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in Patient Care
Starts Here

2018 FINAL PROGRAM

AAHKS
2018 ANNUAL MEETING

November 1-4 | Dallas, Texas



**SAVE
THE DATE!**

AAHKS 2019
SPRING MEETING MAY 2-4
NEW YORK, NEW YORK, USA

Crowne Plaza Times Square | New York

- Case-based learning
- Peer-to-peer education
- Small-group setting
- Expert faculty



AAHKS®
AMERICAN ASSOCIATION OF
HIP AND KNEE SURGEONS

Visit www.AAHKS.org for meeting details

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Education

EDUCATIONAL ACTIVITY SCOPE

The **2018** 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 disease.

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 healthcare 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.

The American Association of Hip and Knee Surgeons (AAHKS) designates this live activity for a maximum of *18 AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CLAIM CME CREDITS

AAHKS will send an **email** with a meeting evaluation upon conclusion of the Annual Meeting. The end of the evaluation is a link to claim CME credit. It is the meeting attendee's responsibility to claim credits based on actual hour-for-hour participation actually spent in an educational activity.

DISCLAIMER

The material presented at this Annual Meeting has been made available by AAHKS for educational purposes only. This material is not intended to represent the only, nor necessarily the best methods or procedures appropriate for the medical situations discussed; but rather, is intended to present an approach, view, statement or opinion of the faculty, which may be helpful to others who face similar situations. AAHKS disclaims any and all liability for injury or other damages resulting to any individual attending a course and for all claims, which may arise out of the use of the techniques, demonstrated there in by such individuals, whether these claims shall be asserted by a physician or any other person.

CONTENT AGREEMENT

By attending in 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.

FDA STATEMENT

Some pharmaceuticals and/or medical devices demonstrated 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.

Educational Grants

AAHKS wishes to thank

DePuy Synthes

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Stryker

Zimmer Biomet

For their generous educational grants that make the Annual Meeting possible.

Education

DISCLOSURE

Each participant in the Annual Meeting has been asked to disclose if he or she has received something of value from a commercial company or institution, which relates directly or indirectly to the subject of their presentation. These are the disclosure categories:

- Nothing to disclose
- Royalties from a company or supplier
- Speakers bureau/paid presentations for a company or supplier
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- Royalties, financial or material support from publishers
- Medical/Orthopaedic publications editorial/governing board
- Board member/committee appointments for a society

An indication of the participant's disclosure appears after his or her name as well as the commercial company or institution that provided the support. 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. Disclosures can be found in the back of this program and at www.AAHKS.org/Meeting.



Raul J. Rosenthal MD, FACS, FASMBS and John Magaña Morton, MD, MPH, FACS, FASMBS are taking part in the symposium, "The Comprehensive Management of the Bariatric Patient: Perspectives from Bariatric and Orthopedic Surgeons," on Friday, November 2, 2018.

AAHKS

2018 ANNUAL MEETING

November 1-4 | Dallas, Texas



Dr. Engh to Receive the 2018 AAHKS Humanitarian Award

Gerard "Jerry" A. Engh, MD has been selected as the 2018 American Association of Hip and Knee Surgeons Humanitarian Award recipient. Dr. Engh founded Operation Walk Virginia in 2006, which has provided hip and knee replacements to the underserved in Managua, Nicaragua, Ecuador, Guatemala, Panama and Bolivia. This chapter was one of the first to branch off from the Operation Walk chapter in Los Angeles founded by Lawrence D. Dorr, MD. Dr. Engh routinely brought along guest surgeons to his mission trips, and many have since gone on to establish their own chapters and successful Operation Walk missions.

Also part of Dr. Engh's vision is to bring doctors from the host countries to the United States to learn by observing the surgical techniques involved in knee and hip replacement. The doctors are then be able to take these skills back to their own country—perpetuating the help for years to come.

After graduating from Davidson College, Dr. Engh attended medical school at the University of Virginia. Following an internship and residency at Yale-New Haven Hospital, he spent two years as a major in the Army Medical Corps. He then joined his brother working at The Anderson Orthopaedic Clinic in Virginia, which had been founded by his father, Otto Anderson Engh. Dr. Engh retired from the practice in 2013.

In recognition of Dr. Engh's contribution to medical missions around the world, an Operation Walk Virginia board member remarked, "He deserves the AAHKS Humanitarian Award because of the amount of people he has touched in a positive way. From his patients at the Anderson clinic, to the fellows he has trained and all their patients, to his family, to his staff and now to patients across the globe. We are talking about hundreds of thousands of people who are better off because Dr. Jerry is in this world. We should all strive to leave such a positive mark on this planet."

The AAHKS 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.

Nominations for the 2019 AAHKS Humanitarian Award are now being accepted through April 15, 2019 at www.AAHKS.org/Humanitarian.

WEDNESDAY, OCTOBER 31, 2018

10:00 a.m. – 5:00 p.m.	Exhibit Set-Up	Learning Center/ Exhibit Hall
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THURSDAY, NOVEMBER 1, 2018

6:30 a.m. – 7:00 p.m.	Registration	Peacock Foyer
10:00 a.m. – 5:00 p.m.	Exhibit Set-Up	Learning Center/ Exhibit Hall
1:00 p.m. – 5:00 p.m.	Poster Set-Up	Chantilly Ballroom

Industry Symposia

Industry Symposia are separate from the official program planned by the AAHKS Annual Meeting Program Committee and **DO NOT** offer AMA PRA Category 1 Credit™ unless noted by the sponsor.

7:30 a.m. – 9:30 a.m.	AmnioFix: Where Does it Fit in Clinical Practice? <i>MiMedx</i>	Grand Ballroom E
10:00 a.m. – 12:00 p.m.	Novel Opioid Sparing Approach for Hip and Total Knee Procedures <i>Avanos</i>	Grand Ballroom A
10:00 a.m. – 12:00 p.m.	Physician-Driven Bundles in Outpatient Total Joint Surgery: A New Value-Based Paradigm <i>Reflexion Health/Delta Joint Management</i>	Grand Ballroom D
10:00 a.m. – 12:00 p.m.	Improving Patient Outcomes with Orthopedic Wound Management Solutions <i>DePuy Synthes (Ethicon-Johnson & Johnson)</i>	Grand Ballroom E
10:00 a.m. – 12:00 p.m.	Cryoanalgesia*: A Path to an Opioid-Free TKA, Pre-op Through Rehab <i>Myoscience</i>	Grand Ballroom B
12:30 p.m. – 2:30 p.m.	Computer-Assisted Anatomic Tibia First, Balanced Femur TKA <i>BrainLab</i>	Grand Ballroom A
12:30 p.m. – 2:30 p.m.	Evolving Utility of Negative Pressure Therapy in Arthroplasty Patients: Review of New Clinical Evidence to Reduce Complications and Improve Functional Outcomes <i>KCI – An Acelity Company</i>	Grand Ballroom B
12:30 p.m. – 2:30 p.m.	Breaking Down the Buzz <i>DJO Surgical</i>	Grand Ballroom D
12:30 p.m. – 2:30 p.m.	Transitioning to Same-Day Surgery: Outpatient Total Joints <i>Medtronic</i>	Grand Ballroom E
3:00 p.m. – 5:00 p.m.	Four Critical Enablers of Successful TJR Migration to an ASC Setting <i>DePuy Synthes</i>	Grand Ballroom E



THURSDAY, NOVEMBER 1, 2018

3:00 p.m. – 5:00 p.m.	Rising to Meet the Threat Posed by Periprosthetic Joint Infection, with Dr. Javad Parvizi <i>Heraeus Medical LLC</i>	Grand Ballroom B
3:00 p.m. – 5:00 p.m.	Cementing the Hip: New Focus on a Gold Standard <i>Heraeus Medical LLC</i>	Grand Ballroom A
4:00 p.m. – 5:30 p.m.	International Reception (Invitation Only) Co-hosted by AAHKS, British Hip Society and Italian Hip Society	Topaz Room
4:00 p.m. – 5:30 p.m.	Young Arthroplasty Group Reception (Invitation Only)	Emerald Room
5:00 p.m. – 7:00 p.m.	AAHKS Board of Directors Meeting (Invitation Only)	Wedgwood Ballroom
7:00 p.m. – 7:15 p.m.	FARE Board of Directors Meeting (Invitation Only)	Wedgwood Ballroom

FRIDAY, NOVEMBER 2, 2018

6:00 a.m. – 7:30 p.m.	Registration	Peacock Foyer
6:00 a.m. – 8:00 a.m.	Breakfast for all attendees	Learning Center/ Exhibit Hall
6:00 a.m. – 8:00 p.m.	AAHKS and Guest Societies Poster Exhibition Thank you to Stryker	Chantilly Ballroom
6:00 a.m. – 2:55 p.m.	Learning Center/Exhibit Hall Open	Learning Center/ Exhibit Hall
6:00 a.m. – 8:30 p.m.	Surgical Technique Video Viewing	Rotunda
7:00 a.m. – 2:45 p.m.	Orthopaedic Team Member Course Chair: James A. Browne, MD Co-Chair: Jeremy M. Gililland, MD Co-Chair: Jana L. Flener, PA-C	Wedgwood Ballroom
7:00 a.m. – 2:45 p.m.	The Business of Total Joint Replacement: Finding Talent and Value Co-Chair: William A. Jiranek, MD Co-Chair: Mark I. Froimson, MD, MBA	Senators Lecture Hall
7:00 a.m. – 2:45 p.m.	AAHKS Resident Arthroplasty Course Thank you to DePuy Synthes, Smith & Nephew, Stryker, and Zimmer Biomet Chair: Samuel S. Wellman, MD Co-Chair: James I. Huddleston, MD	Cortez Ballroom
Resident Hip and Knee Breakout Sessions at 10:20 a.m. – 12:00 p.m. and 1:15 p.m. – 2:40 p.m.		



FRIDAY, NOVEMBER 2, 2018

Industry Symposia

7:30 a.m. – 9:30 a.m.	Optimizing Results in Total Knee Arthroplasty <i>DePuy Synthes</i>	Grand Ballroom E
7:30 a.m. – 9:30 a.m.	OA Symptom Management for Non-Operative and Non-Optimized Hip and Knee Patients: Cooled Radiofrequency Ablation <i>Avanos</i>	Grand Ballroom B
7:30 a.m. – 9:30 a.m.	Practical Tools for Bundled Payment Success – Will Your Strategy Work? <i>Smith & Nephew, Inc.</i>	Grand Ballroom A
7:30 a.m. – 9:30 a.m.	How Specialists Can Align with Referring Physicians in a Value-Based Environment <i>Surgical Care Affiliates</i>	Grand Ballroom D
10:00 a.m. – 12:00 p.m.	Outpatient Total Joint Arthroplasty: Economics, Protocols and Challenges <i>Corentec America</i>	Grand Ballroom D
10:00 a.m. – 12:00 p.m.	Advancing Total Hip Arthroplasty through Automation <i>DePuy Synthes</i>	Grand Ballroom E
10:00 a.m. – 12:00 p.m.	Localized Treatment for Osteoarthritis Knee Pain with a Novel Intra-Articular Formulation <i>Flexion Therapeutics</i>	Grand Ballroom A
10:00 a.m. – 12:00 p.m.	From Design to Data – A Value-Based Overview of Mako Technology <i>Stryker</i>	Grand Ballroom B
10:00 a.m. – 12:00 p.m.	Zimmer Biomet Educational Event <i>Zimmer Biomet</i>	Mobile Lab in Anatole Sculpture Park
11:00 a.m. – 1:00 p.m.	Lunch for all attendees	Learning Center/ Exhibit Hall
12:45 p.m. – 2:00 p.m.	"Ask the Experts" Case Sessions Thank you to Exactech	Grand Ballrooms and Sapphire Room
	Primary Hip	Grand Ballroom A
	Panelists: Daniel J. Berry, MD; Robert L. Barrack, MD; Thomas K. Fehring, MD; William J. Hozack, MD; Luigi Zagra, MD	
	Primary Knee	Grand Ballroom B
	Panelists: Steven B. Haas, MD; Kirby D. Hitt, MD; Brett R. Levine, MD; Mark W. Pagnano, MD; Fares S. Haddad, BSc, MD(Res), FRCS	
	Revision Hip	Grand Ballroom E
	Panelists: Thomas P. Sculco, MD; Kevin L. Garvin, MD; David G. Lewallen, MD; Wayne G. Paprosky, MD; Andrew R. Manktelow, BSc, MBBS, FRCS (Orth)	



FRIDAY, NOVEMBER 2, 2018

12:45 p.m. – 2:00 p.m.

"Ask the Experts" Case Sessions, continued

Thank you to Exactech

Revision Knee

Grand Ballroom D

Panelists: Walter B. Beaver, MD; Matthew P. Abdel, MD;
Robert M. Molloy, MD; Javad Parvizi, MD;
Claudio C. Castelli, MD

Joint Preservation

Sapphire Room

Panelists: Robert T. Trousdale, MD; Robert L. Buly, MD;
Jonathan M. Vigdorchik, MD; Atul F. Kamath, MD

2:30 p.m. – 2:55 p.m.

Break

Learning Center/
Exhibit Hall

2:55 p.m.

President's Welcome to the 2018 AAHKS Annual Meeting

Craig J. Della Valle, MD

Trinity Ballroom

3:00 p.m. – 4:08 p.m.

Session One: Primary Total Knee Arthroplasty

Moderators: Craig J. Della Valle, MD and
William A. Jiranek, MD

Trinity Ballroom

3:00 p.m.

Paper #1

No Difference in Five-Year Clinical and Radiographic
Outcomes Between Kinematic and Mechanical Alignment
in TKA – A Randomized Controlled Clinical Trial

Matthew Walker,
FRACS
Auckland, New
Zealand

3:06 p.m.

Paper #2

To Cement or Not? Five-Year Update of a Prospective
Randomized Trial Comparing Cemented
vs. Cementless Total Knee Arthroplasty

Kevin B. Fricka, MD
Alexandria, VA

3:12 p.m.

Paper #3

A Prospective, Randomized Trial of Cemented
vs. Cementless Total Knee Arthroplasty of the Same,
Modern Design

Denis Nam, MD, MSc
Chicago, IL

3:18 p.m.

Paper #4

Physical Therapy on Postoperative Day 0 Following Total
Knee Arthroplasty: A Randomized Controlled Trial of 394
Patients

Tyler E. Calkins, BS
Chicago, IL

3:24 p.m.

Discussion

3:34 p.m.

Paper #5

The Effect of Topical and Intravenous Tranexamic Acid on
Drug Levels in Patients Undergoing Total Knee
Arthroplasty: A Randomized Double-Blind Placebo
Controlled Study

David J. Mayman, MD
New York, NY



FRIDAY, NOVEMBER 2, 2018

3:40 p.m.	Paper #6 Intraoperative Ketamine During Total Knee Arthroplasty: A Prospective Randomized Controlled Trial	Eric Levicoff, MD Philadelphia, PA
3:46 p.m.	Paper #7 Is Operative Time a Predictor for Postoperative Infection Following Total Knee Arthroplasty?	Hiba Anis, MD Cleveland, OH
3:52 p.m.	Paper #8 Preoperative Weight Loss for Morbidly Obese Patients Undergoing Total Knee Arthroplasty: How Much Is Necessary?	Benjamin J. Keeney, PhD Hanover, NH
3:58 p.m.	Discussion	
4:08 p.m. – 4:15 p.m.	Guest Societies Recognition British Hip Society and Italian Hip Society	Presented by: Craig J. Della Valle, MD, and Rafael J. Sierra, MD
4:15 p.m. – 5:15 p.m.	Symposium I Simplifying the Concepts of the Hip-Spine Relationship for THA	Moderator and Introduction: Matthew P. Abdel, MD
	What's the Problem and What's the Relevant Terminology?	Lawrence D. Dorr, MD
	How Do I Work-up a High-risk THA Patient?	Jonathan M. Vigdorchik, MD
	What Do I Need To Do Differently Intraoperatively?	Douglas E. Padgett, MD
	When Do I Use Dual-Mobility and Why Does It Work?	Matthew P. Abdel, MD
	Questions and Answers vs. Case-Based Panel Discussion	All
5:15 p.m. – 5:20 p.m.	The AAHKS Humanitarian Award Presented to Gerard A. Engh, MD	Presented by Lawrence D. Dorr, MD
5:20 p.m. – 5:30 p.m.	AJRR Update	Kevin J. Bozic, MD
5:30 p.m. – 6:30 p.m.	Symposium II The Comprehensive Management of the Bariatric Patient: Perspectives from Bariatric and Orthopaedic Surgeons	Moderator and Introduction: Mark I. Froimson, MD, MBA
	What are the Implications of Obesity on Total Joint Arthroplasty?	Bryan D. Springer, MD
	Understanding the Impact of the Obesity Disease, on the Patient	Raul J. Rosenthal MD, FACS, FASMBS
	How to Implement Bariatric Surgery into Your practice	John M. Morton, MD, MPH, FACS, FASMBS
	Discussion	All



FRIDAY, NOVEMBER 2, 2018

6:30 p.m. – 8:00 p.m.	Reception for All Attendees Thank you to United Surgical Partners International (USPI)	Learning Center/ Exhibit Hall
6:30 p.m. – 8:00 p.m.	Learning Center/Exhibit Hall Open	Learning Center/ Exhibit Hall

SATURDAY, NOVEMBER 3, 2018

FROM 6:00AM – 9:00AM, TRINITY BALLROOM IS OPEN TO PRE-APPROVED KEYNOTE SESSION TICKET HOLDERS ONLY. BALLROOM WILL RE-OPEN AT 9:05AM FOR ALL OTHER ATTENDEES.

Please note: Ticket holders need to show **Photo ID, Meeting Badge, and Keynote Ticket** to be admitted.

5:30 a.m. (Check-in)	5K Fun Run and 1 Mile Walk Benefiting FARE	Trinity Strand Trail – Anatole
5:55 a.m. (Start)	Thank you to Smith & Nephew and Elsevier, publisher of the <i>Journal of Arthroplasty</i> and <i>Arthroplasty Today</i>	
6:00 a.m. – 7:30 p.m.	Registration	Peacock Foyer
6:00 a.m. – 7:00 a.m.	Coffee Service for Keynote Ticket Holders Only	Learning Center/ Exhibit Hall
	Breakfast for All Attendees	Chantilly Ballroom
6:00 a.m. – 7:00 a.m.	Committee Informal Meetings	Coral
9:05 a.m. – 7:30 p.m.	Learning Center/Exhibit Hall Open	Learning Center/ Exhibit Hall
6:00 a.m. – 8:00 p.m.	Surgical Technique Video Viewing	Rotunda
6:00 a.m. – 7:30 p.m.	AAHKS and Guest Society Poster Exhibition Thank you to Stryker	Chantilly Ballroom
6:55 a.m.	Program Chair's Welcome Matthew P. Abdel, MD	Trinity Ballroom
7:00 a.m. – 7:55 a.m.	Symposium III Partial Knee Arthroplasty: Should We Be Doing More?	Moderator and Introduction: Adolph V. Lombardi Jr., MD, FACS
	Indications and Techniques for Medial Unicompartmental Knee Arthroplasty	Adolph V. Lombardi, Jr., MD, FACS
	Robotically Assisted Medial Unicompartmental Knee Arthroplasty: My Surgical Technique	Andrew D. Pearle, MD
	Cases, Discussion, and Questions	All
	Lateral Unicompartmental Knee Arthroplasty: Indications and My Surgical Technique	William A. Jiranek, MD
	Patellofemoral Knee Arthroplasty: Indications and My Surgical Technique	Jess H. Lonner, MD
	Cases, Discussion, and Questions	All
7:55 a.m. – 8:55 a.m.	Keynote Session	Trinity Ballroom Moderator: Matthew P. Abdel, MD



SATURDAY, NOVEMBER 3, 2018

8:55 a.m. – 9:05 a.m.	Break	
9:05 a.m. – 10:01 a.m.	Session Two: Revision Total Hip Arthroplasty Moderators: Ryan M. Nunley, MD and Bryan D. Springer, MD	Trinity Ballroom
9:05 a.m.	Paper #9 Evaluation of the Spine Is Critical in Patients with Recurrent Instability After Total Hip Arthroplasty	Jonathan M. Vigdorchik, MD New York, NY
9:11 a.m.	Paper #10 IV Tranexamic Acid (TXA) Effectively and Safely Reduces Transfusion Rates in Revision Total Hip Arthroplasties	Jeremy T. Hines, MD Rochester, MN
9:17 a.m.	Paper #11 Safety of Tranexamic Acid in Patients with Comorbidities: A National Assessment Using Claims Data from 1.7 Million Hip and Knee Arthroplasties	Calin S. Moucha, MD New York, NY
9:23 a.m.	Discussion	
9:33 a.m.	Paper #12 Multicenter Evaluation of a Modular Dual Mobility Construct for Revision Total Hip Arthroplasty	Ronald C. Huang, MD New York, NY
9:39 a.m.	Paper #13 Mid-Term Results of Dual Mobility for Monoblock Metal-on-Metal Revision – Is It Safe?	Nicholas, D. Colacchio, MD Charlotte, NC
9:45 a.m.	Paper #14 Constrained Liner Revision Is Less Effective with Each Subsequent Constrained Liner Revision at Preventing Instability in Revision Total Hip Arthroplasty	Nicholas M. Hernandez, MD Rochester, MN
9:51 a.m.	Discussion	
10:01 a.m. – 10:56 a.m.	Symposium IV Revision Total Hip Arthroplasty: How I Manage the Most Common Problems I See <i>A case will be presented for each topic, then discussed by the panel and followed by questions from the audience:</i> I. The Unstable Total Hip Arthroplasty II. The Chronically Infected Total Hip Arthroplasty III. Periprosthetic Fracture of the Femur IV. Corrosion at the Head Neck Junction V. Wear and Osteolysis General Questions from Audience	Moderator and Introduction: Craig J. Della Valle, MD Panelists: Tad M. Mabry, MD Javad Parvizi, MD Benjamin M. Stronach, MD Luigi Zagra, MD
10:56 a.m. – 11:01 a.m.	Break	All



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11:01 a.m. – 11:57 a.m.	Session Three: Primary Total Hip Arthroplasty Moderators: Jay R. Lieberman, MD and William G. Hamilton, MD	Trinity Ballroom
11:01 a.m.	Paper #15 IV vs. Oral Acetaminophen as a Component of Multimodal Analgesia After Total Hip Arthroplasty: A Randomized, Double-Blinded, Controlled Trial	Geoffrey H. Westrich, MD New York, NY
11:07 a.m.	Paper #16 Evaluation of Vitamin E Diffused Highly Crosslinked Polyethylene Wear and Porous Titanium Coated Shell Stability: A Seven-Year Randomized Control Trial using Radiostereometric Analysis	Orhun K. Muratoglu, PhD Boston, MA
11:13 a.m.	Paper #17 Posterior Hip Precautions Do Not Impact Early Recovery at Total Hip Arthroplasty: A Multicenter Randomized Controlled Study	Matthew J. Dietz, MD Morgantown, WV
11:19 a.m.	Discussion	
11:29 a.m.	Paper #18 Time to Dislocation Analysis of Lumbar Spine Fusion Following Total Hip Arthroplasty: Breaking Up a Happy Home	Connor A. King, MD Chicago, IL
11:35 a.m.	Paper #19 Primary Total Hip Arthroplasty Instability Following Lumbosacral Fusion: What Are the Risk Factors?	Matthew P. Siljander, MD Royal Oak, MI
11:41 a.m.	Paper #20 Dynamic Sitting to Standing Radiographs More Accurately Depict Functional Mechanics Than Static Radiographs in Total Hip Arthroplasty	Aaron Buckland, MD New York, NY
11:47 a.m.	Discussion	
11:57 a.m. – 12:45 p.m.	Lunch for All Attendees	Learning Center/ Exhibit Hall
12:45 p.m. – 1:41 p.m.	Session Four: Primary Total Hip Arthroplasty & Other Moderators: James I. Huddleston, MD and Michael P. Bolognesi, MD	Trinity Ballroom
12:45 p.m.	Paper #21 Cluster-Randomized Trial of Opiate-Sparing Analgesia After Discharge from Elective Hip Surgery	Antonia F. Chen, MD, MBA Boston, MA
12:51 p.m.	Paper #22 Primary Total Hip Arthroplasty in Patients Less than 50 Years of Age at a Mean of 16 Years	Andrew J. Bryan, MD Chicago, IL



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12:57 p.m.	Paper #23 Perioperative Periprosthetic Femur Fractures Are Strongly Correlated with Fixation Method: An Analysis from the American Joint Replacement Registry (AJRR)	Bryan D. Springer, MD Charlotte, NC
1:03 p.m.	Discussion	
1:13 p.m.	Paper #24 Does Taper Design Affect Taper Fretting Corrosion in Ceramic on Polyethylene Total Hip Arthroplasty? A Retrieval Analysis	Ali Sobh, MD Royal Oak, MI
1:19 p.m.	Paper #25 Higher Volume Surgeons Have Lower Cost, Readmissions and Mortality After THA	Stephen B. Murphy, MD Boston, MA
1:25 p.m.	Paper #26 The Effect of Body Mass Index in 30-Day Complications After Revision Total Hip and Total Knee Arthroplasty	Nicolas S. Piuze, MD Cleveland, OH
1:31 p.m.	Discussion	
1:41 p.m. – 1:51 p.m.	AAHKS 2017-2018 Health Policy Fellow Reports	Nicholas B. Frisch, MD, MBA, and Bradford S. Waddell, MD
1:51 p.m. – 2:01 p.m.	AAHKS Presidential Award Presented to Stefano A. Bini, MD	Presented by Craig J. Della Valle, MD
2:01 p.m. – 2:57 p.m.	Session Five: Periprosthetic Joint Infection Moderators: Javad Parvizi, MD, and Brett R. Levine, MD	Trinity Ballroom
2:01 p.m.	Paper #27 Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty: A Single Dose Is as Effective as Multiple Doses	Timothy L. Tan, MD Philadelphia, PA
2:07 p.m.	Paper #28 What Is the Role of Repeat Aspiration in the Diagnosis of Periprosthetic Hip Infection?	Adam J. Schwartz, MD, MBA Phoenix, AZ
2:13 p.m.	Paper #29 Diagnostic Accuracy of the Alpha-Defensin Test for Periprosthetic Joint Infection in Patients with Inflammatory Diseases	Yushi Miyamae, MD Yokohama, Japan
2:19 p.m.	Discussion	
2:29 p.m.	Paper #30 Failed Debridement and Implant Retention Does Not Compromise Success of Subsequent Staged Revision in Infected Total Knee Arthroplasty	Simon W. Young, FRCS Auckland, New Zealand



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2:35 p.m.	Paper #31 Nationwide Organism Susceptibility Patterns to Common Preoperative Prophylactic Antibiotics: What Are We Covering?	Scott R. Nodzo, MD Las Vegas, NV
2:41 p.m.	Paper #32 Hepatitis C May Be a Modifiable Risk Factor in Total Joint Arthroplasty: Preoperative Treatment of Hepatitis C is Associated with Decreased Post-Operative Complications in US Veterans	Ilya Bendich, MD San Francisco, CA
2:47 p.m.	Discussion	
2:57 p.m. – 3:45 p.m.	Symposium V Practice Norms in Primary Hip and Knee Arthroplasty: What is Everyone Else Doing?	Moderator: Daniel J. Berry, MD
	Discussion	
3:45 p.m. – 3:51 p.m.	FARE Grant Award	Presented by Javad Parvizi, MD and Craig J. Della Valle, MD
3:51 p.m.	The James A. Rand Young Investigator's Award Large Opioid Prescriptions are Unnecessary After Total Joint Arthroplasty: A Randomized Controlled Trial Charles P. Hannon, MD, Chicago, IL	Presented by James A. Browne, MD
3:57 p.m.	Discussion	
4:00 p.m.	The Lawrence D. Dorr Surgical Techniques & Technologies Award Why Are Contemporary Revision Total Hip Arthroplasties Failing? An Analysis of 2500 Cases Ashton H. Goldman, MD, Portsmouth, VA	Presented by Lawrence D. Dorr, MD
4:06 p.m.	Discussion	
4:09 p.m.	The AAHKS Clinical Research Award Prophylactic Tamsulosin Does Not Reduce the Risk of Urinary Retention Following Lower Extremity Arthroplasty: A Double-Blind Randomized Controlled Trial Aidin Eslam Pour, MD, MS, Ann Arbor, MI	Presented by Mark I. Froimson, MD, MBA
4:15 p.m.	Discussion	
4:18 p.m.	In Memoriam: Richard H. Rothman, MD, PhD	Trinity Ballroom
4:20 p.m. – 4:35 p.m.	Break	Learning Center/ Exhibit Hall



SATURDAY, NOVEMBER 3, 2018

4:35 p.m. – 5:35 p.m.	Symposium VI Periprosthetic Joint Infection in Hip and Knee Arthroplasty	Moderator and Introduction: Fares S. Haddad, BSc, MD(Res), FRCS
	Practical Approach to Reducing the Infection Burden: Prophylactic and Preventative Measures in 2018	Matthew S. Austin, MD
	Diagnosis of Periprosthetic Infection: An Update on the Available Techniques, Controversies and Definitions	Denis Nam, MD
	Algorithmic Approach: Which Procedure, When and for Whom?	Fares S. Haddad, BSc, MD(Res), FRCS
	Two-Stage Revision: Managing the Interval, Antibiotics and Re-Implantation	Andrew R. Manktelow, BSc, MBBS, FRCS(Orth)
	Case-Based Discussion	All
5:35 p.m. – 6:30 p.m.	Session Six: Revision Total Knee Arthroplasty Moderators: Scott M. Sporer, MD and Gregory G. Polkowski II, MD, MSc	Trinity Ballroom
5:35 p.m.	Paper #33 A Multi-Center Randomized Clinical Trial of Tranexamic Acid in Revision Total Knee Arthroplasty: Does the Dosage Regimen Matter?	Yale A. Fillingham, MD Philadelphia, PA
5:41 p.m.	Paper #34 Topical Tranexamic Acid in Revision Total Knee Arthroplasty Reduces Transfusion Rates and May Be Associated with Earlier Functional Recovery	Alejandro Gonzales Della Valle, MD New York, NY
5:47 p.m.	Paper #35 Next Generation Sequencing for the Diagnosis of Periprosthetic Knee Infection: A Multicenter Investigation	Karan Goswami, MD Philadelphia, PA
5:53 p.m.	Discussion	
6:03 p.m.	Paper #36 Does Neutral Mechanical Alignment Improve the Durability of Revision Total Knee Arthroplasty?	Matthew P. Abdel, MD Rochester, MN
6:09 p.m.	Paper #37 Ignore the Patella in Revision Total Knee Surgery	David F. Dalury, MD Towson, MD
6:15 p.m.	Paper #38 What Is the Value of Component Loosening Assessment of a Preoperatively-Obtained Bone Scan Prior to Revision Total Knee Arthroplasty?	David C. Holst, MD Denver, CO
6:21 p.m.	Discussion	
6:30 p.m. – 8:00 p.m.	Reception for All Attendees	Learning Center/Exhibit Hall



SUNDAY, NOVEMBER 4, 2018

6:00 a.m. – 10:00 a.m.	Registration	Peacock Foyer
6:00 a.m. – 7:00 a.m.	Breakfast for All Attendees	Trinity Ballroom Foyer
6:00 a.m. – 12:00 p.m.	AAHKS and Guest Society Poster Exhibition Thank you to Stryker	Chantilly Ballroom
7:00 a.m. – 7:15 a.m.	AAHKS Business Meeting All members participate in nominating and voting on Board positions	Trinity Ballroom
7:15 a.m. – 8:11 a.m.	Session Seven: Non-Arthroplasty and Other Moderators: Rafael J. Sierra, MD and Matthew S. Austin, MD	Trinity Ballroom
7:15 a.m.	Paper #39 Natural History of the Dysplastic Hip Following Periacetabular Osteotomy	Cody C. Wyles, MD Rochester, MN
7:21 a.m.	Paper #40 Surgical Treatment of Femoroacetabular Impingement: Arthroscopy vs. Surgical Hip Dislocation – A Propensity Matched Analysis	John C. Clohisy, MD St. Louis, MO
7:27 a.m.	Paper #41 Patient Reported Outcomes in Joint Registries: Defining the Optimal Collection Window	Mohamad J. Halawi, MD Farmington, CT
7:33 a.m.	Discussion	
7:43 a.m.	Paper #42 When Should Complete Blood Count Tests Be Performed in Primary Total Knee Arthroplasty Patients?	Beau J. Kildow, MD Durham, NC
7:49 a.m.	Paper #43 Identifiable Risk Factors to Minimize Postoperative Urinary Retention in Modern Outpatient Rapid Recover Total Joint Arthroplasty	R. Michael Meneghini, MD Indianapolis, IN
7:55 a.m.	Paper #44 Transdermal Scopolamine as an Adjunct to Multi-Modal Pain Management in Patients Undergoing Total Joint Arthroplasty	Roshan Shah, MD New York, NY
8:01 a.m.	Discussion	



SUNDAY, NOVEMBER 4, 2018

8:11 a.m. – 9:11 a.m.	Symposium VII	Moderator and Introduction:
	Outpatient Joint Replacement: Practical Guidelines for Your Program Based on Evidence, Success, and Failures	R. Michael Meneghini, MD
	Introduction/Patient Selection	R. Michael Meneghini, MD
	Office and Staff Protocols	Alexander P. Sah, MD
	Facility Protocols and Pathways	William G. Hamilton, MD
	ASC vs. Hospital	Charles A. DeCook, MD
	Case Examples – Threats of Discharge Question and Answer	All
9:11 a.m. – 9:16 a.m.	The Hip Society Update President: Douglas E. Padgett, MD	Trinity Ballroom
9:16 a.m. – 9:21 a.m.	The Knee Society Update President: Robert L. Barrack, MD	Trinity Ballroom
9:21 a.m. – 10:17 a.m.	Session Eight: Complications Not Including Infection Moderators: Mark J. Spanghel, MD and C. Lowry Barnes, MD	Trinity Ballroom
9:21 a.m.	Paper #45 Cotinine Testing Improves Smoking Cessation Prior to Total Joint Arthroplasty	Adam Hart, MD Rochester, MN
9:27 a.m.	Paper #46 Diabetes Mellitus Type I Poses Greater Risk for Periprosthetic Joint Infection than Type II for Patients Undergoing Total Joint Arthroplasty	Jeremy M. Gililland, Salt Lake City, UT
9:33 a.m.	Paper #47 Smoking Adversely Affects Patient Reported Outcomes Following Total Joint Arthroplasty	Mark P. Cote, MD Farmington, CT
9:39 a.m.	Discussion	
9:49 a.m.	Paper #48 Aspirin for Venous Thromboembolism Prophylaxis Decreases Mortality After Primary Total Joint Arthroplasty	Alexander J. Rondon, MD, MBA Philadelphia, PA
9:55 a.m.	Paper #49 Are Patients More Satisfied with a Balanced TKA?	Gregory J. Golladay, MD Richmond, VA
10:01 a.m.	Paper #50 Emergency Department Visit Within One Year Prior to Elective Total Joint Arthroplasty is Predictive of Postoperative Return to Emergency Department Within 90 Days	Michael D. Gabbard, MD Detroit, MI
10:07 a.m.	Discussion	



SUNDAY, NOVEMBER 4, 2018

10:17 a.m. – 11:17 a.m.	Symposium VIII Taper Corrosion in Total Hip Arthroplasty: Applying the Best Evidence into Practice	Moderator and Introduction: Joshua J. Jacobs, MD
	What Surgeons Need to Know About Taper Corrosion in THA	Joshua J. Jacobs, MD
	How Big Is the Problem?	Brian J. McGrory, MD
	How to Evaluate for Taper Corrosion in MoP THA?	Brett R. Levine, MD
	What Are the Risk Factors for Taper Corrosion ALTR and Revision Outcome?	Young-Min Kwon, MD, PhD
	Case Presentations with Discussion	All
11:17 a.m. – 12:13 a.m.	Session Nine: Health Policy Moderators: J. Bohannon Mason, MD and Jonathan L. Schaffer, MD, MBA	Trinity Ballroom
11:17 a.m.	Paper #51 Unintended BPCI Consequences Following Removal of TKA from Inpatient-Only List	Brian M. Curtin, MD MS, Charlotte, NC
11:23 a.m.	Paper #52 Age and Frailty Influence Hip and Knee Arthroplasty Reimbursement in a Bundled Payment Care Improvement Initiative	Andrew M. Pepper, MD New York, NY
11:29 a.m.	Paper #53 Perioperative Orthopaedic Surgical Home (POSH): Optimization of High-Risk TJA Candidates Is Effective	Afshin A. Anoushiravani, MD New York, NY
11:35 a.m.	Discussion	
11:45 a.m.	Paper #54 Medical Malpractice Litigation Following Primary Total Joint Arthroplasty: A Comprehensive, Nationwide Analysis for the Last Decade	Linsen T. Samuel, MD MBA, Cleveland, OH
11:51 a.m.	Paper #55 Preoperative Optimization Checklists Within the CJR Bundle Have Not Decreased Hospital Returns	Sean P. Ryan, MD Durham NC
11:57 a.m.	Paper #56 Antibiotic-Loaded Bone Cement in Primary Total Knee Arthroplasty: Utilization Patterns and Impact on Complications Using a National Database	Darwin Chen, MD New York, NY
12:03 a.m.	Discussion	
12:13 p.m.	Concluding Remarks	Craig J. Della Valle, MD
12:15 p.m.	Adjourn	
12:15 p.m.	Poster Take-Down Any posters remaining after 1:00 p.m. will be discarded.	Chantilly Ballroom

No Difference in Five-Year Clinical and Radiographic Outcomes Between Kinematic and Mechanical Alignment in TKA—A Randomized Controlled Clinical Trial

Introduction: Kinematic Alignment (KA) technique in total knee arthroplasty (TKA) attempts to match implant position to the pre-arthritic anatomy of an individual patient. This contrasts with a traditional neutral mechanical alignment (MA) goal. This study compares the mid-term survivorship, functional outcomes and radiographic signs of loosening/failure between these two techniques.

Results: There was no significant difference in patient reported outcome measures (PROMs) at five years. The difference between the means (MA vs. KA) were –Oxford Knee Score 0.42 ± 9.74 ($p=0.77$), WOMAC score 3.57 ± 3.12 ($p=0.32$), Forgotten Joint Score 6.08 ± 5.39 ($p=0.26$), EQ-5D 0.05 ± 0.28 ($p=0.25$), Knee Society Pain/Motion 1.44 ± 2.43 ($p=0.55$) or Function Scores 5.13 ± 3.65 ($p=0.16$), and Range of Motion -1.80 ± 1.7 ($p=0.29$). There were no significant differences in the presence of static or progressive radiolucent lines. There were no differences in the number of re-operations. The MA group had two revisions for infection and one secondary patella resurfacing. The KA group had one liner exchange for stiffness and one liner exchange plus secondary patellar resurfacing for on-going pain.

Conclusions: We found no significant difference in functional or radiographic outcomes between TKAs implanted with MA or KA. The revision and re-operation rates were similar. These mid-term results support the two-year findings of no difference in MA vs. KA, however the impact on long-term survivorship is still unknown.

To Cement or Not? Five-Year Update of a Prospective Randomized Trial Comparing Cemented vs. Cementless Total Knee Arthroplasty

Introduction: The optimal mode of fixation in total knee arthroplasty (TKA) is a continuing subject of debate. The younger population of knee patients and longer life expectancies require excellent outcomes with longer durability. The purpose of this study was to compare mid-term outcomes for cemented and cementless TKA.

Results: At 5 years, the mean KSS clinical and functional scores, mean Oxford scores, and responses to self-reported questions for satisfaction (less pain and better function) were similar in both groups. The cementless group had two revisions, one for instability and one for malunion after late periprosthetic fracture. The cemented group had one revision for infection and one amputation following a traumatic knee dislocation. Survivorship with revision as an endpoint was equivalent (96%, $p=0.98$) for both groups. There was no significant difference in the incidence of radiolucencies between the groups ($p=0.228$), all were non-progressive, and 3/4 with subsidence from the two-year report had stabilized.

Conclusions: Cementless TKA continues to show equivalent patient reported outcomes and survivorship compared to cemented TKA at mid-term follow-up. Updates are planned at the 10 and 15-year intervals to obtain long-term outcomes.

A Prospective, Randomized Trial of Cemented vs. Cementless Total Knee Arthroplasty of the Same, Modern Design

Introduction: Highly porous surfaces promoting biologic fixation have renewed interest in cementless total knee arthroplasty (TKA), but the potential for failed ingrowth remains. This investigation compared the clinical outcomes of cemented and cementless versions of the same TKA design at a minimum of 2-years.

Results: 120 patients were enrolled (56 cemented, 64 cementless). There was no difference in age, gender, BMI, or ASA score ($p=0.1$ to 0.9). There was no difference in change in hemoglobin on postoperative day 1 between the two cohorts (-2.5 ± 0.9 vs. -2.6 ± 1.4 , $p=0.5$), but total operative time was decreased in the cementless cohort (82.1 ± 16.2 vs. 93.7 ± 16.7 , $p=0.001$). No differences were seen in any clinical outcome measure ($p=0.2$ to 0.8). Cemented patients rated their TKA to be $87.0 \pm 12.3\%$ of normal versus $87.6 \pm 13.8\%$ in the cementless cohort ($p=0.8$). There was no radiographic evidence of component loosening in either cohort.

Conclusions: A recently introduced cementless TKA design demonstrates excellent results without early failure for aseptic loosening, but continued surveillance is necessary to determine its potential long-term benefit.

Physical Therapy on Postoperative Day 0 Following Total Knee Arthroplasty: A Randomized Controlled Trial of 394 Patients

Introduction: Early mobilization with physical therapy (PT) has been emphasized as a strategy to facilitate early discharge following total knee arthroplasty (TKA). The purpose of this study was to determine whether starting PT the afternoon of postoperative day (POD) 0, instead of starting PT the morning of POD1, could shorten hospital length of stay.

Results: Out of 394 patients enrolled and randomized, 378 (95.9%) completed the study. 183 Were randomized to start PT on POD0 and 195 to start PT on POD1. Baseline characteristics did not differ between groups, suggesting appropriate randomization. Hospital length of stay did not differ between groups (intention-to-treat analysis: median of 32.0 hours for POD0 PT versus 31.0 hours for POD1 PT, $p=0.646$; as-treated analysis: median of 31.0 hours for POD0 PT versus 32.0 hours for POD1 PT, $p=0.119$). Finally, the two groups did not differ in satisfaction with inpatient PT (10.0 vs. 10.0, $p=0.766$), patient-reported readiness for discharge at time of discharge (10.0 vs. 10.0, $p=0.968$), or pain on POD0 (3.3 vs. 4.0, $p=0.789$).

Conclusions: This randomized trial suggests no difference in length of stay, patient satisfaction, or patient-reported readiness for discharge when PT is initiated on the day of TKA versus the morning after.

The Effect of Topical and Intravenous Tranexamic Acid on Drug Levels in Patients Undergoing Total Knee Arthroplasty: A Randomized Double-Blind Placebo Controlled Study⁰

Introduction: Tranexamic acid (TXA) is used to decrease blood loss during total knee arthroplasty (TKA). We sought to examine if TXA levels changed systemically and in the wound when the drug is given intravenously (IV) compared to topical.

Results: Systemic TXA levels were higher in the IV group at all time points ($p < 0.001$). At 4 hours post-TQ release, wound and systemic levels of TXA were similar in the IV group. Wound levels of IV TXA were greater than in the topical group ($p < 0.001$). At 4 hours post TQ release, topical TXA wound blood levels were significantly higher than the systemic level ($p < 0.001$). Calculated total blood loss was higher in the topical group ($p = 0.023$), but there was no significance difference between the amount of wound blood from the drain ($p = 0.404$).

Conclusions: High wound levels of TXA are achieved when the drug is given IV raising the possibility of the wound being its major site of action. Four hours post TQ release, higher wound blood levels are seen compared to topical administration. Topical TXA systemic levels in the blood are about 1/3 that of IV TXA at 1-hour post TQ release.

Notes

Intraoperative Ketamine During Total Knee Arthroplasty: A Prospective Randomized Controlled Trial

Introduction: Multimodal pain protocols have increased in popularity with the aim of reducing narcotic consumption and side-effects. Multiple studies have demonstrated that ketamine, a glutamate receptor blocker, may decrease postoperative pain in abdominal and orthopaedic surgeries. However, its role with spinal anesthesia and total knee arthroplasty remains unknown. The purpose of this study was to determine the efficacy of sub-anesthetic dosing of ketamine during total knee arthroplasty (TKA) on postoperative pain and narcotic consumption.

Methods: In this prospective, randomized double blinded clinical trial, we enrolled 90 patients undergoing primary TKA with spinal anesthesia in a single institution between January 2016 to April 2018. Patients were randomized to intraoperative ketamine incision at a rate of 6mcg/kg/min for 75 minutes or a saline placebo. All patients received spinal anesthesia and otherwise identical surgical approaches, pain management and rehabilitation protocols. Patient-reported visual analogue pain scores (VAS) were calculated preoperatively, postoperative day (POD) 0 to 7 and 14 days. Narcotic consumption was evaluated on POD 0 and 1.

Results: There was no significant difference between the groups in terms of average, least, or maximum VAS pain scores ($p>0.05$ for all) for any of the first seven postoperative days. Average daily pain was 35.1 and 32.5 on POD0 ($p=0.48$), 47.4 and 55.0 on POD1 ($p=0.19$), and 53.4 vs. 49.1 on POD2 ($p=0.49$) for ketamine and saline placebo, respectively. There was also no difference in total morphine equivalents on POD 0 (35.5 vs. 27.3 $p=0.31$), and a trend toward increased narcotic consumption for ketamine on POD1 (44.2 vs. 33.5, $p=0.05$). There was no difference in narcotic or ketamine related side effects.

Conclusions: As part of multimodal pain management protocol, intraoperative ketamine does not result in any clinically significant improvement of the measured outcomes following TKA.

Is Operative Time a Predictor for Postoperative Infection Following Total Knee Arthroplasty?

Introduction: Determining risk factors is crucial in potentially avoiding surgical site infections (SSI) and prosthetic joint infections (PJI) after total knee arthroplasty (TKA). The purpose of this study was to evaluate the association of SSI and PJI with operative time in primary TKA.

Methods: A retrospective review was conducted using an institutional database yielding 12,541 primary TKA procedures performed between 2014 and 2017. Medical records were reviewed for diagnoses of SSI (skin and superficial wound infections) and PJI (deep joint infections requiring surgery) over an average 2-year postoperative period. Multivariate logistic regression was performed to adjust for gender, age, BMI, Charlson Comorbidity Index, year of surgery, hospital volume, and surgeon volume. Volume was determined as low, intermediate, or high by mean TKAs/year at each hospital (<250, 250-500, or >500, respectively) and by each surgeon (<50, 50-150, or >150, respectively).

Results: 324 patients with subsequent SSI had longer mean operative times (118±41 min) compared to non-infected patients (108±35 min, $p<0.001$). 82 procedures complicated by PJI (136±47 min) had longer mean operative times compared to non-infected patients (108±35 min, $p<0.001$). Multivariate analysis showed operative time was an independent predisposing factor for SSI (odds ratio [OR]=1.006; 95% confidence interval [CI], 1.003-1.009; $p<0.001$) and PJI (OR=1.010; 95% CI, 1.006-1.015; $p<0.001$). This corresponded to a 9% increased risk for SSI and a 15% increased risk for PJI for every 15-minute increase in operative time.

Conclusions: Identifying risk factors that are easily measurable and modifiable, such as procedure duration, can aid in risk-stratifying postoperative surveillance. These findings support recent studies. Moreover, this study differentiated effects of operative time on SSI and PJI and demonstrated these associations remain significant after adjusting for patient and hospital/surgeon factors. This study highlights the importance of minimizing intraoperative delay to significantly improve patient outcomes.

Preoperative Weight Loss for Morbidly Obese Patients Undergoing Total Knee Arthroplasty (TKA): How Much Is Necessary?

Introduction: Many surgeons require or request weight loss among morbidly obese (body mass index (BMI) >40) patients before undergoing TKA. We sought to determine how much weight reduction was necessary to improve operative time, length of stay (LOS), discharge to a facility, and physical function improvement.

Results: Compared to morbidly obese patients who did not lose 20 pounds, losing 20 pounds before TKA among morbidly obese patients was associated with lower adjusted odds of discharge to a facility (OR 0.28, 95% CI 0.09–0.94, $P=0.039$), lower odds of extended LOS of at least 4 days (OR 0.24, 95% CI 0.07–0.88, $P=0.31$), and absolute shorter LOS (-0.87 days, 95% CI -1.39–-0.36, $P=0.001$). There were no differences in operative time or PCS improvement. Losing 5 or 10 pounds was not associated with differences for any outcome.

Conclusions: Although there were no differences for operative time or physical function improvement, losing at least 20 pounds before TKA was associated with shorter LOS and lower odds of facility discharge for morbidly obese patients. This has immense implications on patient burden and cost reduction, even while most patients remained morbidly or severely obese. Patients and providers may want to focus on larger pre-surgical weight loss.

Symposium I

Simplifying the Concepts of the Hip-Spine Relationship for Total Hip Arthroplasty

Moderator: Matthew P. Abdel, MD

Faculty: Jonathan M. Vigdorchik, MD, Lawrence D. Dorr, MD, Douglas E. Padgett, MD

Spinal pathology plays an intricate role in the risk of dislocation after primary THA. It has been shown in numerous studies that spinal fusion increases the risk of dislocation.

Objectives:

1. Understand how the spine affects the movement of the pelvis and how this relates to acetabular component positioning.
2. Understand how to recognize a patient at high-risk of dislocation after primary THA and how to decrease this risk.
3. Understand how to adapt acetabular component positioning and implant selection based on spinal pathology.

Outline:

Introduction of Symposium and Faculty

Matthew P. Abdel, MD

What's the Problem and What's the Relevant Terminology?

Lawrence D. Dorr, MD

How Do I Work-up a High-risk THA Patient?

Jonathan M. Vigdorchik, MD

What Do I Need to Do Differently Intraoperatively?

Douglas E. Padgett, MD

When Do I Use Dual-Mobility and Why Does It Work?

Matthew P. Abdel, MD

Questions & Answers vs. Case-Based Panel Discussion

Notes

Symposium II

The Comprehensive Management of the Bariatric Patient Perspectives from Bariatric and Orthopedic Surgeons

Moderator: Mark I. Froimson, MD, MBA

Faculty: Bryan D. Springer, MD, Raul Rosenthal, MD, FACS, FASMBS, John M. Morton, MD, MPH, FACS, FASMBS

The burden of obesity continues to rise both for the general public and within the arthroplasty population. When Osteoarthritis and Morbid Obesity coexist, managing these concurrent conditions using comprehensive and evidence-based protocols has been shown to improve outcomes and reduce complications and cost of care.

Objectives:

1. To provide surgeons with evidence on the best methods to mitigate and manage the risks associated with managing patients facing both obesity and advanced arthritis
2. To provide surgeons and their teams with the tools to create comprehensive teams and strategies to minimize the burden of managing these resource intensive patients
3. To provide guidelines on the metabolic effects of the weight loss surgeries available, the timing of arthroplasty surgery following bariatric surgery and special considerations in managing patients who require both procedures

Outline:

Introduction

Mark I. Froimson, MD, MBA

What Are the Implications of Obesity on Total Joint Arthroplasty?

Bryan D. Springer, MD

Understanding the Impact of the Obesity Disease on the Patient

Raul Rosenthal, MD, FACS, FASMBS

How to Implement Bariatric Surgery into Your Practice

John M. Morton, MD, MPH, FACS, FASMBS

Discussion

Notes

Symposium III

Partial Knee Arthroplasty: Should We Be Doing More?

Moderator: Adolph V. Lombardi, Jr., MD, FACS

Faculty: William A. Jiranek, MD, Jess H. Lonner, MD, Andrew D. Pearle, MD

Among reconstructive procedures of the knee, partial knee arthroplasty has experienced the greatest growth over the past decade. However, questions persist regarding the optimal candidates for partial knee arthroplasty procedures that include medial unicompartmental, lateral unicompartmental, and patellofemoral replacement.

Objectives:

1. Describe the current indications for patellofemoral, medial unicompartamental, and lateral unicompartamental knee arthroplasty.
2. Identify the clinical presentation as well as radiographic evaluation and imaging studies which should be obtained preoperatively to determine patient selection for these specific operative interventions.
3. Adapt the surgical pearls which will facilitate the performance of these respective arthroplasties.
4. Present a literature review which forms the basis for the continued utilization of specific partial knee arthroplasty.
5. Enhance the practicing orthopaedic surgeon's understanding of the current status of total partial knee arthroplasty.
6. Facilitate improved results in partial knee arthroplasty by clarifying patient selection.

Outline:

Indications and Techniques for Medial Unicompartmental Knee Arthroplasty

Adolph V. Lombardi, Jr., MD, FACS

Robotically Assisted Medial Unicompartmental Knee Arthroplasty: My Surgical Technique

Andrew D. Pearle, MD

Cases, Discussion and Questions

Lateral Unicompartmental Knee Arthroplasty: Indications and My Surgical Technique

William A. Jiranek, MD

Patellofemoral Knee Arthroplasty: Indications and My Surgical Technique

Jess H. Lonner, MD

Cases, Discussion and Questions

Notes

Evaluation of the Spine Is Critical in Patients with Recurrent Instability After Total Hip Arthroplasty

Introduction: Previously underappreciated, the spine contributes substantially to THA dislocations, and must be taken into consideration during preoperative planning for revision THA due to recurrent instability. We developed a protocol to assess the functional position of the spine, the significance of these findings, and how to address different pathologies at the time of revision THA.

Methods: Prospectively collected data on 111 patients undergoing revision THA for recurrent instability from January 2014 to January 2017 at two institutions were included (protocol group) and matched 1:1 to 111 revisions specifically performed for instability not using this protocol (control group). Protocol patients underwent standardized preoperative imaging including a supine AP pelvis radiograph, standing AP pelvis, and sitting and standing lateral radiographs. Each case was scored according to the “Hip-Spine Classification in Revision THA” as follows:

- 1.** Normal spinal alignment (defined by $PI-LL \pm 10^\circ$)
- 2.** Flatback deformity ($PI-LL > 10^\circ$)
- 3.** Hyperlordosis ($PI-LL < -10$)
 - a.** Normal spinal mobility
 - b.** Stiff spine (defined as $< 20^\circ$ change in pelvic tilt or sacral slope from stand to sit)

Each group has an associated explanation and treatment recommendation, and instability was addressed surgically through the algorithm based on the above classification.

Results: Survivorship free of dislocation at 2 years was 97% in the protocol group (3 dislocations all within 3 months of surgery) vs. 84% in the control group (18 patients). Amazingly, 77% of the inappropriately positioned acetabular components would have been unrecognized by supine AP pelvis imaging alone. All cases fell within one of the five categories.

Conclusions: Using a new Hip-Spine Classification System in revision THA, we demonstrated a significant decrease in the risk of recurrent instability compared to a control group. Without the use of this algorithm, 77% of inappropriately positioned acetabular components would have been unrecognized.

IV Tranexamic Acid (TXA) Effectively and Safely Reduces Transfusion Rates in Revision Total Hip Arthroplasties[†]

Introduction: TXA has been shown to reduce transfusion rates in primary total hip arthroplasties (THAs), but data is limited in the revision setting. The purpose of this study was to compare the rate of blood transfusions and symptomatic venous thromboembolic events (VTEs) in revision THAs treated with or without IV TXA.

Results: TXA significantly reduced the rate of blood transfusions after revision THA overall from 54% to 26% ($p < 0.001$; unadjusted RR 2.1, adjusted RR 1.6), with a significant reduction in both septic (73% to 53%, $p = 0.04$) and aseptic (49% to 18%, $p < 0.001$) revisions. The rate of VTE was minimal overall, with 3 events (0.3%) in the group with TXA and 4 events (0.2%) in the group without TXA. There were no significant differences in VTE rates in those who did or did not receive IV TXA based upon the procedures being septic or aseptic in nature.

♦ The FDA has not approved tranexamic acid for use in orthopaedics.

Safety of Tranexamic Acid in Patients with Comorbidities: A National Assessment Using Claims Data from 1.7 Million Hip and Knee Arthroplasties[◇]

Introduction: With increasing use of tranexamic acid (TXA) in total hip and knee arthroplasties (THA/TKA), safety concerns remain specifically regarding patients with preexisting comorbidities. Therefore, using national claims data, we aimed to study 1) current utilization patterns of TXA in THA/TKA procedures and 2) its impact on complications when used in patients with preexisting comorbidities.

Methods: In this retrospective cohort study we assessed data on n=1,694,795 THA/TKA procedures (Premier Healthcare claims database; 2006-2016). The main effect was TXA use; main outcomes were blood transfusion and complications (including acute renal failure, acute myocardial infarction and thromboembolism). Subgroups of interest were based on comorbidity burden: either by Deyo Charlson comorbidity index (0, 1, 2, >2) or history of thromboembolism, myocardial infarction or renal disease. Mixed effects models measured associations between TXA use and outcomes. We report odds ratios (OR) and 95% confidence intervals (CI).

Results: Overall transfusion rate was 16.9% (n=286,468) while TXA utilization rate was 25.6% (n=433,276); TXA utilization did not differ by patient comorbidity burden. TXA use was associated with decreased odds for blood transfusion while no increased odds for complications were observed. This effect was universal across comorbidity categories (Deyo Charlson 0, 1, 2, >2): blood transfusion OR 0.38 (CI 0.37-0.39), OR 0.39 (CI 0.38-0.40), OR 0.42 (CI 0.40-0.44), OR 0.47 (CI 0.45-0.49)/complications OR 0.68 (CI 0.65-0.72), OR 0.70 (CI 0.66-0.74), OR 0.74 (CI 0.69-0.79), OR 0.69 (CI 0.66-0.74), by comorbidity categories, respectively, all $P < 0.0001$. Similar effects were observed when stratifying TXA use by cases with a history of thromboembolism, myocardial infarction or renal disease.

Conclusions: TXA utilization is similar in patients with and without comorbidities in THA/TKA cohort. While effective in reducing blood transfusions, TXA is not associated with increased complications irrespective of patient comorbidity burden. These findings support routine use of TXA in THA/TKA.

❖ The FDA has not approved tranexamic acid for use in orthopaedics.

Multicenter Evaluation of a Modular Dual Mobility Construct for Revision Total Hip Arthroplasty

Introduction: The risk of instability following revision total hip arthroplasty (THA) is greater than after primary THA. New modular dual mobility (MDM) constructs have offered increased stability without compromising hip range of motion. The purpose of this study is to evaluate the outcomes of revision THA using MDM constructs.

Results: Of the 370 patients, 315 patients met one-year minimum follow-up and were included in the study. Average follow-up was 3.3 years (range 1.0-7.7 years). The acetabular component was revised in 84% cases whereas only an MDM liner was placed in 16% of cases. Average Harris Hip Score improved from 54.8 to 83.4 ($p<0.001$). Thirty (9.5%) hips required reoperation, nine (2.9%) for instability, eight (2.5%) for acetabular component loosening, six (1.9%) for infection, four (1.3%) for periprosthetic fractures, one (0.3%) for acetabular component malposition, one (0.3%) for improper liner seating, and one (0.3%) for improper screw placement. Seven of 107 cases performed for instability had recurrent instability (6.5%), of which five did not undergo acetabular component revision during the index surgery. Recurrent instability was associated with not revising the acetabular component ($p=0.003$).

Conclusions: Revision THAs with MDM constructs provided a very low rate of instability, good functional improvement and a low reoperation rate. Recurrent instability following use of MDM in revision THA was associated with retention of the acetabular component, likely due to cup malposition. While longer-term follow-up is needed to fully assess these devices, there is clearly a benefit in the first few years following revision surgery.

Mid-term Results of Dual Mobility for Monoblock Metal-on-Metal Revision– Is It Safe?

Introduction: Revision of monoblock metal-on-metal (MoM) total hip arthroplasty (THA) is associated with high complication rates. Limited revision by conversion to dual mobility (DM) without acetabular component extraction may mitigate these complications. However, the concern for polyethylene wear and osteolysis remains unsettled. This study investigates the mid-term results of DM conversion of monoblock-MoM THA compared to formal acetabular revision.

Methods: 143 revisions of monoblock-MoM THA were reviewed. 29 were revision to a DM construct and 114 were complete revision of the acetabular component. Mean patient age was 61. 55% were women. Components used, acetabular cup position, radiographic outcomes, serum metal ion levels, and HOOS Jr clinical outcome scores were investigated.

Results: At 3.6years follow up [range 2-5years] there were 2 revisions (6.9%) in the DM cohort, 1 for instability and another for periprosthetic fracture. Among the formal acetabular revision group there was 20% early complications (23/114) and 16% early revision surgery (18/114) for: aseptic loosening (6%), deep infection (6%), dislocation (4%), acetabular fracture (3%), and superficial infection or delayed wound healing (6%). In the DM cohort, there were no radiographic signs of aseptic loosening, component migration or polyethylene wear. One DM patient had a small posterior metadiaphyseal femur lesion that will require close monitoring. There were no other radiographic signs of osteolysis. There were no clinically significant elevations of serum metal ion levels. HOOS Jr scores were favorable.

Conclusions: Limited revision with conversion to DM is a viable treatment option for failed monoblock-MoM THA with lower complication rates than formal revision. Limited revision to DM appears to be a safe option for revision of monoblock-MoM THA with a cup in good position and an internal geometry free of sharp edges or articular surface damage. Longer follow-up is needed to demonstrate any potential wear implications of these articulations.

Constrained Liner Revision Is Less Effective with Each Subsequent Constrained Liner Revision at Preventing Instability in Revision Total Hip Arthroplasty

Introduction: Constrained liners have been used to treat recurring THA dislocations, but there is concern regarding its effectiveness. The aim of this study was to evaluate the rate and survivorship free of revision for dislocation because of constrained liner failure in patients who were revised to their first, second, or third constrained liner.

Results: In patients receiving their first, second, and third constrained liners, the survivorship free of revision for dislocation at 5 years was 90%, 54%, and 38%, respectively. Patients with a second constrained liner were more likely to have a revision for dislocation (Odds-Ratio=6.5; $p=0.0001$) compared to those receiving their first constrained liner. Patients with a third constrained liner had a trend towards being more likely to have a revision for dislocation (Odds-Ratio=2; $p=0.09$) compared to those receiving their second constrained liner.

Conclusions: After revision to a second constrained liner, 1/2 will undergo revision at 5 years, and after revision to a third constrained liner, 3/5 will undergo revision for dislocation. Patients receiving their second constrained liner are 6.5-fold more likely to have a dislocation requiring revision because of constrained liner failure compared to those receiving their index constrained liner. When a THA becomes unstable after a constrained liner, surgeons should optimize all other implant factors, and exercise caution before revising to another constrained liner.

Symposium IV

Revision Total Hip Arthroplasty: How I Manage the Most Common Problems I See

Moderator: Craig J. Della Valle, MD

Faculty: Javad Parvizi, MD, Luigi Zagra, MD, Tad M. Mabry, MD, Benjamin M. Stronach, MD, MS

Given the increasing demand for total hip arthroplasty, along with the number of implants presently in service, the absolute number of revision procedures being performed annually is on the rise.

Objective:

Learn how to evaluate and manage the unstable total hip arthroplasty, the chronically infected total hip arthroplasty, periprosthetic fractures of the femur, corrosion at the head-neck junction, and wear and osteolysis.

Outline:

Introduction

Craig J. Della Valle, MD

Panel:

Javad Parvizi, MD, Luigi Zagra, MD, Tad M. Mabry, MD,
Benjamin M. Stronach, MD, MS

1. The Unstable Total Hip Arthroplasty:
Case Presentation, Discussion, Questions
2. The Chronically Infected Total Hip Arthroplasty:
Case Presentation, Discussion, Questions
3. Periprosthetic Fracture of the Femur:
Case Presentation, Discussion, Questions
4. Corrosion at the Head Neck Junction:
Case Presentation, Discussion, Questions
5. Wear and Osteolysis:
Case Presentation, Discussion, Questions

Discussion and Questions

Notes

IV vs. Oral Acetaminophen as a Component of Multimodal Analgesia After Total Hip Arthroplasty: A Randomized, Double-Blinded, Controlled Trial

Introduction: Multimodal analgesia, the administration of analgesic agents targeting multiple pain pathways, has seen increased popularity in pain management for total hip arthroplasty (THA) patients. Acetaminophen is a common non-opioid administered as part of multimodal panels due to its efficacy and minimal contraindications. Although intravenous (IV) acetaminophen presents pharmacokinetic benefits, such as increasing both serum blood and cerebrospinal fluid levels more rapidly, there is limited analysis of its clinical advantages compared to oral acetaminophen. The authors hypothesized that there would be a reduction in pain with activity, opioid usage, or opioid related side effects among patients receiving IV acetaminophen compared to oral acetaminophen.

Methods: In a double-blinded, controlled trial, 154 patients undergoing THA were randomized to receive oral acetaminophen plus IV placebo or IV acetaminophen plus oral placebo. Multimodal inpatient perioperative pain management consisted of a combined spinal-epidural and postoperative patient-controlled analgesia of bupivacaine and clonidine, intravenous ketorolac, oral meloxicam, and either tramadol for mild/moderate pain or oxycodone for severe pain. The primary outcomes were pain with physical therapy on postoperative day (POD) 1, measured on a 0-10 Numeric Rating Scale (NRS), the Opioid Related Symptom Distress Scale (ORSDS) score on POD 1, and cumulative opioid use over POD 1-3, converted to oral morphine equivalents (OME).

Results: There were no differences in ORSDS scores ($p=0.212$) or NRS pain scores with physical therapy ($p=0.384$) between groups. The IV acetaminophen group had a mean OME of 119mg compared to 100mg among the oral group. This was not significantly different ($p=0.428$).

Conclusions: Despite the similar outcomes, patients in both groups had low pain scores with activity, minimal opioid-related side effects, and limited opioid usage (OME of 120mg corresponds to six doses of tramadol 100mg over 3 days). This highlights multimodal analgesia as an effective method of pain control for THA.

Evaluation of Vitamin E Diffused Highly Crosslinked Polyethylene Wear and Porous Titanium Coated Shell Stability: A Seven-Year Randomized Control Trial using Radiostereometric Analysis

Introduction: Vitamin-E diffused, highly-crosslinked polyethylene (VEPE) and porous titanium-coated (PTC) shells were introduced in total hip arthroplasty (THA) to reduce the risk of aseptic loosening. Radiostereometric analysis (RSA) is the gold-standard for the assessment of in vivo implant performance. The purpose of this study was to use RSA to: (1) evaluate the in vivo wear properties of VEPE, (2) assess the stability of PTC shells, and (3) report their clinical outcomes at 7-years.

Methods: Eighty-nine patients were enrolled into a prospective study. All patients received a PTC shell and were randomized to receive a VEPE liner (N=44) or a moderately-crosslinked polyethylene liner (ModXLPE) (N=45). RSA was used to measure polyethylene wear and cup migration. Differences in wear were assessed while adjusting for BMI, activity level, acetabular inclination, anteversion, and head size. Plain radiographs were assessed for radiolucency, and patient-reported outcome measures (PROMs) were administered at each follow-up.

Results: Seventy-three patients (82%) completed the 7-year visit. RSA quality metrics were excellent (mean condition number= 28 ± 1 , mean error= 0.19 ± 0.01 mm). Median 7-year linear penetration was -0.07 ± 0.16 mm and 0.00 ± 0.22 mm for the VEPE and ModXL cohorts, respectively ($p=0.116$). PROMs ($p=0.310$ - 0.807) and radiolucency incidence ($p=0.330$) were not different between the polyethylene cohorts. The average shell migration rate was 0.04 ± 0.09 mm/yr. At 7-years, patients with radiolucency (34%) demonstrated greater migration (mean difference: 0.6 ± 0.2 mm; $p<0.001$). Disease-specific PROMs were lower for patients with radiolucency and greater migration ($p=0.009$ - 0.045). No implants appeared loose based on plain radiographic evaluation, and none were revised for aseptic loosening.

Conclusions: This is the first RCT to report 7-year RSA results for VEPE. All wear rates were below the previously-reported osteolysis threshold of 0.1mm/yr. PTC shells demonstrated acceptable primary stability through 7 years as indicated by low migration and lack of failures due to aseptic loosening. Patients with acetabular radiolucency were associated with higher shell migration and lower PROMs.

Posterior Hip Precautions Do Not Impact Early Recovery at Total Hip Arthroplasty: A Multicenter Randomized Controlled Study

Introduction: Posterior hip precautions have been routinely prescribed to decrease dislocation rates. The purpose of this study was to determine if the absence of hip precautions improved early recovery after total hip arthroplasty via the posterolateral approach.

Results: From 2016–2017, 149 patients were randomized to NHP and 150 patients were randomized to SHP. There were no differences in demographics. There was no difference in the average cup size ($p=0.156$) or head diameter ($p=0.05$) for each group. The only difference in outcomes scores between the two groups was at 2 weeks the SHP group had an improved HOOS Jr score when compared to the NHP ($p=0.03$). There was no difference in outcome scores between at all other time points when compared to preoperative assessments. In the SHP group there were 3 recorded dislocations (2%) and one in the NHP group 0.6% ($p=0.62$). Ninety five percent of patients in the SHP reported following precautions, while 39% of the NHP reported self-imposed precautions ($p<0.001$).

Conclusions: In this randomized controlled multicenter study the absence of hip precautions in the postoperative period did not improve subjective outcomes which may be explained by self-limiting behavior of NHP patients. Further, with the numbers available for the study, there was no difference in the rate of dislocation between the two groups.

Paper #18

Time to Dislocation Analysis of Lumbar Spine Fusion Following Total Hip Arthroplasty: Breaking Up a Happy Home

Connor A. King, MD, David C. Landy, MD, PhD, Hue H. Luu, MD, Lewis L. Shi, MD, John M. Martell, MD, Michael J. Lee, MD

Introduction: Prior studies reported an increased risk of dislocation in patients undergoing THA after LSF. Less understood is hip stability in patients with a previously stable THA undergoing LSF. This scenario is complicated not only by the need to understand when any resultant instability manifests but also by selecting appropriate controls. The aim of this study was to describe the dislocation free survival experience of patients with a previously stable THA undergoing LSF and to compare it to that of similar patients not undergoing LSF.

Methods: A retrospective analysis of Center for Medicare Service billing data from 2005 and 2014 was conducted utilizing the PearlDiver platform. Stable THA was defined as having no dislocation event within six months of THA. A 10-year Kaplan Meier survival analysis was performed to evaluate dislocation free survival.

Results: There were 863,182 patients that met inclusion criteria for primary THA. Among these, 17,223 patients underwent subsequent LSF. The comparison of Kaplan Meier Survival Analysis plots demonstrates a substantially sustained increase in the rate of dislocation that persists to long-term follow-up. Ten-year dislocation free survival for patients undergoing LSF after primary THA was 92.9%. Among primary THA without LSF there was a significantly higher dislocation free survival at 10 years (95.8%, $P<0.001$). Stratified by level of fusion the 10-year survival was 93.9% among those undergoing Fusion of 2–3 vertebra while it was 91.6% in those undergoing Fusion of 4–8 vertebrae ($P=0.12$).

Conclusions: This study demonstrates that dislocations of primary THA are significantly more common in patients who undergo subsequent LSF and that this increased risk is experienced not just in the perioperative period but persists for at least 10 years. This underscores the importance of counseling all patients undergoing LSF following THA on what is likely an increased lifetime risk of dislocation.

Notes

Primary Total Hip Arthroplasty Instability Following Lumbosacral Fusion: What Are the Risk Factors?

Introduction: Lumbosacral fusion can influence the flexibility of the lumbar spine and can impact total hip arthroplasty (THA) stability. The purpose of this study was to evaluate the incidence and risk factors of THA dislocation after lumbosacral fusion.

Results: The study population was 64.5% female with an average age of 66.4 years (range 44–89). Primary THA dislocation rate in patients with a prior lumbar fusion was 6.5%. There was no difference in age between patients that dislocated versus not, but women may have a higher rate of dislocation than men (women: 8.7%, men 2.4%; $p=0.064$). Patients that dislocated had a lower BMI ($p=0.027$). Increased head sizes had lower dislocation rates ($p=0.035$), with no dislocations in head sizes above 36 mm. There was no difference in dislocation based on cup inclination ($p=0.34$), but increased cup anteversion was associated with decreased dislocation risk ($p=0.008$). There was no increased risk in dislocation based on fusion to the sacrum ($p=0.79$), but increasing lumbar fusion levels were more likely to result in dislocation ($p=0.022$), with no reported dislocations in the 55 patients with only one fusion level.

Conclusions: Lumbar spine fusion prior to primary THA has a high rate of dislocation. Increasing number of fusion levels increases the risk of dislocation and increasing head size and anteversion of the cup appears to be protective. Careful attention to cup positioning should be employed in patients with lumbosacral spinal fusion.

Dynamic Sitting to Standing Radiographs More Accurately Depict Functional Mechanics Than Static Radiographs in Total Hip Arthroplasty

Introduction: Hip osteoarthritis (OA) is frequently co-existent with lumbar degenerative pathology, and therefore static sitting-standing radiographs are often used to preoperatively evaluate dynamic changes in spinopelvic parameters when planning THA. The purpose of this study is to compare dynamic sitting-standing to static radiographs in the accuracy of determining functional spinopelvic mechanics in patients with hip OA.

Results: A total of 50 patients with static radiographs were compared to 50 patients with dynamic radiographs. Standing PT ($p<0.001$), standing LL ($p<0.001$), sitting PT ($p<0.001$), and sitting LL ($p=0.007$) were significantly different between dynamic and relaxed cohorts, respectively. Dynamic imaging from single leg standing to the flexed seated position demonstrated greater effects of LL ($p<0.001$) and PT ($p=0.001$) in functional positions. Dynamic imaging showed a lower effect of PT ($p=0.002$) and greater effect SS ($p=0.003$) from the standing to step up compared to relaxed sitting to standing positions.

Conclusions: Dynamic sitting-standing imaging emphasizes the compensatory mechanisms of patients with concomitant hip and spine pathology more effectively than static imaging, and more reproducibly simulates high-risk positions of dislocation in THA. Dynamic radiographs should be included as part of routine spinopelvic evaluation when planning THA, especially in individuals with co-existing OA and lumbar pathology.

Cluster-Randomized Trial of Opiate-Sparing Analgesia After Discharge from Elective Hip Surgery

Introduction: Orthopedic surgeons have relied heavily on opiates after total hip replacement (THR) despite no clear evidence of benefit and a rapidly growing abuse epidemic. Multimodal analgesia may reduce or even obviate the need for opiates after elective surgery.

Results: Daily pain was significantly lower in both multimodal groups, Group A (Coeff -0.81, $p=0.003$) and Group B (Coeff -0.61, $p=0.021$). While daily utilization and duration of opiate use was lower for both Group A (Coeff -0.77, $p<0.001$) and Group B (Coeff -0.30, $p=0.04$) compared with Group C, opiate use was also lower for Group A than Group B (Coeff -0.46, $p=0.002$). There were significantly fewer opiate-related symptoms in Group A compared to Group C ($p=0.005$), but Group B and C didn't differ ($p=0.13$). Additionally, both multimodal regimens improved satisfaction and sleep, and there was no difference in hip function or adverse events.

Conclusions: A multimodal analgesic regimen with minimal opiates improved pain control while significantly decreasing opiate utilization and opiate-related adverse effects. It's time to rethink traditional opiate prescription after elective surgery.

Primary Total Hip Arthroplasty in Patients Less than 50 Years of Age at a Mean of 16 Years

Introduction: The purpose of this study was to evaluate clinical and radiographic outcomes of patients under 50 years of age undergoing primary THA at minimum of 10 years.

Results: There were six revisions for wear in the non-XLPE group (10.5%) compared to none in the XLPE group ($p<0.001$). Similarly, survivorship with revision for any reason at 15 years was significantly higher in the XLPE group 93.0% (95% CI 88.0 to 93.4%) compared to 84.2% (95% CI 71.9 to 91.5%) in the non-XLPE group ($p=0.008$). Additional revisions in the XLPE group included 6 for instability (2.8%), 5 secondary to infection (2.4%), and 3 stem failures (1.4%). Non-wear related revisions in the non-XLPE group included 5 due to instability (8.8%) and 3 stem failures (5.3%). Mean Harris Hip Scores for the entire cohort improved from a mean of 46.2 points preoperatively to 89.8 points postoperatively ($p<0.001$).

Conclusions: The use of XLPE has led to a significant reduction in the risk of failure in patients <50 years old, with over 93% survivorship at 15 years. Instability and infection, however, remain substantial causes of failure.

Perioperative Periprosthetic Femur Fractures Are Strongly Correlated with Fixation Method: An Analysis from the American Joint Replacement Registry (AJRR)

Introduction: Perioperative periprosthetic femur fractures (PPFx) following total hip arthroplasty (THA) remain a leading cause of early stem failure and revision and are associated with high rates of morbidity and mortality. We sought to analyze AJRR data to determine the relationship of femoral stem fixation to PPFx requiring revision.

Methods: All early (= 3 months from index arthroplasty) linked primary and revision hip arthroplasties where both procedures were reported to AJRR between 2012-2017 were analyzed to identify revisions for PPFx. We evaluated patient demographics, device characteristics (hemiarthroplasty vs. THA) and stem fixation.

Results: There were 10,277 linked revisions reported to AJRR during the time period of the study. Early PPFx requiring revision occurred in 622 patients (6.1%). The diagnosis for the index arthroplasty was osteoarthritis in 404 (65.0%) and femoral neck fracture in 218 (35.0%). 522 patients (84%) were treated with THA and 100 patients with hemiarthroplasty (16%). There was a preponderance of revisions for PPFx in females (70%). 58% of patients were ≥ 70 years of age, while 20% were ≥ 80 years of age. Cementless femoral fixation was associated with 93.7% (583 vs. 39) of the periprosthetic fractures. Patients with cementless stems were 2.6 times (95% CI 0.59-11.1) more likely to undergo early revision for PPFx than those with cemented fixation, although with the numbers of cemented stems available this was not statistically significant.

Conclusions: Mirroring other studies and national registries, there was an association between cementless fixation and PPFx in the AJRR. Nevertheless, there has been a trend over time of increasing utilization of cementless femoral fixation for both THA and hemiarthroplasty reported to the AJRR, with cementless fixation accounting for 93% of THA stems with early periprosthetic fracture. Additional analysis is needed to better understand this phenomenon, especially in the elderly.

Paper #24

Does Taper Design Affect Taper Fretting Corrosion in Ceramic on Polyethylene Total Hip Arthroplasty? A Retrieval Analysis

Matthew Siljander, MD, **Ali Sobh, MD**, Corinn Gehrke, BS, Samantha Wheeler, BS,
Michael A. Flierl, MD, Drew D. Moore, MD, Erin Baker, PhD

Introduction: Ceramic-on-polyethylene (CoP) implants have exhibited lower fretting and corrosion scores than metal-on-polyethylene (MoP) implants. This study aims to investigate the effect of taper design on taper corrosion and fretting in modular ceramic total hip arthroplasty (THA) systems.

Methods: Under an IRB-approved protocol, a query of an implant retrieval library from 2002 – 2017 identified 120 retrieved CoP THA systems with zirconia toughened alumina (ZTA) femoral heads, with four different taper designs (11/13, 12/14, 16/18, V40). Femoral stem trunnions were visually evaluated and graded for fretting, corrosion and damage at the taper interface. Medical records were reviewed for patient demographics and implant characteristics. Data was statistically analyzed using Spearman correlation and rank sum tests with a Dunn's post-hoc test, with a significance level of $\alpha=0.05$.

Results: Four different taper designs were evaluated including: 11/13 (n=18), 12/14 (n=53), 16/18 (n=21), and V40 (n=28). There were no statistically significant demographic differences between taper groups for duration of implantation, laterality, patient age, and patient sex, but patients with 16/18 tapers had a higher BMI than V40 tapers ($p=0.012$). Duration of implantation had a weak positive correlation with both trunnion fretting ($p=0.224$, $p=0.016$) and corrosion ($p=0.253$, $p=0.006$). Summed fretting and corrosion scores were significantly greater on the V40 and 16/18 tapers compared with the 12/14 tapers (all $p=0.001$).

Conclusions: Taper fretting and corrosion were observed in ceramic THA implants and were greatest on implants with V40 and 16/18 tapers and lowest on implants with 12/14 tapers. Differences in taper design characteristics may lead to greater micromotion at the taper-head interface, leading to increased fretting and corrosion.

Notes

Higher Volume Surgeons Have Lower Cost, Readmissions and Mortality After THA

Introduction: The advent of value-based care has increased the focus on surgeon- and hospital-specific outcomes. However, methods to identify high quality, low cost surgeons are not well developed. The current study seeks to determine whether there is a relationship between surgeon Total Hip Arthroplasty (THA) volume and the outcomes of mortality, readmission, and Medicare expenditure for that surgeon.

Results: When compared to the highest volume group, each lower-volume group had increased costs, increased readmission rates, and increased mortality rates in a stepwise fashion. The lowest volume group resulted in 27.20% more CMS payments per case ($p<0.001$; 95% confidence interval (CI), 26.62%–27.78%), had an increased mortality odds ratio (OR) of 4.69 ($p<0.001$; 95% CI, 3.99–5.50), and had an increased readmission OR of 1.77 ($p<0.001$; 95% CI, 1.69–1.85) when compared to the highest volume group.

Conclusions: There is a strong association between a surgeon's Medicare volume and lower CMS payments, mortality, and readmissions. Further, the majority of Medicare THA in the US are performed by surgeons who perform more than 10 operations annually.

The Effect of Body Mass Index in 30-Day Complications After Revision Total Hip and Total Knee Arthroplasty

Introduction: The impact of obesity on complications after total joint arthroplasty (TJA) has been well documented. However, few studies have specifically examined the effect on revision TJA. Therefore, the objective of this study was to explore the effect of BMI on 30-day readmissions and complications after aseptic revision total hip arthroplasty (rTHA) and aseptic revision total knee arthroplasty (rTKA), considering BMI as both a categorical and continuous variable.

Results: There was a linear relationship between increased BMI and readmission and reoperation rates for rTKA ($p < 0.001$). Morbid obesity was associated with an increased risk of readmission ($p < 0.001$), reoperation ($p = 0.004$), and adverse events ($p = 0.021$) vs. normal weight patients undergoing rTKA. Major complication rates for rTKA appear to be lowest at approximately 30 kg/m². For rTHA, major complication rates had a nadir of approximately 28 kg/m². On multivariate analysis, adverse events and minor complications were significantly higher in morbidly obese individuals vs. patients with a normal BMI.

Notes

Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty: A Single Dose Is as Effective as Multiple Doses

Introduction: Recent surgical site infection prevention guidelines recommend that no additional prophylactic antibiotics should be administered after the surgical incision is closed in clean-contaminated procedures. Although there is ample evidence to support this recommendation in non-arthroplasty surgery, there is concern about extending these guidelines to surgeries with an implant such as total joint arthroplasty (TJA). The aim of this study is to review pertinent literature and compare the efficacy of a single-dose prophylactic antibiotics versus multiple doses of antibiotics in prevention of periprosthetic joint infection (PJI) in patients undergoing TJA.

Results: The overall PJI rate was 0.60% (27/4523) in patients who received a single dose of antibiotic compared to 0.87% (142/16159) in patients receiving multiple doses of antibiotics. There was no difference in the overall PJI rate between patients who received a single dose and those who received multiple doses in both the univariate (OR 0.674, $p=0.064$) or the multivariate analyses (OR 0.708, $p=0.107$). Furthermore, multiple doses did not demonstrate any additional benefit for patients with a high preoperative risk of PJI (adjusted OR 0.981, $p=0.943$).

Conclusions: This study supports the notion that the administration of additional antibiotics following skin closure may not be required in patients undergoing primary TJA, regardless of their preoperative risk of PJI. The findings of this large retrospective study combined with the body of existing literature highlight the need for a randomized, prospective study to base current guidelines on.

What Is the Role of Repeat Aspiration in the Diagnosis of Periprosthetic Hip Infection?

Introduction: The American Academy of Orthopaedic Surgeons (AAOS) clinical practice guideline currently recommends repeat joint aspiration when workup of periprosthetic joint infection (PJI) reveals conflicting data. This guideline is based upon a single study of 31 patients published twenty-five years ago. We sought to determine the correlation between first and second aspirations and factors that may play a role in variability between them.

Methods: Sixty patients with less than 90 days between aspirations and no intervening surgery were identified at our institution and classified by MSIS criteria as infected, not infected, or not able to determine after both aspirations. Culture results from both aspirations were recorded. The rates of change and correlation in clinical diagnosis and culture results between aspirations were determined.

Results: Repeat aspiration changed the diagnosis in 26 cases (43.3%, 95% CI: 31.6%-55.9%, Kappa coefficient 0.32, $p < 0.001$), and the culture results in 25 cases (41.7%, 95% CI: 30.1% to 54.3%, Kappa coefficient 0.27, $p < 0.01$). Among patients initially MSIS negative, the proportion who changed to MSIS positive was greater for those with history of prior PJI compared to those without (66.7% vs. 0%, $p < 0.05$), and the first aspiration mean volume was higher for those changed to MSIS positive compared to those that remained MSIS negative (12.0 ml vs. 3.0 ml, $p < 0.01$). Among patients initially MSIS positive, the proportion of patients changed to MSIS negative was greater for those with history of adverse local tissue reaction (ALTR) to metal debris compared to patients without suspicion of ALTR (100% vs. 7.7%, $p < 0.05$).

Conclusions: Repeat aspiration is particularly useful in patients with conflicting clinical data and prior history of PJI, suspicion of ALTR, or high clinical suspicion of infection.

Diagnostic Accuracy of the Alpha-Defensin Test for Periprosthetic Joint Infection in Patients with Inflammatory Diseases

Introduction: Alpha-defensin has high accuracy to diagnose prosthetic joint infection (PJI). However, the reliability of the test in patients with systemic inflammatory diseases (e.g., rheumatoid arthritis [RA] and psoriatic arthritis [PsA]) is unclear. Several recent studies reported high accuracy of alpha-defensin in diagnosing PJI in a heterogenous population inclusive of primarily patients suffering from osteoarthritis, but also containing small numbers of patients with systemic inflammatory diseases. The purpose of this study was to determine the accuracy of alpha-defensin in diagnosing PJI in a homogenous cohort of patients afflicted by systemic inflammatory disease and underwent revision surgery.

Methods: A retrospective review was conducted of all 1374 cases who underwent revision total hip/knee arthroplasty at a single healthcare system from 2014 to 2017. Forty-three cases with inflammatory disease who received a one stage revision arthroplasty or the first stage of 2-stage revision arthroplasty with available preoperative alpha-defensin results were included. Two cases who received a spacer exchange were excluded from this study. Cases were classified as infected or not according to Musculoskeletal Infection Society (MSIS) criteria. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy of alpha-defensin to diagnose PJI were calculated. Receiver operating characteristic (ROC) analysis was performed.

Results: A total of 41 cases met the inclusion criteria, including 17 with RA, 13 seronegative arthropathy (e.g., PsA), and 11 systemic inflammatory diseases (e.g., sarcoidosis). Fifteen cases were diagnosed as MSIS positive. The alpha-defensin test demonstrated a sensitivity of 93%, a specificity of 100%, a PPV of 100%, a NPV of 96%, and accuracy of 97% for the diagnosis of PJL. There was one patient with polymyositis who had a false-negative alpha-defensin result.

Conclusions: The alpha-defensin test provides useful information with high accuracy in diagnosing PJI in patients with inflammatory diseases.

Failed Debridement and Implant Retention Does Not Compromise Success of Subsequent Staged Revision in Infected Total Knee Arthroplasty

Introduction: Prosthetic joint infection (PJI) is the leading cause of early revision following total knee arthroplasty (TKA). Debridement, antibiotics and implant retention (DAIR) is often the initial treatment of PJI; however, there is concern that a failed DAIR attempt undermines the success of future revision procedures. The aim of this study is to investigate how DAIR affects subsequent staged revisions for PJI.

Results: Of 293 eligible patients, 63 underwent stage revision and 230 underwent DAIR as the first procedure for PJI. 75 patients failed DAIR and underwent subsequent staged revision. The success rate of treatment was 72.0% in the F-Dair group compared to 79.4% in the staged-only group at an average follow-up of 6.2 years. On survival analysis, there was no significant difference in sub-distribution hazard ratio comparing the probability of failure in the two treatments groups (Figure 1, SHR=0.87; 95% CI 0.40-1.88; P=0.72)

Conclusions: This study suggested that a previously failed DAIR does not compromise the success rate of a subsequent staged revision.

Nationwide Organism Susceptibility Patterns to Common Preoperative Prophylactic Antibiotics: What Are We Covering?

Introduction: Many periprosthetic joint infections (PJI) are caused by organisms unsusceptible to first generation cephalosporins. We sought to evaluate the national susceptibility patterns of organisms to cefazolin/oxacillin, clindamycin, and vancomycin using antibiogram data.

Results: Seven state and 41 regional antibiograms were reviewed (Figure 1). There were 105,335 *Staphylococcal aureus* isolates tested in which 48,783 (46.3%) were methicillin resistant (MRSA) strains. Oxacillin was a sensitive antibiotic in $99.2 \pm 4.8\%$ of Methicillin sensitive *Staphylococcus aureus* (MSSA) isolates, $0 \pm 0\%$ of MRSA isolates, $44.5 \pm 13.7\%$ of coagulase negative staph organism isolates (CNS), and $30.6 \pm 10.5\%$ of *Staphylococcal epidermidis* (SE) isolates. Clindamycin was a sensitive antibiotic in $75.8 \pm 8.4\%$ of MSSA isolates, $60.2 \pm 13.2\%$ of MRSA isolates, $60.3 \pm 11.4\%$ of CNS isolates, and $56.2 \pm 6.5\%$ of SE isolates. Vancomycin was a sensitive antibiotic in $99.9 \pm 0.4\%$ of MSSA isolates, $99.8 \pm 0.4\%$ of MRSA isolates, $99.8 \pm 0.5\%$ of CNS isolates, and $99.6 \pm 0.7\%$ of SE isolates. Figure 2 shows all organism and susceptibility patterns. Clindamycin was significantly less sensitive in MSSA isolates as compared to oxacillin and vancomycin ($p < 0.0001$). Oxacillin was significantly less sensitive in CNS, SE, and MRSA isolates as compared to clindamycin and vancomycin ($p < 0.0001$).

Conclusions: MSSA and MRSA represent 30-50% of infections in recent PJI studies. It is important to understand the limited susceptibility profile of first generation cephalosporins. The national clindamycin susceptibility pattern is limited compared to vancomycin and may not have a susceptibility profile suitable for use as a prophylactic antibiotic in cephalosporin allergic patients.

Hepatitis C May Be a Modifiable Risk Factor in Total Joint Arthroplasty: Preoperative Treatment of Hepatitis C is Associated with Decreased Postoperative Complications in US Veterans

Introduction: Hepatitis C Virus (HCV) is associated with poor outcomes in Total Joint Arthroplasty (TJA). Since 2014, oral direct-acting-antivirals (DAAs) have been available for HCV curative treatment. The goal of this study was to determine if HCV may be a modifiable risk factor in TJA by comparing postoperative complications of TJA patients with HCV who receive treatment preoperatively to those untreated. The US Veteran population was chosen given a high HCV prevalence.

Methods: A US Department of Veterans Affairs (VA) dataset of primary total knee arthroplasty (TKA) and total hip arthroplasty (THA) performed between 2014-2018, when DAAs were available, was retrospectively reviewed. HCV-infected patients were identified using ICD-9/10 codes and lab values. HCV-infected patients treated at least 3-months prior to TJA with DAA or ribavirin were included in the “treated” group. HCV-infected patients untreated were assigned to the “untreated” group. Medical and surgical complications up to 1-year postoperatively were identified using ICD-9/10 codes. Student t-test compared complication rates between groups.

Results: 42,268 patients underwent TJA (28,125 TKA, 14,143 THA) at VA Hospitals between 2014-2018. 7.5% of TJA patients had HCV. 9.3% of TJA HCV patients received HCV treatment at least 3-months preoperatively. For THA patients with HCV, medical and surgical complications up to 1-year postoperatively were 10.4% and 4.9% in the untreated group, respectively, and 0.8% and 0% in the treated group, respectively ($p=0.001$ medical, $p=0.013$ surgical). In TKA patients with HCV, medical and surgical complications up to 1-year postoperatively were 8.3% and 5.6% in the untreated group, respectively, and 1.1% and 0% in the treated group, respectively ($p=0.001$ medical, $p=0.001$ surgical).

Conclusions: TJA patients with HCV who receive treatment preoperatively have significantly lower postoperative medical and surgical complication rates. Study suggests HCV may be a modifiable risk factor in TJA; HCV-infected patients would likely benefit from HCV treatment.

Symposium V

Practice Norms in Primary Hip and Knee Arthroplasty: What is Everyone Else Doing?

Moderator: Daniel J. Berry, MD

Dr. Berry will conduct a poll of attendees using the audience response system with real-time display of results and commentary.

Objectives:

1. Identify what AAHKS peers are currently doing for perioperative management of primary THA and TKA and how this has changed in the key areas in the past two years
2. Identify what AAHKS peers are currently doing with respect to intraoperative decisions, choices, and practices in primary THA and TKA and how this has changed in the past two years

Outline:

1. Primary THA: Perioperative Management
2. Primary THA: Intraoperative Decisions, Choices, and Practices
3. Primary TKA: Perioperative Management
4. Primary TKA: Intraoperative Decisions, Choices, and Practices

Notes

The James A. Rand Young Investigator's Award

Large Opioid Prescriptions are Unnecessary After Total Joint Arthroplasty: A Randomized Controlled Trial[◇]

Charles P. Hannon, MD, Tyler E. Calkins, BS, Jefferson Li, BA, Chris Culvern, MS, Brian Darrith, MD, Denis Nam, MD, MSc, Tad L. Gerlinger, MD, Craig J. Della Valle, MD

Introduction: Opioids are an important component of multimodal analgesia, but improper utilization places patients at risk for overdose and addiction. The purpose of this randomized controlled trial is to determine whether the quantity of opioid pills prescribed at discharge is associated with the amount of opioids consumed or unused by patients after total hip (THA) and knee (TKA) arthroplasty.

Methods: 304 Opioid naïve patients undergoing THA or TKA were randomized to receive a prescription for either 30 or 90 5mg oxycodone immediate release (OxylIR) tablets at discharge. All patients received acetaminophen, meloxicam, tramadol, and gabapentin perioperatively. Daily opioid consumption (morphine equivalent dose, MED), number of unused OxylIR pills, and pain scores were calculated for 30 days after discharge with a patient-completed medication diary. Number of OxylIR refills and total MED received were recorded for 90 days postoperatively. Power analysis determined that 141 patients per group were necessary to detect a 25% reduction in means in opiate consumption between groups. Statistical analysis involved t-test, rank sum, and chi-squared tests with $\alpha=0.05$.

Results: 161 Patients were randomized to receive 30 tablets and 143 to receive 90. In the first 30 days after discharge, the median number of unused OxylR tablets was 15 in the 30 group versus 73 in the 90 group ($p<0.0001$). Within 90 days of discharge, 26.7% of the 30 group and 10.5% of the 90 group requested a refill ($p<0.001$), leading to a mean of 777.1 MED versus 1089.7 prescribed ($p<0.0001$). There was no difference between groups in mean MED consumed and pain scores within the first 30 days. Baseline demographics and outcome scores were similar between groups suggesting appropriate randomization.

Conclusions: Prescribing a smaller number of opioids at the time of surgery is associated with equivalent pain scores and opioid consumption, yet a significant reduction in unused narcotics.

- ◆ The FDA has not approved gabapentin for acute postoperative pain.

Notes

The Lawrence D. Dorr Surgical Techniques & Technologies Award

Why Are Contemporary Revision Total Hip Arthroplasties Failing? An Analysis of 2500 Cases

Ashton H. Goldman, MD, Rafael J. Sierra, MD, Robert T. Trousdale, MD, David G. Lewallen, MD,
Daniel J. Berry, MD, Matthew P. Abdel, MD

Introduction: Historically, the most common indications for re-revision of a total hip arthroplasty (THA) have been aseptic loosening, instability, infection, and periprosthetic fracture. As revision implants and techniques have evolved, understanding why contemporary revision THAs fail is important to direct further improvement and innovation. As such, the goals of this study were to determine the implant survivorship of contemporary revision THAs, as well as the most common indications for re-revision.

Methods: We retrospectively reviewed 2589 aseptic revision THAs completed at our academic institution between 2005 and 2015 through our total joint registry. There were 39% isolated acetabular revisions, 22% isolated femoral revisions, 18% both component revisions, and 21% modular component exchanges. The mean age at index revision THA was 66 years, and 46% were males. The most common indications for the index revision THA were aseptic loosening (21% acetabular, 15% femoral, 5% both components), polyethylene wear and osteolysis (18%), instability (13%), fracture (11%), and other (17%). Mean follow-up was 6 years.

Results: There were 211 re-revision THAs during the study period. The overall survivorship free of any re-revision at 2, 5, and 10 years was 94%, 92%, and 88%, respectively. The most common reasons for re-revision were hip instability (52%), periprosthetic fracture (11%), femoral aseptic loosening (11%), acetabular aseptic loosening (9%), infection (6%), polyethylene wear (3%), and other (8%). A pre-revision diagnosis of instability had the worst survivorship free of revision at 10 years (79%).

Conclusions: Compared to historical series, the 88% survivorship free of any re-revision at 10 years in a difficult revision cohort is notably improved. As implant fixation has improved, aseptic loosening has become much less common after revision THA, and instability has come to account for more than half of re-revisions. Methods to further mitigate this risk may be emphasized during index revision THA.

Notes

Prophylactic Tamsulosin Does Not Reduce the Risk of Urinary Retention Following Lower Extremity Arthroplasty: A Double-Blind Randomized Controlled Trial

Introduction: Postoperative urinary retention (POUR) is a common postoperative problem. Selective alpha-1 adrenergic antagonists, such as tamsulosin, are effective for treating various forms of urinary retention. The purpose of this study was to determine if prophylactic tamsulosin perioperatively reduces the incidence of postoperative POUR.

Results: 154 patients were enrolled in the study. 38 patients were excluded due to abnormal laboratory values, self-withdrawal, and canceled surgeries. The remaining study participants (N=116) were randomized to the tamsulosin (n=56) or placebo (n=60) groups. There was a total of 42 patients (36.21%) who developed postoperative urinary retention in the entire study cohort, with 23 cases of POUR (38.33%) in the placebo group and 19 (33.92%) in the tamsulosin group ($p=0.622$). The odds ratio is 0.826, but the risk difference (RD) is 4.41% between the groups.

Conclusions: Prophylactic tamsulosin did not reduce the incidence of urinary retention after lower extremity arthroplasty compared to placebo. The odds ratio indicates an approximately 17% decreased odds of developing POUR in the active medication group, although this was not statistically significant. Tamsulosin does not appear to be effective as a prophylactic measure in reducing POUR.

Symposium VI

Periprosthetic Joint Infection in Hip and Knee Arthroplasty

Moderator: Fares S. Haddad, FRCS

Faculty: Denis Nam, MD, Matthew S. Austin, MD, Andrew R. Manktelow, BSc, MBBS, FRCS (Orth)

Objectives:

1. Consider key aspects of patient selection and optimization prior to arthroplasty surgery
2. Review the technologies that are available to help differentiate the infected from the non-infected arthroplasty, as well as protocols and pathways for patient evaluation
3. Examine the selection of treatment methodology
4. Discuss two stage revision for periprosthetic joint infection management

Outline:

Introduction

Fares S. Haddad, FRCS

A Practical Approach to Reducing the Infection Burden: Prophylactic and Preventative Measures in 2018

Matthew S. Austin, MD

The Diagnosis of Periprosthetic Infection: An Update on Definitions and Techniques

Denis Nam, MD

An Algorithmic Approach: Which Procedure, When and for Whom?

Fares S. Haddad, FRCS

Two-Stage Revision: Managing the Interval, Antibiotics and Reimplantation

Andrew R. Manktelow, BSc, MBBS, FRCS (Orth)

Case-Based Discussion

Notes

A Multi-Center Randomized Clinical Trial of Tranexamic Acid in Revision Total Knee Arthroplasty: Does the Dosage Regimen Matter?[†]

Introduction: Tranexamic acid (TXA) is proven to reduce blood loss following total knee arthroplasty (TKA), but there are limited data on the impact of similar dosing regimens in revision TKA that is associated with greater blood loss. The purpose of this multi-center randomized trial was to determine the optimal regimen to maximize the blood-sparing properties of TXA in revision TKA.

Results: One patient withdrew, 3 didn't undergo surgery, 16 were screen failures, and 17 did not receive the assigned treatment, leaving 196 patients for the analysis. There was no significant difference in reduction in hemoglobin amongst treatment groups (2.88g/dL for oral TXA, 2.79g/dL for single-dose IV TXA, 2.59g/dL for combined IV/topical TXA, and 2.58g/dL for double-dose IV TXA; $p=0.48$). Similarly, calculated blood loss ($p=0.63$) and transfusions ($p=0.78$) were not significantly different between groups. Finally, equivalence testing assuming a 1g/dL difference in hemoglobin change as clinically relevant showed all possible pairings were statistically equivalent.

♦ The FDA has not approved tranexamic acid for use in orthopaedics.

Topical Tranexamic Acid in Revision Total Knee Arthroplasty Reduces Transfusion Rates and May Be Associated with Earlier Functional Recovery^o

Introduction: Although use of tranexamic acid (TXA) has been proven to be effective in reducing blood loss/transfusions after primary total knee arthroplasty (TKA), there is a lack of evidence for its use in revision TKA. The purpose of this study was to evaluate if use of topical TXA in revision TKA is safe and associated with reduced blood loss/transfusion rates.

Results: The mean estimated blood loss, hemoglobin drop, and the transfusion rate were significantly lower in the study group than the control ($p=0.008$, $p<0.001$, $p<0.001$, respectively). Hidden blood loss was similar between the two groups ($p=0.12$). At six weeks, the improvement in the KSS was significantly higher in the study group than in the control ($p<0.001$). No significant differences were found in the rate of thromboembolic complications between the two groups ($p=0.92$). In the subgroup analysis, when both components were revised, the relative risk of transfusion was significantly lower with the use of TXA (RR=0.227; IC 0.0593–0.860; $p=0.004$). TXA was the main factor associated with avoiding blood transfusion (OR=0.087, 95% CI: 0.03-0.24; $p<0.001$).

❖ The FDA has not approved tranexamic acid for use in orthopaedics.

Next Generation Sequencing for the Diagnosis of Periprosthetic Knee Infection: A Multicenter Investigation

Introduction: Identifying the infecting organism in periprosthetic joint infection (PJI) continues to be a challenge, with one-third of PJIs reported to have negative cultures. Recent reports demonstrate that Next-Generation Sequencing (NGS) facilitates pathogen identification in culture-negative PJI (CN-PJI); however, this signal has not been externally corroborated. This multi-institutional study was initiated to examine the ability of NGS to identify the causative organism(s) in patients with PJI of the knee.

Results: In 36 revisions, the cases were considered to be infected; 26 of these were culture-positive (26/36; 72.7%), while NGS was positive in 21 (30/36; 83.3%). Among the positive cultures, complete concordance between NGS and culture was noticed in 19 cases (19/21; 90.4%). Two cases were discordant between NGS and culture. Among the 10 cases of culture-negative PJI, NGS identified an organism in 9 cases (90%). Five patients with negative NGS results had positive cultures, of which two were fungal species. Sixty-six revisions were considered aseptic; NGS identified microbes in 25 of 66 “aseptic” revisions (37.9%) and culture isolated an organism in 4 of 66 cases (6.1%). The remaining cases (41/66; 62.1%) were both NGS and culture-negative.

Conclusions: NGS was able to detect a pathogen in the majority (>90%) of culture-negative cases and demonstrated a high rate of concordance with culture in culture-positive cases. Our collaborative findings suggest that NGS is a useful adjunct for identifying the causative organism in PJI, particularly in the setting of CN-PJI.

Does Neutral Mechanical Alignment Improve the Durability of Revision Total Knee Arthroplasty?

Introduction: In contrast to primary total knee arthroplasty (TKA), little attention has been given to the relationship between durability and coronal alignment in revision TKAs. We hypothesized that a postoperative mechanical axis of $0\pm3^\circ$ would result in better survivorship and functional outcomes, and retrospectively studied a large cohort of revision TKAs.

Results: At most recent follow-up, 22 of 258 neutrally-aligned revision TKAs were re-revised for aseptic loosening vs. 14 of 153 in the outlier group. The 10-year survivorship free of re-revision for aseptic loosening was 82% in the neutrally-aligned group vs. 77% in the outlier group ($p=0.84$). In total, 31 neutrally-aligned revision TKAs were re-revised for any cause vs. 23 in the outlier group. The 10-year survivorship free of any re-revision was 77% in the neutrally-aligned group vs. 70% in the outlier group ($p=0.62$). KSS were similar between the neutrally-aligned and outlier groups at 5 years (69 vs. 74; $p=0.56$).

Conclusions: After revision TKA with cemented VWC implants, we could not demonstrate a difference in functional outcomes or 10-year implant survivorship between a large group of mechanically well-aligned knees ($0^\circ \pm 3^\circ$) and a group of outliers. While neutral mechanical alignment remains a useful goal in revision TKA, factors other than static coronal alignment may be as important in determining durability.

Ignore the Patella in Revision Total Knee Surgery

Introduction: In the setting of the aseptic revision, a common question is: what should be done with the resurfaced patella? We report on a series of aseptic RTKR where one or both components were revised, and the patella was not.

Results: At final follow-up of a minimum of 5 years (range 5 to 9), there had been no reoperations on any patella, and none were at risk of failure. 6 of the patella had tilt beyond 10 degrees on the sunrise view, but none were subluxed. KSS averaged 86 (range 24-100) at final follow-up.

Conclusions: At midterm follow-up in the group of RTKR where the patella was not revised, we identified no subsequent failures of the patella. This is despite the presence of patella poly-wear and mismatched shapes in several knees. Unless the button is loose, severely worn or maltracking, surgeons can confidently retain the original button in place.

Paper #38

What Is the Value of Component Loosening Assessment of a Preoperatively-Obtained Bone Scan Prior to Revision Total Knee Arthroplasty?

David C. Holst, MD, Marc R. Angerame, MD, Douglas A. Dennis, MD, Jason M. Jennings, MD

Introduction: Bone scintigraphy (BS) is frequently ordered to investigate cause of failure following total knee arthroplasty (TKA). Its correlation of component loosening with intraoperative findings at the time of revision TKA (rTKA) has not been well studied. This study investigated correlations between preoperatively obtained radiologist report (RR) of BS, preoperatively documented surgeon predictions (SP) of component loosening, and operative reports documenting intraoperative findings (IF).

Methods: Our institutional database was retrospectively reviewed for all rTKA done after BS and revealed 96 eligible cases. The RR and SP cohorts were subdivided into all potential combinations of component loosening and were then compared to each other as well as IF. In addition to calculating percentage correct of RR and SP compared to IF, the levels of agreement between RR and SP were compared using the kappa statistic.

Results: Of the 96 cases, the RR correctly correlated with IF in 35 cases (37%), and the SP was correct in 66 cases (69%), indicating the preoperative interpretation of the surgeon regarding component loosening at rTKA was correct more frequently ($p < 0.001$). The kappa statistic between RR and IF was only 0.23 (95% CI 0.15-0.32), indicating minimal agreement. The kappa statistic between SP and IF was 0.57 (95% CI 0.46-0.68), indicating weak agreement. Furthermore, the kappa statistic between RR and SP was 0.36 (95% CI 0.27-0.45), also indicating minimal agreement.

Conclusions: In rTKA, there is weak agreement regarding component loosening between a radiologist's opinion of a preoperatively obtained bone scan and the surgeon's preoperative interpretation of clinical and radiographic data. While neither reliably accurately predicts what is found at the time of rTKA, the surgeon's preoperative interpretation is more closely correlated with actual intraoperative findings of component loosening.

Notes

Natural History of the Dysplastic Hip Following Periacetabular Osteotomy

Introduction: Periacetabular osteotomy (PAO) remains the gold standard treatment for developmental dysplasia of the hip (DDH). The purpose of this multicenter cohort study was to delineate the long-term radiographic natural history of the dysplastic hip following PAO.

Results: At final follow-up, 144 patients (50%) had progressed at least 1 Tönnis grade with 42 patients (14.6%) undergoing total hip arthroplasty. The mean number of years spent in each Tönnis grade following PAO was as follows: Tönnis 0=11, Tönnis 1=19, Tönnis 2=8, Tönnis 3=4. The probability of progression to THA increased significantly based on higher initial Tönnis grade ($p<0.001$). The most marked difference occurred between Tönnis 0 or 1 compared to Tönnis 2; for Tönnis 1, the probability of progression to THA at 5 and 10 years was 2% and 11%, respectively, compared to 23% and 53%, respectively, for Tönnis 2.

Conclusions: PAO significantly alters the natural history of DDH. Precise radiographic progression based on the Tönnis grade can now be used to ascribe prognosis for the native hip. Importantly, this investigation demonstrates a stark increase in progression to THA within 10 years of PAO for patients with Tönnis 2 compared to Tönnis 0 or 1 osteoarthritis.

Surgical Treatment of Femoroacetabular Impingement: Arthroscopy vs. Surgical Hip Dislocation–A Propensity Matched Analysis

Introduction: Surgical treatment of femoroacetabular impingement (FAI) has continues to evolve. Hip arthroscopy is increasingly utilized for treatment of typical FAI deformities, while open surgical hip dislocation is reserved for complex or severe cases. The purpose of the current study was to compare the outcomes of surgical treatment of FAI between hip arthroscopy and open surgical hip dislocation utilizing a propensity analysis.

Results: The mean mHHS was similar at baseline between the two groups (60.2 HA vs. 60.7 SD). Both groups demonstrated statistically significant improvements in all PROs. The final mHHS was not statistically different between the two groups (81.2 vs. 80.2, $p=0.67$). Similarly, the HOOS pain subscale was similar at final follow-up (80.6 vs. 77.7, $p=0.32$). The rates of THA (0% and 3.1%, $p=0.409$) and revision surgery (7.8% and 10.9%, $p=0.34$) in the HA and SD groups. Overall rates of failure (revision surgery or clinical failure) were 21.9% for HA and 25.0% for SD ($p=0.54$).

Conclusions: Patients undergoing surgical treatment of FAI with either hip arthroscopy and surgical hip dislocation demonstrate significant improvements in PRO which are similar for patients undergoing hip arthroscopy or surgical hip dislocation.

Patient Reported Outcomes in Joint Registries: Defining the Optimal Collection Window

Introduction: Patient-reported outcomes (PROs) are increasingly being used in joint registries and healthcare agencies to assess the quality of care. While there have been abundant publications describing their use, few have discussed the optimal timing of PROs administration postoperatively. The purpose of this study was to determine the optimal window for PROs collection in the postoperative period.

Results: A significant plateau in PRO improvement was noted by 6 months postoperatively. For TKA, the percentage of overall improvement achieved by 6 months was 88.7%, 84.5%, 100%, and 90.5% for the WOMAC, SF-12 PCS, UCLA, and KSCRS respectively. For THA, these values were 92.7%, 83.5%, 88.0%, and 89.8% respectively for the same measures. There were marginal improvements from 6 to 12 months and no improvement from 12 to 24 months. Follow-up attrition rates at 6, 12, and 24 months were 85%, 69%, 40% respectively. Our institutional costs for collecting a complete dataset per patient are \$159, \$333, and \$1,256 for 6, 12, and 24 months respectively.

Conclusions: This study provides evidence that the vast majority of improvement in PROs following TJA occurs within the first six months postoperatively. Considering the high cost of data acquisition and attrition rates, collection of PROs beyond 6 months may not be necessary or cost-effective.

When Should Complete Blood Count Tests Be Performed in Primary Total Knee Arthroplasty Patients?

Introduction: Routine laboratory studies are often obtained following total knee arthroplasty (TKA). Moreover, laboratory studies are often continued daily until the patient is discharged from the hospital regardless of medical management. The purpose of this study was to investigate utility and cost of routine complete blood count (CBC) tests following TKA. Secondly, to identify patient factors associated with abnormal lab values.

Results: Of the 484 patients who underwent primary TKA, 25 required transfusion (5.2%). Patients who required transfusion had a significantly lower pre-operative hemoglobin (11.47 g/dL) compared to patients who did not require transfusion (13.58 g/dL) $p=0.005$. Risk of transfusion was 5.2 times more likely in patients who were anemic preoperatively (95% CI 2.90-9.35) $p<0.001$. Without TXA, patients were 2.75 times more likely to receive a transfusion (95% CI 1.43-5.30) $p<0.001$. Length of surgery was not associated with increased risk of transfusion. There were no patients who received intervention for the outcome of platelet and white blood counts. Average number of CBC tests collected for patients who did not receive medical intervention was 2.89. This equated to \$76,287 in hospital charges.

Conclusions: Maintaining high quality patient care while being cost effective is critical to the new era of bundled payments for total joint arthroplasty. Routine postoperative CBC tests in patients with a normal preoperative hemoglobin and receive TXA who undergo TKA with a tourniquet do not add value to patient care. Patients who are anemic prior to TKA or do not receive TXA should obtain a CBC. Consideration should be taken to refrain from further CBC tests if intervention is not necessary after day one post-TKA.

Identifiable Risk Factors to Minimize Postoperative Urinary Retention in Modern Outpatient Rapid Recover Total Joint Arthroplasty

Introduction: Postoperative urinary retention (POUR) following total joint arthroplasty (TJA) ranges from 0 to 75% reflecting variations in the perioperative practices of TJA programs; study populations; and definitions, measurement, and treatment methods for POUR. Further, POUR presents a significant barrier to outpatient and early discharge TJA. This study examined the incidence and risk factors for acute POUR in patients discharged on the day of, or the day after, surgery in a modern, evidence-based care and coordination early discharge TJA program.

Methods: Prospectively recorded data on 620 consecutive primary TJAs discharged on the day of or the day after surgery were retrospectively reviewed. POUR was diagnosed by a perioperative internal medicine specialist whose practice focuses exclusively on TJA. Univariate analysis of potential predictors was performed, followed by binary logistic regression (BLR) testing of predictors with $p=0.20$.

Results: After exclusions for confounds the final analysis sample consisted of 613 procedures. The overall incidence of POUR was 4.2% (n=26). Male sex, THA, history of urinary retention, use of neostigmine, and the absence of an indwelling catheter were associated with a higher prevalence of acute POUR and met criteria for entry into multivariate BLR. Seventeen additional predictors, including opioid spinals and outpatient surgery were unrelated to POUR. In the final BLR model, the probability of developing POUR in patients with a history of urinary retention, without an indwelling catheter, and who received neostigmine was 82.4%, which declined to 2.5% in the absence of these risk factors. All cases of POUR resolved, and there were no long-term complications.

Conclusions: Despite a relatively low incidence of 4.2%, patients with a history of POUR, the use of neostigmine by anesthesia should be carefully considered and potentially avoided in stand-alone ambulatory surgery centers.

Paper #44

Transdermal Scopolamine as an Adjunct to Multi-Modal Pain Management in Patients Undergoing Total Joint Arthroplasty

Ari Ruben Berg, BA, Akshay Lakra, MBBS, Emma Jennings, BS, Herbert John Cooper, MD,
Roshan P. Shah, MD, Jeffrey A. Geller, MD

Introduction: Postoperative nausea and vomiting (PONV) after surgery is detrimental to patient experience, tolerance of pain medication, rehabilitation progress, and functional outcomes. Given the importance of early rehabilitation following arthroplasty (TJA), we asked whether transdermal scopolamine is effective in reducing rates of PONV and improving functional outcomes following TJA.

Methods: We retrospectively reviewed the charts of 1,085 consecutive patients who underwent TJA between 2014 and 2017 and compared patients prior to the addition of the scopolamine patch in our peri-operative regimen (control group) to those after the addition (study group). All patients after 10/1/2014 were given scopolamine patch in the holding area unless contraindicated in our protocol (allergy, open angle glaucoma, age over 75 years, urinary retention history). 495 were excluded. Charts were reviewed for incidence of PONV, demographic information, surgical time, length of stay, distance walked with physical therapy, and VAS pain scores. Student t-test was used to compare continuous data and fisher exact test was used for categorical variables.

Results: The incidence of PONV was significantly lower in the scopolamine group compared to the control group (14.4% vs. 29.3%, $p<0.0001$). Patients who were given scopolamine also had a significantly shorter length of stay (2.3 days vs. 2.8 days, $p<0.0001$), were more likely to be discharged (84.0% vs. 63.9%, $p<0.0001$), had lower VAS pain scores on postoperative days (POD) 0-2 ($p<0.01$), were able to walk further distances on POD 0-3 ($p<0.001$), and received fewer morphine equivalents when compared to the control group on POD 1-2 ($p<0.001$).

Conclusions: Use of a scopolamine patch was associated with a significant reduction in PONV and improvement in functional outcomes following TJA. This data supports the use of transdermal scopolamine as part of a multi-modal, perioperative pain protocol in patients undergoing TJA.

Notes

Symposium VII

Outpatient Joint Replacement: Practical Guidelines for Your Program Based on Evidence, Success, and Failures

Moderator: R. Michael Meneghini, MD

Faculty: William Hamilton, MD, Alexander P. Sah, MD, Charles A. DeCook, MD

There are growing trends in outpatient joint replacement that show how important it is to learn from past failures in order to shape future success.

Objectives:

1. Utilize real case examples of failures to illustrate potential risks and complications associated with outpatient joint replacement by highlighting consequences of overlooking the importance of patient selection and proper protocols
2. Show how case examples have shaped current practices by learning from prior failures to emphasize the importance of an ever-evolving protocol for successful outpatient joint replacement
3. Answer the most common real-life challenges related to outpatient joint replacement from general patient selection to specific details, such as dealing with urinary retention or nausea

Outline:

Introduction: Why Are We Here? Growing Trends in Outpatient Joint Replacement

Michael Meneghini, MD

Patient Selection: It All Starts Here

Alexander Sah, MD

The Pathways and Protocols that Make It Work

Bill Hamilton, MD

The ASC Is Not Your Hospital OR.

Charlie DeCook, MD

Questions and Discussion

Michael Meneghini, MD

Notes

Cotinine Testing Improves Smoking Cessation Prior to Total Joint Arthroplasty

Introduction: Patients who are actively smoking at the time of primary joint arthroplasty (TJA) are at an increased risk of perioperative complications. Serum cotinine testing is a sensitive and specific method to verify abstinence from smoking and may therefore improve a patient's chance of smoking cessation. The purpose of this study was to assess whether cotinine testing improves the self-reported quit-rate among smokers before TJA.

Results: Of the 28,758 primary TJAs identified, 8.8% (2,514) were smokers. Serum cotinine testing was obtained on 103 of these patients. The abstinence rate (by means of self-reporting) before surgery significantly improved from 15.8% to 28.2% in the untested versus cotinine-tested groups, respectively ($p=0.005$). Among patients who underwent cotinine testing, 77% were negative (abstinent). Among patients who stated they had quit smoking, 15% still had positive cotinine tests.

Conclusions: Smoking cessation remains a major challenge in contemporary TJA practices despite a concerted effort and sundry of tools to help patients quit. Our findings suggest that cotinine testing significantly improves the self-reported quit rates of smokers before surgery and helps identify the 15% who falsely report abstinence to ensure appropriate counseling of inherent risks. This simple, reliable, and relatively inexpensive test should therefore be considered as a valuable adjunct in helping smokers quit before surgery.

Diabetes Mellitus Type One Poses Greater Risk for Periprosthetic Joint Infection than Type Two for Patients Undergoing Total Joint Arthroplasty

Introduction: The effect of diabetes on the risk of periprosthetic joint infection (PJI) is not well documented. We hypothesized that diabetes mellitus type 1 (DM1) patients would be at greater risk for PJI than those with diabetes mellitus type 2 (DM2) and that a history of diabetic complications would be associated with an increased risk for PJI.

Methods: We performed a retrospective cohort study on all adult patients that underwent hip or knee arthroplasty, with =2-years follow-up, within a state-wide database from 1996-2013. Of the 75,478 patients included, 1,668 had DM1 and 18,186 had DM2. There was no difference in age or sex between groups ($p>0.05$). Risk factors were calculated using Cox regression, adjusting for siblings and stratified by age. Logistic regression was used to analyze the effect of diabetic complications on risk of PJI, controlling for other known risks for PJI.

Results: The frequency of PJI in non-diabetic patients was 2.6% compared to 4.3% in all diabetics (RR 1.47, $p < 0.001$). The patients with DM1 were at 1.8 times greater risk for PJI than DM2 (7% vs 4%, $p < 0.001$). The following diabetic complications increased the risk of PJI: peripheral circulatory disorders (OR 2.59), ketoacidosis (OR 2.52), neurologic (OR 2.33), renal (OR 2.15), and ophthalmic (OR 1.76) (all $p < 0.002$). The odds of PJI increased with each added complication (all, $p < 0.001$) and patients with 4 or more complications were 9 times more likely to have PJI than uncomplicated diabetics. Overweight and obese DM2 patients were at greater risk for PJI whereas underweight DM1 patients were at greater risk (all $p < 0.05$).

Conclusions: Our data showed an increased risk of PJI in DM1 patients compared with DM2, along with increasing risk for additional diabetic complications. These findings emphasize the need to better understand our diabetic patients' medical histories for more appropriate risk management.

Smoking Adversely Affects Patient Reported Outcomes Following Total Joint Arthroplasty

Introduction: While smoking is well accepted as a risk factor for surgical complications after total joint arthroplasty (TJA), little is known about the effects of smoking on patient reported outcomes (PROs). In this study, we investigated the association between smoking and a panel of commonly used PROs.

Results: Nonsmokers demonstrated higher baseline preoperative PROs than active smokers. With the exception of SF-12 MCS ($p=0.671$) and UCLA ($p=0.178$), nonsmokers showed significantly greater improvements in WOMAC ($p=0.002$), SF-12 PCS ($p=0.005$), and OHS ($p=0.033$). Additionally, for each unit increase in packs per day smoked, the WOMAC scores decreased by 7.7 points ($p=0.003$), SF-12 PCS by 4.8 points ($p=0.001$) and OHS by 3.0 points ($p=0.033$). At final follow-up, nonsmokers had better absolute scores for all PROs measured ($p<0.05$).

Conclusions: Previous and never smokers achieved statistically and clinically greater improvement in most PROs after TJA when compared to active smokers. There was a dose-dependent inversely proportional relationship between smoking and outcomes. Since smoking is a modifiable risk factor, smokers should be counseled to quit smoking to optimize outcomes.

Aspirin for Venous Thromboembolism Prophylaxis Decreases Mortality After Primary Total Joint Arthroplasty

Introduction: Aspirin has increased in popularity as prophylaxis for venous thromboembolism (VTE) following total joint arthroplasty (TJA). However, the potential cardioprotective effects of aspirin when administered for VTE prophylaxis remains unknown. This study aimed to investigate the influence of VTE prophylaxis, including aspirin, with respect to mortality following primary TJA.

Results: Overall, the mortality rate was 0.22% and 0.56% at 30-days and 1-year following TJA. The use of aspirin was independently associated with lower risk for death at both 30-days (OR 0.37, $p=0.016$) and 1-year (OR 0.52, $p=0.006$). Patients in the non-aspirin cohort demonstrated a 3-fold increased risk for death at 30-days (0.3% vs. 0.1%, $p=0.004$) and 2-fold increased risk of death at 1-year (0.7% vs. 0.3%, $p<0.001$) compared to aspirin. At 1-year, the primary cause of death in the non-aspirin group was cardiac (46/23,072, 0.20%). In the aspirin cohort, the rate of death due to cardiac cause was almost 5-fold lower (3/8,061, 0.04%, $p=0.005$). Risk factors for mortality at 1-year included higher mean age ($p<0.001$), male gender ($p=0.024$), pre-existent congestive heart failure ($p=0.009$), cerebrovascular disease ($p=0.001$), malignancy ($p<0.001$) and history of myocardial infarction ($p<0.001$).

Conclusions: This study demonstrates that administration of aspirin as a VTE prophylaxis reduces the risk of mortality following primary TJA. Given the numerous options available and permitted by the current guidelines, surgeons should be aware of this added benefit of aspirin when selecting VTE prophylaxis.

Are Patients More Satisfied with a Balanced TKA?

Introduction: Studies have shown that as many as 1 in 5 patients is dissatisfied following TKA. The purpose of this study was to determine whether or not patients with a balanced TKA, as measured using intraoperative sensors, exhibit better clinical outcomes.

Results: Of the 318 patients, 208 were balanced and 110 were unbalanced. When correcting for confounding factors, patients with a balanced knee exhibited greater satisfaction at 6 weeks, 6 months and 1 year compared to the patients with an unbalanced knee ($p=0.011$). Similarly, the same cohort of patients with a balanced knee showed a more forgotten joint (higher Forgotten Joint Score) at the same time intervals ($p=0.044$).

Conclusions: As patient reported outcomes become increasingly important for maintaining favorable hospital and provider metrics, it is imperative to find new methods to increase satisfaction levels among TKA recipients. In this study, patients with quantitatively balanced TKA had significantly better KSS satisfaction and forgotten joint scores compared to patients with unbalanced TKA.

Emergency Department Visit Within One Year Prior to Elective Total Joint Arthroplasty is Predictive of Postoperative Return to Emergency Department Within 90 Days

Introduction: The Comprehensive Care for Joint Replacement Model, developed by Centers for Medicare and Medicaid Services, aims to improve the quality of joint replacement. Metrics, including emergency room visit rates after Primary Total Knee and Total Hip Arthroplasty (TKA and THA), are of particular interest. The purpose of this study was to determine if preoperative Emergency Department (ED) visits are predictive of postoperative ED visits among patients undergoing elective THA or TKA.

Results: TKA and THA patients with a single preoperative ED visit had an OR of 1.9 and 2.0, respectively, of returning to the ER postoperatively ($P<0.001$). Increasing preoperative visit frequency correlated with increasing odds ratios (up to 5 preoperative visits) (OR 1.9-16.7, $P<0.001$). The proximity of the most recent preoperative visit to surgery was a risk factor for postoperative return to ED (OR 4.6 hips, 2.9 knees, $P<0.001$).

Conclusions: Presentation to the ED is common prior to total joint arthroplasty and is predictive of a postoperative visit within 90 days. Preoperative visit frequency and proximity prior to surgery increases a patient's risk of a postoperative visit within 90 days.

Symposium VIII

Taper Corrosion in Total Hip Arthroplasty: Applying the Best Evidence into Practice

Moderator: Joshua J. Jacobs, MD

Faculty: Brian J. McGrory, MD, Young-Min Kwon, MD, PhD, Brett Levine, MD

An interactive didactic and case presentation format highlights treatment of THA patients with modular taper corrosion, enhancing understanding and applying evidence-based practice to optimize patient evaluation, revision surgery indication, surgical techniques and outcomes.

Objectives:

1. Understanding the spectrum of clinical presentations of adverse soft tissue reactions due to taper corrosion, reflecting a complex interplay of implant, surgical and patient factors.
2. Understanding the current state of knowledge of importance of various parameters affecting taper corrosion including patient-, implant- and surgeon-specific factors.
3. Gain understanding of utility and limitations of specialized diagnostic tests including blood metal levels and cross-sectional imaging studies in the clinical decision-making process
4. Optimizing revision surgery outcomes for taper corrosion which involves careful pre-operative planning, implant selection, and surgical techniques to overcome challenges associated with soft tissue necrosis

Outline:

Introduction

Joshua J. Jacobs, MD

What Surgeons Need to Know About Taper Corrosion in MoP THA

Brett Levine, MD

How Big is the Problem?

Brian J. McGrory, MD

Risk Factors, Metal Levels, and Revision Outcome in Taper Corrosion ALTR

Young-Min Kwon, MD, PhD

Case Presentations and Discussions

Notes

Unintended BPCI Consequences Following Removal of TKA from Inpatient-Only List

Introduction: Centers for Medicare and Medicaid Services (CMS) beginning in 2013 introduced the Bundled Payments for Care Improvement (BPCI) initiative to test innovative payment and service delivery models. Early BPCI implementers report decreased length of stays (LOS), discharges to inpatient facilities, and readmission rates with overall cost savings. Removing TKA from the Medicare Inpatient Only list may change the case-mix of patients included in 2018 BPCI bundles. The purpose of the study was to compare expenditures and post-acute events of a subset of total joint arthroplasty (TJA) patients discharged after 24 hours to all TJA patients regardless of LOS.

Methods: CMS data of 1,729 patients who underwent TJA in 2017 were identified using Diagnosis-Related Groups 469 and 470. All 1,729 patients were compared to a subset of 1,042 patients who had a LOS>24 hours. Expenditures and post-acute events within a 90-day episode including admission to an IRF/SNF, home health (HH) and readmissions were analyzed. Statistical analyses were performed using Wilcoxon tests and Chi Square tests.

Results: The median expenditures were \$18,362 (IQR \$13,447-\$19,185) for all TJA patients and \$21,118 (IQR \$15,368-\$22,772) for TJA patients discharged after 24 hours ($p<0.001$). The median post-acute care spent was \$5,509 (IQR \$1,685-\$5,725) for all patients and \$7,429 (IQR \$2,961-\$8,159) for patients with LOS>24 hours ($p<0.001$). Patients with a LOS>24 hours had a higher rate of SNF admissions (32% vs. 20%; $p<0.001$), IRF admissions (1% vs. 0%; $p=0.25$), HH (67% vs. 59%; $p<0.001$) and readmissions (8% vs. 6%; $p=0.12$).

Conclusions: Implications of removing TKA from the Inpatient Only List could potentially remove up to 40% of patients from the BPCI program leading to substantially less savings of almost \$3,000 per patient, on average. Remaining bundle patients are also more likely to require HH and SNF following discharge.

Age and Frailty Influence Hip and Knee Arthroplasty Reimbursement in a Bundled Payment Care Improvement Initiative

Introduction: The Bundled Payment Care Improvement (BPCI) initiative aims to improve the quality of patient care while mitigating cost. How patient age and frailty affect reimbursement after hip and knee total joint arthroplasty (TJA) is not known. This study aims to evaluate if patient age and frailty affect cost of care.

Results: Age was evaluated as a categorical variable, with the median age of our sample population the categorical cutoff. Age greater than or equal to 72 years old increased cost by 8.6% and increasing mFI score increased cost by 4.4%, 10.8%, 31.7%, 35.3%, 69.1% for mFI scores 1-5, respectively (p-values<0.01). Age demonstrated an increase in cost of 0.68% per incremental age increase (p-value<0.01). Multivariate evaluation of increasing age and mFI revealed increased cost: mFI 2, 9.7% (CI 5.1%, 14.3%), mFI 3, 29.9% (CI 22.1%, 27.6%), mFI 4, 33.8% (CI 20.0%, 47.6%), mFI 5, 67.4% (CI 39.2%, 95.6%) (p-values<0.01).

Conclusions: Increasing age and frailty increase the cost associated with TJA. The BPCI initiative over-simplifies the cost associated with TJA. This information could de-incentivize care to older, higher-risk patients. Objective patient-specific/risk-adjusted stratification of BPCI pricing is necessary to be considered as a valid financial model.

Perioperative Orthopaedic Surgical Home (POSH): Optimization of High-Risk TJA Candidates Is Effective

Introduction: It is well recognized that unplanned readmissions following total joint arthroplasty (TJA) are more prevalent in patients with comorbidities. However, few investigators have delayed surgery and medically optimized patients prior to surgery. In its current form, the Perioperative Orthopaedic Surgical Home (POSH) is a surgeon-led screening and optimization initiative targeting eight common modifiable comorbidities.

Results: Since the implementation of the POSH initiative, patients with RRAT scores ranging from 3 to 5 have experienced lower 30-day (1.6% vs. 5.3%; $p=0.03$) and 90-day (3.2% vs. 7.4%; $p<0.05$) readmission rates when compared to the non-POSH cohort. Only 15.3% of medically optimized patients enrolled in the POSH initiative were discharged to a post-acute care (PAC) facility, whereas, 23.4% of non-POSH patients were discharged to a PAC facility ($p=0.01$). There were no differences in LOS and infection rates between the two cohorts. Moreover, 90-day episode of care costs were 14.9% greater among non-POSH Medicare TJA recipients and 32.6% higher if a readmission occurred.

Conclusions: The identification and medical optimization of comorbidities prior to surgical intervention may enhance the value of care TJA candidates receive. A standardized multi-disciplinary approach to the medical optimization of high-risk TJA candidates may improve patient engagement and perioperative outcomes, while reducing cost associated with TJA.

Medical Malpractice Litigation Following Primary Total Joint Arthroplasty: A Comprehensive, Nationwide Analysis for the Last Decade

Conclusions: Infection and nerve injury were the most common reasons of malpractice litigation against adult reconstruction surgeons. The most likely outcome of these lawsuits was a jury verdict in favor of the surgeon. Regardless, surgeons should be cognizant of the potential for lawsuit due to these complications and should simultaneously ensure they inform patients of these potential complications of TJA preoperatively.

Preoperative Optimization Checklists Within the CJR Bundle Have Not Decreased Hospital Returns

Introduction: The Comprehensive Care for Joint Replacement (CJR) model has resulted in the evolution of preoperative optimization programs to decrease costs and readmissions. At the investigating institution, one center is not within the CJR bundle and has dedicated fewer resources to this effort. The remaining centers have adopted an 11 metric checklist designed to identify and mitigate modifiable preoperative risks. We hypothesized that this checklist would improve postoperative outcomes for total knee arthroplasty (TKA) patients eligible for participation in CJR.

Methods: The institutional database was retrospectively queried for patients undergoing TKA from 2014 to 2018. Only patients with eligible participation in the CJR reimbursement system were included. Demographic information including age, sex, body mass index (BMI), and ASA score were determined, and outcome measurements comprising length of stay (LOS), disposition, 90-day ED visits, and hospital readmissions were explored. Statistical analysis was performed to determine differences in outcomes between CJR participating and non-CJR participating hospitals.

Results: 2,308 TKA patients including 1,564 from a CJR participating center and 744 from a non-CJR center were analyzed. There was no significant difference in patient age (median 71 years) or sex (62.4% female); however, patients at the non-CJR hospital had significantly higher BMI ($p<0.001$) and ASA scores ($p<0.001$). Patients in the CJR network had significantly greater discharges to home ($p=0.050$) compared to skilled nursing facilities, and shorter LOS ($p<0.001$). However, there was no reduction in 90-day ED visits or readmissions.

Conclusions: The resources utilized at CJR participating hospitals, including patient optimization checklists, did not effectively alter patient outcomes following discharge. Investments in infrastructure impacted only discharge disposition and LOS. While contributing to cost savings, this does not translate to improved patient outcomes. Likely, a checklist alone is insufficient and detailed optimization protocols for modifiable risk factors must be investigated.

Antibiotic-Loaded Bone Cement in Primary Total Knee Arthroplasty: Utilization Patterns and Impact on Complications Using a National Database

Introduction: Routine prophylactic use of antibiotic-loaded cement in primary total knee arthroplasty (TKA) remains controversial and is currently not FDA-approved in the U.S. Its effectiveness in mitigating infection remains unclear while the high antibiotic elution may lead to other medical complications. The purpose of this population-based study was to evaluate utilization patterns of antibiotic-loaded bone cement in primary TKA, and its impact on outcomes and economic burden.

Results: Overall, antibiotic cement was utilized in 27.2% (N=322,476) of all primary TKA procedures. This increased from 17.3% in 2006 to 30.2% in 2010 and plateaued until 2016. Utilization of antibiotic cement was lower in rural hospitals (21.4%) and higher in large (>500 beds; 29.4%) hospitals. After adjusting for relevant covariates, antibiotic-loaded cement use was associated with significantly decreased odds for postoperative infection (OR=0.89; CI 0.83-0.96) and increased odds for AKI (OR = 1.06; CI 1.02-1.11). Associations with other outcomes were either statistically or clinically non-significant.

Conclusions: This is the first national study on the prophylactic use of antibiotic-loaded bone cement in primary TKA patients. With utilization rates of around 30% we found reduced odds for infection while there may be a potential increase AKI. These data highlight the need for cost-effective analyses with infection reduction weighed against serious adverse events.

Notes

Matthew Philip Abdel, MD

American Association of Hip and Knee Surgeons: Board or committee member
International Congress for Joint Reconstruction: Board or committee member
Journal of Bone and Joint Surgery–British: Editorial or governing board
Mid-America Orthopaedic Association: Board or committee member
Minnesota Orthopaedic Society: Board or committee member
Springer: Publishing royalties, financial or material support
Stryker: Paid consultant

Jeffrey Alexander Ackerman, MD

This individual reported nothing to disclose.

Muyibat A. Adelani, MD

American Association of Hip and Knee Surgeons: Board or committee member

Derek F. Amanatullah, MD

AAOS: Board or committee member
Acumed, LLC: Research support
BlueJay Mobile Health: Paid consultant; Research support
DePuy, A Johnson & Johnson Company: Paid consultant
Exactech, Inc: Paid consultant
Omni: Paid consultant
Stryker: Paid consultant; Research support
WebMD: Publishing royalties, financial or material support
Zimmer: Paid consultant; Research support

Hiba Anis, MD

This individual reported nothing to disclose.

Afshin Anoushiravani, MD

This individual reported nothing to disclose.

Matthew Austin, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or

committee member
Corin U.S.A.: Paid consultant
JayPee: Publishing royalties, financial or material support
Journal of Arthroplasty: Editorial or governing board
Journal of the American Academy of Orthopaedic Surgeons: Editorial or governing board
Link Orthopaedics: Paid consultant
Stryker: Paid consultant
Zimmer: IP royalties; Paid consultant; Research support

Michael P. Ast, MD

American Association of Hip and Knee Surgeons: Board or committee member
Conformis: Paid consultant
Eastern Orthopaedic Association: Board or committee member
Maxx Orthopaedics: Paid consultant; Paid presenter or speaker
OrthAlign: Paid consultant; Stock or stock Options
OrthAlign Inc: Paid presenter or speaker
OrthAlign, Inc: IP royalties
Smith & Nephew: Paid consultant; Paid presenter or speaker; Research support
Stryker: Paid consultant; Research support

Trevor R. Banka, MD

This individual reported nothing to disclose.

C. Lowry Barnes, MD

American Association of Hip and Knee Surgeons: Board or committee member
ConforMIS: Research support
DJO: IP royalties
HealthTrust: Paid consultant
HipKnee Arkansas Foundation: Board or committee member
Journal of Arthroplasty: Editorial or governing board
JSOA: Editorial or governing board
Medtronic: IP royalties; Paid consultant
Mid American Orthopaedic Association: Board or committee member

None: Unpaid consultant
Responsive Risk Solutions: Paid consultant; Stock or stock Options
Southern Orthopaedic Association: Board or committee member
Zimmer: IP royalties

Robert L. Barrack, MD

Biomet: Research support
EOS Imaging: Research support
Hip Society: Board or committee member
Journal of Bone and Joint Surgery–American: Editorial or governing board
Journal of Bone and Joint Surgery–British: Editorial or governing board
Knee Society: Board or committee member
Medical Compression Systems: Research support
Smith & Nephew: Research support
Stryker: IP royalties; Other financial or material support; Paid consultant; Research support
The McGraw-Hill Companies Inc: Publishing royalties, financial or material support
Wolters Kluwer Health–Lippincott Williams & Wilkins: Publishing royalties, financial or material support
Wright Medical Technology, Inc.: Research support

Walter Burns Beaver, MD

DePuy, A Johnson & Johnson Company: Research support
DonJoy: Research support
ICJROrthoCarolina Research Institute: Board or committee member
Pacira Pharmaceutical: Research support
Stryker: IP royalties; Paid consultant; Paid presenter or speaker; Research support

Hany S. Bedair, MD

DEF Medical: Stock or stock Options
Smith & Nephew: Paid consultant

Ilya Bendich, MD

This individual reported nothing to disclose.

Daniel J. Berry, MD

American Joint Replacement Registry: Board or committee member
Bodycad: Paid consultant; Stock or stock Options
DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant; Research support
Elsevier: Publishing royalties, financial or material support
International Hip Society: Board or committee member
Journal of Bone and Joint Surgery–American: Editorial or governing board
Mayo Clinic Board of Governors: Board or committee member
Wolters Kluwer Health–Lippincott Williams & Wilkins: Publishing royalties, financial or material support

Hari Bezwada, MD

Corentec: Paid consultant
Encore Medical: Paid consultant
Flexion Therapeutics: Paid consultant
Journal of Arthroplasty: Editorial or governing board
Journal of the American Academy of Orthopaedic Surgeons: Editorial or governing board

Stefano Alec Bini, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Arthroplasty Today, Associate Editor: Editorial or governing board
CaptureProof: Stock or stock Options
Cloudmedx: Stock or stock Options
HealthLoop: Research support
Johnson & Johnson: Paid consultant
Journal of Arthroplasty: Editorial or governing board
Medtronic: Research support

Stryker: Paid consultant
Zimmer: Research support

Michael Bolognesi, MD

Amedica: Stock or stock Options; Unpaid consultant
American Association of Hip and Knee Surgeons: Board or committee member
AOA Omega: Other financial or material support
Arthroplasty Today: Editorial or governing board
Biomet: Research support
DePuy, A Johnson & Johnson Company: Research support
Eastern Orthopaedic Association: Board or committee member
Journal of Arthroplasty: Editorial or governing board
Journal of Surgical Orthopaedic Advances: Editorial or governing board
TJO: IP royalties; Paid consultant; Stock or stock Options
Zimmer: IP royalties; Paid presenter or speaker; Research support

Kevin John Bozic, MD, MBA

American Association of Hip and Knee Surgeons: Board or committee member
American Joint Replacement Registry: Board or committee member
Cardinal Analytx: Paid consultant
Carrum Health: Paid consultant
Centers for Medicare and Medicaid Services: Paid consultant
Harvard Business School: Unpaid consultant

James Andrew Browne, MD

American Association of Hip and Knee Surgeons: Board or committee member
American Joint Replacement Registry: Board or committee member
American Journal of Orthopedics: Editorial or governing board
DJ Orthopaedics: IP royalties; Paid consultant
Ethicon: Paid consultant

Journal of Arthroplasty: Editorial or governing board
Journal of Bone and Joint Surgery–American: Publishing royalties, financial or material support
Radlink: Stock or stock Options
Saunders/Mosby-Elsevier: Publishing royalties, financial or material support
Southern Orthopaedic Association: Board or committee member
Virginia Orthopaedic Society: Board or committee member

Thomas E. Brown, MD

This individual reported nothing to disclose.

Andrew John Bryan, MD

This individual reported nothing to disclose.

Aaron Buckland, FRACS

K2M: Paid consultant
Nuvasive: Paid consultant

Robert L. Buly, MD

Blue Belt Technology: Stock or stock Options
Journal of Orthopaedics and Traumatology: Editorial or governing board
Maurice Mueller Foundation of North America International Society for Hip Arthroscopy: Board or committee member

Tyler Edwin Calkins, BS

This individual reported nothing to disclose.

Claudio Castelli

DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant; Paid presenter or speaker
Italian Hip Society: Board or committee member

Antonia F. Chen, MD, MBA

3M: Paid consultant
AAOS: Board or committee member
ACI: Paid consultant
AJRR: Board or committee member
American Association of Hip and Knee Surgeons: Board or

committee member
Annals of Joint: Editorial or governing board
bOne: Paid consultant
Bone & Joint 360 Journal: Editorial or governing board
Clinical Orthopaedics and Related Research: Editorial or governing board
Convatec: Paid consultant
DJ Orthopaedics: Paid consultant
European Knee Association: Board or committee member
Graftworx: Stock or stock Options
Halyard: Research support; Paid consultant
Healthcare Transformation: Editorial or governing board
Heraeus: Paid consultant
International Congress for Joint Reconstruction: Board or committee member
Irrimax: Paid consultant; Research support
Joint Purification Systems: Stock or stock Options
Journal of Arthroplasty: Editorial or governing board
Journal of Bone & Joint Infection: Editorial or governing board
Knee Surgery, Sports Traumatology, Arthroscopy: Editorial or governing board
Musculoskeletal Infection Society: Board or committee member
Pfizer: Paid consultant
Recro: Paid consultant
SLACK Incorporated: Publishing royalties, financial or material support
Smith & Nephew: Research support
Sonoran: Stock or stock Options
Stryker: Paid consultant
Zimmer: Paid consultant

Darwin D. Chen, MD

Conformis: Paid consultant

John C. Clohisy, MD

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Nicholas Dominic Colacchio, MD

This individual reported nothing to disclose.

Herbert John Cooper, MD

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Brian Matthew Curtin, MD

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David F. Dalury, MD

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Chris John Dangles, MD

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Charles M. Davis III, MD, PhD

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Journal of Arthroplasty: Editorial or governing board

Charles Adam DeCook, MD

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Daniel J. Del Gaizo, MD

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Craig J. Della Valle, MD

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Matthew J. Dietz, MD

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Lawrence D. Dorr, MD

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Jacob M Drew, MD

DePuy, A Johnson & Johnson Company: Paid presenter or speaker
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Stephen Thomas Duncan, MD

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Kentucky Orthopaedic Society: Board or committee member
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Zimmer: Paid consultant; Research support

Robert Easton, MD

Encore Medical: IP royalties; Paid consultant

Aidin Eslam Pour, MD

This individual reported nothing to disclose.

Thomas K. Fehring, MD

DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant; Paid presenter or speaker; Research support

Yale Fillingham, MD

Johnson & Johnson: Paid consultant

Mark G. Freeman, MD

HealthTrustPG: Paid consultant
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Medtronic: Paid consultant; Paid presenter or speaker
Smith & Nephew: Paid consultant; Paid presenter or speaker

Kevin B. Fricka, MD

2ndMD: Paid consultant
OrthAlign: Stock or stock Options
OrthoCareRN: Other financial or material support
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Zimmer, INOVA Health Care Services: Research support

Mark I. Froimson, MD

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American Journal of Orthopedics: Editorial or governing board
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Journal of Bone and Joint Surgery—American: Editorial or governing board
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Pacira: Stock or stock Options
UOC: Paid consultant

Michael David Gabbard, MD

This individual reported nothing to disclose.

Kevin L. Garvin, MD

AAOS: Board or committee member
American Orthopaedic Association: Board or committee member
Hip Society: Board or committee member
Knee Society: Board or committee member

Wolters Kluwer Health –
Lippincott Williams & Wilkins:
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Jeremy Gililland, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
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CoNexions: Stock or stock Options
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Stryker: Research support
Zimmer: Research support

Devon D. Goetz, MD

Clinical Orthopaedics and Related Research: Editorial or governing board
Journal of Bone and Joint Surgery – American: Editorial or governing board
society for arthritic joint surgery: Board or committee member

Ashton Goldman, MD

This individual reported nothing to disclose.

Jeffrey M. Goldstein, MD

DePuy, A Johnson & Johnson Company: Paid presenter or speaker
Journal of Arthroplasty: Editorial or governing board

Gregory Golladay, MD

American Association of Hip and Knee Surgeons: Board or committee member
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Editorial Board, Journal of Arthroplasty: Editorial or governing board
Orthosensor: Paid consultant; Research support

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Alejandro Gonzalez Della Valle, MD

Intellijoint: Paid consultant; Research support
Link Orthopaedics: Paid consultant
OrthoDevelopment: IP royalties; Paid consultant
OrthoSensor: IP royalties; Paid consultant

Alexander C. Gordon, MD

OrthoSensor: Paid consultant; Research support; Stock or stock Options

Karan Goswami, MD

This individual reported nothing to disclose.

William L. Griffin, MD

American Association of Hip and Knee Surgeons: Board or committee member
DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant; Paid presenter or speaker; Research support
Journal of Arthroplasty, CORR: Editorial or governing board
Knee Society, AAOS: Board or committee member
Zimmer: Research support

Steven B. Haas, MD

OrthAlign: Paid consultant
Ortho.Secure: Stock or stock Options
Smith & Nephew: IP royalties; Paid consultant; Paid presenter or speaker; Research support

Fares Sami Haddad, FRCS

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Stryker: IP royalties; Paid consultant

Mohamad Jamal Halawi, MD

American Journal of Orthopedics: Editorial or governing board

William G. Hamilton, MD

Biomet: Research support
DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant; Paid presenter or speaker; Research support
Inova Health Care Services: Research support
Total Joint Orthopedics: IP royalties; Paid consultant

Brian R. Hamlin, MD

AAOS: Board or committee member
Bodycad: IP royalties; Paid consultant; Stock or stock Options
Journal of Arthroplasty, Transfusion: Editorial or governing board
Smith & Nephew: Paid consultant

Charles Patrick Hannon, MD

This individual reported nothing to disclose.

Adam Hart, MD

This individual reported nothing to disclose.

Nicholas Hernandez, MD

This individual reported nothing to disclose.

Carlos A. Higuera Rueda, MD

3M: Research support
American Association of Hip and Knee Surgeons: Board or committee member
American Journal of Orthopedics: Editorial or governing board
CD Diagnostics: Research support
Cempra: Research support
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Stryker: Research support
TenNor Therapeutics Limited: Paid consultant
Zimmer: Paid consultant; Research support

Jeremy Tyler Hines, MD

This individual reported nothing to disclose.

Kirby Hitt, MD

Stryker: IP royalties; Other financial or material support; Paid consultant; Research support
StrykerConvatec: Paid presenter or speaker

David Holst, MD

This individual reported nothing to disclose.

William J. Hozack, MD

Journal of Arthroplasty: Editorial or governing board
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Ronald Huang, MD

This individual reported nothing to disclose.

Disclosures

James I. Huddleston, III MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
American Knee Society: Research support
Biomet: Paid consultant; Research support
California Joint Replacement Registry: Board or committee member; Paid consultant
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Jason Ray Hull, MD

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Jason Michael Hurst, MD

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Joint Development Corporation: Stock or stock Options
SPR Therapeutics: Research support
SPR Therapeutics, LLC: Stock or stock Options
Total Joint Orthopedics: IP royalties; Paid consultant
Zimmer Biomet: IP royalties; Paid consultant; Research support

Richard Iorio, MD

American Association of Hip and Knee Surgeons: Board or committee member

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Orthosensor: Research support
Pacira: Paid consultant; Research support
Recro Pharma: Paid consultant
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Vericel: Research support
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Zimmer: Paid consultant

Joshua J. Jacobs, MD

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Hip Society: Board or committee member
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Nuvasive: Research support
Orthopaedic Research and Education Foundation: Board or committee member
The Journal of Bone and Joint Surgery: Board or committee member
Zimmer: Research support

Derek R. Jenkins, MD

This individual reported nothing to disclose.

Jason Michael Jennings, MD

DePuy, A Johnson & Johnson Company: Research support
Total Joint Orthopedics: Paid consultant
Xenex: Paid presenter or speaker

Seth A. Jerabek, MD

Imagen Technologies: Stock or stock Options
Stryker: IP royalties; Paid consultant; Paid presenter or speaker; Research support

William A. Jiranek, MD

American Association of Hip and Knee Surgeons: Board or committee member
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Stryker: Research support

Atul F. Kamath, MD

AAOS: Board or committee member
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Research support; Stock or stock Options

Benjamin Keeney, PhD

Spine: Editorial or governing board

Harpal S. Khanuja, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Journal of Arthroplasty: Editorial or governing board

Beau Jackson Kildow, MD

This individual reported nothing to disclose.

Connor Andrew King, MD

This individual reported nothing to disclose.

David J. Kolessar, MD

This individual reported nothing to disclose.

Young-Min Kwon, MD, PhD

Biomet: Research support
Corentec: Research support
DePuy, A Johnson & Johnson Company: Research support
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Claudette Lajam, MD

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My home hospital journal: Editorial or governing board
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Ruth Jackson Orthopaedic Society: Board or committee member

Jason Edward Lang, MD

This individual reported nothing to disclose.

Eric Alan Levicoff, MD

This individual reported nothing to disclose.

Brett Russell Levine, MD

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David G. Lewallen, MD

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Jay R. Lieberman, MD

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Adolph V. Lombardi Jr., MD

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Jess H. Lonner, MD

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Tad M. Mabry, MD

This individual reported nothing to disclose.

William B. Macaulay, MD

This individual reported nothing to disclose.

Andrew Manktelow, MD

Biomet: Other financial or material support; Paid presenter or speaker
British Hip Society: Board or committee member
Matortho: Paid consultant
Smith & Nephew: Paid presenter or speaker
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Theodore Thomas Manson, MD

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Synthes: Research support

J. Bohannon Mason, MD

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Vasilios Mathews, MD

DePuy, A Johnson & Johnson Company: Research support

David Jacob Mayman, MD:

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Knee Society: Board or committee member
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Smith & Nephew: Paid consultant; Paid presenter or speaker; Research support

Benjamin Allen McArthur, MD

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Journal of Arthroplasty: Editorial or governing board

Brian Joseph McGrory, MD, MS

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Simon Mears, MD

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SAGE: Editorial or governing board

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R. Michael Meneghini, MD

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Osteoremedies: IP royalties;
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Yushi Miyamae, MD, PhD

This individual reported nothing to disclose.

Robert M. Molloy, MD

Stryker: Paid consultant; Paid presenter or speaker;
Research support
Zimmer: Research support

John Morton, FACS, MD, MPH

ASMBS: Board or committee member
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Michael J. Morris, MD

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Wayne E. Moschetti, MD, MS

DePuy, A Johnson & Johnson Company: Paid consultant;

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Joseph T. Moskal, MD

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Calin Stefan Moucha, MD

3M: Paid presenter or speaker
Biocomposites: Paid presenter or speaker

Orhun K Muratoglu, PhD

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Denis Nam, MD, MSc

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Synotrac Inc.: Stock or stock Options
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Sumon Nandi, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Journal of Arthroplasty: Editorial or governing board

Nader A Nassif, MD

DePuy, A Johnson & Johnson Company: Paid presenter or speaker

Charles L. Nelson, MD

AAOS: Board or committee member
Journal of Hip Surgery: Editorial or governing board
Knee Society: Board or committee member
Zimmer: Paid consultant;
Research support

Scott Nodzo, MD

This individual reported nothing to disclose.

Ryan M. Nunley, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons, Board of Directors and Treasurer: Board or committee member
Biocomposites: Paid consultant
Biomet: Research support
Cardinal Health: Paid consultant
DePuy, A Johnson & Johnson Company: Paid consultant;
Research support
Halyard: Paid consultant
Hip Society: Board or committee member
Medical Compression System Inc: Paid consultant
Medical Compression Systems, Inc.: Research support

Medtronic: Paid consultant
Microport: IP royalties;
Paid consultant
Mid-America Orthopaedic Association, Program Committee Chair, 2018
Program Chair: Board or committee member
Mirus: Paid consultant
Missouri State Orthopaedic Association, Board Member and President: Board or committee member
Smith & Nephew: Paid consultant; Research support
Southern Orthopaedic Association, 2nd Vice President, President Elect: Board or committee member
Stryker: Research support
The Knee Society, Education Committee, 2018 Program Chair: Board or committee member

Ali R. Oliashirazi, MD

DePuy, A Johnson & Johnson Company: Paid consultant;
Paid presenter or speaker;
Research support
Medtronic: Paid consultant
Zimmer: Paid consultant

Douglas E Padgett, MD

American Joint Replacement Registry: Board or committee member
DJ Orthopaedics: IP royalties;
Paid consultant; Paid presenter or speaker
Journal of Arthroplasty: Editorial or governing board
PixarBio: Paid consultant;
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The Hip Society: Board or committee member

Mark W Pagnano, MD

DePuy, A Johnson & Johnson Company: IP royalties
Hip Society: Board or committee member
KCI: Paid consultant
Knee Society: Board or committee member
Stryker: IP royalties

Wayne Gregory Paprosky, MD

Innomed inc.: IP royalties
Intellijoint: Paid consultant;
Stock or stock Options

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Co-Medical Director JRI: Other
financial or material support
Stryker: IP royalties
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Publishing royalties, financial or
material support
Zimmer: IP royalties; Paid
consultant

Hari Kiran Parvataneni, MD

AAOS: Board or
committee member
American Association of Hip
and Knee Surgeons: Board or
committee member
Arthroplasty Today: Editorial or
governing board
Florida Orthopaedic Society:
Board or committee member

Javad Parvizi, MD, FRCS

Alphaeon: Stock or
stock Options
CeramTec: Paid consultant
Ceribell: Stock or
stock Options
ConvaTec: Paid consultant
Corentec: IP royalties; Paid
consultant; Stock or
stock Options
Cross Current Business
Intelligence: Stock or
stock Options
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financial or material support
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Association: Board or
committee member
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financial or material support
Ethicon: Paid consultant
Heron: Paid consultant
Hip Innovation Technology:
Stock or stock Options
Intellijoint: Stock or
stock Options
Invisible Sentinel: Stock or
stock Options
Jaypee Publishers: Publishing
royalties, financial or
material support
Joint Purification Systems:
Stock or stock Options
Journal of Bone and Joint
Surgery–American: Editorial or
governing board

MDValuate: Stock or
stock Options
MedAp: Stock or
stock Options
MicroGenDx: Stock or
stock Options
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committee member
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Stock or stock Options
Physician Recommended
Nutriceuticals: Stock or
stock Options
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stock Options
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Tenor: Paid consultant
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Zimmer: Paid consultant

Shaun P. Patel

Journal of Arthroplasty:
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Andrew D Pearle, MD

Exactech, Inc: Paid consultant
Stryker: Paid consultant
Zimmer: IP royalties; Paid
consultant

Christopher Earl Pelt, MD

AAOS: Board or
committee member
American Association of Hip
and Knee Surgeons: Board or
committee member
KCI: Paid consultant
TJO (Total Joint Orthopedics):
IP royalties; Paid consultant;
Paid presenter or speaker
Zimmer Biomet: Paid
consultant; Paid presenter or
speaker; Research support

Andrew Michael Pepper, MD

This individual reported nothing
to disclose.

Brett Christopher Perricelli, MD

AAHKS–Abstract Review
Committee: Board or
committee member

AAHKS–Patient Educational
Committee Member: Board or
committee member
Biomet: Paid consultant
Data Trace Publishing
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Pacira Pharmaceuticals Inc:
Stock or stock Options
Zimmer: Paid consultant
Zimmer Biomet: Paid presenter
or speaker

Kevin I. Perry, MD

This individual reported nothing
to disclose.

Christopher L. Peters, MD

American Association of Hip
and Knee Surgeons: Board or
committee member
Biomet: IP royalties; Paid
consultant; Paid presenter or
speaker; Research support
CoNextions Medical: Stock or
stock Options
Journal of Arthroplasty:
Editorial or governing board
Journal of Hip Preservation:
Editorial or governing board
Knee Society: Board or
committee member
Muve Health: Stock or
stock Options

Nicolas Santiago Piuze, MD

This individual reported nothing
to disclose.

Kevin D Plancher, MD, MPH, MS

American Academy of
Orthopaedic Surgeons: Board
or committee member
American Association of Hip
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committee member
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for Sports Medicine: Board or
committee member
American Shoulder and Elbow
Surgeons: Board or
committee member
Anika Therapeutics:
Research support

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committee member
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North America: Board or
committee member
Arthroscopy: The Journal
of Arthroscopic & Related
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governing board
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Related Research: Editorial or
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committee member
Flexion: Paid presenter
or speaker
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Arthroscopy, Knee Surgery,
and Orthopaedic Sports
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committee member
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governing board
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New York: Board or
committee member
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governing board
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Active Lifestyles: Board or
committee member
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Education Foundation: Board
or committee member
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Techniques: Board or
committee member
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Research support
Pacira: Paid consultant
Recro Pharma: Paid consultant
Sam Sport: Research support
Smith & Nephew: Paid
consultant
Southern Orthopaedic
Association: Paid presenter
or speaker
Techniques in Orthopaedics:
Editorial or governing board

Disclosures

Gregory G. Polkowski, MD, MSc

American Association of Hip and Knee Surgeons: Board or committee member
DJ Orthopaedics: Paid consultant

Alexander Rondon, MD

This individual reported nothing to disclose.

Raul Rosenthal, MD

This individual reported nothing to disclose.

Sean Patrick Ryan, MD

This individual reported nothing to disclose.

Alexander P. Sah, MD

Angiotech: Paid presenter or speaker
Convatec: Paid presenter or speaker
Mallinckrodt: Paid presenter or speaker
Medtronic: Paid presenter or speaker
NextStep: IP royalties
Pacira: Paid presenter or speaker
Zimmer: Research support

Linsen Thoppil Samuel, MBA, MD

This individual reported nothing to disclose.

Adam Anton Sassoon, MD

American Association of Hip and Knee Surgeons: Board or committee member
Biocomposites Inc.: Paid consultant
Smith & Nephew: Paid consultant

Arjun Saxena, MD

American Association of Hip and Knee Surgeons: Board or committee member
American Board of Orthopaedic Surgery, Inc.: Board or committee member
DePuy, A Johnson & Johnson Company: Paid presenter or speaker
Eastern Orthopaedic Association: Board or committee member
Journal of Arthroplasty:

Editorial or governing board
Journal of Bone and Joint Surgery–American: Editorial or governing board
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Jonathan L. Schaffer, MD

American Association of Hip and Knee Surgeons: Board or committee member
Compliant Innovations, LLC: Paid consultant; Stock or stock Options
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MyDoc PTE LTD: Paid consultant
Orthogenics AS: Paid consultant
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Taylor and Francis: Publishing royalties, financial or material support
Zin Medical, Inc. now Flex Life Healthcare: IP royalties

Adam Schwartz, MD

AAOS: Board or committee member
American Journal of Orthopedics: Editorial or governing board

Ran Schwarzkopf, MD

AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Arthroplasty Today: Editorial or governing board
Gauss surgical: Stock or stock Options
Intelijoint: Paid consultant; Stock or stock Options
Journal of Arthroplasty: Editorial or governing board
Smith & Nephew: Paid consultant; Research support

Thomas P. Sculco, MD

American Journal of Orthopedics: Editorial or governing board
Exactech, Inc: IP royalties
Knee Society: Board or committee member
Lima Orthopedic: Unpaid consultant

Thorsten M. Seyler, MD, PhD

Biomet: Research support
KCI: Research support
MedBlue Incubator Inc: Research support
Pfizer: Paid consultant
Reflexion Health Inc.: Research support
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Total Joint Orthopedics, Inc.: Paid consultant

Ritesh Shah, MD

Biomet: Research support
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Wright Medical Technology, Inc.: Research support
Zimmer: Research support

Roshan P Shah, MD, JD

Link Orthopaedics: Paid consultant
U.S. Food and Drug Administration: Board or committee member

Vivek M. Shah, MD

Biomet: Paid presenter or speaker
DePuy, A Johnson & Johnson Company: Paid presenter or speaker
Medtronic: Paid consultant

Rafael Jose Sierra, MD

American Association of Hip and Knee Surgeons: Board or committee member
Biomet: Paid consultant; Paid presenter or speaker

DePuy, A Johnson & Johnson Company: Research support
Journal of Arthroplasty: Editorial or governing board
Link Orthopaedics: IP royalties; Paid consultant
Midamerica orthopedic society: Board or committee member
Springer: Publishing royalties, financial or material support
Stryker, Biomet: Research support
Zimmer: IP royalties; Research support

Matthew Siljander, MD

This individual reported nothing to disclose.

James D. Slover, MD

American Association of Hip and Knee Surgeons: Board or committee member
Biomet: Research support

Ali Hussein Sobh, MD

This individual reported nothing to disclose.

Mark J. Spangehl, MD

Arthroplasty Today: Editorial or governing board
BodyCad: Paid consultant
DePuy, A Johnson & Johnson Company: Research support
Journal of Arthroplasty: Editorial or governing board
Sonoran Biosciences: Stock or stock Options
Stryker: Research support
Zimmer: Paid consultant

Scott M. Sporer, MD

American Joint Replacement Registry: Board or committee member
DJO Surgical: IP royalties; Paid consultant
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Bryan Donald Springer, MD

AJRR: Board or committee member
 Arthroplasty Today: Editorial or governing board
 Ceramtec: Paid presenter or speaker
 Convatec: Paid consultant
 ICJR: Board or committee member
 Joint purifications systems.: Other financial or material support
 Journal of Arthroplasty: Editorial or governing board
 osteoremedies: Paid consultant
 Stryker: IP royalties; Paid consultant

Philip Sprinkle, JD

This individual reported nothing to disclose.

Garen Daxton Steele, MD

American Association of Hip and Knee Surgeons: Board or committee member
 OrthoCor: Paid consultant
 Zimmer: Paid consultant

Benjamin M. Stronach, MD

AAOS: Board or committee member
 American Association of Hip and Knee Surgeons: Board or committee member
 DePuy, A Johnson & Johnson Company: Paid consultant; Research support
 Joint Development LLC: Stock or stock Options
 KCI: Research support
 Medical Device Business Services, Inc.: Paid consultant
 Mississippi Orthopaedic Society: Board or committee member
 Smith & Nephew: Unpaid consultant
 Tightline Development LLC: IP royalties

Louis S. Stryker, MD

AAOS: Board or committee member
 American Association of Hip and Knee Surgeons: Board or committee member
 Journal of Arthroplasty: Editorial or governing board

Timothy Tan, MD

This individual reported nothing to disclose.

Michael J. Taunton, MD

AAOS: Board or committee member
 American Association of Hip and Knee Surgeons: Board or committee member
 DePuy, A Johnson & Johnson Company: Research support
 DJ Orthopaedics: IP royalties; Paid consultant
 Journal of Arthroplasty: Editorial or governing board
 Mid America Orthopedic Association: Board or committee member
 Stryker: Research support

Krishna Raj Tripuraneni, MD

Arthroplasty Today: Editorial or governing board
 DJO Surgical: Research support
 Graftworx: Stock or stock Options
 Journal of Arthroplasty: Editorial or governing board
 Orthopaedic Implant Company: Stock or stock Options
 Zimmer: Research support

Robert T. Trousdale, MD

American Association of Hip and Knee Surgeons: Board or committee member
 DePuy, A Johnson & Johnson Company: IP royalties; Paid consultant
 Hip Society: Board or committee member
 Journal of Arthroplasty: Editorial or governing board
 Knee Society: Board or committee member
 Medtronic: IP royalties

Kenneth Urish, MD, PhD

AAOS: Board or committee member
 ASTM: Board or committee member
 BodyCad: Research support
 Smith & Nephew: Paid consultant

Jonathan M. Vigdorchik, MD

Corin U.S.A.: Paid consultant
 Intellijoint Surgical: Paid consultant
 Stryker: Paid consultant

Bradford Sutton Waddell, MD

Current Reviews in Musculoskeletal Medicine: Editorial or governing board
 KCI: Paid consultant
 Stryker: Research support

Matthew R. Walker, MD

This individual reported nothing to disclose.

Samuel Secord Wellman, MD

American Association of Hip and Knee Surgeons: Board or committee member
 Biomet: Research support
 DePuy, A Johnson & Johnson Company: Research support
 Journal of Arthroplasty: Editorial or governing board
 Stryker: Research support
 Total Joint Orthopaedics: Paid consultant
 Total Joint Orthopedics: IP royalties
 Zimmer: Research support

Geoffrey H. Westrich, MD

Eastern Orthopedic Association: Board or committee member
 Exactech, Inc: IP royalties; Paid consultant; Paid presenter or speaker; Research support
 Knee Society: Board or committee member
 Mallinckrodt Pharmaceuticals: Paid presenter or speaker; Research support
 Stryker: IP royalties; Paid consultant; Paid presenter or speaker; Research support

Sigita Wolfe

This individual reported nothing to disclose.

Cody Wyles, MD

This individual reported nothing to disclose.

Simon Young, MD, FRACS

Arthrex, Inc: Paid presenter or speaker
 DePuy, A Johnson & Johnson

Company: Paid presenter or speaker
 Stryker: Paid consultant; Paid presenter or speaker; Research support
 Surgical Solutions: Stock or stock Options
 Vidacare: Research support

Cameron Youngblood, PA-C

ZipLine Medical: Paid consultant

Khalid Mohammed Yousuf, MD, MS

BD Carefusion: Paid presenter or speaker

Luigi Zagra, MD

American Association of Hip and Knee Surgeons: Board or committee member
 CeramTec: Paid presenter or speaker
 DePuy, A Johnson & Johnson Company: Paid presenter or speaker
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 LimaCorporate: Paid presenter or speaker; Research support
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AAHKS

2019 ANNUAL MEETING

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2020 ANNUAL MEETING

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Future AAHKS/The Hip Society/
The Knee Society Specialty Days

MARCH 16, 2019 • LAS VEGAS

MARCH 28, 2020 • ORLANDO



9400 W. Higgins Rd., Suite 230
Rosemont, IL 60018-4976
847-698-1200
www.AAHKS.org