for instability (Hazard Ratio (HR) 1.89 95%CI 1.1-4.1, p=0.02). Constrained liners were associated with a higher risk of revision for instability (HR 2.7 95%CI 1.05-6.8, p=0.01). Younger age at surgery (p=0.002), elevated BMI (p=0.01), abductor deficiency (p=0.03) and using a constrained liner (p=0.04) were significantly associated with all-cause rerevision.

Conclusion: In patients undergoing first time rTHA for instability nearly 20% will have recurrent instability and 30% will undergo further revision. DM and large femoral heads demonstrate similar long-term survivorship. Several patient and implant-related factors are associated with instability-specific and all-cause re-revision.

Concordance of Dislocation Direction and Surgical Approach is an Approach-Dependent Risk For Recurrent Instability Following Total Hip Arthroplasty

Notes

Andrew M. Schwartz, MD, Lindsey Ruderman, BA, Crystal Jing, BA, David G. Deckey, MD, Michael P. Bolognesi, MD, Sean P. Ryan, MD

Introduction: The purpose of the study was to quantify the risk of recurrent hip dislocation in relation to concordance of dislocation directionality and surgical approach.

Methods: Included patients underwent anterior-based or posterior-based elective total hip arthroplasty (THA) at a single institution and sustained at least one dislocation. Surgical approach, timing, direction and management of dislocations, including closed reduction and reoperation were obtained. Concordance was defined as dislocation in the same direction as the surgical approach. Chi-Square analysis was performed to assess differences in dislocation recurrence, depending upon approach and dislocation directionality. Ordinal logistic regression assessed predictors of dislocation count, while Cox regression and Kaplan-Meier analysis evaluated time and risk of second dislocation.

Results: One hundred and ten patients (112 hips) experienced dislocation after THA between January 1, 2013 and April 14, 2025. Posterior approach was most common (61.6%), followed by anterior (27.7%) and direct lateral (10.7%). Median time to first dislocation was 41 days [18, 102.5] and most were posteriorly dislocated (64.3%). Five patients (4.5%) required an open reduction and revision after index dislocation. Fifty-six patients experienced at least two dislocations, accounting for 52.3% of patients that weren't revised at initial dislocation. Median time to second dislocation was 94 days [44, 344]. For posterior approaches, 61.8% of posterior dislocations, recurred, while just 28.6% of anterior dislocations recurred (p=0.02). For anterior approaches, 42.3% of posterior dislocations and 41.2% of anterior dislocations recurred (p=0.94).

Conclusion: Concordance between approach and dislocation directionality is a helpful predictor of recurrence for posterior-based approaches. Recurrent instability occurs in more than half of patients after a single dislocation, so indications for revision should be closely scrutinized after an instability event.

Risk Factors for Dislocation After Total Hip Arthroplasty: Does Head-to-Cup Size Ratio Matter?

Notes

Jacqueline K. Kobayashi, MD, Elizabeth A. Klag, MD, Zhaorui Wang, MD, Michael M. Kheir, MD

Introduction: Dislocation is a known complication after THA. Utilizing a large femoral head to increase jump distance may reduce this risk; however, large head sizes may not be available for smaller cups depending on manufacturer. The head-cup ratio may be a more tailored measure of determining optimal head size to prevent dislocation. This study aims to determine if the head-cup ratio predicts 90-day dislocation rate after primary THA.

Methods: This was a retrospective study of 6,167 patients who underwent primary THA at a single academic institution from 2012-2024 and were prospectively enrolled in MARCQI (Michigan Arthroplasty Registry Collaborative Quality Initiative). Univariate and logistic regression analyses were performed. ROC curves were generated to determine the optimal head-cup ratio to prevent dislocation.

Results: Eighty-six patients (1.4%) sustained a dislocation within 90 days postoperatively. We observed a temporal trend of increasing head size over this period, as well as decreasing dislocation rate. The optimal head-cup ratio to prevent dislocation was identified as \geq 0.7 (AUC 0.61; sensitivity 79.1%, specificity 43.0%). Seventy-three of 86 dislocations (84.9%) occurred in patients with head-cup ratio <0.7. In our univariate analyses, a higher head-cup ratio (p<0.01) and use of robotic technology (0.2 vs. 1.5%, p=0.02) were associated with lower dislocation rate. Our logistic regression analysis demonstrated that higher head-cup ratio (p=0.01), robotic use (p=0.04) and lower Elixhauser scores (p<0.01) were associated with decreased odds of dislocation.

Conclusion: Having a higher head-cup ratio as well as robotic use were independently associated with a lower rate of prosthetic hip dislocations within 90 days postoperatively when controlling for several confounders. With highly cross-linked polyethylene, surgeons should consider the benefits of using a larger femoral head to prevent dislocation; furthermore, the use of technology including robotics may allow more precise positioning of components which aids in further reducing this risk.

The Effect of Dual Mobility Articulations on Re-Revision After Revision for Dislocation

Mazen Zamzam, BS, Noah Hodson, MD, Richard E. Hughes, PhD, Ql Zhu, MS, Huiyong Zheng, PhD, **Brian R. Hallstrom, MD**, Michael A. Charters, MD

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Introduction: Recurrent instability and subsequent revisions remain persistent challenges after revision total hip arthroplasty. Dual mobility acetabular constructs may reduce dislocation and early re-revision risk, though long-term comparative data remain limited. This study evaluated whether dual mobility cups used during revision for instability are associated with lower re-revision rates than traditional fixed-bearing constructs.

Methods: A retrospective analysis of the Michigan Arthroplasty Registry Collaborative Quality Initiative identified 796 patients who underwent revision of elective primary total hip arthroplasty for dislocation between February 15, 2012, and December 31, 2023. Resurfacing, conversion and urgent cases were excluded. The primary outcome was time to re-revision. Cumulative percent revision (CPR) curves were compared using log-rank testing. A multivariable logistic regression model was used to evaluate odds of revision within two years, adjusting for age, sex, body size, smoking status and comorbidity status.

Results: The two- and five-year CPR for re-revision were 12.6% (95% CI, 10.1-15.0) and 17.1% (95% CI, 14.1-20.0), respectively. Dual mobility constructs had significantly lower CPRs than non-dual mobility (log-rank p = 0.022). At one year, CPR was 4.7% (95% CI, 1.8-7.5) vs. 11.3% (95% CI, 7.7-14.8); at two years, 6.8% (95% CI, 3.3-10.2) vs. 14.2% (95% CI, 10.2-18.0). By five years, confidence intervals overlapped: 12.3% (dual mobility) vs. 20.2% (non-dual mobility). The early protective effect persisted after adjustment; non-dual mobility constructs had significantly higher odds of revision within two years (odds ratio, 2.04; 95% CI, 1.2-3.5; p = 0.009).

Conclusion: Dual mobility cups significantly reduce early re-revision risk following revision total hip arthroplasty for instability, even after adjusting for patient characteristics. However, the benefit diminishes by five years, likely due to other failure mechanisms. These findings support selective dual mobility use and highlight the need for long-term surveillance to assess durability and late complications.

Anterior Approach Is Associated with Lower Dislocation Risk for Isolated Head-Liner Exchange

Pravjit Bhatti, MD, Alex J. Anatone, MD, Josef E. Jolissaint, MD, Patrick J. Gallagher, MS, Jiaqi Zhu, MA, Eytan M. Debbi, MD, PhD, Jose A. Rodriguez, MD, Brian P. Chalmers, MD,

Notes

Elizabeth B. Gausden, MD, MPH

Introduction: Isolated head-liner exchange (HLE) can be utilized as a less invasive option for specific indications in revision THA. Historically, the most common complication following HLE is dislocation. The objective of this study was to determine if the direct anterior approach (DAA) with medial capsule preservation results in a lower incidence of dislocation when compared to the posterolateral approach (PLA) for HLE.

Methods: A retrospective review identified 117 patients undergoing isolated HLE revision THA (88 PLA and 29 DAA) for polyethylene wear between 2016-2023. Cases that had a previous periprosthetic joint infection (PJI) or previous instability were excluded. Kaplan Meier curve demonstrated the probability of survival in reoperation and dislocation by Anterior vs. Posterior group over time. Differences in survival probability between groups were assessed using the log-rank test.

Results: Femoral head size was increased in 53% of PLA and 35% of DAA. Elevated liners were placed in 36% of PLA HLE vs. 7% of DAA, and dual mobility construct (DMC) or a constrained liner in 10% and 6% of PLA, respectively, but in none of the DAA cohort. Dislocation occurred following HLE in 18/88 PLA hips vs. 1/29 DAA hips (p=0.049). The one dislocation in the DAA cohort had no subsequent instability events, while 8 of the PLA cohort dislocated more than once (range, 2-4). There were 11 reoperations, all in the PLA cohort (12.5% vs. 0%, p=0.061). Indications for reoperations included recurrent instability (n=7), PJI (n=2), periprosthetic femur fracture (n=1), and wound dehiscence (n=1).

Conclusion: Use of the DAA with medial capsule preservation for isolated HLE was associated with a lower rate of dislocation, despite less frequent use of DMC, larger heads and elevated liners in the DAA cohort. Surgeons may consider DAA for isolated HLE to reduce the risk of postoperative instability.

Arthroplasty for Femoral Neck Fracture Can Be Delayed for Treatment with an Arthroplasty Surgeon

Notes

Alan E. Wilson, MD, Alexandra L. Hohmann, MD, Nihir Parikh, MD, Alexander G. Athey, MD, **Chad A. Krueger, MD**, Yale A. Fillingham, MD

Introduction: The modern treatment paradigm for displaced femoral neck fractures favors early arthroplasty for medically optimized patients. Typically, these injuries are managed by the on-call orthopedist regardless of subspeciality training to facilitate prompt care. The aims of this study were to compare outcomes for patients treated with arthroplasty for femoral neck fracture performed by adult reconstruction subspecialized surgeons to those performed by surgeons of other orthopaedic subspecialties and to determine if surgery can safely be delayed to accommodate subspecialized care.

Methods: A retrospective, single-institution analysis was performed on all patients who underwent hemiarthroplasty or THA for displaced femoral neck fracture from 2015 through 2023. Patient demographics, time from admission to surgery, medical complications, surgical complications and 90-day readmissions were recorded from the medical record. Patients were divided into cohorts based on time from admission to surgery greater or less than 36 hours and if their operating surgeon was classified as a member of the adult reconstruction division vs. those with other orthopaedic subspecialty affiliations.

Results: We identified 752 patients who underwent hemiarthroplasty and 509 who underwent THA for displaced femoral neck fracture. Almost all included THAs were performed by arthroplasty surgeons (98.4% vs. 1.57%). Greater rates of in-hospital complications were not observed when delaying care over 36 hours for surgeries performed by adult reconstruction surgeons compared to those treated by non-adult reconstruction specialized surgeons within 36 hours (P= 0.174). Hiprelated readmission rates and 90-day mortality did not differ significantly among the four cohorts (P=0.611 and P=0.257). For the outcome of 90-day readmissions, 91% power was achieved.

Conclusion: Delaying arthroplasty for femoral neck fracture up to 36 hours appears to be safe when surgeries are performed by adult reconstruction surgeons. Larger studies are needed to assess differences in surgical complications between these groups.

Symposium VIII

State of the Art Management of Periprosthetic Fractures of the Femur

Moderator: George J. Haidukewych, MD

This symposium will provide the latest techniques on the management of complex pelvic bone defects in revision total hip arthroplasty (rTHA). Audience members will leave with an enhanced understanding of preoperative planning, available reconstructive options, and intraoperative pelvic reconstructive techniques using various surgical approaches in rTHA.

Learning Objectives:

- 1. To understand the advantages, disadvantages and indications for use of modular or monoblock femoral revision stems.
- 2. To identify helpful fracture reduction techniques to rebuild the femoral isthmus before or after stem implantation.
- **3.** To understand the indications and utility of the proximal femoral replacement in cases of significant bony compromise or an unsalvageable proximal femur.
- **4.** To illustrate the indications and utility of an extended trochanteric osteotomy and indications for using supplemental fixation (i.e. plating) to augment fixation of the revision THA.

Outline:

Introduction

George J. Haidukewych, MD)

Periprosthetic Fractures of the Femur Are Best Treated with Monoblock Stems

Ran Schwartzkopf, MD, MSc

Periprosthetic Fractures of the Femur Are Best Treated with Modular Stems

George J. Haidukewych, MD

Open Reduction & Internal Fixation (ORIF) of B1 Fractures: Preserving Vascularity and Surgical Tips & Tricks

Elizabeth D. Jacobs. MD

ORIF Around Loose Stems? Why Are Some Doing This?

George J. Haidukewych, MD

Direct Anterior Approach in the Management of Periprosthetic Femur Fractures: Is There a Role? Lucas A. Anderson, MD

Proximal Femoral Replacement, When Do I Give Up? Ran Schwartzkopf, MD, MSc

Interprosthetic Fractures: The Role of Nail-Plate Combinations

Elizabeth D. Jacobs, MD

Discussion

All Faculty

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MEETING

Radisson Blu Aqua Hotel April 30 - May 2, 2026 Chicago, Illinois

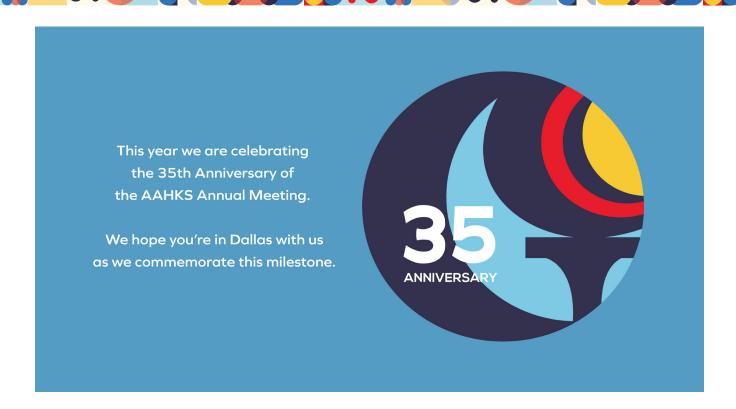
2026 AAHKS Spring Meeting

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April 30-May 2, 2026 Radisson Blu Aqua Hotel Chicago, IL

2026 AAHKS Annual Meeting

Nov. 5-8, 2026 Gaylord Texan Resort & Convention Center Dallas, TX

2027 AAHKS Spring Meeting

April 29-May 1, 2027 JW Marriott Essex House New York New York, NY

2027 AAHKS Annual Meeting

Nov. 4–7, 2027 Gaylord Texan Resort & Convention Center Dallas, TX



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