

ADULT RECONSTRUCTION FELLOWSHIP

Research Studies and Recent Publications

A consolidated overview of current fellowship research, manuscripts in development or publication, and peer-reviewed articles published during the last three years.



13

PUBLISHED REFERENCES

25

ADDITIONAL STUDIES

2023–2026

PUBLICATION PERIOD

Recent Publications

Peer-reviewed manuscripts published within the last three years, including articles published online ahead of print.

2026 4 PUBLICATIONS

1. Saba BV; VIP Study Group; Long WJ, Higuera CA, Dundon J, Cooper HJ, Dennis DA, Chen AF, Schwarzkopf R. The One-Year Infection Rates After Vancomycin Powder and Dilute Povidone-Iodine Lavage in High-Risk Primary Total Joint Arthroplasty: A Multicenter Randomized Controlled Trial. *J Arthroplasty*. 2026 Apr 24:S0883-5403(26)00396-7. doi: [10.1016/j.arth.2026.04.064](https://doi.org/10.1016/j.arth.2026.04.064). Epub ahead of print. PMID: 42036089.
2. Noe Treviño, Joshua Uffer, Skylar Lewis, Nicholas Brown, John M. Dundon, Increased patient comorbidities among inpatient total joint arthroplasty following increase of outpatient surgery, *Journal of Orthopaedics*, Volume 75, 2026, Pages 268-273, ISSN 0972-978X, <https://doi.org/10.1016/j.jor.2026.02.034>.
3. John M. Dundon, Joshua Uffer, Noe Treviño, Skylar Lewis, Nicholas Brown, Paul Lombardi, Accuracy and reproducibility of posterior tibial slope restoration in robotic-assisted versus conventional total knee arthroplasty: A comparative analysis across alignment strategies, *Journal of Orthopaedics*, Volume 76, 2026, Pages 274-278, ISSN 0972-978X, <https://doi.org/10.1016/j.jor.2026.03.041>.
4. Frisch NB, Edwards P, Bloomfield M, Redfern RE, Brown N, Dundon J. Midterm clinical outcomes and survivorship of a next generation revision knee system in complex primary and revision total knee arthroplasty. *Knee*. 2026 Jan 20;60:104328. doi: [10.1016/j.knee.2026.104328](https://doi.org/10.1016/j.knee.2026.104328). Epub ahead of print. PMID:

2025 6 PUBLICATIONS

1. Dundon JM, Trevino N, Lewis S, Sharipov H, Gemmell Detection of Knee Implant Instability Using the Persona IQ Smart Implant System: A Case Report. *Journal of Orthopaedic Science and Research*. 1-13. 10.46889/JOSR.2025.6309.
2. Dundon JM, Brown NC, Gogel L, Gilyard R, Lee S, DiSalvo D, Escobar J, Wlodarski M, Lombardi PM. The Race to the Bottom: A High-Volume Hospital Experience With Comprehensive Care for Joint Replacement. *J Arthroplasty*. 2025 Oct 27:S0883-5403(25)01302-6. doi: [10.1016/j.arth.2025.10.024](https://doi.org/10.1016/j.arth.2025.10.024). Epub ahead of print. PMID:
3. Dundon JM, Brown N, Escobar J, Lombardi PM. Declining Service Labor Rates for Total Hip and Total Knee Arthroplasty in Medicare Patients. *Arthroplast Today*. 2025 May 12;33:101742. doi: [10.1016/j.artd.2025.101742](https://doi.org/10.1016/j.artd.2025.101742). PMID: 40585395; PMCID: PMC12205584.
4. Dundon JM, Brown N, Escobar J, Lombardi PM. Closing the flexion gap: Differences in femoral sizes, level of constraint, and joint anatomy between robotic assisted and conventional high volume orthopedic surgeons. *J Orthop*. 2025 Aug 7;70:220-225. doi: [10.1016/j.jor.2025.08.009](https://doi.org/10.1016/j.jor.2025.08.009). PMID: 40895363; PMCID: PMC12391486.
5. Dundon JM, Ballard JC, Whaley AL, Aubin PM, Maurer AM, Yergler JD, "Sensor-Derived TKA Gait Metrics Correlate More Strongly with in-clinic Performance Tests than PROs", *Journal of Orthopaedic Reports*, DOI:[10.1016/j.jorep.2025.100826](https://doi.org/10.1016/j.jorep.2025.100826).
6. Dundon J, Brown N, Wlodarski M, Begley B. Smart Implantable Device-Enabled Remote Monitoring Reduces Rates of Manipulation Under Anesthesia Following Total Knee Arthroplasty. *Cureus*. 2025 Oct 25;17(10):e95376. doi: [10.7759/cureus.95376](https://doi.org/10.7759/cureus.95376). PMID: 41306160; PMCID: PMC12645511.

2024 2 PUBLICATIONS

1. Dundon JM, Aubin PM, Hunter W. Objective Gait Analysis Following Total Knee Arthroplasty With a Smart Implant Directs Early Intervention With Manipulation Under Anesthesia. *Journal of Orthopaedic Experience & Innovation*, 2024 February. <https://doi.org/10.60118/001c.89961>.
2. Brown N, Dundon J. Atraumatic Fracture of Newer Generation Ceramic Head Three Days Post-op: A Case Report. *Cureus*, 2024, Dec 04, 16(12): e75100. doi:[10.7759/cureus.75100](https://doi.org/10.7759/cureus.75100).

1. Dundon JM, Koss J, Hodapp K, Lefevre C, Poletick E, Patel JN. Readmission Risk Assessment Tool (RRAT) for Decreasing 30-Day Readmission Rates in Total Joint Arthroplasty and Predicting Readmission. Cureus 2023 Feb. DOI: [10.7759/cureus.35313](https://doi.org/10.7759/cureus.35313).

Current and Pending Research

Study information reproduced from the fellowship research presentation. Repeated published references are excluded.

RESEARCH STUDY

AvaSci Knee/Hip

Status / update Research study

- Monocentric longitudinal research study
- Patients grouped based off of previously identified condition: varus knee, valgus knee, stiff knee, global instability, flexion instability, left and right hips
- Motion capture system captures short-wavelength light pulses transmitted from the device. Sensor within the device measures how long it takes for the light to bounce back. Software uses this time to calculate the distance to the object and determines angles between different joints of the body

MANUSCRIPT / PUBLICATION STAGE

Tourniquet Use Does Not Impact Transfusion Rates in Revision Total Knee Arthroplasty: A Retrospective Analysis

Status / update Manuscript written

- Tourniquets are traditionally used in TKA to minimize blood loss and improve surgical visibility
- Evaluated whether tourniquet use during revision TKA affects transfusion rates
- Retrospective cohort study on 638 consecutive revision TKAs performed between April 2023 – July 2026
- Two groups:
 - Group 1: 444 with tourniquet use
 - Group 2: 194 without tourniquet use
- Pre-operative and post-operative hemoglobin levels were recorded for both groups
- 34 subjects in tourniquet use required blood transfusions (7.66%)
- 9 subjects in tourniquetless received blood transfusions after the operation (4.64%)
- No statistical difference between the two groups ($p=0.162$)
- Conclusion:
 - - Tourniquetless techniques may be safely adopted without increasing transfusion risk

RESEARCH STUDY

Is Routine Patellar Resurfacing During Primary Total Knee Arthroplasty Associated with Increased Rates of Postoperative Peri-patellar Injury?

Status / update Research study

- Routine patellar resurfacing during primary TKA is common
- Complications to peri-patellar area and extensor mechanism following TKA are rare but catastrophic
- 3,383 patient undergoing primary TKA
- Inclusion: primary TKA with minimum 90 days post-op
- Exclusion: revision TKA or primary TKA secondary to acute trauma
- Purpose: investigate the association between routine patellar resurfacing during primary TKA and rates of post-operative peri-patellar injury requiring operative treatment
- 22 out of 3,383 patients underwent peri-patellar repair surgery
- 2,508 patients in resurfaced patella group / 875 in the unresurfaced patella group / 0 in the routine unresurfaced group
- All peri-patella injuries occurred in the patellar resurfaced group (0.88%)
- 5 patients underwent patellar tendon repair (2 primary / 3 with graft)
- 14 patients underwent quadriceps tendon repair
- 3 patients underwent quadriceps tendon secondary reconstruction (with graft)
- 0 patients underwent surgical treatment of patellar fracture
- Conclusion:
 - Routine patellar resurfacing during TKA was associated with significantly higher rates of peri-patellar injuries requiring operative repair

PUBLISHED / ACCEPTED

On-Table Intraoperative Technique Reduces Postoperative Dislocation Risk by 96% in Primary Total Hip Arthroplasty: A Retrospective Cohort Study

Status / update Manuscript accepted and published as of Sept 1, 2026

- Postoperative dislocation remains a notable complication following THA
- Surgical approach and intraoperative imaging technique may influence the risk of instability
- Investigated: whether using a traction table ("on-table") to obtain intraop imaging is associated with lower dislocation rates compared to standard operating tables ("off-table") during primary THA
- 2,503 consecutive primary THAs between June 2023 – May 2025
- Surgeon 1: anterior robotic / Surgeon 2: anterior on-table with traditional instruments / Surgeon 3: posterior off-table / Surgeon 4: anterior off-table

Does the Use of an Artificial Intelligence-Based Scribe Decrease Surgeon Workload and Burnout? A Prospective Study in an Orthopedic Arthroplasty Practice

Status / update 13 surgeons used the same AI scribe program over 90-days, and completed a survey prior to using the program and after using the program for 90-days · Out of 13 surgeons, 1 did not use the AI scribe and 3 did not complete both pre-participation and post-participation surveys · Manuscript pending publication

- Artificial Intelligence (AI) scribe applications typically use language learning models (LLM) to record and interpret physician-patient encounters and create a medical note
- Time to write notes outside work hours significantly decreased by over 1.5 hours per week with the use of the AI scribe program ($p < 0.01$)
- Maslach Burnout Inventory improved in all sections
- Exhaustion: $p = 0.322$
- Depersonalization: $p = 0.352$
- Accomplishment: $p = 0.325$
- Conclusion:
- Use of AI scribe program is effective in decreasing surgeon workload
- Improved perceived surgeon burnout and satisfaction

HYBRID RETROSPECTIVE/PROSPECTIVE STUDY – CHLOROPROCAINE VS. MEPIVACINE SPINAL ANESTHESIA FOR TKA

Status / update Submitted to AAHKS and AAOS 2026

- Spinal anesthesia is preferred over general anesthesia – avoids airway manipulation, cardiopulmonary stress, and is associated with better pain control, faster recovery, and lower costs
- Hyperbaric bupivacaine – unpredictable duration of 3-9 hours / delay ambulation and discharge
- Mepivacaine – immediate-acting agent for a duration of 90-150 minutes / faster return to motor function and shorter hospital stays
- Chloroprocaine – fast onset of 3-5 minutes and short duration of 45-75 minutes
- Objectives:
- Determine whether chloroprocaine spinal anesthesia reduces time to discharge readiness compared with mepivacaine in unilateral TKA
- Compare block onset time, operative duration, discharge time, evaluate adverse events, and examine interactions with surgeon and predicted OR duration
- This retrospective cohort study of consecutive primary TKA and THA performed by four surgeons, which included THA: chloroprocaine ($n = 405$) and mepivacaine ($n = 403$), and TKA: chloroprocaine ($n = 303$) and mepivacaine ($n = 304$). The data extracted includes patient demographics, procedure type (THA vs TKA), anesthetic (chloroprocaine vs. mepivacaine), intraoperative opioid administration, PACU opioid administration, and difference in episode time intervals. There were no differences found within the demographics. Opioid doses were converted to MME.
- Mean recovery time was significantly longer for both THA and TKA with mepivacaine (108.84 ± 29.63 min, 106.07 ± 29.69 min) compared with chloroprocaine (102.58 ± 27.77 min, $p < 0.001$, 100.14 ± 25.15 min, $p < 0.001$). Chloroprocaine demonstrated a shorter preoperative-to-discharge episode of care time for both THA (243.5 ± 35.8 minutes with chloroprocaine versus 293.2 ± 45.0 minutes) and TKA (259.7 ± 35.5 minutes versus 301.2 ± 44.8 minutes). Mepivacaine anesthesia was associated with significantly reduced postoperative opioid requirements in both THA (2.75 ± 4.51 MME vs. 0.99 ± 2.60 MME, $p < 0.001$), and TKA (1.99 ± 3.68 vs. 0.79 ± 2.49 , $p < 0.001$). A greater proportion of patients that received chloroprocaine required PACU opioids for both THA (35.3% vs. 14.6%, $p < 0.001$) and TKA (27.7% vs. 10.5%, $p < 0.001$).

RESEARCH STUDY

Retrospective Analysis of Internal Femoral Rotation versus Lateral Femoral Condyle Hypoplasia in Valgus Knee Deformities

Status / update Research study

- Valgus knee deformities are characterized by a lateral mechanism axis deviation greater than 10 degrees
- Lateral femoral condyle hypoplasia considered a primary contributor – reduces lateral compartment support and exacerbating valgus alignment
- Posterior condylar angle (PCA) may significantly alter joint kinematics
- Objective: leverage pre-operative full-length lower extremity weight-bearing X-rays processed by ROSA's X-Atlas 2D to 3D Technology to measure PCA and condyle morphology
- Aim to deliver novel insights into TKA planning and execution

RESEARCH STUDY

Comparison of Gait and Activity Between PIQ Patients who Visit ED vs. do not within 90-days

Status / update Research study

MANUSCRIPT / PUBLICATION STAGE

Association Between Knee Compartmental Laxity on Post-Operative Step Counts, Gait Speed, and Gait Asymmetry

Status / update Manuscript finished

- Association between intra-operative compartmental laxity and post-operative functional gait measures can inform robotic surgical decision-making and potentially impact patient care
- Study aims to investigate impact of compartmental joint laxity measures on post-operative step counts, gait speed, and gait asymmetry
- 5009 patient using a single robotic system and cruciate retaining femurs were analyzed
- Laxities: <0.5mm, 0.5 to <1.5mm, 1.5 to <2.5mm, 2.5 to <3.5mm, 3.5 to <4.5mm
- Medial-lateral: <-2.5, <-2.5 to <-1.5, -1.5 to <-0.5, -0.5 to <0.5, 0.5 to <1.5, 1.5 to <2.5, 2.5
- Step counts
- Lateral compartment laxity in extension – significant differences at d30 ($p=0.02-0.04$)
- Medial laxity gaps - significant for both flexion and extension at d90 ($p=0.02-0.05$)
- All analyses
- Laxity group <0.5mm had the greatest reduction in step count from pre-op values but watch usage had a larger effect ($p=0.00$)
- Gait speed
- Flexion balance – significant difference at d15 and d30 ($p=0.01-0.04$) – greatest reduction in gait speed from pre-op values <-2.5mm
- Walking asymmetry
- Medial flexion laxity and extension balance – significantly different at d90 ($p=0.04$ and -0.03)
- Laxity group <0.5mm – higher increase in asymmetry / >2.5mm balance group greater decrease in asymmetry
- Dr. Dundon met with Mike at AAHKS

Patient Characteristics and Pre-Operative Gait Speed as Useful Factors to Separate Recovery Curves Generated by a Smart Implant

Status / update Analysis demonstrated the feasibility of collecting data from wearable devices in tandem with implanted sensors to better evaluate recovery following TKA · Manuscript complete

- Technology advances including smartphones and implantable sensors within the tibial stem that utilizes accelerometers and gyroscopes for passive collection of data have potential insight into patient's progress following TKA
- Determine which patient characteristics can be used to separate recovery curves generation by the sensors within a tibial stem extension implanted during TKA
- Separate 2,472 patients into cohorts based on age, sex, BMI, and pre-op gait speed
- Gait metrics collected through 60-day post-op
- Knee ROM, tibial ROM, cadence, gait speed, stride length, step counts, and average distance
- Age/sex – strongest cohort to separate ROM recovery over time ($p < 0.001$)
- Post-op gait speed and stride length separated, and paired ($p < 0.001$), with gait speed providing a stronger impact than any other characteristic
- Conclusion:
- Patient gait recovery curves can be stratified based on demographic variables, strengthened by the addition of pre-op gait speed
- Improved patient progress feedback to clinicians and patients

Comparative Outcomes of Subvastus versus Medial-Parapatellar Approach in Total Knee Arthroplasty: A Combined Retrospective and Prospective Cohort Study

Status / update This was a retrospective analysis of gait and activity data from a large national cohort of TKA patients who had a smart implantable device (SID) implanted between 10/4/2021 and 3/13/2026. Patients who had subvastus variant primary TKA were retrospectively assigned to the subvastus cohort (N=241). These arthroplasties were performed by two different surgeons in two different surgeons (Surgeon 1 (N=112 TKAs) and Surgeon 2 (N=128 TKAs)). To account for potential confounding by patient demographics, a 5:1 propensity score matching was performed, matching from a pool of 15,158 control patients to subvastus's patients on sex, age at TKA, and body mass index (BMI). The resulting matched cohort comprised 240 subvastus TKAs and 1203 control TKAs. Groupwise difference in demographics were assessed with chi-squared test (sex) and Mann-Whitney U (age and BMI). A Kaplan-Meier survival analysis was performed to compare the time to first sustained long walk, defined as the first post-operative day on which a patient achieved $\geq 1,000$ steps (~0.5 miles) within one hour. Survival curve between-group differences were assessed using the log-rank test. Smart knee gait parameters and step count were processed into 7-day rolling averages over the first 90 days post TKA. Group-wise comparisons between subvastus TKA patients and the control cohort were performed at post-operative days 7, 28, 84 using Mann-Whitney U tests. To control for multiplicity across 18 simultaneous comparisons, p-values were adjusted using the Benjamini-Hochberg false discovery rate (FDR) procedure. Statistical significance was set at $\alpha = 0.05$ (FDR-corrected).

- Standard medial-parapatellar (MP) approach for TKA provides excellent exposure but disrupts the quadriceps tendon and patellar blood supply
- Subvastus approach preserve the extensor mechanism and peripatellar vasculature
- Quadriceps atrophy after TKA may contribute to functional decline and can be assessed by thigh circumference
- Objective:
- Compare post-op functional outcomes between patients undergoing TKA via the subvastus and MP approaches
- Compare peri-operative variables, assess quadriceps muscle preservation
- Demographics between the control and subvastus cohorts showed no statistically significant differences ($p > 0.05$) (Table 1). Of 240 patients in subvastus's cohort, 194 (80.8%) achieved the long-walk threshold with a median time of 25 days. In the control group (N = 1203), 935 (77.7%) reached the threshold with a median time of 37 days. The log-rank test indicated that this difference was statistically significant ($\chi^2 = 28.86$, $p = < 0.0001$), suggesting that subvastus's patients achieved functional walking capacity approximately 12 days earlier than the controls (Figure 1). Additionally, the subvastus cohort demonstrated statistically significantly higher step count on day 7 (subvastus: 188 steps vs control: 23 steps), day 28 (subvastus: 1943 steps vs control: 1162 steps), and day 84 (subvastus: 3430 steps vs control: 2743 steps) (FDR-correct $p < 0.05$). Knee ROM was statistically significant higher in the subvastus group on day 7 (subvastus: 48.9 degrees vs control: 46.0 degrees) and day 28 (subvastus: 53.2 degrees vs control: 51.2 degrees) (FDR-correct $p < 0.05$). Walking speed was statistically significant higher on day 7 (subvastus: 0.39 m/s vs control: 0.37 m/s), while cadence was statistically significant higher on day 7 (subvastus: 76.5 steps/min vs control: 70.1 steps/min) and day 28 (subvastus: 87.8 steps/min vs control: 83.0 steps/min) (FDR-correct $p < 0.05$). There was no statistically significant difference in stride length (m) at any timepoint (FDR-correct $p > 0.05$). The control cohort knee ROM demonstrated a decline from 47 degrees to 45.9 degrees during the first 7 days after TKA, while the subvastus cohort had monotonically increasing knee ROM from post-operative day 1 (Figure 2, Table 2).

VARIABILITY OF SURGEON ALIGNMENT PHILOSOPHIES IN THE UNITED STATES FOR ROBOTIC ASSISTED TOTAL KNEE ARTHROPLASTY

Status / update Submitted and pending publication

- Technological advances in robotic-assisted total knee arthroplasty (raTKA) allowed for the high fidelity collection of intra-operative data
- Purpose:
 - investigate whether automatically collected intraoperative robotic data can differentiate surgeon alignment philosophies
 - Can it highlight surgeon to surgeon variability in femoral rotation – how these boundaries compare to historical manual rotation targets
- 2,573 from 10 highest volume surgeons in the USA for comparison
- Final HKA of 9 surgeons showed variability with 7 having a mean varus HKA
- 7 surgeons demonstrated variability in their femur resections with 1 having a valgus median resection and 4 having a varus median resection
- Tibia
 - 8 surgeons showed variability with 6 having the tibia with a varus resection
 - 9 surgeons showed variability with the median values for femoral rotation relative to the posterior condylar axis between 2.5 degrees and 4 degrees
- Conclusion:
 - Considerable variability in TKA alignment philosophies
 - Variability in femoral rotation when balancing the flexion gap during raTKA
 - Dramatic shift from the manual TKA training of 3 degrees external to PCA for varus and 5 degrees external PCA for valgus' aligned knees
 - The majority are more restricted with an interquartile range between +/-3 degrees HKA boundaries for 4 surgeons

Periprosthetic Femoral Fracture Rates in Primary Total Hip Arthroplasty: Single-□Taper Wedge versus Triple-Taper Collared Stems

Status / update Triple-taper collared stems potentially reduce periprosthetic fracture rates following primary total hip arthroplasty - Update · Manuscript done

- Periprosthetic Femoral Fracture Rates in Primary Total Hip Arthroplasty: Single-
- Taper Wedge versus Triple-Taper Collared Stems - Overview
- Periprosthetic fractures following total hip arthroplasty (THA) can have catastrophic complications
- Triple taper wedge and collared stems – shown reduced periprosthetic fracture rates compared to collarless stems
- Purpose: analyze periprosthetic fracture rates between single taper wedge designs and triple-taper collared stems at a single institution
- 2,942 consecutive subjects who underwent primary THA
- Taper Wedge versus Triple-Taper Collared Stems - Results
- 14 periprosthetic Vancouver B fractures = 0.48%
- 10 fractures occurred while using the single taper wedge type stems out of 1,648 subjects = 0.61%
- 4 fractures occurred while using the triple-taper collared stem out of 1,294 subjects = 0.31% (P=0.291)
- Conclusion:
 - - Triple-taper, collared stems presented with nearly half the rate of periprosthetic fractures compared to single taper wedge stems
 - Need to add comparison of fracture rates vs. non-fractures

ACTIVE / DEVELOPING STUDY

Pre- and Postoperative Vitamin C and D Supplementation to Reduce Opioid Use and Improve Recovery After Hip and Knee Arthroplasty

Status / update

- Patients often require opioids for several weeks following TKA and THA surgery
- Prolonged opioid use can increase risk of gastrointestinal adverse effects, respiratory depression, dependence, and persistent use
- Vitamin C can attenuate neuropathic and inflammatory pain by reducing oxidative stress and inflammation, protecting peripheral nerves and modulating neurotransmitters and endogenous opioids
- Vitamin D modulates the innate and adaptive immune response, enhances antimicrobial peptide production, and down-regulation of pro-inflammatory cytokines
- Micronized Purified Flavonoid Fraction (MPFF) increases venous tone, decreases vascular permeability, and improves lymphatic drainage
- Objective
- Determine whether pre- and post-op vitamin C and/or vitamin D supplementation reduces cumulative opioid consumption during hospitalization and at 2 and 4-weeks after primary unilateral TKA or THA
- Assess whether supplementation improves patient-reported outcomes, LOS, complication rates, etc.
- Examine whether MPFF alone, or in combination with vitamins C and D can provide additional analgesic benefit
- Estimated sample size: 4-60 patients per group
- Supplement dosing:
 - Vitamin C: 500mg capsule 2x daily – begin 14 days before surgery and continue for 28 days after surgery
 - Vitamin D: 2,000 IU softgel 1x daily – begin 14 days before surgery and continue for 28 days after surgery
 - MPFF (optional): 500mg table 2x daily – begin 5-7 days before surgery and continue for 14-28 days after surgery

MANUSCRIPT / PUBLICATION STAGE

Safety and Efficacy of Cefazolin (Ancef) Prophylaxis in Patients with Reported Penicillin Allergy Undergoing Total Joint Reconstruction

Status / update Evaluate adherence to updated antibiotic stewardship guidelines · Manuscript pending publication · Submitted to AAHKS and AAOS 2026

- Surgical site infections (SSIs) – significant complication following total joint replacement, and Ancef is widely recommended as the first-line antibiotic for prophylaxis
- Objectives
- Compare surgical site infection rates within 90-days post-op between penicillin-allergic patients receiving Ancef and those receiving alternative antibiotics
- Assess incidence of hypersensitivity reaction to Ancef in penicillin-allergic patients
- Analyze cost differences and microbial profiles of SSIs between groups
- 3 Cohorts
 - Exposed group: patients with reported penicillin allergy who received Ancef for perioperative prophylaxis
 - Comparison group: patients with reported penicillin allergy who received alternative antibiotics
 - Control group: non-penicillin-allergic patients who received Ancef

Smart Implantable Device Monitoring Links Lumbar Radiculopathy to Delayed Gait Recovery Post-TKA

Status / update – Submitted and accepted to AAHKS 2026

- This retrospective cohort study compared gait recovery and clinical outcomes following primary TKA between patients with and without pre-operative lumbar radiculopathy. Gait data were captured by SID and linked to insurance claims via a privacy preserving algorithm. Propensity score matching was performed using logistic regression, yielding 1163 lumbar radiculopathy patients and 1163 matched controls (N = 2326). Demographics and post-operative outcomes were compared using Mann-Whitney U (continuous) and Chi-squared/Fisher's exact (categorical) tests. Gait data were summarized as 7-day rolling averages and compared at post-operative days 7, 28, 84, 182, 365 using Mann-Whitney U tests. All p-values were corrected using Benjamini-Hochberg FDR ($\alpha = 0.05$); Bonferroni corrections are additionally reported.
- All covariates included in the propensity score matching were well-balanced ($p > 0.05$). The lumbar radiculopathy cohort had statistically significantly ($p=0.0194$) higher incidence of ED utilization (13.16% vs 9.11%). Hospital readmission and TKA complications were not statistically significantly different. Average stride length was statistically significantly shorter for the lumbar radiculopathy cohort than the control cohort at post-operative days 7, 28, and 84 (lowest adjusted $p = 0.02481$). No other differences in the recovery of gait and activity were observed.

Recovery Trajectories Following Robotic-Assisted and Conventional Total Knee Arthroplasty

Status / update A retrospective review was performed on 1,809 consecutive primary TKAs performed by a single surgeon. Patients underwent either robotic assisted TKA (RaTKA) or conventional instrumentation during the same operative period. Longitudinal recovery metrics were collected using the CMP and included KOOS-JR scores, pain scores, daily step counts, and gait speed parameters. Recovery trajectories were evaluated preoperatively and through 12 months postoperatively. Comparative analyses were performed between robotic assisted and conventional cohorts. · Submitted to AAHKS and AAOS 2026

- Of the 1,809 TKAs included, 1,167 (64.5%) were RaTKA and 642 (35.5%) were conventional. At 3 months postoperatively, Ra TKA demonstrated greater improvement in KOOS-JR scores (+17.1 vs +15.3 points, $p=0.09$) and lower pain scores (2.6 vs 2.8). Mean daily step counts increased from 3,176 preoperatively to 3,343 at 90 days following RaTKA, compared with 3,107 to 3,279 following conventional TKA. Higher postoperative gait speed correlated with improved 3-month KOOS-JR scores ($\rho=0.195$, $p<0.001$) and lower pain scores ($\rho=-0.136$, $p=0.0009$). Longitudinal recovery curves demonstrated consistent postoperative improvement in both PROMs and wearable derived activity metrics across cohorts.

Surgeon Level Variation in Cost and Operative Efficiency for Medicare Total Joint Arthroplasty

Status / update Submitted and accepted for AAHKS 2026

- We retrospectively analyzed 613 Medicare TKA and 487 THA cases (63.4% female, mean age 66.2, mean BMI 29.6) across four surgeons (A–D) at a single institution. Revenue was set at the 2025 Medicare facility fee schedule rate of \$10,552 per TKA and \$10,776 per THA. Non-implant fixed hard and soft costs of \$2,867 per case were derived from itemized supply, sterilization, pharmaceutical, and administrative data. A time-driven cost model for staffing costs was applied at OR rates of \$15, \$20, and \$25 per minute, average rates at ambulatory surgical centers. Differences in implant cost and OR time across cohorts were assessed by one-way ANOVA with post-hoc pairwise comparisons. Significance was set at $p < 0.05$.
- Significant differences were found in both implant cost and OR time across surgeons ($p < 0.001$). Mean implant cost for each surgeon represented 37–42% of total reimbursement. Mean OR time in minutes ranged from 66.1–101.7 minutes. After applying OR costs at \$20/minutes, higher time efficient surgeons generated \$2,127/case versus \$1,656/case for lower time efficient surgeons in TKAs and \$2,911/case versus \$2,252/case in THAs. Lower implant-cost advantage was fully negated at OR rates as low as \$10.89/minute in TKAs and \$3.33/minute in THAs. Higher efficiency surgeons produced the greatest aggregate contribution margin across all modeled rates, driven by operative efficiency and case volume.

RESEARCH STUDY

Does Narcotic Usage Decrease After Introduction of Oral Tranexamic Acid in Arthroplasty: A Retrospective Cohort Study

Status / update Research study

- Background/Rationale: Tranexamic acid (TXA) is widely used in arthroplasty to reduce perioperative blood loss. While intravenous and topical formulations are well established, oral TXA has emerged as a low-cost and convenient alternative. Following institutional adoption of oral TXA in November of 2024, it is important to evaluate its broader perioperative impact. Reduced blood loss may correlate with improved early recovery and potentially decreased postoperative narcotic requirements.
- Study objective: To determine whether routine use of oral TXA is associated with decreased postoperative narcotic usage in the post-anesthesia care unit (PACU) among patients undergoing primary total hip and knee arthroplasty.
- Primary outcomes:
 - Postoperative narcotic use in PACU:
 - Incidence of opioid administration
 - DVT rates
 - Total MME per case
- Secondary outcomes:
 - Comparison of opioid use by:
 - Procedure type (THA vs TKA)
 - TXA dosing regimen
 - High-risk patient subgroups (elevated BMI, ASA higher than 3)
- Working on obtaining data

Cost Analysis of Robotic vs Manual Total Knee Arthroplasty at a Single Ambulatory Surgical Center

Status / update A retrospective cost analysis of 613 TKA cases (63.4% female, mean age: 66.2 years, mean BMI: 29.6) performed between 5/1/2025-3/31/2026 was conducted. One surgeon performed robotic-assisted TKA (n=219); three surgeons performed manual TKA (n=394). Facility staffing costs were derived from a six-month rolling average, yielding \$4,200 in daily staff costs plus \$205 in daily utility costs. Fixed costs were split equally across all four surgeons, and a surgeon-specific cost per minute (CPM) was calculated. Total per-case cost incorporated implant cost, staffing cost, and robot amortization where applicable. Mann-Whitney U and Kruskal-Wallis tests were used for group comparisons, with significance set at $\alpha=0.05$. · Submitted to AAHKS and AAOS 2026

- The robotic cohort demonstrated a mean OR time of 66.1 minutes versus 90.5 minutes in the manual cohort ($p<0.001$). This efficiency advantage translated directly into cost savings: at a pooled CPM of \$21.40, the robotic cohort saved \$522 in staffing costs per case relative to the manual average. Even after adding \$183 in robot amortization and additional implant costs for pin and array disposables, total per-case cost remained lower in the robotic cohort (\$5,636 vs. \$6,290; $p<0.001$). The break-even threshold for the robotic system required only 8.5 minutes of OR time savings per case; the robotic cohort exceeded this threshold by 15.9 minutes, delivering 2.8 times the efficiency gain necessary to offset the technology cost.

Postoperative Outcomes of Correctable and Fixed Knees Following Total Knee Arthroplasty

Status / update Submitted to AAHKS and AAOS 2026

- This retrospective comparative study evaluated postoperative clinical outcomes in patients undergoing TKA. No differences in demographics. Patients were categorized into varus and valgus cohorts, categorized by initial hip-knee-ankle angle (HKA), and correctability was determined by correctability within 3 degrees by assessment of a robotic platform. Patients with HKA >3 degrees after stress correction were classified as fixed, while those with HKA ≤ 3 degrees were classified as correctable deformities. The primary postoperative outcomes included postoperative effusion, postoperative flexion, achievement of full extension, postoperative instability, and improvement in postoperative and 3-month postoperative visits. Statistical significance was defined as $P < 0.05$.
- 242 varus knees and 267 valgus knees included in the alignment comparison. Varus knees had a significantly higher postoperative effusion rate (29.8%) compared to valgus knees (16.9%) ($p=0.0007$). The postoperative flexion was slightly higher in valgus knees than varus knees ($p=0.0099$), but was clinically modest at about 2.4 degrees. Improved postoperative flexion occurred in 88.8% of varus knees and 93.6% of valgus knees, but did not reach significance ($p=0.0814$). Among the 242 varus knees, only 44 knees were correctable (18.2%), compared to the 267 valgus knees, where 212 were correctable (79.4%). Correctability differed significantly between alignment groups, with valgus knees substantially more likely to be correctable than varus knees ($p<0.0001$).

Coronal Valgus Severity Predicts Internal Rotation of the Distal Femur in Total Knee Arthroplasty

Status / update This retrospective analysis of 376 valgus-labeled primary TKA cases was performed data harvest from the care management platform. Valgus knees were stratified into mild ($0-3^\circ$) and severe ($>3^\circ$) deformities. PCA, TEA, and AP axis were measured using a robotic knee system. Linear regression evaluated associations between deformity severity and rotational parameters with significance set at $p < 0.05$. · Submitted to AAHKS and AAOS 2026

- Mean PCA, TEA, and AP rotations were $3.66^\circ \pm 1.91^\circ$, $3.74^\circ \pm 3.39^\circ$, and $2.77^\circ \pm 5.85^\circ$, respectively. TEA and PCA remained closely associated across the cohort, with a mean TEA-PCA difference of $0.08^\circ \pm 3.04^\circ$, while the AP axis demonstrated substantially greater variability. Compared with mildly valgus knees, severe valgus deformed knees demonstrated significantly greater PCA rotation (3.98° vs 3.22° , $p = 0.0003$) and TEA rotation (4.05° vs 3.32° , $p = 0.0457$), while AP rotation did not differ significantly (2.70° vs 2.87° , $p = 0.781$). Increasing valgus severity was significantly associated with increasing PCA rotation (0.119° per 1° HKA, $p < 0.0001$) and TEA rotation (0.101° per 1° HKA, $p = 0.0249$), but not AP rotation ($p = 0.9315$). Mild valgus knees demonstrated substantially smaller rotational changes than more severe deformities.

RESEARCH STUDY

Postoperative Activity Outcomes Differ Between Varus and Valgus Knees After Total Knee Arthroplasty

Status / update A retrospective review of patients undergoing primary TKA with a smart implantable device (SID) was performed ($n = 324$, 61.5% female, 60.6% ages 65-79, BMI 31.4). Patients were categorized according to preoperative coronal deformity as varus ($n = 215$) or valgus ($n = 109$). Activity and patient reported outcomes were collected preoperatively and at serial postoperative follow-up intervals. Linear mixed-effects modeling was used to assess the effects of time, deformity group, and the interaction between time and deformity group on postoperative activity while accounting for repeated within-subject measurements. Significance was set at $\alpha = 0.05$.

- Significant improvements over time were observed for KOOS-JR, pain, knee range of motion, and double support percentage from the preoperative period through 1-year follow-up (all $p < 0.001$). No significant overall differences between varus and valgus knees were identified for KOOS-JR ($p = 0.956$), pain ($p = 0.451$), knee ROM ($p = 0.448$), or double support percentage ($p = 0.923$), and no significant differences in longitudinal recovery trajectories were observed between deformity groups for these outcomes (all $p > 0.05$).
- Valgus knees demonstrated greater overall daily stand hours compared to varus knees (12.1 vs 10.3 hours, $p < 0.001$), although no significant changes over time or differences in longitudinal trajectories were identified ($p > 0.05$). Step count demonstrated a significant effect of time ($p = 0.047$) and a significant interaction between deformity group and time ($p = 0.038$), indicating differing postoperative activity trajectories between groups. Varus knees demonstrated decline in step count at 3 months before returning to baseline whereas this occurred at 6 months in valgus knees. Gait speed improved significantly between the 1- and 3-month postoperative intervals ($p < 0.001$), without significant differences between deformity groups ($p = 0.209$).

Triple Taper Collared Femoral Stems Are Associated With Lower Rates of Periprosthetic Femur Fracture and Cementation in Total Hip Arthroplasty

Status / update Submitted to AAHKS and AAOS 2026

- We performed a retrospective comparative cohort study of 2,032 primary THA cases by two surgeons. Cases were grouped by femoral stem type as STWS or TTCS. There were no significant demographic differences between groups. Unadjusted comparisons used Fisher exact or chi-square testing. Multivariable penalized logistic regression evaluated predictors of cementation and fracture, adjusting for age, site, surgeon, and sex. Sensitivity analyses excluded uncertain fracture cases and used only each patient's first procedure to account for staged bilateral or repeat cases.
- The cohort comprised 834 TTCS and 1,198 STWS cases. There were 16 fracture events, including 13 Vancouver B1/B2 fractures, all in the uncemented STWS cohort. In adjusted penalized regression, TTCS use was associated with lower odds of fracture that did not reach significance with the numbers available (adjusted OR 0.13; 95% CI 0.007–0.485; $p = 0.177$); sensitivity analyses were similar. Cementation decreased from 9.93% in STWS to 0.36% in TTCS, a 96.4% relative reduction, and TTCS use remained independently associated with lower odds of cementation (adjusted OR 0.03; 95% CI 0.004–0.069; $p < 0.001$).

Declining Medicare Profitability for Total Joint Arthroplasty: A Multi-Surgeon Economic Analysis and 2027 Projection

Status / update We performed a retrospective, multi-surgeon economic analysis of 7,882 primary THA and TKA procedures recorded from January 2024 through June 2026. Annual case volume and professional revenue were summarized by payer. Per-case profit was calculated under 40%, 50%, and 60% overhead costs. Medicare reimbursement and profit trends from 2024 through 2026 were summarized using absolute and percentage changes and exploratory linear trend estimates. The 2027 Medicare estimate was treated as a scenario projection based on 20% reduction from 2026 reimbursement per case. · Manuscript pending publication

- Medicare accounted for 3,365 cases, Medicare Advantage for 1,481, and commercial insurance for 3,036. Medicare reimbursement per case decreased from \$1,408.49 in 2024 to \$1,236.60 in 2026, a 12.2% reduction. Estimated Medicare profit per case decreased by 15.4%, 17.8%, and 22.9% under 40%, 50%, and 60% overhead cost assumptions, respectively. The observed annual change in Medicare reimbursement was -\$85.95 per case (95% CI, -\$406.32 to \$234.43; $p=0.182$). At 60% overhead, the annual change in profit was -\$35.13 per case (95% CI, -\$180.80 to \$110.54; $p=0.201$). Exploratory linear trends were negative across all Medicare financial outcomes. Under predetermined 2027 scenario, reimbursement was \$989.00 per case and estimated profit at 60% overhead was -\$75.86 per case.