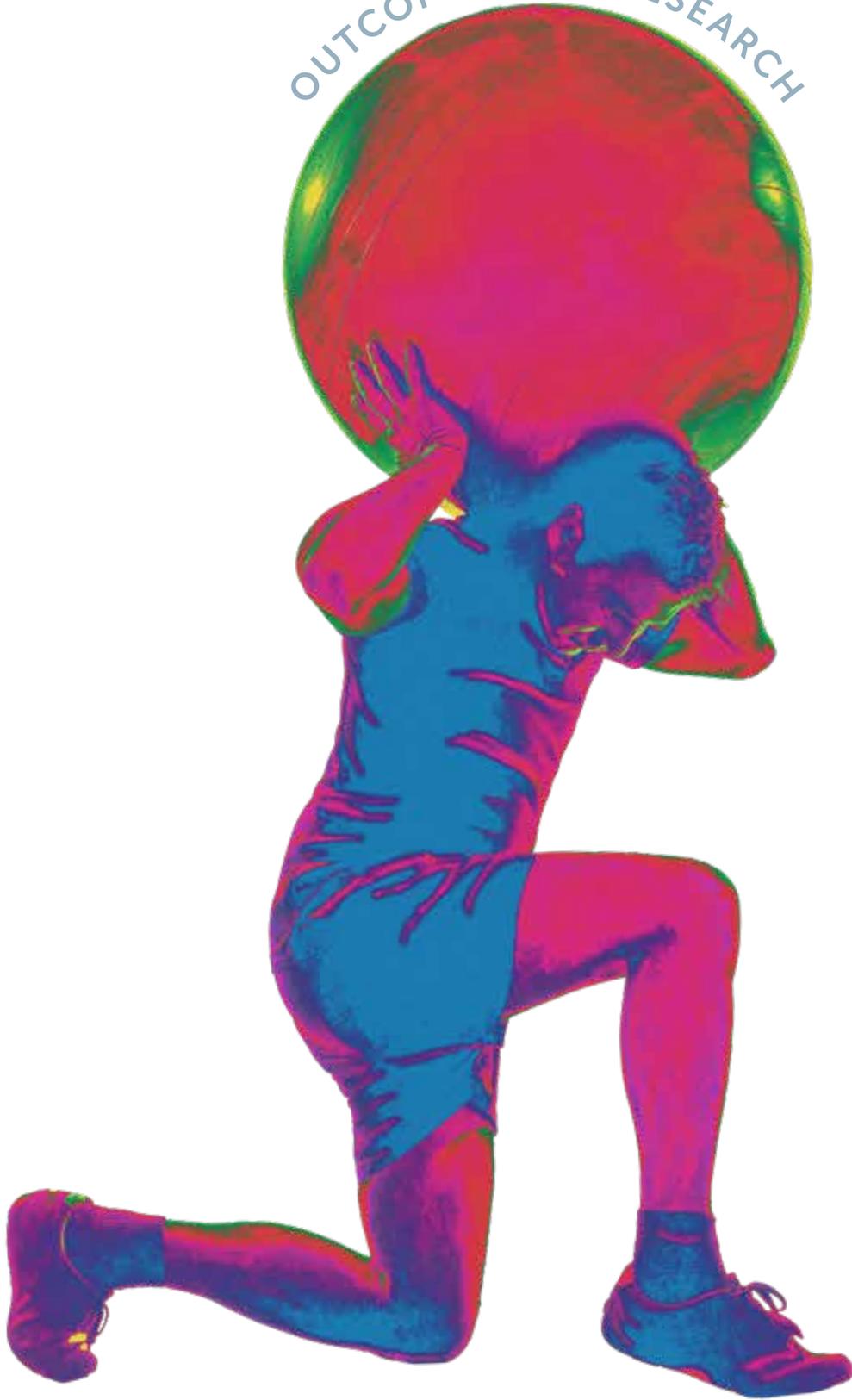


ORTHOPAEDIC

OUTCOMES AND RESEARCH



Jefferson Health®

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE



A MESSAGE FROM THE CHAIR

Dear Colleagues,

It is an especially exciting time at Jefferson Health's Department of Orthopaedic Surgery and I am pleased to share this annual *Orthopaedic Outcomes and Research* report on what's been accomplished over the past year.

The vibrant images that accompany the report reflect the intensity, focus and determination of our efforts and the resulting benefit to our patients. Our staff of clinicians and researchers is driving advances in orthopaedic care with an intensity that sets us apart from other academic programs. Whether it's finding ways to refine common surgical techniques or furthering the understanding of complex orthopaedic conditions, the work of our team is leading to ever better care for patients. We see outstanding results every day as patients return to their lives with restored function and performance. We appreciate the validation of our efforts from *U.S. News & World Report*, which ranked Thomas Jefferson University Hospital fourth in the country in 2017 for orthopaedic care.

Jefferson Health's Department of Orthopaedic Surgery includes the expertise of surgeons and other orthopaedic-care specialists from Rothman Institute at Jefferson, Philadelphia Hand to Shoulder Center at Jefferson, 3B Orthopaedics, the Abington Orthopedic & Spine Institute – Jefferson Health, and the orthopaedic services of Jefferson Hospitals in New Jersey. We also benefit from collaboration with the Sidney Kimmel Cancer Center at Jefferson. Last year our combined orthopaedic team responded to more than 815,055 patient visits and performed more than 61,000¹ surgical procedures, making our program the largest in the Philadelphia region. Getting our patients back to a full life, whether at work, home or on the playing field, is always our focus.

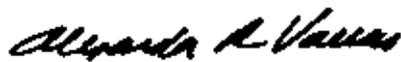
We are fortunate to have clinicians who value research. Last year our research agenda resulted in the presentation or publications of 286 papers at medical conferences and in leading peer-reviewed journals. Jefferson Health's clinicians and scientists are tackling some of the most important and timely issues in orthopaedics, including the responsible use of opioid medications and the design of new approaches to delivering high-quality, efficient care.

I invite you to explore in the pages ahead the many ways Jefferson Health's Department of Orthopaedic Surgery is making a difference in the specialties of spine, hip and knee, foot and ankle, hand and wrist, shoulder and elbow, trauma, sports medicine and musculoskeletal oncology.

Thank you for taking an interest in our work. I invite you to visit our website, Jefferson.edu/orthopedic, to learn more about the services we provide. To refer a patient please call **215-503-8888** or have your patient call **1-800-JEFF-NOW**.

With another new year upon us, I want to wish you much success and happiness.

Sincerely,



Alexander R. Vaccaro, MD, PhD, MBA
Richard H. Rothman Professor and Chair
Department of Orthopaedic Surgery
Jefferson Health
Sidney Kimmel Medical College at Thomas Jefferson University

¹ Total includes unspecified orthopaedic and fracture/dislocation procedures.



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KINETIC ENERGY

AN OVERVIEW

Kinetic energy is the energy of motion. According to basic laws of physics, as long as an object is moving at the same velocity, it will maintain the same kinetic energy. It's on display everywhere, whether someone is pushing a shopping cart down a grocery store aisle, or a pole vaulter is sprinting toward her leap over the bar. Helping people maintain that dynamic – the transfer of potential energy to kinetic energy – is inherent in all we do at Jefferson Health's Department of Orthopaedic Surgery. Our clinicians and research scientists are pursuing an intense research agenda that is committed to translating medical discoveries into everyday practices that enhance the care of patients.

Our broad research portfolio includes clinical trials, assessments of novel surgical techniques and materials, and evaluation of new systems for delivering orthopaedic care outside of the traditional inpatient hospital setting. Basic science projects are also key to our research work because they illuminate the root causes of disease and can point to new avenues for treatment.

Jefferson Health orthopaedic specialists, which include clinicians from Rothman Institute at Jefferson, Philadelphia Hand to Shoulder Center at Jefferson, 3B Orthopaedics, the Abington Orthopedic & Spine Institute – Jefferson Health, and the orthopaedic services of Jefferson Hospitals in New Jersey, are experts at handling both common and complex cases involving the spine; hip and knee; shoulder, elbow and hand; and foot and ankle; as well as orthopaedic trauma and orthopaedic oncology. Our research findings help inform each stage of patient care, from initial examination and diagnosis, to treatment management, recovery and rehabilitation.

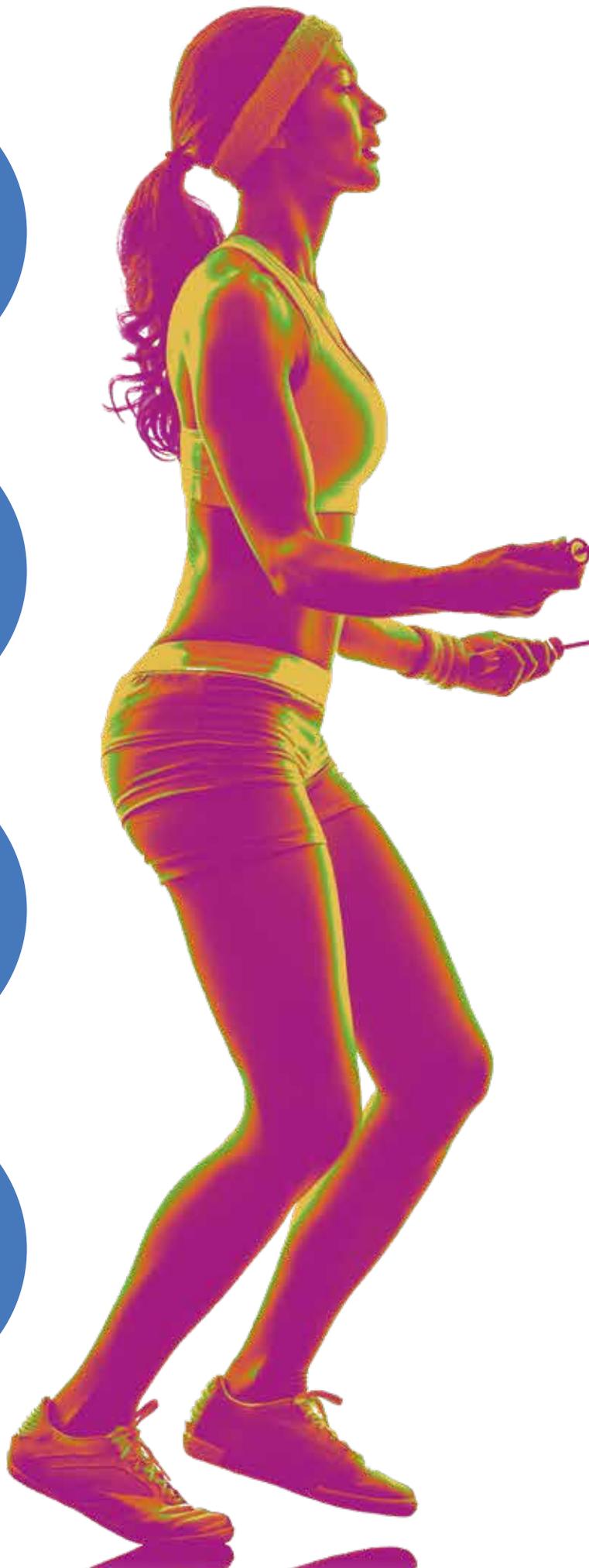
Recognizing that one size does not fit all, Jefferson Health researchers are exploring whether certain surgical approaches may benefit younger patients while other techniques might be well suited for older persons. Whether the patient in our care is an elite athlete or someone determined to keep up with grandkids, the focus of treatment is always to restore optimal function and get patients back as soon as possible to an active lifestyle.

Patient outcomes aren't just measured by successful surgery, but whether quality of life factors, such as good sleep and freedom from both pain and potentially addictive medication, are achieved.

Among the many research developments in orthopaedics at Jefferson Health over the past year:

- **Spine.** Researchers helped evaluate a proposed universal system for classifying sacral fractures, which would help promote effective communication among multi-disciplinary treatment teams.
- **Shoulder.** An analysis found that total shoulder arthroplasty may be a better option than hemiarthroplasty for young patients with end-stage shoulder arthritis.
- **Hand.** A survey found that surgical residents tend to prescribe more opioids for pain than attending surgeons, a finding that suggests more training in responsible opioid use is needed.
- **Sports medicine.** A long-term study that evaluated sleep quality in patients who underwent rotator cuff surgery found that improvements in sleep remain two years after surgery, but sleep disturbances continue for patients who take narcotic medication.

These and other studies from Jefferson Health's Department of Orthopaedic Surgery are detailed on the pages ahead. See how Jefferson Health's intense research efforts are leading to better outcomes for patients.



Joint Replacement Surgeries

14,489

Foot and Ankle Surgeries

3,822

Shoulder and Elbow Surgeries

4,923

Sports Medicine Cases

10,134

Hand and Wrist Surgeries

18,293

Trauma Cases

2,530

Spine Surgeries

5,265

Musculoskeletal Oncology Cases

424

September 2016–August 2017.
Source: Jefferson internal data





Complex Spine

Jefferson Health spine surgeons are respected leaders in their field, working to advance the treatment of both common and complex spinal injuries and diseases, including spinal cord injuries, herniated disc, degenerative disc disease, spine deformity, fractures and tumors.

The spine team's commitment to clinical and basic science research means that patients benefit from the latest surgical innovations as well as advances in management of pain, stiffness and other symptoms stemming from overuse, strain, injury or osteoarthritis. Patients in an emergency situation are in especially good hands because Thomas Jefferson University Hospital is a designated Level 1 Regional Resource Trauma Center and a federally designated Regional Spinal Cord Injury Center.

SERVICES

Treatment for cervical, thoracic and lumbosacral spine conditions

Treatment for scoliosis, spine deformities, spondylolisthesis, spinal cord injuries/trauma, spinal infections and spinal tumors

Minimally invasive techniques and image-guided technology

Comprehensive treatment of disc disease, including disc replacement

Many patients with complex spine problems are transferred to Jefferson Health because of its team's experience in dealing with challenging cases. The spine team is committed to providing a full continuum of care, from diagnosis to treatment planning to rehabilitation and follow-up. The spinal surgery program performed more than 5,265 surgeries last year, making it one of the busiest in the Philadelphia region.

Here is a summary of two studies published recently.

The Development of a Universally Accepted Sacral Fracture Classification: A Survey of AOSpine and AOTrauma Members

Rothman Institute at Jefferson

Many classifications have been proposed for sacral fractures, but none are comprehensive or universally accepted. The development of a comprehensive, reliable and universally accepted classification of sacral fractures is critical to help ensure effective communication among multi-disciplinary treatment teams as well as researchers. A reliable classification system also could lead to the development of an optimal treatment algorithm for these challenging injuries.

The current classification systems are based on either fracture morphology or an inferred mechanism of injury. They are problematic in a number of ways, such as being too broad and simplistic, or too exceedingly detailed. Another shortcoming is that associated complications such as neurologic status and soft tissue injuries aren't considered.

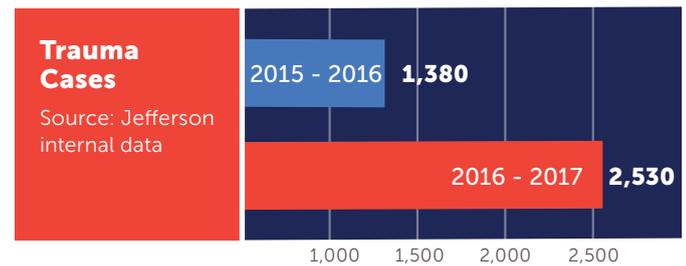
Recognizing the limitations of the existing classifications, the AOSpine Trauma Knowledge Forum partnered with pelvic trauma experts from AOTrauma to develop a comprehensive sacral fracture classification system that will provide a common language for the various medical personnel treating such injuries and one that is acceptable to both spine surgeons and orthopaedic traumatologists. Some aspects of the proposed classification are bound to be controversial.

To get input, an online survey containing four key yes-or-no questions was sent to all members of AOSpine and AOTrauma, and Jefferson Health researchers. A total of 474 surgeons answered all the survey questions. Among the results reported in *Global Spine Journal*:

- 86.9% of respondents felt that the proposed hierarchical nature of injuries was appropriate.
- 77.8% agreed that the risk of neurologic injury is highest in a vertical fracture through the foramen.
- Almost 80% felt that the separation of injuries based on the integrity of L5-S1 facet was appropriate.
- 83.3% agreed that a non-displaced sacral U fracture is a clinically relevant entity.

The researchers said the survey was useful for gaining a “global perspective on the controversial areas in the injury patterns of sacral fractures.” They said the fact that most surgeons were in agreement on any given question “demonstrates that universally accepted sacral classification is possible.”

The proposed classification system is still being finalized, and an international group of surgeons is working to independently validate the classification.



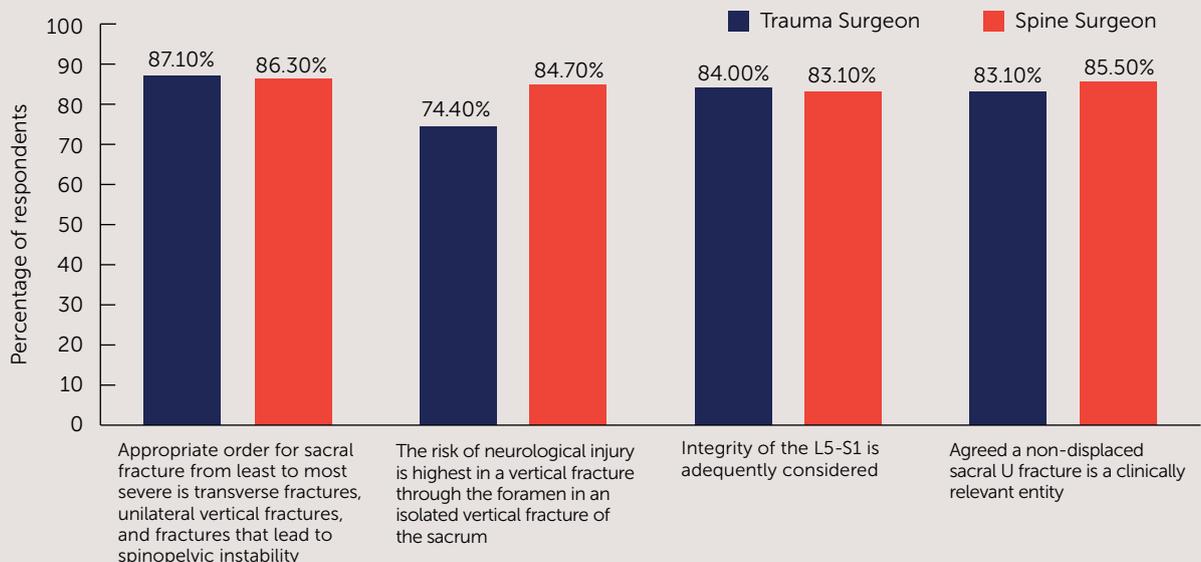
Survey Questions

Do you think that the appropriate order for sacral fracture severity from least to most severe is transverse fractures, unilateral vertical fractures, and fractures that lead to spinopelvic instability?

In an isolated vertical fracture of the sacrum, do you agree that the risk of neurologic injury is highest in a vertical fracture through the foramen and lowest in a vertical fracture medial to the foramen?

Do you think the integrity of the L5-S1 facet is adequately considered if a unilateral vertical fracture where the ipsilateral superior S1 facet is discontinuous with the medial portion of the sacrum is considered differently from a fracture where the ipsilateral superior S1 facet is in continuity with the medial portion of the sacrum?

Do you think a nondisplaced sacral U fracture that may be seen in low-energy insufficiency fractures is a clinically relevant entity that deserves its own spot in a classification?



Results of the survey comparing spine surgeons and trauma surgeons. More spine surgeons than trauma surgeons agreed with the organization of B-type injuries (84.7% versus 75.4%, respectively, P ¼ 0.03); however, still more than three in four trauma surgeons agreed with the organization of B-type injuries.

Source: James C. Krieg, MD

Reliability and Clinical Utility of the CARDS Classification for Degenerative Spondylolisthesis

Rothman Institute at Jefferson

Degenerative spondylolisthesis (DS) is a heterogeneous disorder with variations in radiographic and clinical presentation. The condition may present with several radiographic features, including translation, kyphosis and disc space collapse, in addition to symptoms of back pain and radiculopathy. Recommended surgical options for DS range from simple decompression without fusion to fusion with or without instrumentation, though the optimal surgical treatment for DS remains debatable.

The Meyerling classification is the most widely used method for describing the degrees of spondylolisthesis and it stratifies the disease into grades I-IV based on the percent translation between vertebral levels. The usefulness of the Meyerling classification system is limited, however, because nearly all cases of DS fall into Grade I, with a few in Grade II, and not all factors relevant to DS are considered.

An alternative grading system called the Clinical and Radiographic Degenerative Spondylolisthesis (CARDS) system was recently proposed to better take into consideration the large variation in radiographic features of DS. It differentiates DS into four distinct categories, A through D, based on disc height, anterior translation and the presence of segmental kyphosis.

Jefferson Health researchers, including Alan S. Hilibrand, MD, conducted a retrospective study to assess whether the CARDS system could be a consistent and reliable classification system to help in surgical decision-making.

Five spine surgeons evaluated radiographs for 78 consecutive surgical patients with L4 to L5 DS and assigned a CARDS ranking of A, B, C or D, as well as a Meyerling score of I or II. The demographic and preoperative and postoperative outcomes scores (ODI, SF-12 mental and physical, and VAS) were also collected for each of the patients.

The study found that by measure of the criteria of the CARDS classification system, the 78 patients were spread across four grades – four in type A; 19 in type B; 45 in type C and eight in type D – instead of being lumped into Grade 1 or II under the Meyerling system.

The patients who met the criteria for Grade D tended to have the worst back pain, but they also tended to show



Type A: Collapse of disc space with bony apposition. Lumbar lordosis is preserved.



Type B: Partial preservation of disc space with ≤ 5 mm of translation.



Type C: Partial preservation of disc space with > 5 mm of translation.

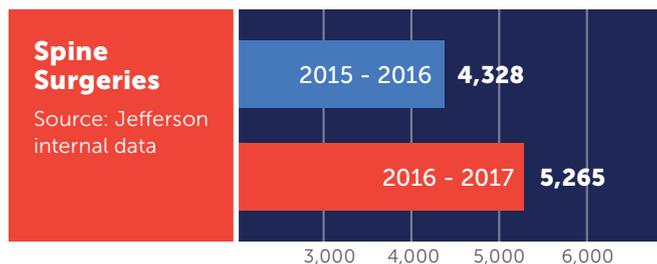


Type D: Kyphotic alignment of L4-5.

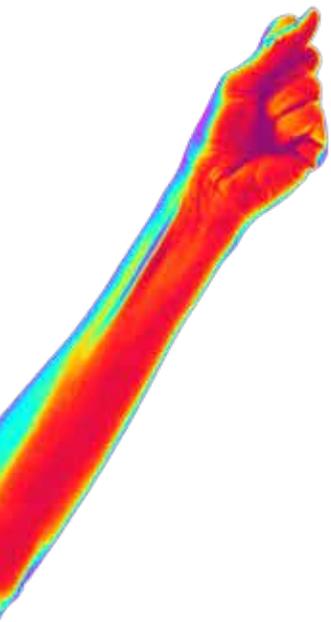
Source: Alan S. Hilibrand, MD

the most improvement post-surgically. The researchers said the CARDS classification system needs to be further tested, including a closer look at why the Grade D subgroup stood out.

The authors believe the CARDS system could prove useful in the “identification of optimal treatment strategies for these specific DS subtypes.” In particular, the authors are pursuing further prospective studies to determine whether each of the different CARDS groups may benefit from its own unique treatment algorithm, such as decompression alone for CARDS A, and interbody or anterior/posterior stabilization CARDS D patients.







Upper Extremity

Injuries and disorders involving the upper extremities can be both life altering and painful. An injury to one part can affect function of the entire body.

Jefferson Health's Department of Orthopaedic Surgery has a full complement of surgeons who specialize in the treatment of the shoulder, elbow, arm, wrist and hand. They are leaders in the treatment of rotator cuff injuries, carpal tunnel syndrome, hand arthritis, shoulder arthritis and complex nerve conditions, to name just a few of their specialty services. They have collectively performed 23,216 surgeries and cared for thousands of patients in 2016.

SERVICES

- Hand and wrist surgery
- Microvascular surgery
- Joint replacement and reconstruction for hand arthritis
- Treatment of carpal and cubital tunnel syndrome
- Brachial plexus reconstruction
- Treatment of Dupuytren's disease
- Shoulder and elbow surgery, including replacement, arthroscopy and open
- Treatment of rotator cuff injuries
- Treatment of shoulder and elbow instability and fractures
- Distal biceps and triceps rupture repair
- Treatment of tendonitis

The surgeons are also widely published researchers, reporting regularly on findings that help advance the medical and surgical management of patients with upper extremity injuries and disorders. They also investigate the efficacy of new implant materials and designs.

Their research portfolio last year was broad: from looking at the timely topic of opioid prescribing patterns among hand surgeons and trainees, to evaluating surgical techniques for both common and complex injuries.

Here are some findings:

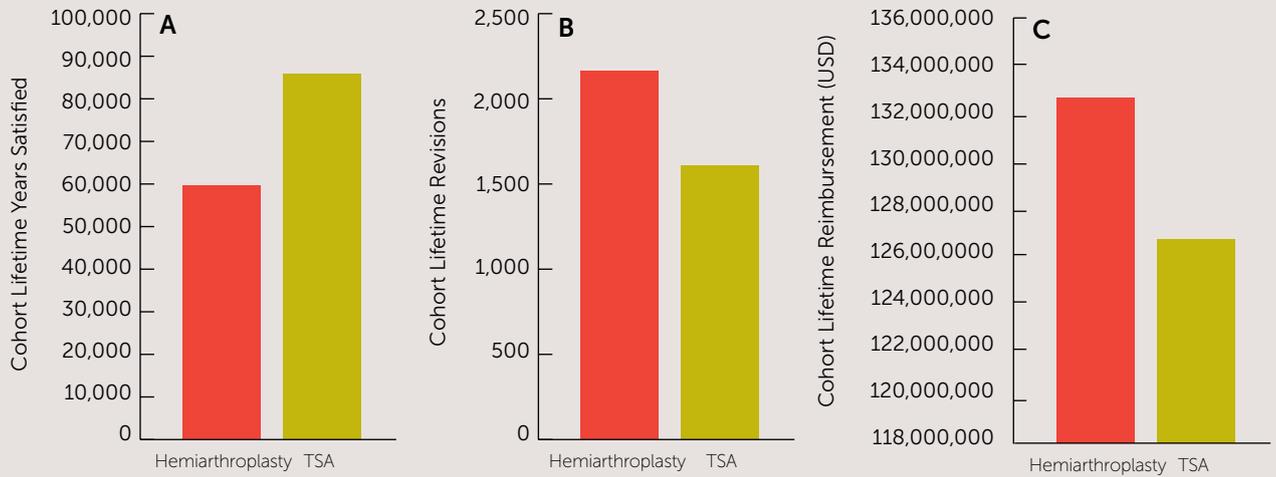
Economic Decision Model Suggests Total Shoulder Arthroplasty is Superior to Hemiarthroplasty in Young Patients with End-State Shoulder Arthritis

Rothman Institute at Jefferson

There is an increasing demand for shoulder arthroplasty in the United States. Young patients with severe glenohumeral arthritis pose a challenging management problem for shoulder surgeons because of their increased activity levels, higher expectations and longer life expectancy, compared to older patients having the surgery.

Two treatment options are total shoulder arthroplasty (TSA) and hemiarthroplasty, with hemiarthroplasty tending to be the preferred choice for younger patients despite indications that there may be a higher chance of revision with the procedure.

Jefferson Health researchers from the Shoulder and Elbow Division, including Mark D. Lazarus, MD, Charles L. Getz, MD, Gerald R. Williams, MD, and Surena Namdari, MD, created a statistical predictive model to assess outcomes and costs associated with the two procedures to determine if, at a population level, it made sense to favor one surgical approach over the other for younger patients.



(A) The total lifetime patient years with a satisfactory or excellent result are shown for treatment of glenohumeral arthritis in patients 30 to 50 years old with hemiarthroplasty versus TSA (total shoulder arthroplasty), as determined using the modified Neer criteria. (B) The total lifetime revisions for treatment of glenohumeral arthritis in patients 30 to 50 years old with hemiarthroplasty versus TSA. (C) The total lifetime cost in dollars for treatment of patients 30 to 50 years old with hemiarthroplasty versus TSA.

Source: Surena Namdari, MD

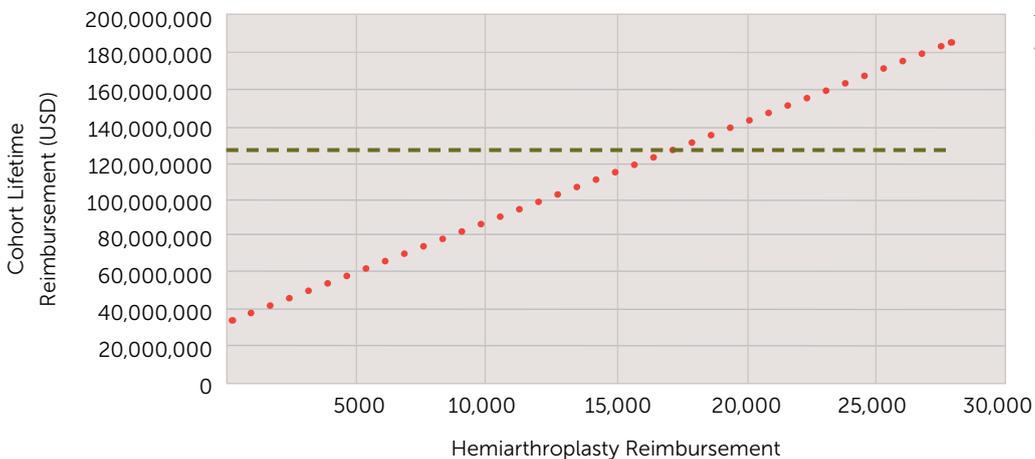
The statistical model drew on data in the literature related to incidence of arthroplasty, outcomes and direct costs associated with surgery. The researchers estimated that each year in the United States, 5,279 people between the ages of 30 to 50 with early glenohumeral arthritis need shoulder arthroplasty (either TSA or hemiarthroplasty), so any cost savings could be significant at the societal level.

The researchers used the statistical model to answer three questions: Are more years of patient-derived satisfactory outcomes (as measured by the Neer criteria and quality-adjusted life-years, QALYs) achieved with a TSA or a hemiarthroplasty? Which procedure results in more revisions? Which procedure is associated with greater costs to society?

The analysis, published in *Clinical Orthopaedics and Related Research*, came out in favor of TSA. It found that for a lifetime of a cohort of 5,279 patients:

- Hemiarthroplasty resulted in 11.29 years on average of satisfactory or excellent results and an average gain of 6.55 QALYs. By comparison, TSA resulted in an average of 16.29 years of satisfactory or excellent results and an average gain of 7.96 QALYs.
- With hemiarthroplasty, there were 0.4 revisions per patient as compared to 0.3 revisions per patient when TSA was done initially.
- Hemiarthroplasty was associated with an average direct reimbursement of \$25,000 per patient, compared to \$23,700 per patient for TSA.

“Our study showed that at the point when surgery is being considered after exhausting nonoperative treatment options, treating end-stage glenohumeral arthritis in patients 30 to 50 years in the United States with TSA instead of hemiarthroplasty would result in greater cost savings, avoid a substantial number



The one-way sensitivity analysis with varying reimbursement of primary hemiarthroplasty is shown.

Source: Surena Namdari, MD

of revision procedures, result in greater years of satisfactory or excellent patient outcomes, and greater QALYs gained," the researchers concluded.

Because the analysis had some limitations, they said the findings need to be confirmed by future research.

Postoperative Opioid-Prescribing Practices of Hand Surgeons and Trainees: A Nationwide Survey of 1,300 Providers

Philadelphia Hand to Shoulder Center at Jefferson

Prescription opioid abuse is now an epidemic in the United States as the use of opioid analgesics has risen dramatically over the past two decades. The origin of this crisis is multifactorial. One factor is thought to be an increased focus by practitioners in recent years on postoperative pain management and patient satisfaction.

To better understand the opioid problem from the perspective of hand and upper extremity surgery, recent studies have focused on patient demographics. However, far less is known about the surgeon factors that may play a role in opioid-prescribing patterns for postoperative pain after hand surgery. In particular, little is known about the relationship between opioid-prescribing behavior and surgeon experience, training background and practice settings. For instance, do hand surgeons and trainees have differing prescribing practices?

To gain insight, Jefferson Health researchers, including Patrick Kane, MD, conducted a survey of hand surgeons and trainees. They used an online survey tool and contacted potential participants through the American Association for Hand Surgery and residency and fellowship coordinators of Accreditation Council for Graduate Medical Education (ACGME) training programs in orthopaedic surgery, plastic surgery and hand surgery.

The survey focused on common hand surgeries: open carpal tunnel release (CTR), trigger finger release (TFR), thumb carpometacarpal (CMC) arthroplasty, and distal radius fracture (DFR) open reduction and internal fixation (ORIF). For each of the procedures, the survey asked about the type of medicine typically prescribed postoperatively, dosage of medication, and number of pills prescribed. The survey also asked the respondents about factors that influence their prescribing behavior. Trainees were asked if they had any discussion to receive instructions from their superiors on

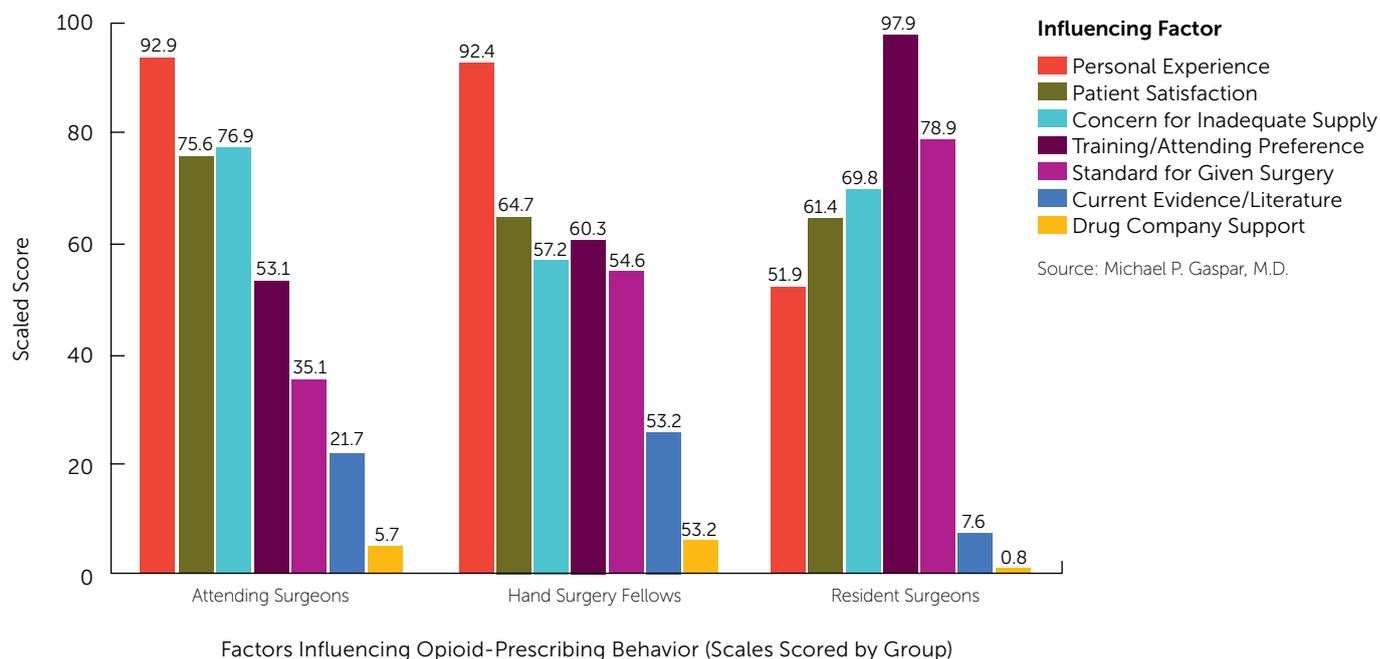
postoperative pain management. Respondents were also asked about their perceptions on patient handling of prescription opioids.

Surveys were collected from October 2015 to March 2016 and 1,300 responses (266 hand surgeons and 1,034 surgical trainees) were analyzed. The findings were reported in *The Journal of Bone & Joint Surgery*.

They included:

- Compared to residents, attending surgeons prescribed significantly less total morphine milligram equivalent (MME) units and were more likely to prescribe lower-potency opioids or non-opioid analgesics.
- Within the attending surgeon responders, those who practiced in a community or private setting and those in plastic surgery prescribed more MME for TFR and CTR, but not for the other procedures.
- Attending surgeons trained in plastic surgery and those in private practices were more likely to prescribe higher potency opioids and less likely to prescribe non-opioids for all procedures.
- Among surgical residents, those at the lower levels of training tended to have higher opioid prescribing compared to residents later in training. Orthopaedic residents prescribed less than residents in plastic surgery.
- Personal experience was the most influential factor for prescribing behavior for both attending surgeons and hand surgery fellows. By contrast, residents reported that the preferences of their supervising attending were the greatest influence.
- Only 4.3% of orthopaedic residents reported directed opioid-related communications with their attending, compared to 16.4% of plastic surgery residents.
- The majority of attending surgeons (59%) and fellows (64.3%) believed that patients use more than half of their opioid medication compared to just 20.3% of residents. Attending surgeons and fellows were also more likely to believe that patients disposed of unused pills responsibly.

"This study provides important evidence that opioid overprescribing is common among hand and wrist



surgeons, and even more so among trainees,” the researchers concluded. “Residents are particularly prone to overprescribing despite highly skeptical views regarding patient opioid utilization and misuse.”

The researchers said more communication between supervising surgeons and trainees could help improve prescribing behavior as could more education and training programs on opioid use for both attending surgeons and trainees.

An Assessment of the Safety of an Orthopaedic Specialty Hospital: A 5-Year Experience

Rothman Institute at Jefferson

One of the goals of orthopaedic specialty hospitals is to provide safe and effective elective care to carefully selected patients. An argument in favor of such hospitals is that they may deliver care more efficiently and less expensively than full-service, acute-care hospitals to patients who meet medical screening criteria. On the other hand, orthopaedic hospitals may not be as safe or cost-effective if patients have to be transferred to an acute-care facility if complications arise.

A team of Jefferson Health researchers who are owners of a 24-bed orthopaedic specialty hospital (OSH) in the Philadelphia suburbs conducted a five-year assessment to consider the safety of such

facilities. The OSH is used for all types of orthopaedic surgery, including spine, hip and knee arthroplasty, shoulder and elbow, foot and ankle, and hand.

A retrospective analysis of the billing database from January 2010 to September 2014 was performed. All cases were included, except for minor interventions such as epidural steroid injections. In all, billing data for 8,235 (41% inpatient, 59% outpatient) procedures were analyzed.

The analysis, reported in *Orthopedics*, found favorable trends:

- Inpatient procedures had an average length of stay (LOS) of 1.35 days.
- The specific LOSs for cases without major complications or morbidity were 1.34 days for unilateral primary total joint arthroplasty; 2.18 days for bilateral primary total joint arthroplasty; 1.48 days for noncervical spinal fusion; 1.03 days for cervical spinal fusion; and 1.32 days for unilateral primary upper extremity joint arthroplasty. The LOSs were comparable to national figures for acute-care hospitals reported by Medicare.
- The transfer rate was very low. Only 32 patients (0.39% of cases) required transfer to an acute-care hospital. The most common reasons for transfer were cardiac or pulmonary issues.

- Two procedures, uncomplicated bilateral total joint arthroplasty and noncervical spine fusion, had significantly higher transfer rates, 3.3% and 2.9%, respectively.
- There were no deaths.

“Carefully selecting patients who are healthy enough for an OSH and having a system in place for potential transfers to a general hospital are two variables critical to the management of an OSH,” the authors, including Matthew Ramsey, MD, reported.

They said it would be useful to conduct a prospective randomized trial to compare orthopaedic care at the OSH to an acute-care hospital. They said future research could also look at readmission, a variable not captured in this study. Also, preoperative screening criteria for higher-risk procedures such as bilateral total joint arthroplasty and noncervical spine fusion may require further analysis.

Another question unanswered by the study was the potential influence of physician investment in OSHs. The researchers noted that regulations prohibit new physician investment and cap old investments in specialty hospitals, but they say such hospitals may have an important role in the changing healthcare marketplace, which is dealing with increased costs and patient demand, particularly in the area of orthopaedics.

“The results suggest that further investigation into the role of specialty hospitals in the health care economy may be useful,” the researchers said.

Midterm Outcomes of Standard Proximal Row Carpectomy versus Proximal Row Carpectomy with Dorsal Capsular Interposition for Treatment of Late-Stage Wrist Arthropathy

Philadelphia Hand to Shoulder Center at Jefferson

Proximal row carpectomy (PRC) is a widely accepted surgical treatment option for a number of late-stage wrist arthropathies. Long-term outcomes have generally been favorable for PRC, although its use has historically been contraindicated in patients with preexisting disease of the capitate head or lunate facet of the radius, due to increased stresses at the newly created radiocapitate joint.

To overcome shortcomings of PRC, a number of surgical modifications have been proposed, including

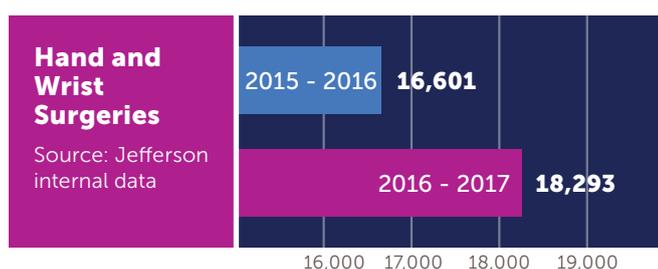
Comparison of Nonoperative Treatments Between a PSH and an ACH						
Nonoperative Treatments	Total Knee Arthroplasty (%)		P Value	Total Hip Arthroplasty		P Value
	PSH	ACH		PSH	ACH	
Physical therapy	35	36.4	1.00	36.5	45.8	.36
NSAIDs	72.5	70.5	1.00	74.6	72.9	.84
Non-narcotic medication	30	43.2	.26	25.4	32.2	.43
Narcotic medication	17.5	13.6	.77	23.8	13.6	.17
Bracing	12.5	20.5	.39	0	3.4	.23
Glucosamine	62.5	40.9	.05	36.5	27.1	.33
Cortisone	80	56.8	.04	34.9	22.0	.16
Viscosupplementation	40	43.2	4.83	1.6	6.8	.20

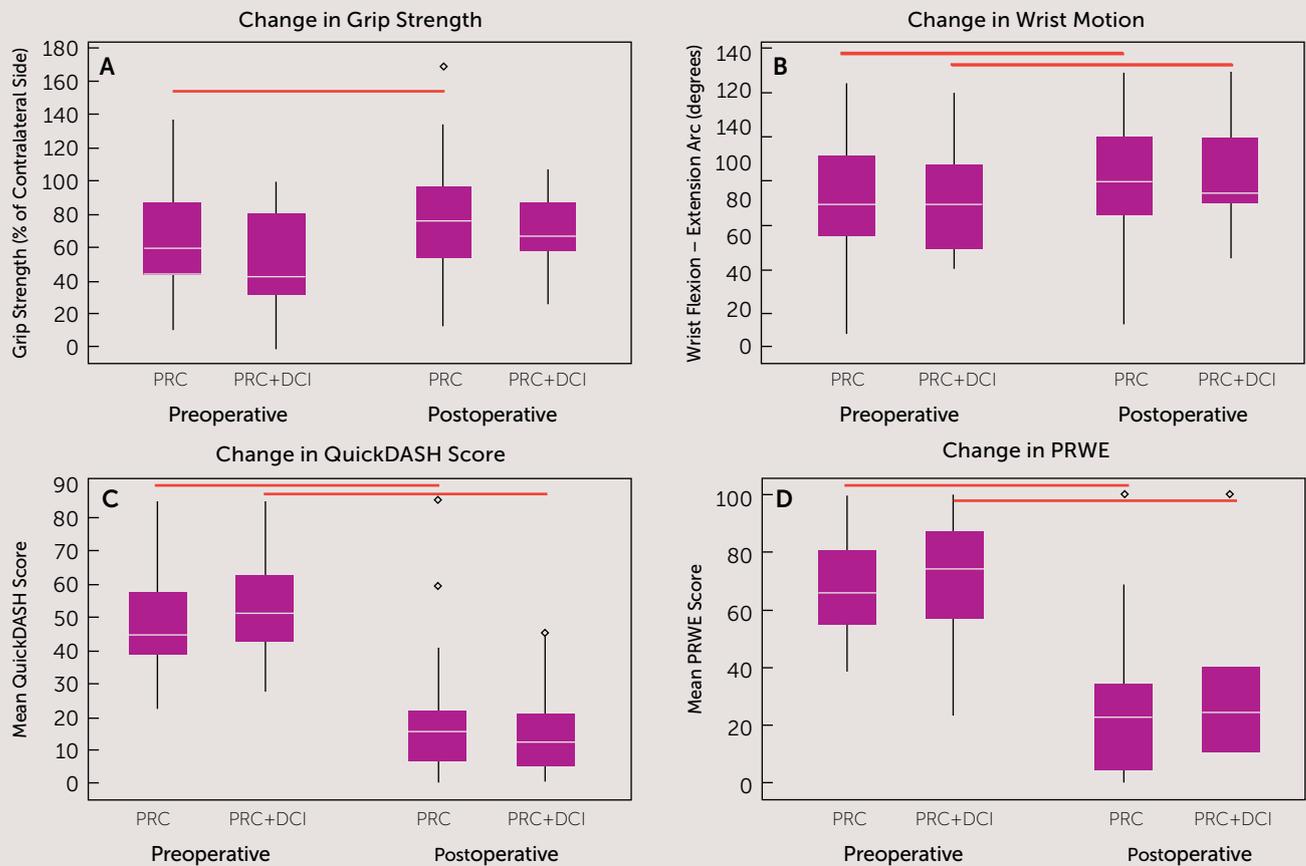
ACH: acute care hospital; NSAIDs: nonsteroidal anti-inflammatory drugs; PSH: physician-specialty hospital.

Source: Matthew L. Ramsey, MD

combining PRC with dorsal capsular interposition (DCI). The combination technique is promising, but clinical results so far have been limited to a small series of patients.

Jefferson Health researchers, including Eon Shin, MD, conducted a retrospective review to compare midterm outcomes of PRC+DCI to standard PRC. They identified 75 cases (25 PRC+DCI; 50 PRC) from 2005 to 2014 performed by any one of three fellowship-trained hand surgeons. The main outcome measures were Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH) and Patient-Related Wrist Evaluation (PRWE) scores. In addition to a chart review, follow-up evaluations on the patients were obtained prospectively, with an average follow-up time postoperatively of 5.9 years.





Box and whisker plots representing pre- and postoperative outcomes. (A) grip strength (B) wrist flexion-extension arc (C) QuickDASH scores and (D) PRWE scores between the proximal row carpectomy (PRC) and PRC with dorsal capsular interposition groups. Diamonds represent outliers, red horizontal bars show statistically significant differences between subgroups.

Source: Eon K. Shin, MD.

Significant improvements in average grip strength, wrist flexion-extension arc and QuickDASH and PRWE scores were observed across the full cohort.

“No difference was found between the PRC+DCI and PRC groups for any of the measured outcomes,” the researchers reported in *The Bone & Joint Journal*.

Some specific findings:

- One patient who had PRC+DCI required additional surgery for a deep infection, while two patients in the PRC group had complications.
- One patient in each group was converted to total wrist arthrodesis for progression of radiocarpal disease.
- Seventy of the 75 patients (93%) were satisfied with their outcome.

“Although patients with lunate facet/and or the proximal capitate degeneration have been historically contraindicated for PRC, when performed in conjunction with DCI, these patients have similar

outcomes as patients treated with standard PRC alone at a mean follow-up of more than five years,” the researchers concluded.

They said further study is warranted to compare PRC+DCI with alternative salvage options in this population of patients.

Prospective Evaluation of Sleep Improvement Following Carpal Tunnel Release Surgery

Rothman Institute at Jefferson

Sleep disturbance is a well-known symptom of carpal tunnel syndrome (CTS), with as many as 80% of patients experiencing a decrease in sleep quality. A small study showed some relief of nighttime waking following carpal tunnel release (CTR) surgery, but the effect of the procedure on overall sleep quality has not been fully investigated.

Jefferson Health researchers, headed by Asif M. Ilyas, MD, conducted a prospective study of 398 patients with positive nerve studies who were treated with CTR.

The Questions on the ISI Questionnaire as Administered to the Patients, With Mean Responses Before and After Surgery and at 3 Months*

ISI Question	Before	After	3 mo
1. Difficulty falling asleep	1.26	.61	.46
2. Difficulty staying asleep	1.98	.76	.66
3. Problems waking up too early	1.66	.70	.66
4. How satisfied/dissatisfied are you with your current sleep pattern?	2.49	1.23	1.20
5. How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?	1.56	.77	.67
6. How worried/distressed are you about your current sleep problem?	1.64	.60	.54
7. To what extent do you consider your sleep problem to interfere with your daily functioning (e.g., daytime fatigue, mood, ability to function at work/daily chores, concentration, memory)?	1.65	.73	.56
Total score	12.24	5.39	4.74

*Answers are rated on a scale of 0 (none) to 4 (very severe).

Source: Asif M. Ilyas, M.D.

The patients were followed up at two weeks and three months following surgery. Patients were evaluated using the 11-question Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH) questionnaire and the Insomnia Severity Index (ISI) scale, which rates seven categories related to sleep.

The researchers reported these findings in the *Journal of Hand Surgery*:

- At the time of final follow-up, average QuickDASH scores had improved significantly, from an average baseline score of 44 (out of a possible 100) before surgery to 32.9 at two weeks and 17.8 at three months.
- There was also a significant improvement at the two-week mark in average ISI scores for all seven aspects of sleep quality, though there was not much more improvement, nor was there worsening, by three months. The average overall ISI score was 11.99 (out of a possible 28) before surgery and it improved to 4.64 at two weeks and 2.83 at three months. That improvement amounted to going from a clinical diagnosis of insomnia to one of normal sleep.
- Sleep improvement was unrelated to pre-operative EMG severity, gender or whether the CTR had been done using an open or endoscopic procedure.

- Patients on Workers' Compensation (WC) tended to report ongoing sleep problems.

"The findings of this study demonstrate that CTR surgery can reliably and quickly (within two weeks) improve multiple aspects of sleep disturbances associated with CTS in non-WC patients," the researchers concluded. "They also demonstrate that this improvement is sustained through at least three months."

The researchers said the findings could be useful to surgeons and patients as they discuss the potential benefits of CTR on sleep.

Late Reconstruction of the Interosseous Membrane with Bone-Patellar Tendon-Bone Graft for Chronic Essex Lopresti Injuries: Outcomes with Mean Follow-Up of Over Ten Years

Philadelphia Hand to Shoulder Center at Jefferson

Essex Lopresti Injury (ELI) is a potentially devastating injury that involves a radial head fracture, distal radioulnar joint (DRUJ) disruption and forearm interosseous membrane (IOM) rupture that generally follows a high-axel loading injury. Although in the initial presentation, ELI may be treated without forearm IOM reconstruction, in an estimated 50% to 75% of all ELI cases, the true extent of injury is not recognized initially. Patients with inadequately treated injuries can go on to develop chronic forearm instability, which



Initial anteroposterior (A) and lateral (B) elbow radiographs of a 67-year-old male who fell from a ladder onto his outstretched non-dominant arm demonstrate a comminuted radial head fracture. The patient underwent radial head arthroplasty (C,D) at an outside institution within one week of his initial injury. The patient developed gradually worsening wrist pain and weakness with forceful grip over the next 16 months, and was referred to our institution, where posteroanterior (E) and lateral (F) wrist radiographs revealed ulnar positive variance. Follow-up anteroposterior (G) and lateral (H) radiographs of the forearm demonstrate sustained ulnar negative variance at 11.2 years from IOM reconstruction.

Source: Michael P. Gaspar, MD

is much more difficult to treat and results in poorer outcomes than acute injuries.

Which surgical technique is best for treating chronic ELI injuries is not clear. Jefferson Health researchers analyzed long-term outcomes for patients who underwent reconstruction of the forearm IOM using a bone-patellar tendon-bone (BPTB) graft.

A total of 30 cases conducted over a 20-year period were analyzed. Researchers, including A. Lee Osterman, MD, reviewed pre-injury clinical evaluations and radiographic measurements. Data collected postoperatively included Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH), Modified Mayo Wrist (MMW) and Broberg and Morrey Elbow Function scores. The IOM reconstruction was performed at an average interval of 44.9 months from the initial injury, and patients had at least five years of follow-up.

The analysis, reported in *The Journal of Bone & Joint Surgery*, found that at an average follow-up of 10.9 years there were significant improvements in mean elbow flexion-arc, wrist flexion-extension arc, forearm pronosupination and grip strength. Improvements in ulnar variance were sustained over the long term.

Those who underwent surgery sooner after the initial injury tended to do better than those with more delayed surgery. The complication and revision surgery rate of 30% was concerning, the researchers said, but said it needed to be considered in the context of the severity of the original injury and alternatives to IOM reconstruction.

“IOM reconstruction with BPTB is an effective treatment option for chronic ELIs, with satisfactory clinical and functional outcomes over the long term,” the researchers concluded.



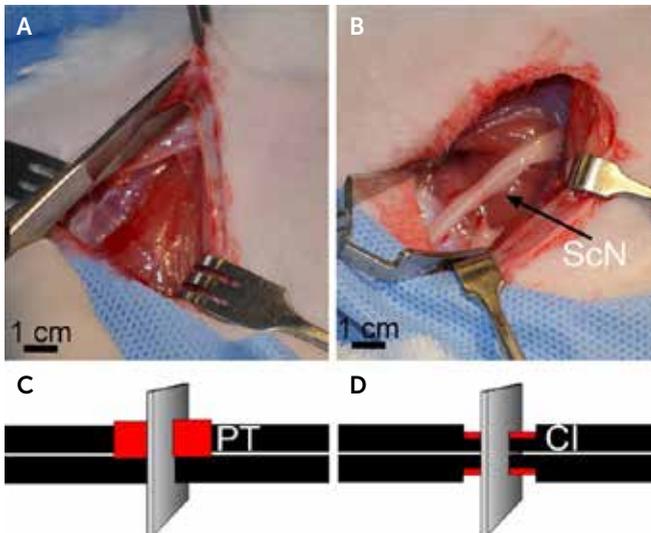
Shoulder and Elbow Surgeries

Source: Jefferson internal data

Patterns of Production of Collagen-Rich Deposits in Peripheral Nerves in Response to Injury: A Pilot Study in a Rabbit Model

Rothman Institute at Jefferson

Peripheral nerve injury (PNI) occurs in an estimated 2% to 2.8% of patients with upper and lower extremity



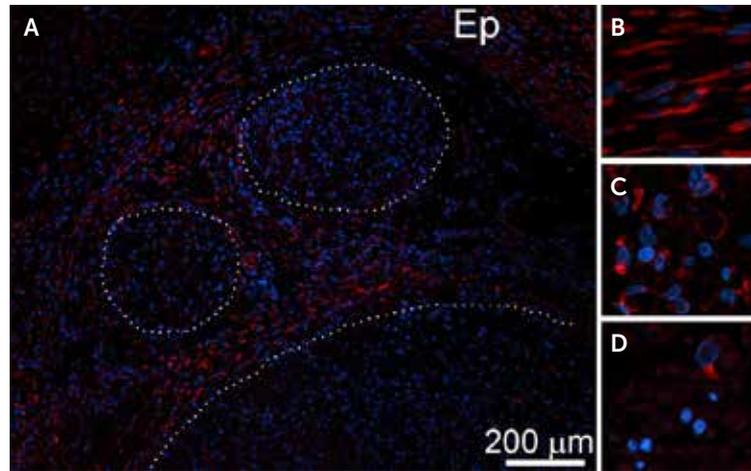
An experimental model of nerve injury. (A,B) Accessing the sciatic nerve of a rabbit. (C) PT nerve injury in which 50% of the thickness of the nerve for a length of 1 cm is removed. (D) CI nerve injury in which a hemostat is placed around the sciatic nerve 1 cm distal to the sciatic notch. The hemostat is then tightened to the first locking flange and held in place for 30 s. In panels C and D, the sites of injury are indicated by red color. Planes corresponding to the orientation of samples collected from the injured nerves are also indicated.

Source: Andrzej Fertala, PhD

trauma, causing a significant burden of disease and disability. The morbidity associated with PNI is compounded by a high rate of incomplete motor recovery. Many of the functional deficits that occur are attributed to neural fibrosis and scarring, which presents a mechanical barrier to peripheral nerve regeneration.

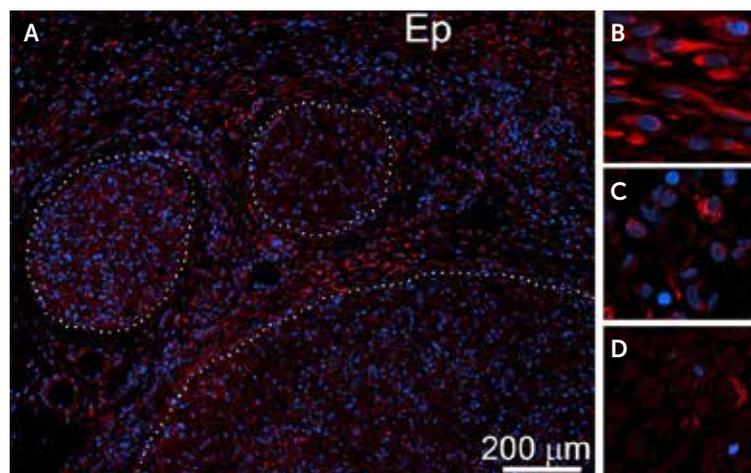
Although collagen-rich deposits are the main component of neural scars, the patterns of their formation are ill-defined. Essential to the biosynthesis of collagen fibrils are enzymes catalyzing posttranslational modifications and chaperones that control the formation of the collagen triple helix. Prolyl-4-hydroxylase (P4H) and heat shock protein-47 (HSP47) play a key role and their production is upregulated during scar formation in human tissues. Alpha smooth muscle actin (α SMA) is also produced during fibrotic processes in myofibroblasts that participate in fibrotic response. In injured peripheral nerves, however, the distribution of cells that produce these markers is poorly understood.

Jefferson Health researchers, led by Michael Rivlin, MD, conducted a study to determine the distribution of the α SMA-positive, HSP47-positive and the P4H-positive cells to better understand the formation of collagen-rich fibrotic tissue (FT) in response to peripheral nerve injury. They did the analysis using a



HSP47-positive cells are evident within the CI nerves. (A) A representative region depicting fascicles (delineated with dotted lines) and epineurium (Ep). (B) A magnified view at HSP47 positive cells present in epineurium of a CI site. (C) A magnified view at HSP47 positive cells present within endoneurium of a CI site. (D) A magnified view at HSP47 positive cells present within endoneurium of a control uninjured nerve.

Source: Andrzej Fertala, PhD



α P4H positive cells are evident within CI nerves. (A) A representative region depicting fascicles (delineated with dotted lines) and epineurium (Ep). (B) A magnified view at α P4H-positive cells present in epineurium of a CI site. (C) A magnified view at α P4H positive cells present within endoneurium of a CI site. (D) A magnified view at α P4H positive cells present within endoneurium of a control nerve.

Source: Andrzej Fertala, PhD

rabbit model of crush-injury and partial-transection injury of the sciatic nerves.

The study, reported in *Brain and Behavior*, found that α SMA is expressed in a relatively small number of cells seen in neural FT. In contrast, cells producing P4H and HSP47 are ubiquitously present in injury sites involving sciatic nerves.

“We contemplate that these proteins may serve as valuable markers that define fibrotic activities in the injured peripheral nerves,” they wrote.





Lower Extremity

Successful treatment of injuries or disorders of the lower extremities involves a special understanding of how the various parts work together to provide strength, balance, stability and mobility.

Whether the focus is the hip, knee, ankle or foot, the goal of treatment is to return patients to a high level of function, free of pain, at work, home and in leisure and sports activities.

Jefferson Health is a leader in total joint replacement and its surgeons help set standards of care for patients undergoing hip or knee arthroplasty. Last year 14,489 joint replacement procedures were performed at Jefferson Health, making it one of the busiest programs in the Philadelphia area. The team is frequently sought out to perform complex revision procedures for patients with prior surgical failures.

SERVICES

Joint revision surgery

Adult joint reconstruction and preservation procedures

Hip and knee replacement, partial knee replacement, ankle replacement

Treatment of hip and knee disorders in young adults

Pelvic reconstruction, osteotomy and hip-impingement surgery

Achilles tendon rupture and tendonitis

Foot and ankle: sprains, fractures and arthritis

Talus and Lisfranc fracture/dislocation

Posterior tibial tendonitis

Tarsal tunnel syndrome

Hallux valgus

Flat foot reconstruction

Foot conditions

Techniques for addressing common problems such as anterior cruciate ligament reconstruction are continually being evaluated and refined, with particular emphasis on identifying ways to enhance outcomes for patients undergoing revision ACL reconstruction.

Last year Jefferson Health foot and ankle specialists cared for thousands of patients, with over 3,000 of them undergoing surgery. Jefferson Health is recognized as a leader in the field of total ankle replacement, often for cases caused by severe arthritis.

Patient care is informed by research that focuses on critical surgical issues such as prevention of pulmonary emboli and periprosthetic joint infection; responsible prescribing of narcotics for pain relief; and optimal use of minimally-invasive techniques and outpatient procedures when appropriate.

Here is a summary of some of the Jefferson Health research that focuses on the lower extremities.

Outcomes After Percutaneous Reduction and Fixation of Low-Energy Lisfranc Injuries

Rothman Institute at Jefferson

The term Lisfranc injury refers to a spectrum of injuries to the tarsometatarsal complex of the foot, most specifically to the bony-ligamentous complex between the base of the second metatarsal and the medial cuneiform. These injuries are often missed or misdiagnosed and not anatomically reduced, leading to midfoot collapse, arthrosis and pain. Operative management of these injuries is also fraught with complications, particularly with respect to the soft tissues. Wound dehiscence and infection are concerns.

Jefferson Health researchers, including Steven M. Raikin, MD, conducted a study to analyze outcomes of a minimally-invasive technique in reduction and percutaneous fixation of low-energy minimally displaced Lisfranc injuries to determine if the approach is a safe alternative to more traditional open procedures.

A retrospective review was performed for all patients who underwent minimally invasive Lisfranc treatment at a single center over a one-year period. The 38 patients underwent the procedure on average 12.4 days after their injury and they had a minimum follow-up of three years. Patients were assessed clinically and radiologically and were scored using the Foot and Ankle Ability Measure (FAAM), Activities of Daily Living (ADL) and sports subscales at a mean follow-up of 66 months. Patients were also asked to subjectively rate their percentage return to preinjury function at the time of final follow-up.

The researchers described the operative technique and reported outcomes for the study group in *Foot & Ankle International*:

- The mean FAAM-ADL score was 94.2 (range 40.5 to 100) and the mean sports score was 90.4 (range 0-100).
- The patient-reported percentage recovery relative to their preinjury level averaged 91.4%.
- No patients experienced complications. Twenty-two patients underwent screw removal at an average of 6.9 months following the procedure.
- No patients had undergone any additional operative procedures or had any objective evidence of midfoot collapse or arthritis at the time of final follow-up.

"Minimally invasive methods of treating low-energy Lisfranc injuries with less soft tissue stripping and disruption, as described in this series, were a valuable tool to optimize outcomes while minimizing the potential morbidity of more traditional, open techniques," the researchers concluded.



(A) Preoperative anteroposterior radiograph demonstrating disruption of the articulation between the medial cuneiform and base of the second metatarsal. (B) Anteroposterior radiograph following percutaneous reduction and screw fixation of the Lisfranc injury. (C) Anteroposterior radiograph following percutaneous reduction and screw fixation of the Lisfranc injury.

Source: Steven M. Raikin, M.D.

Global Forum: An International Perspective on Outpatient Surgical Procedures for Adult Hip and Knee Reconstruction

3B Orthopaedics at Jefferson

Over the past decade there has been a growing trend worldwide for arthroplasties to be performed in an outpatient surgical setting. The question arises whether this outpatient trend is being driven purely by psychosocial and economic factors. The same-day approach may sound appealing to patients who want to avoid a hospital stay and return home quickly and to insurance payers and healthcare providers interested in containing costs associated with surgical procedures.

There is no doubt that outpatient or same-day total hip and knee arthroplasties are entirely feasible from a surgical standpoint, but, for the moment, they appear to be best done in a scrupulously selected patient population and with very extensive perioperative resources.

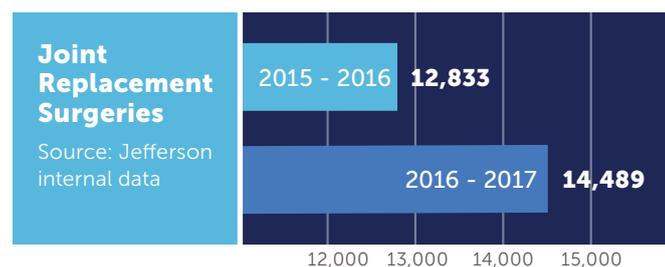
A team of researchers, including 3B Orthopaedics orthopaedic surgeon Robert E. Booth, Jr., MD, wrote a perspective piece in *The Journal of Bone & Joint Surgery* on the factors that should be considered when deciding whether to do outpatient hip and knee reconstruction:

- **Patient Selection.** Preoperative screening needs to concentrate on both the patient's comorbidities and home environment to provide a proper alignment of the expectations of the surgeon, the patient and the patient's family. For instance, patients with cardiopulmonary disease, cirrhosis, diabetes and genitourinary disease tend to have a high prevalence of readmission, while elevated body mass index and advanced age may not necessarily be a determining factor on how patients fare. Having a caregiver at home for the first 24 hours is critical, as is having an ongoing support system in place.
- **Preoperative Education.** Patients must be instructed on all aspects of treatment, including the surgery, pain management, early mobilization (patient should practice using crutches) and requirements for physical therapy and rehabilitation. The patient must be able to reach a member of the caregiving team at any time with follow-up concerns, and the staff should call the patient the evening of or day after surgery.

- **Pain Control and Perioperative Analgesia.** A comprehensive pain control plan should include multimodal and preventive analgesia. Preemptive medications, minimization of narcotics and a combination of general and regional anesthesia are necessary when arthroplasty is performed as an outpatient procedure. Pain breakthrough, wound drainage and medication side effects such as dizziness need to be considered as possibilities ahead of time.
- **Blood-Loss Treatment and Operative Course.** Blood loss during and after total knee arthroplasty or total hip arthroplasty can be substantial, and it can be either visible or less obvious. There needs to be preoperative identification of anemia and attention directed toward minimizing blood loss, including the consideration of using tranexamic acid during the surgical procedure. Although any surgical approach is appropriate, minimally invasive surgical procedures and gentle handling of soft tissue and bone are important.
- **Postoperative Course and Discharge.** This period of care extends from the initial recovery from anesthesia to the physical therapist's evaluation of the patient's ambulatory status. After the patient meets the criteria for discharge — and is discharged — a nurse should later in the day call the patient to check on wound status, pain control and muscle weakness.

The researchers noted that outpatient is a good option only if ideal outcomes are achieved, patient satisfaction is high and readmissions are not increased. They noted that there will always be patients with comorbidities that warrant a hospital stay. They cautioned that surgeons have a moral and legal obligation not to be driven by economic factors when selecting a surgical plan, noting that a "high-quality arthroplasty at any cost is better than a low-quality arthroplasty at any saving."

"Outpatient surgical procedures for adult hip and knee are still exploratory, and patient selection is crucial



to not jeopardize safety (including complications and readmissions) and patient satisfaction,” the researchers concluded. “All of these issues should be properly balanced against whether or not we are providing better outcomes for our patients, for which compelling data of the outpatient results of hip and knee arthroplasty are still lacking.”

The Incidence and Economic Burden of In-Hospital Venous Thromboembolism in the United States

Rothman Institute at Jefferson

Pulmonary embolism (PE) and deep vein thrombosis (DVT), together referred to as venous thromboembolism (VTE), are potentially preventable and costly complications after total joint arthroplasty (TJA). VTE can lead to longer hospital stays and even be fatal.

In recent years, practice guidelines have been developed to help prevent VTE. Orthopaedic surgeons have adopted numerous prevention strategies, including early ambulation of patients, a trend toward hypotensive regional anesthesia and a refinement in the use of VTE prophylaxis. What’s unknown, however, is whether such changes have led to a decline in VTE in general and PE specifically.

Jefferson Health researchers, including Javad Parvizi, MD, conducted a study to analyze the incidence and economic burden of VTE following TJA.

They used the Nationwide Inpatient Sample to estimate the number of total hip arthroplasty (THA), total knee arthroplasty (TKA) and VTE events from 2002 to 2011. The International Classification of Diseases, Ninth Revision procedure codes were used to identify cases. The rate of in-hospital DVT and PE, associated length of hospitalization and current and projected in-hospital charges were obtained for the data.

The analysis, published in *The Journal of Arthroplasty*, found some significant trends:

- Revision arthroplasty had higher rates of in-hospital VTE compared to primary TJA (2.5% versus 1.6%). The median incidence of in-hospital VTE events during the initial hospitalization was 0.59% for primary THA and 1.01% for primary TKA.
- Revision THA had more VTE events than revision TKA.
- The total number of VTE events for primary THA declined by 7.1% annually, compared to a 5.2% decline for TKA.



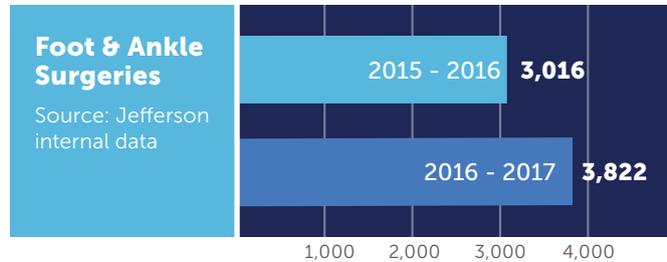
- While overall VTE rates have gone down in recent years, PE rates have remained relatively constant. Patients with VTE had a median hospital stay of seven days versus three days for those without. For primary TKA, the difference was seven days with a VTE complication versus three days without. For primary THA, the difference was six days versus three days.
- VTE was associated with a significant increase in hospital charges. The median charge for a primary TKA was \$38,791, but that increased to \$53,307 when there was VTE. The charge for THA was \$41,605, but that increased to \$62,263 with VTE. Similar increases occurred with revision surgery that involved a VTE.

The researchers said the decline over time in VTE, while at the same time the incidence of PE held steady, indicated that the current recommendation by the American Academy of Orthopedic Surgeons

for VTE prophylaxis “are adequate for preventing DVT without increasing the rate of PE.” But they also said it’s possible that there’s now an underreporting of DVT by hospitals because the complication was designated in 2009 as a “never event” with financial penalties by the Centers for Medicare & Medicaid Services (CMS).

The researchers said that despite the progress in preventing VTE, it continues to be a huge economic burden for the healthcare system. More prevention strategies are needed.

“Further work should be conducted to reduce the rate of VTE events while also decreasing the rate of PEs,” they concluded.







Musculoskeletal Oncology

The advantage of a multi-specialty orthopaedic program with immediate access to other areas of complementary expertise is especially apparent when it comes to bone and soft tissue cancer. At Jefferson Health, patients benefit from the multidisciplinary care of specialists within the Department of Orthopaedic Surgery as well as those in the Jefferson Sarcoma and Bone Tumor Center, which brings together experts from the Rothman Institute at Jefferson and the NCI-designated Sidney Kimmel Cancer Center at Jefferson.

Our orthopaedic oncology experts routinely handle rare and complex cases involving cancers such as osteosarcoma, chondrosarcoma, Ewing sarcoma and all subtypes of soft tissue sarcoma. Our dedicated team of anesthesiologists and rehabilitation medicine physicians have developed protocols specifically for musculoskeletal oncology patients that optimize their experience not only while undergoing surgery, but also during rehabilitation and subsequent return to function.

The Jefferson Sarcoma and Bone Tumor Center functions as one of the nation's few complete sarcoma centers. Studies have shown that patients with sarcoma who are treated at sarcoma centers have better overall outcomes than those who are not.

The team focuses on providing the highest quality oncologic resections of extremity bone and soft tissue malignancies while preserving maximal function. In the vast majority of cases, we are able to perform limb-salvage surgery so our patients can continue to maintain their lifestyles.

The Jefferson Sarcoma and Bone Tumor Center has an extensive research agenda. It is conducting several clinical trials that could identify breakthrough medical treatments for sarcoma. Surgeons and scientists in the Department of Orthopaedic Surgery and the Sidney Kimmel Cancer Center at Jefferson collaborate to study the molecular basis of disease.

SERVICES

Limb salvage surgery and complete reconstruction

Osteosarcoma treatment

Chondrosarcoma treatment

Ewing sarcoma treatment

Soft tissue sarcoma treatment

Myeloma treatment

Evaluation and treatment of spinal tumors

Treatment of metastatic disease

Prophylactic fixation

Imaging and interventional services

Bone and soft tissue resection

Radiation and chemotherapy treatment

Here is a look at one of the team's latest findings:

Can Navigation-Assisted Surgery Help Achieve Negative Margins in Resection of Pelvic and Sacral Tumors?

Rothman Institute at Jefferson

Navigation-assisted resection has been proposed as a potential method to improve resection of malignant bone tumors in difficult anatomic sites in the lower extremity such as the pelvis and sacrum, where it can be very difficult to achieve tumor-free resection margins.

As this is an emerging application of this technology, and pelvic and sacral sarcomas are very rare, very few studies exist, most of which are case reports or very small case series. Results from those limited reports have been promising. Very few reports, however, have documented benefits of navigation-assisted resection in a large series of pelvic or sacral primary tumors. Critics of navigation technology suggest that the technique may add time and expense to the surgical procedure, so it is important to determine whether this technique provides any significant benefit.

Jefferson Health researchers, led by John A. Abraham, MD, who is one of the pioneers of this technique for bone sarcoma resection, analyzed a series of 23 cases to determine what proportion of pelvic and sacral bone sarcoma resections using a computer-assisted resection technique achieved negative margins. The 23 cases were performed between 2009 and 2012, a period when the navigation system was used on all such patients at Jefferson Health. For the extremely rare condition of pelvic sarcoma, this represents the largest series in the world literature on this topic.

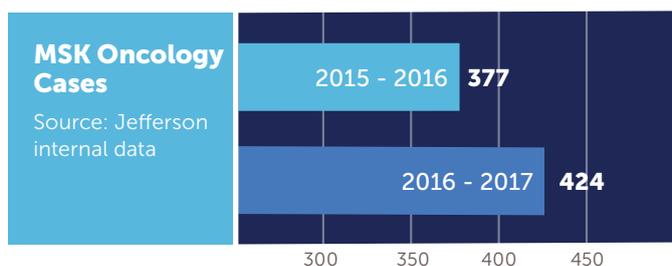
Researchers analyzed procedure-related complications and oncological outcomes for the patients, who were evaluated at a mean of 27 months after surgery.

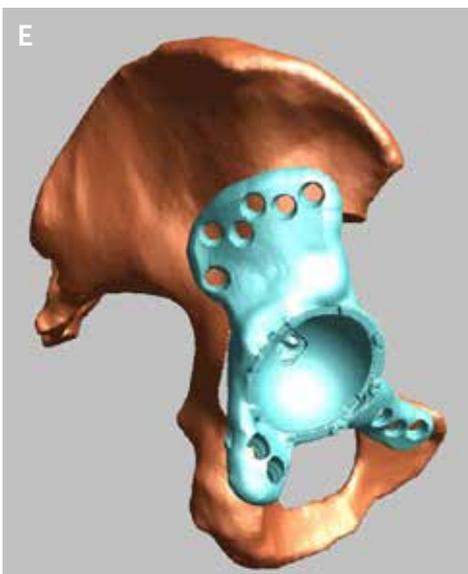
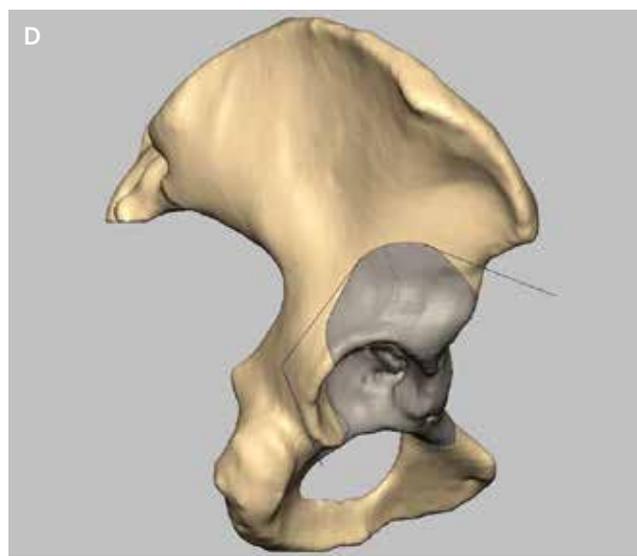
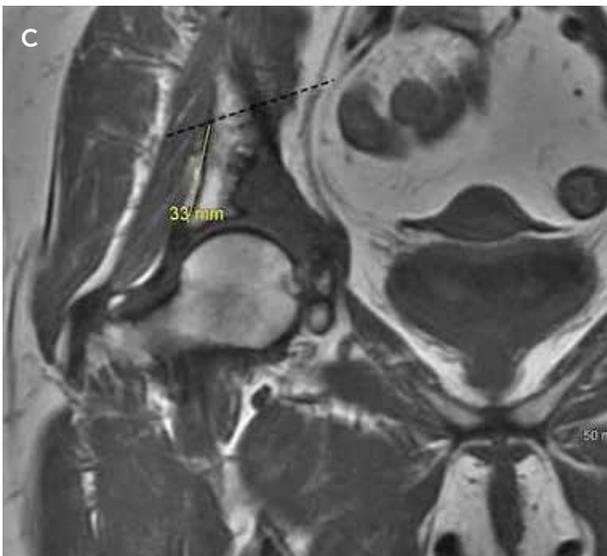
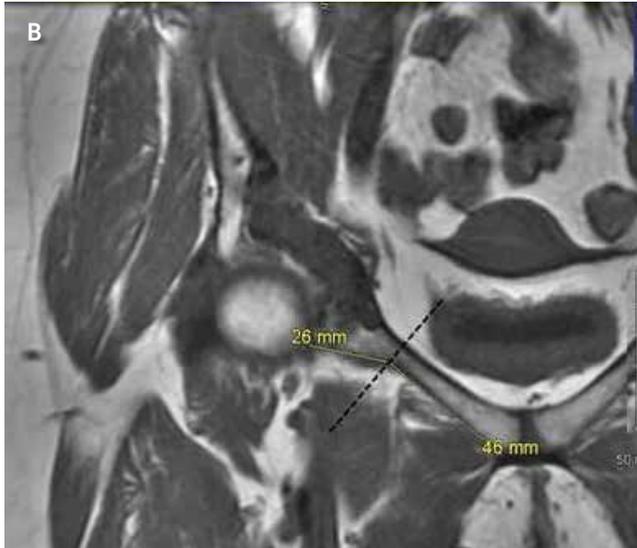
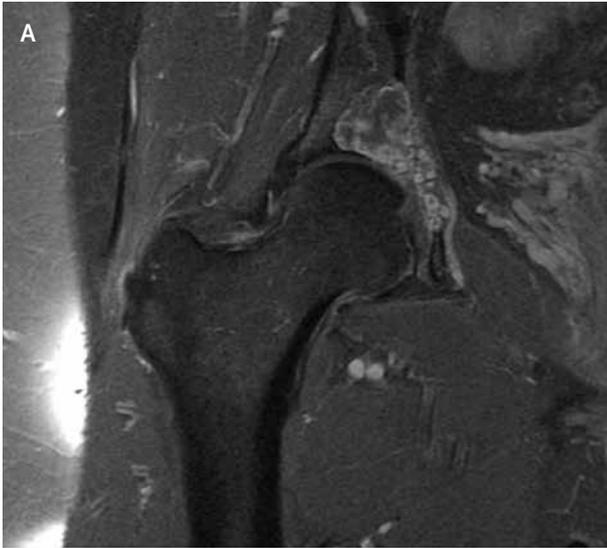
The findings, reported in *Clinical Orthopaedics and Related Research*, included:

- Twenty-one of 23 patients had a negative margin resection. In all patients, the bone margin was negative, but two patients with sacral resection had positive soft tissue margins. This represents a significantly higher rate of negative margin resection than comparative studies of resections performed without navigation.
- Six patients experienced local recurrence during the study period, which is a lower rate of recurrence than expected from data on non-navigated resections, and three patients died.
- Seventeen patients demonstrated no evidence of disease at the time of last recorded follow-up. This represents a potentially improved rate of disease-free survival as compared to data from non-navigated resections.
- There were three intraoperative complications: one dural tear, one iliac vein laceration, and one bladder injury.
- Eight patients had wound complications resulting in operative debridement, and two patients developed transient postoperative nerve palsy, which the researchers suggest may perhaps have been caused by a stretch of the femoral nerve secondary to the placement of the reference array in the pubic ramus.

The researchers said the results were extremely encouraging. Additional research will be conducted to directly compare navigated to non-navigated resection and to optimize the techniques for navigation-assisted resection.

"We believe there is a major benefit to using navigation-assisted surgery in resection of these extremely difficult tumors of the pelvis and sacrum, and feel that this technique likely enables the surgeon to provide a better resection for the patient. Future study will be needed to determine its precise impact, if any, on local recurrence and other oncological outcomes, but the results of our current study are very encouraging in this regard," the researchers concluded.





This figure is an example of the navigation-assisted resection workflow. **(A)** Preoperative coronal MR image demonstrate a chondrosarcoma of the anterior column of the acetabulum. **(B-C)** Planning images demonstrate the intended osteotomies. **(D)** This panel is a computer-generated model of the resection. Gray areas represent the tumor plus the minimum intended margin, and lines represent planned osteotomies. **(E)** This panel shows a computer-generated model of the resection plus the custom-made implant. **(F)** A postoperative radiograph demonstrates the reconstruction at 3-year followup.

Source: John A. Abraham, MD





Sports **Medicine**

Sports injuries can be both debilitating and career altering, causing pain, diminished performance or even a need to drop out of a sport entirely. As more people participate in sports at all levels – from youth programs to professional teams – there is a growing demand for healthcare practitioners who are trained in sports medicine and understand body mechanics, human performance, injury prevention strategies and the latest medical and surgical interventions.

Jefferson Health's Sports Medicine experts are among the leading orthopaedic sports surgeons in the nation, and last year evaluated more than 85,000 sports injuries and performed more than 10,000 surgeries. These include the full spectrum of sports injuries, such as anterior cruciate ligament tears of the knee, labral tears of the shoulder, femoral-acetabular impingement of the hip and ulnar collateral ligament tears of the elbow. Rothman Institute at Jefferson's Sports Medicine team serves as team physicians for the Philadelphia Phillies, Eagles, 76ers and Flyers, as well as for eight university and college sports programs and 40 regional high school programs to help improve player health and safety.

SERVICES

Arthroscopy of the hip, knee and shoulder

Cartilage restoration procedures: microfracture, osteochondral allograft transplantation and autologous chondryte implantation

Knee ligament reconstruction – ACL surgery

Meniscal transplantation

Patellofemoral joint instability

PCL injury

Rotator cuff repair

Repair and reconstruction of the knee, shoulder and elbow

A key focus is on preventing injuries, whether acute or chronic. The increasing demands of youth and high-school sports compel many athletes to practice and perform year-round at intense levels. At the other end of the spectrum, many older athletes don't want to slow down on the sports they love, perhaps even taking up competitive swimming or long-distance running later in life.

Athletes who seek treatment at Jefferson Health are offered guidance on ways to avoid the long-term repercussions of repetitive motion and overuse injuries. Appropriate treatment and rehabilitation at the time of initial injury can help prevent problems such as osteoarthritis later on.

In addition to providing comprehensive clinical care, the Sports Medicine team at Jefferson Health conducts important orthopaedic research aimed at improving treatment outcomes for patients with sports-related injuries. They develop novel diagnostic tools, refine nonoperative treatments, evaluate new surgical techniques and establish sports injury prevention programs.

Here is a look at two recent studies by Jefferson Health Sports Medicine researchers:

Long-Term Correction in Sleep Disturbance Is Sustained After Arthroscopic Rotator Cuff Repair

Rothman Institute at Jefferson

Sleep disturbance is a major complaint of patients with rotator cuff disease. In fact, it is often sleep problems rather than pain and functional deficits that lead patients to seek medical treatment.

Many patients continue to complain of sleep disturbances following surgical rotator cuff repair. Because adequate sleep plays an important role in healing and patient satisfaction, it is important for doctors to better understand the potential for sleep disturbance in patients they treat for rotator cuff disease.

Jefferson Health sports medicine specialists began studying the issue in 2012. They reported previously on a study that found that 89% of patients with rotator cuff disease experienced sleep problems prior to undergoing surgery. Follow-up assessments found that many patients experienced an improvement in sleep after surgery. At six months, nearly two-thirds of patients who had complained of sleep problems prior to rotator cuff surgery had improvements in sleep based on standardized measures.

In a new installment of that research, Jefferson Health researchers, led by J. Gabriel Horneff, MD, looked at longer-term sleep outcomes for patients two years after surgery. Thirty-seven of the 56 patients involved in the original study were available for follow-up. Patient outcomes related to sleep were measured using the Pittsburgh Sleep Quality Index (PSQI), Simple Shoulder Test (SST), Visual Analog Scale (VAS) for pain and Single Assessment Numeric Evaluation (SANE). New scores were compared with the scores obtained before surgery and up to six months afterward.

The researchers reported their latest findings in the *American Journal of Sports Medicine*:

- The improvement in PSQI scores demonstrated at six months postoperatively was maintained over time, with a mean PSQI score of 5.5 for the 37 patients followed beyond 24 months. (PSQI scores can range from 0, indicating high-quality sleep, to 21.) That compared to an average score of 6.2 at six months.
- Of the 37 patients, 41% still had a PSQI score greater than 5, which is indicative of sleep disturbance. The average score for that group was 9.3.

- The only demographic or surgical factor that was a factor in postoperative sleep was the ongoing use of narcotic pain medicine. At 24 months, the patients who continued to use narcotic pain relievers had an average PSQI score of 12.5, significantly higher than the average score of 5.1 for nonusers.
- Improvements in scores for SANE, VAS and SST seen at six months were maintained at the two-year mark.

"It remains critical for the treating surgeon to find alternatives to narcotic pain management early in the postoperative period and to reiterate those alternatives long after surgery has been performed," the researchers concluded.

Based on these and other findings, Jefferson Health physicians have begun to change narcotic protocols and are relying more on other multimodal pain protocols, Dr. Horneff said.

Comparison of Surgical Techniques for Ulnar Collateral Ligament Reconstruction in Overhead Athletes

Rothman Institute at Jefferson

Ulnar collateral ligament (UCL) injuries are being diagnosed with increasing frequency in pitchers and other overhead throwing athletes at all levels of competition. One medical center reported a 22-fold increase in the incidence of UCL reconstruction from 1994 to 2010, a rise likely due in part to increased sports participation and increased awareness of the injury.

Preventive measures, including refinement of throwing mechanics, limitation of pitch counts and avoidance of pitching while fatigued, have been initiated in an attempt to reduce the rate of elbow injuries in overhead throwing athletes.

Surgery for UCL injury was first performed in 1974 and two main surgical techniques have evolved: the figure-of-8 technique (Jobe/modified Jobe technique) and the docking technique. Those two approaches, as well as alternative surgical techniques, aim to restore stability to the medial elbow with minimal alteration to the surrounding anatomy.

The published research on outcomes for UCL reconstruction has indicated a trend toward increased return to play in patients, particularly overhead athletes. In spite of those reports, a clear, concise surgical algorithm for UCL is lacking.

Jefferson Health researchers, including Michael G. Ciccotti, MD, reviewed some of the key research on UCL reconstruction techniques to determine what could be learned regarding outcomes for athletes in particular.

They reported these findings in the *Journal of the American Academy of Orthopaedic Surgeons*:

- While high return-to-play rates for players have been reported regardless of the surgical technique used, more recent studies using performance metrics to assess return to preliminary levels of competition and performance found conflicting results.
- Several technique modifications, including abandonment of flexor pronator mass detachment in favor of either a muscle-splitting or muscle-elevating approach and minimal handling of the ulnar nerve, may result in improved outcomes and decreased complications without diminished functional performance.
- The docking technique may produce lower complication rates and higher return-to-play rates than other techniques, but the reported differences in outcomes are not statistically meaningful.
- Surgeons performing UCL reconstruction should use the technique with which he or she is most familiar until definitive evidence proves that one procedure provides optimal results.

“When treating UCL injury in overhead athletes, healthcare providers must understand all aspects of the various surgical options available,” the Jefferson Health researchers wrote.

They said that “additional studies that use sport-specific outcome measures and performance metrics are needed and may better demonstrate the true number of athletes who return to preinjury performance after reconstruction of the UCL.”

Currently, Jefferson Health sports specialists perform the full spectrum of surgical procedures for injury to the ulnar collateral ligament of the elbow. They continue to develop diagnostic tools such as Stress Ultrasound to determine the severity of UCL injury. They are carrying out evaluations of nonoperative treatment protocols for partial UCL injury. They are also performing the first prospective, randomized, single surgeon evaluation of the Modified Jobe and Docking surgical techniques for this injury. Their work is at the forefront of research on treatment of ulnar collateral ligament injury of the elbow.

Surgical Predictors of Clinical Outcomes After Revision Cruciate Ligament Reconstruction

3B Orthopaedics at Jefferson

Revision anterior cruciate ligament (ACL) reconstruction is a challenging procedure and has been documented to have worse outcomes compared with primary ACL reconstruction. While some variables, such as patient demographics and previous surgical factors and outcomes, are outside the control of the current surgeon, there are certain factors that are under the surgeon’s control at the time of revision that can negatively and positively affect outcomes.

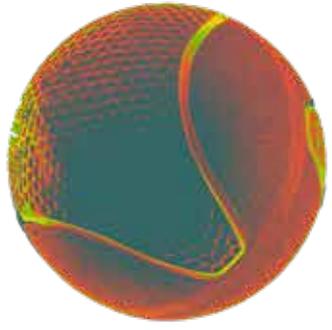
3B Orthopaedics orthopaedic surgeon Arthur Bartolozzi, MD, took part in a multi-center study known as MARS (Multicenter ACL Revision Study) to identify what modifiable factors make a difference in ACL revision outcomes. The study, published in *The American Journal of Sports Medicine*, involved 1,205 patients who underwent ACL revision between 2006 and 2011 and were then followed prospectively.

Data were collected on baseline demographics, intraoperative technique and joint disorders. A series of validated patient-reported outcome instruments – including the International Knee Documentation Committee (IKDC) subjective form; Knee Injury and Osteoarthritis Outcome Score (KOOS); Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC); and Marx activity rating scale – were completed before revision surgery. Patients were followed up for two years and asked to complete an identical set of outcome instruments to allow for comparison. Several factors that are under the control of the surgeon were associated with positive ACL revision outcomes:

- The strongest predictor was the use of a metal interference screw for femoral fixation.
- Other factors, though not as predictive, were drilling a new femoral tunnel versus utilizing a previous tunnel; and bone grafting the tibia when indicated.

“Whenever possible, opting for an anteromedial portal or transtibial surgical exposure, choosing a metal interference screw for femoral fixation, and not performing notchplasty are associated with significantly better two-year clinical outcomes,” the researchers reported.

Dr. Bartolozzi said that many of these and other published findings from the MARS study group are being applied to minimize adverse outcomes after ACL revision surgery.



Basic Science

From the Lab of Theresa Freeman, PhD, Associate Professor, Orthopaedic Surgery

Theresa Freeman, PhD, has been working in the field of plasma medicine to develop therapeutic applications for a novel non-thermal (cold) atmospheric plasma system. Applications investigated in the lab include cold plasma treatment of: mesenchymal cells, mouse limbs and extracellular matrix to enhance cell differentiation and limb growth, promote regeneration of cartilaginous tissues and increase bone formation. Other applications include sterilization of titanium implant surfaces and eradication of melanoma tumors with nanosecond pulsed plasma with simultaneous promotion of T-Cell recognition.

These examples show the numerous potential medical applications of this technology.

The second important area of study in the Freeman lab is understanding mechanisms controlling repair and regeneration of tissues after injury or wounding.

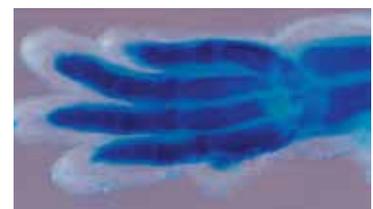
Musculoskeletal tissue dysfunction or degeneration can often be attributed to a trauma that occurs at a younger age, and results in the loss of tissue function over time, leaving patients with pain and reduced ability to perform daily activities. The Freeman lab is studying how inhibition of a protein called apoptosis signal regulated kinase (ASK1) can reduce tissue damage by decreasing cell death and proinflammatory cytokine production to limit cartilage degeneration. Reducing tissue destruction can also stimulate endogenous cells to activate repair cascades to generate a more robust healing/regenerative response.

The hope is that this type of treatment could be administered at the time of injury to reduce tissue damage and promote regeneration, dramatically slowing the development of musculoskeletal tissue degeneration with age.

From the Lab of Noreen Hickok, PhD, Associate Professor, Orthopaedic Surgery

Noreen Hickok, PhD, is leading research on orthopaedic infection that is focused on tailoring interactions between pathogens and bone and implant surfaces in order to allow eradication of bacteria. The lab's work spans the fields of bioengineering, tissue engineering, biochemistry and biology to produce new translational products that can improve the outcome of implantations. Areas of investigation include:

- Permanently attaching antibiotics to implant surfaces. The lab has begun testing these implants in pre-clinical models, and developing them for cancer patients who are more prone to infection due to chemotherapy.

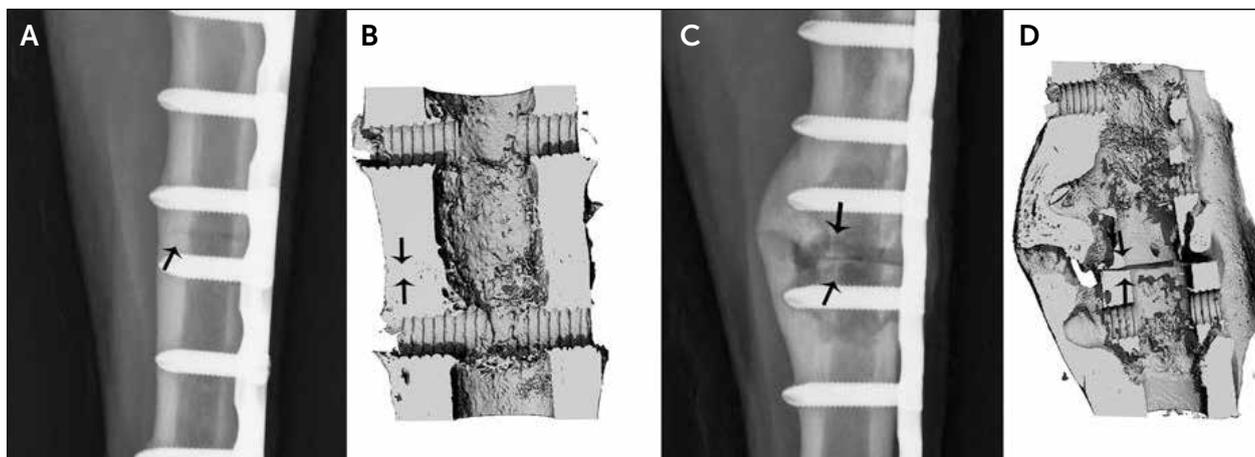


Source: Theresa Freeman, PhD

(A, B) Antibiotic covalent bonded to titanium implant.

(C, D) Infected bone.

Source:
Noreen Hickok, PhD



- Photo-activated compounds that can be used to replace or augment antibiotics, especially in light-accessible sites, such as gingival tissues in dental implantations. Early results have shown that these compounds may continue to be effective even in the dark, opening the door to a multitude of potential uses.
- Prophylactic treatment of the spinal sheath that surrounds the spinal stabilization rod. Infections occur in as many as one in 20 elective spinal surgeries and one in 10 spinal surgeries resulting from traumatic injury. When activated by ultrasound, the spinal sheath would release high concentrations of antibiotics directly to the infection site.
- Biofilms within the joint fluid to combat septic arthritis. Infections of this kind are extremely dangerous and can travel through the bloodstream and infect other sites in the body. Removing the large fibrous bacteria-filled clots is often not enough to prevent septic arthritis from recurring, so the team is investigating the use of ultrasound-activated microbubbles of antibiotics to eliminate infections within the joint fluid.
- Research to learn how compromised oral health influences other degenerative conditions. Based on the lab's findings that dental and oral bacteria are present in osteoarthritis and degenerative disc disease samples, the lab is exploring the pathogenesis of those conditions.

From the Lab of Rowena McBeath, MD, PhD, Assistant Professor, Orthopaedic Surgery

Tendinosis results in painful movement of bones and joints. Current treatment involves physiotherapy, steroid injections and surgery if pain persists. However, the cellular basis of tendinosis is unknown.

Rowena McBeath, MD, PhD, a hand surgeon and clinician scientist, studies human tendon cells in culture and the mechanical and intramolecular signaling mechanisms that govern their proliferation and differentiation. Recent studies on tendinosis of the wrist, a condition called DeQuervain's tendinosis, has linked disease severity with development of chondroid metaplasia of the tendon compartment tissue.

Dr. McBeath's studies on human tendon cells have revealed a capacity of these cells to transdifferentiate, or change their phenotype from tendon to fibrocartilage. These findings may explain the mechanism by which tendinosis develops in patients, and suggest further direction into development of cellular and molecular therapies for these painful conditions.

From the Lab of George Feldman, DMD, PhD, Assistant Professor, Orthopaedic Surgery

The lab of George Feldman, DMD, PhD, focuses on Developmental Dysplasia of the Hip (DDH), a debilitating condition characterized by incomplete formation of the acetabulum and/or femur. This can lead to dislocation of the femur, suboptimal joint function and accelerated wear of the articular cartilage, resulting in a crippling arthritis of the hip.

Jefferson Health researchers studying the DNA of a four-generation family have found a potentially harmful mutation in the CX3CR1 receptor. This DNA variant has been shown by researchers in China to increase a person's odds of getting DDH by a factor of 2.5. A potentially harmful mutation in the teneurin-3 gene has been identified in another family. Both of these DNA changes are thought to delay the maturation of stem cells in forming the cartilage anlage of the labrum of the acetabulum.

To test this hypothesis, mice with similar mutations have been made and used to examine the causative relationship between changes in the DNA and changes in the hip socket. Mice with a dysfunctional CX3CR1 receptor appear to show changes in their hip sockets similar to those seen in humans. The mice also demonstrate gait abnormalities that are consistently seen in humans and mice with osteoarthritis of the hip.

Dr. Feldman and colleagues have broadened the relevance of these findings to include unrelated individuals with DDH. In addition to mutations in both the teneurin-3 and CX3CR1 genes, they have found that these severely affected individuals have mutations in genes linked to the pathways in which both of these family-linked susceptibility inducing genes reside.

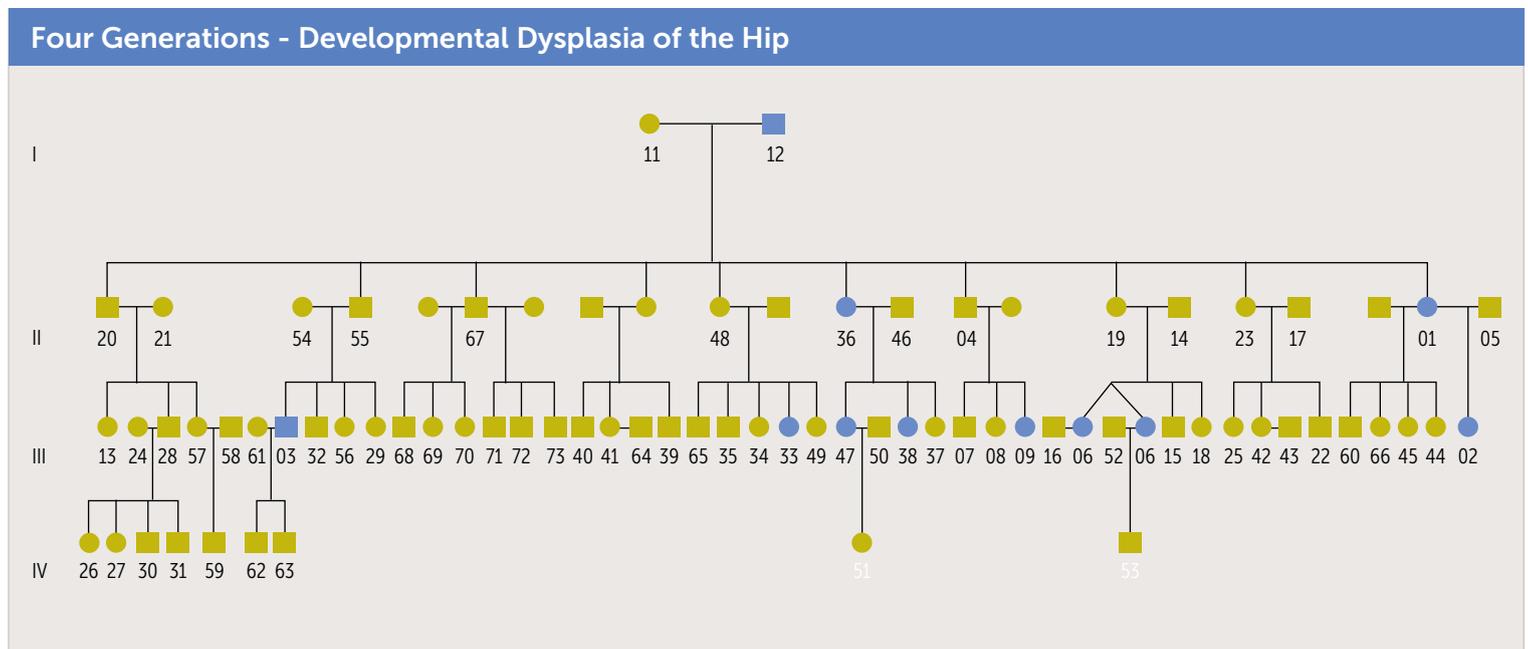
The researchers have found potentially harmful changes in the DNA of these sporadic individuals that

are in genes shown in dogs to be linked to the canine version of DDH. Identification of these mutations may lay the foundation for an accurate diagnostic test in newborns and prevent hip dysplasia from developing into osteoarthritis.

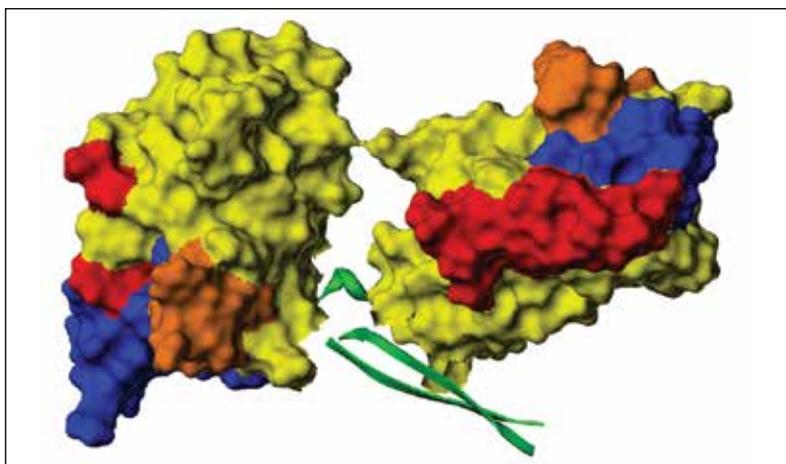
From the Lab of Andrzej Fertala, PhD, Professor of Orthopaedic Surgery

Fibrosis, which results from excessive and disorganized collagen production, can affect almost all tissues. Following knee injury or knee replacement surgery, for instance, arthrofibrosis can cause a painful and debilitating condition known as stiff knee. Andrzej Fertala, PhD, and a group of orthopaedic surgeons are examining novel ways to block excessive collagen production, with the goal of preventing abnormal scarring and improving recovery. Inhibition of the extracellular process of collagen fibril formation represents a new approach to limiting post-traumatic or postsurgical localized fibrosis.

Dr. Fertala's team has demonstrated that a monoclonal antibody that targets the C-terminal telopeptide of the $\alpha 2$ chain of human collagen I is able to block critical collagen I-collagen I interaction, thereby reducing the amount of collagen deposits in vitro and in animal models. The approach is being tested in a preclinical study with the use of a clinically relevant animal model. Data indicate that the anti-collagen antibody reduces the amount of newly-formed collagen fibrils in an



Source: George J. Feldman, PhD, DMD



Recombinant Anti-Fibrotic Antibody

Source: A. Fertala

injured joint capsule, thereby improving the range of motion of an antibody-treated knee. Ongoing studies will further define benefits and limitations of the proposed approach to limit post-traumatic stiffness of joints and test its clinical potential.

The group is also engaged in work on reducing neurofibrosis in peripheral nerves.

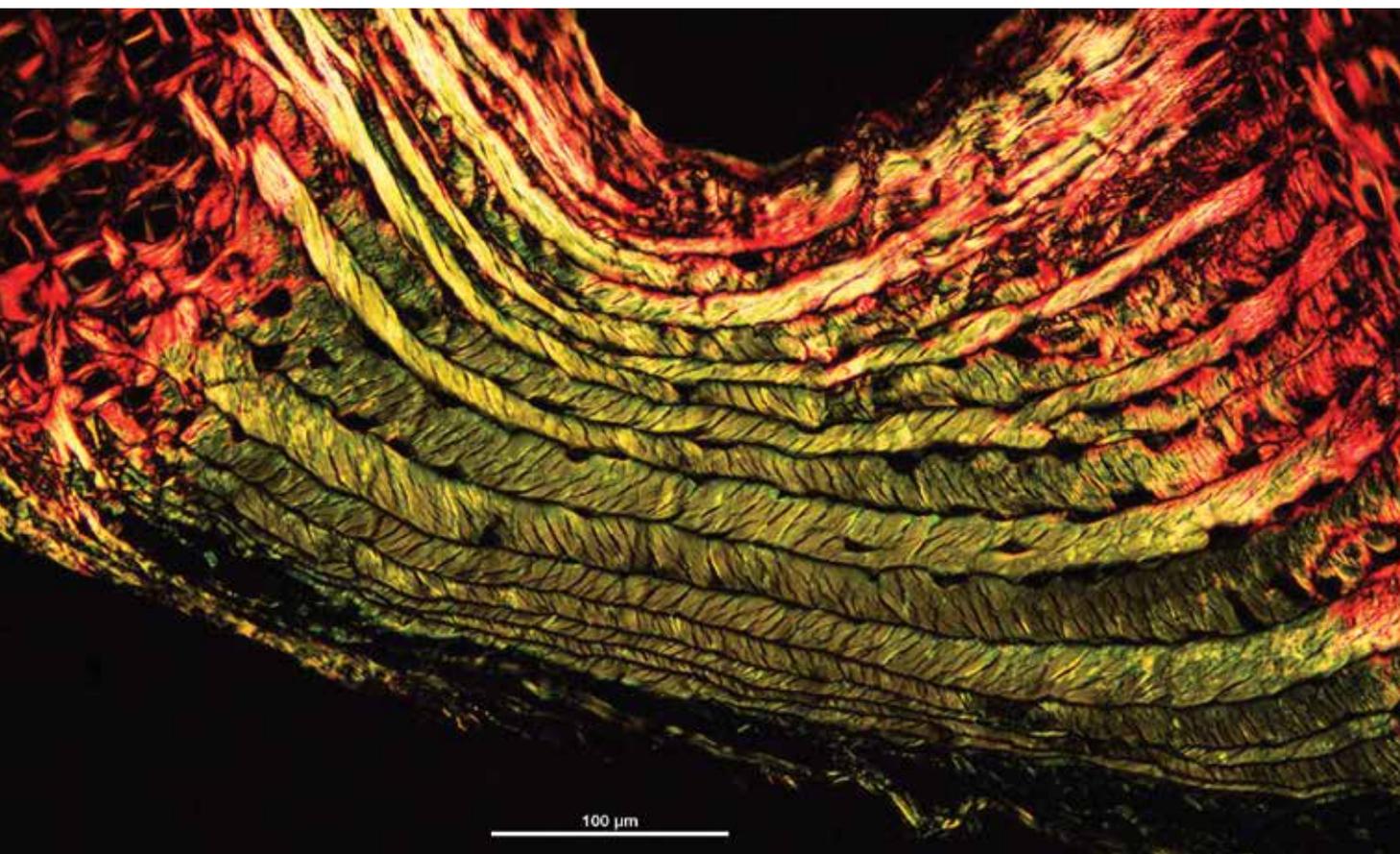
The U.S. Patent Office has recently approved a patent to protect the sequence of the anti-fibrotic antibody developed by Dr. Fertala's team.

From the Lab of Makarand V. Risbud, PhD, Professor, Orthopaedic Surgery and, Irving M. Shapiro, BDS, PhD, Professor, Orthopaedic Surgery

The intervertebral disc is a complex structure that separates opposing cartilage-covered bone, permits a range of motions and accommodates high biomechanical forces.

The interaction between the semifluid nucleus pulposus and the tight molecular lattice of the annulus fibrosus provides the biomechanical properties necessary for spinal stability. Drs. Risbud and Shapiro are studying specific conditions that enhance disc cell survival, as well as elucidating factors that disregulate the local microenvironment and promote degenerative disc disease.

Work is focused on investigating novel transcriptional co-activators of HIF-1 in disc cells. The researchers have observed that chromatin modifying enzymes HDACs and circadian rhythm proteins BMAL1 and RORalpha control HIF-1 activity. They have found that loss of BMAL1 in mice leads to disc degeneration. The lab recently elucidated a novel non-canonical autophagic



Polarized microscopic image, Outside Annulus Fibrosis

Source: Makarand V. Risbud, PhD; Irving M. Shapiro, BDS, PhD

pathway in disc cells that is hypoxia-dependent but mTOR-independent.

The researchers also are exploring the mechanisms by which inflammatory cytokines promote disc degeneration and inflammation. They found an unexpected synergism between two seemingly unrelated protein families: the heparan sulfate proteoglycans, syndecan and key catabolic molecules. They discovered that inflammatory cytokines upregulate syndecan-4 expression and influence the expression and activity of A Disintegrin and Metalloproteinase with Thrombospondin motifs (ADAMTS) as well as Matrix Metalloproteinase-3 (MMP-3), which promote the breakdown of the proteoglycan and the collagen-rich matrix of the disc.

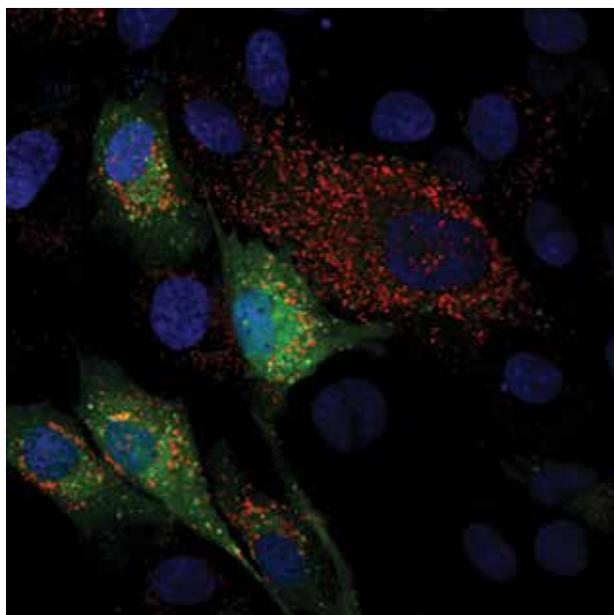
While these events probably represent an initiating factor leading to degeneration, the researchers noted that the inflammatory cytokines promote chemokine expression by disc cells and are thus instrumental in chemotaxis and macrophage infiltration. This finding led to the generation of a more comprehensive theory encompassing feed-forward events triggering back pain as well as the amplification of inflammatory events that promote disc degeneration.

From the Lab of Ryan Tomlinson, PhD, Assistant Professor, Orthopaedic Surgery

Bone is continually sensing and converting mechanical cues into biochemical signals, which subsequently direct and mediate both anabolic and catabolic processes in the skeleton. As a result, new bone is formed at sites of high strain and removed in areas of low strain. This process, referred to as strain adaptive bone remodeling, enables bone to efficiently adapt to functional demands by generating bone where it is needed and eliminating bone that is underutilized – a process that has been shown to greatly increase the fatigue strength of bone.

Research by Ryan Tomlinson, PhD, is primarily focused on characterizing the inflammatory signals generated immediately after skeletal loading that direct and organize the subsequent osteogenic processes. In one project, the lab is investigating the role of NGF-TrkA signaling in sensory nerves. Nearly all of the nerves in bone express TrkA, the high affinity receptor for nerve growth factor (NGF).

Furthermore, sensory nerves blanket the surfaces of bone in a mesh-like network, a privileged location for the acquisition of mechanical signals. Using both in vivo and



Nucleus Pulposus - Cells within the intervertebral disc

Source: Makarand Risbud

in vitro methods, Dr. Tomlinson's team has demonstrated that NGF is robustly expressed by mature osteoblasts in response to non-damaging mechanical loads.

Inhibition of NGF-TrkA signaling impairs load-induced bone formation whereas administration of exogenous NGF increases relative bone formation rates. These effects appear to be facilitated through altered Wnt/ β -Catenin signaling, which the lab is investigating by using mice that lack NGF in the osteoprogenitor and osteoblast lineages. In addition, the lab has identified a compound that may provide long-term activation of TrkA to increase load-induced bone formation without the painful side effects of NGF.

The lab is also investigating the role of non-steroidal anti-inflammatory drugs (NSAIDs) on stress fracture risk and repair. In both clinical and preclinical investigation, researchers have clarified a link between overall NSAID usage and stress fracture risk. They demonstrated in mice that NSAIDs may increase stress fracture risk through two independent mechanisms – diminished load-induced bone formation and decreased bone toughness. They have also identified NSAIDs that can provide analgesia without affecting stress fracture risk or repair.

In future work, the lab will use unbiased transcriptomics and proteomics to identify potential pharmaceutical targets for the next generation of musculoskeletal pain medication. In total, the lab's research suggests that modulation of inflammatory signaling may be an attractive target for improving the skeletal response to loading and reducing overall fracture risk.



Research

FUNDED CLINICAL TRIAL

INVESTIGATOR(S)

Cellentra Viable Cell Bone Matrix (VCBM) Anterior Cervical Discectomy and Fusion Outcomes Study (VCBM/MaxAn®) <i>Biomet</i> (11/2014–ongoing)	Christopher Kepler, MD
A Phase 2b, Randomized, Double-Blind, Placebo-Controlled Study to Evaluate the Safety and Efficacy of a Staphylococcus aureus 4-antigen Vaccine (SA4Ag) in Adults Undergoing Elective Posterior Instrumented Lumbar Spinal Fusion. <i>Pfizer</i> (01/2015–ongoing)	Christopher Kelper, MD; Alexander R. Vaccaro, MD, PhD, MBA
Post Market Clinical Follow-up Study of the Titan Reverse Shoulder System Used in Primary or Revision Total Shoulder Arthroplasty. <i>Zimmer Biomet</i> (06/2014–ongoing)	Surena Namdari, MD; Matthew L. Ramsey, MD
A Retrospective and Prospective Data Collection Study of the TITAN Modular Total Shoulder System Integra (03/2015–ongoing)	Surena Namdari, MD; Matthew L. Ramsey, MD
Retrospective and Prospective Clinical Outcomes of the Zimmer Nexel Total Elbow. <i>Zimmer Biomet</i> (06/2015–ongoing)	Surena Namdari, MD; Matthew L. Ramsey, MD
Prospective Post Market Clinical Follow-Up Study of the Zimmer Trabecular Metal Humeral Stem. <i>Zimmer Biomet</i> (04/05/2012–ongoing)	Joseph A. Abboud, MD; Surena Namdari, MD
Retrospective, Post-Market, Clinical and Radiographic Follow-Up Study of the DePuy Delta Xtend Reverse Shoulder System. <i>DePuy Synthes</i> (9/24/2013–ongoing)	Joseph A. Abboud, MD; Gerald R. Williams, Jr., MD; Surena Namdari, MD
A Phase II Randomized, Double-Blind, Placebo Controlled Study to Assess Safety, Tolerability and Effect on Tumor Size of MCS110 in Patients with Pigmented Villonodular Synovitis (PVNS). <i>Novartis</i> (10/1/2013–ongoing)	John A. Abraham, MD
Prophylactic Antibiotic Regimens in Tumor Surgery (PARITY): A Multi-center Randomized Controlled Study Comparing Alternative Antibiotic Regimens in Patients Undergoing Tumor Resections with Endoprosthetic Replacements. <i>McMaster University</i> (02/2014-present)	John Abraham, MD; Barry Kenneally, MD
A Randomized Phase III Trial of TRC105 and Pazopanib Alone in Patients with Advanced Angiosarcoma. <i>Tracn</i>	John A Abraham, MD; Atrayee Basu Mallick, MD
ARST1321:Pazopanib Neoadjuvant Trial in non-Rhabdomyosarcoma Soft Tissue Sarcoma (PAZNTIS): A Phase II/III Randomized Trial of Preoperative Chemoradiation or Preoperative Radiation +/- Pazopanib. <i>NRG/COG</i>	John A Abraham, MD; Atrayee Basu Mallick, MD
A Phase III Study of AL3138 (Anlotinib)Hydrochloride Monotherapy in Subjects with Metastatic or Advanced Alveolar Soft Parts Sarcoma. <i>Advenchen Lab</i>	John A Abraham, MD; Atrayee Basu Mallick, MD
A Randomized Phase II Study of Nivolumab with or without Ipilimumab in Pateints with Metatstatic or Unresectable Sarcoma. <i>ALLIANCE A91401</i>	John A Abraham, MD; Atrayee Basu Mallick, MD
Bone Biorepository Bank to Characterize the Malignant Bone Microenvironment. <i>Janssen Research and Development, LLC</i>	John A Abraham MD; William Kevin Kelly, DO
Post-Market Clinical Follow-Up Study of the Zimmer Vivacit-E Highly Crosslinked Polyethylene Liner Used with the Continuum Acetabular Shell. <i>Zimmer Biomet</i> (10/1/2013–ongoing)	Javad Parvizi, MD; William V. Arnold, MD, PhD

RESEARCH

FUNDED CLINICAL TRIAL

INVESTIGATOR(S)

Prospective Post-Market Clinical Follow-Up of the Zimmer Biomet Trabecular Metal Reverse; Shoulder System. <i>Zimmer Biomet</i> (08/2011–ongoing)	Bradford S. Tucker, MD; Luke S. Austin, MD; Matthew D. Pepe, MD
Prospective Clinical Evaluation Treating Subchondral Bone Marrow Lesions with Subchondroplasty for Pain Relief. <i>Knee Creations LLC</i> (03/15/2012–ongoing)	Steven Cohen, MD
Trabecular Metal Femoral Hip Stem Used within the Zimmer Biomet Hip Registry. <i>Zimmer Biomet</i> (02/09/2012–ongoing)	Carl Deirmengian, MD
Prospective Post-Market Clinical Follow-up of the Zimmer Biomet Trabecular Metal™ Reverse Shoulder System. <i>Zimmer Biomet</i> (08/23/2011–ongoing)	Matthew L. Ramsey, MD; Charles L. Getz, MD
Ascension Radial Head. <i>Integra Life Sciences</i> (09/2012–ongoing)	Charles L. Getz, MD; Matthew L. Ramsey, MD; Joseph A. Abboud, MD
Multi-center Trial of the Sidus Stem Free Shoulder Arthroplasty System. <i>Zimmer Biomet</i> (07/18/2013–ongoing)	Charles L. Getz, MD; Joseph A. Abboud, MD
Post-Market Study of the Stryker Orthopaedics Triathlon TS Total Knee System. <i>Stryker</i> (04/01/2012–ongoing)	Fabio R. Orozco, MD; Alvin C. Ong, MD
Persona Outcomes Knee Study (POLAR). <i>Zimmer Biomet</i> (03/01/2013–ongoing)	Matthew S. Austin, MD
Retrieval of Discarded Surgical Tissue. <i>National Disease Registry Institute</i> (01/12/2004–ongoing)	James J. Purtill, MD; William J. Hozack, MD; Richard H. Rothman, MD, PhD
Evaluation of In-vivo Wear of Ceramic Femoral Head Against Highly Cross-Linked Polyethylene: A Comparative Study. <i>Ceramtec</i> (11/2011–ongoing)	Javad Parvizi, MD
Retrospective and Prospective Data Collection Study of the TITAN Modular Total Shoulder System (TSS) <i>Integra</i> (08/2014–present)	Surena Namdari, MD; Matthew Ramsey, MD; Joseph Abboud, MD; Mark Lazarus, MD; Gerald Williams, MD; Charles Getz, MD
Prospective Post Market Clinical Follow-Up Study of the Zimmer Trabecular Metal™ Total Ankle System. <i>Zimmer Biomet</i> (08/2014–present)	Steven Raikin, MD; David Pedowitz, MD
Triathlon Tritanium Knee Outcomes Study. <i>Stryker</i> (4/2014–present)	Fabio Orozco, MD; Alvin Ong, MD; Zachary Post, MD
Post Market Study of the Stryker Orthopaedics Triathlon PKR Knee System. <i>Stryker</i> (11/2013–Present)	Fabio Orozco, MD; Alvin Ong, MD, Zachary Post, MD
Clinical Study Protocol for the Investigation of the Simplify Cerical Artificial Disc. <i>Simplify Medical</i> (04/2016–present)	Kristen Radcliff, MD, Barrett Woods, MD
A Prospective, Multi-center Study of Instrumented Posterolateral Lumbar Fusion (PLF) with OsteoAMP® to Evaluate Long-term Safety and Efficacy in Patients Requiring 1-2 Level Instrumented PLF. <i>Bioventus, LLC</i> (01/2016–present)	Barrett Woods, MD, Kristen Radcliff, MD
A Prospective, Randomized, Comparative Study to Assess the Prevention of Surgical Site Infection (SSI?s) in Revision Total Joint Arthroplasty Patients Treated with Single-Use Negative Pressure Wound Therapy (PICO) or Standard Care Dressing (AQUACEL Ag Surgical Dressing). <i>Smith and Nephew</i> (12/2015–present)	Antonia Chen, MD; Javad Parvizi, MD; Matthew Austin, MD; William Hozack, MD; James Purtill, MD; Paul Max Courtney, MD
A Phase 2a Randomized, Single-Blind, Placebo-controlled, 24-week Escalating Dose Study to Assess the Safety, Tolerability and Clinical Activity of 3 Concentrations of Locally Applied MBN-101 to Infected Osteosynthesis Sites. <i>Microbion Coporation</i> (03/2016–current)	James Krieg, MD
Use of Autologous Adipose-Derived Stromal Vascular Fraction to Treat Osteoarthritis of the Knee; A Controlled, Randomized, Double Blinded Trial. <i>GID Group</i> (04/2016-present)	Bradford Tucker, MD
A Phase 2b/3, Double-blind, Randomized, Placebo-Controlled, Multi-center Study to Assess the Efficacy and Safety of VX-210 in Subjects With Acute Traumatic Cervical Spinal Cord Injury. <i>Vertex Pharmaceuticals, Incorporated</i> (04/2016–present)	Alexander Vaccaro, MD; Chris Kepler, MD, Greg Schroeder, MD; Alan Hilibrand, MD
One Stage versus Two Stage For Periprosthetic Hip And Knee Infection. <i>Orthopaedic Research and Education Foundation</i> (05/2016-present)	Javad Parvizi, MD; Antonia Chen, MD; Matthew Austin, MD, Greg Diermengian, MD
Evaluation of Post-Operative Pain Following Primary Total Knee Arthroplasty with Intraoperative Subanesthetic Ketamine Administration and Spinal Anesthesia. <i>Sharpe-Strumia Research Foundation</i> (06/2016–current)	Eric Levicoff, MD; Robert Good, MD

FUNDED CLINICAL TRIAL

INVESTIGATOR(S)

Clinical Outcomes Reporting Study. <i>Stryker Orthopaedics</i> (10/2013–current)	Javad Parvizi, MD; William Hozack, MD; Richard Rothman, MD; Matthew Austin, MD; Gregory Diernengian, MD; James Purtill, MD; Alvin Ong, MD; Fabio Orozco, MD; Zachary Post, MD; Eric Smith, MD; Robert Good, MD; Eric Levicoff, MD; Peter Sharkey, MD
Manipulation Under Anesthesia (MUA) to Treat Postoperative Stiffness after Total Knee Arthroplasty: A Multi-center Randomized Clinical Trial. <i>The Knee Society</i> (09/2016–current)	Matthew Austin, MD, Javad Parvizi, MD, Antonia Chen, MD, Gregory Diernengian, MD, James Purtill, MD, William Hozack, MD, Richard Rothman, MD
Understanding the Presence of Bacteria in the Glenohumeral Joint by Polymerase Chain Reaction (PCR)-Based Electron Spray Ionization of Time-of-Flight Mass Spectrometry (ESI-TOF-MS): An Evaluation of Non-Arthritic, Arthritic, and Revision Arthroplasty. <i>Orthopaedic Research and Education Foundation</i> (07/2016–current)	Surena Namdari, MD
Novel Antibiotic Prophylaxis in Orthopedic Arthrodesis Surgeries. <i>Orthopaedic Research and Education Foundation</i> (07/2016–current)	Antonia Chen, MD
The Effect of Cytokine Levels on the Clinical Outcomes in Patients Undergoing Anterior Cervical Discectomy and Fusion. <i>Orthopaedic Research and Education Foundation</i> (07/2016–current)	Gregory Schroeder, MD
The Investigational Plan for the Evaluation of the ACADIA Facet Replacement System. <i>Globus Medical</i> (08/2013–current)	Victor Hsu, MD
Short, Medium, and Long Term Survivorship of the Attune Primary Total Knee Prostheses. <i>DePuy Synthes</i> . (09/2013–current)	Andrew Star, MD
Dynesys Post Market Clinical Outcome Study. <i>Zimmer Biomet</i> (06/2014–current)	Michael Gratch, MD
Joint Registry – General Outcomes DePuy Tracking System (DOTS). <i>DePuy Synthes</i> . (08/2010–current)	Andrew Star, MD
MIS-REFRESH- Multi-center, Partially Randomized, Controlled Trial of Mis Robotic Versus Freehand in Short Adult Degenerative Spinal Fusion Surgeries. <i>Mazor Robotics, Ltd.</i> (09/2016–current)	Victor Hsu, MD
A Prospective, Single Blinded, Multi-center, Randomized, Controlled, Pivotal Study to Assess the Safety and Effectiveness of the Inspace Device for Treatment of Full Thickness Massive Rotator Cuff Tears. <i>Orthospace, Ltd.</i> (01/2016–current)	Joseph Abboud, MD
Influence of Lateralization on Outcomes After Reverse Arthroplasty? A Randomized Controlled Trial. <i>DJO Surgical</i> (10/2016–current)	Joseph Abboud, MD; Surena Namdari, MD; Gerald Williams, MD
Investigator Driven: FlexiGraft Rotator Cuff Study. <i>Arthrex, Inc.</i> (09/2016–current)	Joseph Abboud, MD; Surena Namdari, MD; Charles Getz, MD
Arthrex Shoulder Arthroplasty Registry Protocol. <i>Arthrex, Inc.</i> (09/2016–current)	Joseph Abboud, MD; Surena Namdari, MD; Charles Getz, MD
A Prospective, Randomized, Multi-center Study to Evaluate the Safety and Efficacy of Arthrex Eclipse Shoulder Arthroplasty System. <i>Arthrex, Inc.</i> (04/2016–current)	Joseph Abboud, MD; Surena Namdari, MD; Charles Getz, MD
Tornier Shoulder Outcomes Study. <i>Tornier, Inc.</i> (10/2014–current)	Joseph Abboud, MD; Mark Lazarus, MD; Gerald Williams, MD; Surena Namdari, MD
Pyrocarbon IDE study. <i>Tornier, Inc.</i> (03/2016–current)	Joseph Abboud, MD; Surena Namdari, MD; Charles Getz, MD; Mark Lazarus, MD
Post-Market Study of Robotic-Arm Assisted Total Knee Arthroplasty. <i>Stryker, Corp.</i> (7/2016–current)	Antonia Chen, MD; William Hozack, MD; Fabio Orozco, MD
A Post-Market, Prospective, Multi-center, Open-Label, Single Arm Clinical Evaluation of Integra Cadence Total Ankle System in Primary Ankle Joint Replacement. <i>Integra</i> (10/2016–present)	David Pedowitz, MD
Thoracolumbar Burst Fractures (AOspine A3, A4) in Neurologically Intact Patients: An Observational Multi-center Cohort Study Comparing Surgical Versus Non-Surgical Treatment. <i>AO Foundation</i> (10/2016–current)	Alexander Vaccaro, MD; Gregory Schroeder, MD; Christopher Kepler, MD
Phase 3, Prospective, Randomized, Partially Blinded Multi-center Study to Measure the Safety and Efficacy of Novocart 3D, Compared to Microfracture in the Treatment of Articular Cartilage Defects. <i>Aesculap</i> (08/2015–current)	Kevin Freedman, MD
Prospective, Multi-center, Randomized Concurrently Controlled Trial to Evaluate the Safety and Effectiveness of the Altum Pedicle Osteotomy System for Use in Lumbar Spinal Stenosis <i>Innovative Surgical Designs</i> (08/2017–current)	Mark Kurd, MD
Longitudinal Outcomes Study of the Subchondroplasty Procedure in the Foot/Ankle. <i>Zimmer Biomet</i> (09/2017–current)	David Pedowitz, MD
A 2 and 5 Year Comparative Evaluation of Clinical Outcomes in the Treatment of Moderate Lumbar Spinal Stenosis with the Superior® Indirect Decompression System (IDS) Versus Direct Decompression Surgery for FDA Actual Conditions of Use Study. <i>Vertiflex</i> (01/2017–current)	Guy Lee, MD

FUNDED CLINICAL TRIAL	INVESTIGATOR(S)
Efficacy of Amniotic Tissue (CLARIX™100 & CLARIX™ CORD 1K) in Pain Reduction and Improvement of Function in the Low Back & Leg Pain in Discectomy Patients. <i>TissueTech</i> (07/2015–current)	D. Greg Anderson, MD
A Phase 2b, Randomized, Double-blind, Placebo-controlled Study to Evaluate the Safety and Efficacy of a Staphylococcus aureus 4-antigen Vaccine (SA4Ag) in Adults Undergoing Elective Posterior Instrumented Lumbar Spinal Fusion. <i>Pfizer</i> (09/2017–ongoing)	Guy Lee, MD
Efficacy of the BioWick SureLock Implant for the Reattachment of Soft Tissue to Bone in Subjects Undergoing Rotator Cuff Repairs. <i>Zimmer Biomet</i> (07/2017–current)	Surena Namdari, MD; Charles Getz, MD; Joseph Abboud, MD
A Post-Market, Prospective, Non-randomized, Multi-center, Open-Label Clinical Evaluation of The Integra Titan Modular Shoulder System 2.5 For Primary Shoulder Joint Replacement. <i>Integra</i> (03/2017–current)	Matthew Ramsey, MD; Surena Namdari, MD
Can Intravenously Administered Indocyanine Green Visualize Rotator Cuff Vascularity? <i>Stryker</i> (07/2017–current)	Matthew Ramsey, MD
A Multi-center, Prospective, Comparative Study of Anterior Versus Posterior Surgical Treatment for Lumbar Isthmic Spondylolisthesis. <i>AO Foundation</i> (11/2016–current)	Alexander Vaccaro, MD, PhD, MBA; Chris Kepler, MD; Gregory Schroeder, MD
A Retrospective Study of the Navio Robotic-Assisted Surgical System. <i>Smith and Nephew</i> (07/2017–current)	Jess Lonner, MD
Intermediate Clinical and Radiographic Outcomes of Isolated Patellofemoral Arthroplasty and Modular Bicompartamental Knee Arthroplasty. <i>Zimmer Biomet</i> (09/2017–current)	Jess Lonner, MD
A Multi-center, Prospective, Randomized, Subject and Evaluator Blinded Comparative Study of Nerve Cuffs and Avance Nerve Graft Evaluating Recovery Outcomes for the Repair of Nerve Discontinuities (RECON). <i>Axogen</i> (05/2017–current)	Asif Ilyas, MD; Chris Jones, MD; Fred Liss, MD; Michael Rivlin, MD; Jonas Matzon, MD; Charles Leinberry, MD; Mark Wang, MD
The Use of Barbed Sutures in Total Hip Arthroplasty: A Prospective, Randomized, and Controlled Clinical Trial. <i>Johnson and Johnson</i> (12/2015–current)	Javad Parvizi, MD
Lateral Ankle Ligament Reconstruction with Internalbrace Augmentation: A Prospective Randomized Study. <i>Arthrex, Inc.</i> (09/2017–current)	Steven Raikin, MD; David Pedowitz, MD
A Multi-center, Randomized, Pivotal Study Evaluating AMPLEX Compared To Autogenous Bone Graft in Subjects Indicated for Arthrodesis Surgery Involving the Hindfoot or Ankle. <i>Ferring Pharmaceuticals</i> (03/2017–current)	Steven Raikin, MD
A Prospective, Controlled, Multi-center, Post-Approval Trial to Evaluate the Long-term Safety and Effectiveness of AUGMENT Bone Graft Compared to Autologous Bone Graft as a Bone Regeneration Device in Foot and Ankle Fusions. <i>Wright</i> (07/2017–current)	Steven Raikin, MD
Use of Cooled Radiofrequency for the treatment of Hip Pain associated with OA of the Hip compared to intra-articular steroid injections. <i>Halyard Health</i> (05/2017–current)	Antonia Chen, MD; David Stolzenberg, MD
Evaluating the Efficacy of Bactisure Wound Lavage in Cleansing Orthopedic Surgical Wounds. <i>Zimmer Biomet</i> (08/2017–current)	Javad Parvizi, MD; Paul Max Courtney, MD
A Pivotal Study Comparing Two Injections of MONOVISC to Two Injections of Saline in Patients with Osteoarthritis of the Hip (15-MVH-01). <i>Mitek DePuy Synthes</i> (09/2017–current)	Chris Mehallo, DO, Michael Ross, MD; Adam Chrusch, MD; Tricia Beatty, DO, Peter Vitanzo, MD; Mark Harwood, MD; Barry Kenneally, MD; Joshua Okon, MD; Lindsey Szymaszek, DO, John Luksch, DO
A Multi-center, Randomized, Double-blind, Controlled study of EXPAREL for Postsurgical Pain Management in Subjects Undergoing Open Lumbar Spinal Fusion Surgery. <i>Exparel</i> (09/2017–current)	Kris Radcliff, MD; Barrett Woods, MD
A Multi-center, Open-Label, Prospective Study of SpinalStim (MOP-SS) as Adjunctive Care Following Lumbar Fusion Surgery. <i>Orthofix</i> (06/2017–current)	Kris Radcliff, MD; Barrett Woods, MD
Clinical Study Protocol for the Investigation of the Simplify Cervical Artificial Disc Two Level. <i>Simplify Medical</i> (09/2017–current)	Kris Radcliff, MD; Barrett Woods, MD
Retrospective Observational Study of Patients Who Have Undergone Lumbar Fusion Surgery with Adjunctive Use of the Orthofix Spinal-Stim Device <i>Orthofix</i> (06/2017–current)	Kris Radcliff, MD; Barrett Woods, MD
A Prospective, Post-market, Multi-center Evaluation of the Clinical Outcomes of the Trident II Acetabular Shell. <i>Stryker</i> (09/2017–current)	Fabio Orozco, MD

PEER-REVIEWED PUBLICATIONS

Rothman Institute at Jefferson

Spine

- **Is It Possible To Evaluate the Ideal Cervical Alignment for Each Patient Needing Surgery? An Easy Rule To Determine the Appropriate Cervical Lordosis in Preoperative Planning.** Marco Ajello; Nicola Marengo; Giulia Pilloni; Federica Penner; Giovanni Vercelli; Federico Pecoraro; Francesco Zenga; Alexander R. Vaccaro; Alessandro Ducati; Diego Garbossa. *World Neurosurg.*, January 2017.
- **Are Modic Changes Associated with Intervertebral Disc Cytokine Profiles?** Gregory D. Schroeder; Dessislava Z. Markova; John D. Koerner; Jeffery A. Rihn; Alan S. Hilibrand; Alexander R. Vaccaro; D. Greg Anderson; Christopher K. Kepler. *The Spine Journal*, January 2017.
- **Point of View.** Gregory D. Schroeder; Brian W. Su; Alexander R. Vaccaro. *Spine*, January 2017.
- **Thoracolumbar Trauma Classification.** Gregory D. Schroeder; James S. Harrop; Alexander R. Vaccaro. *Neurosurgery Clinics of North America*, January 2017.
- **Comparison of Occipitocervical and Atlantoaxial Fusion in Treatment of Unstable Jefferson fractures.** Yong Hu; Zhen-shan Yuan; Christopher K. Kepler; Wei-xin Dong; Xiao-yang Sun; Jiao Zhang. *Indian Journal of Orthopaedics*, January 2017.
- **Psychometric Properties of the 30-m Walking Test in Patients with Degenerative Cervical Myelopathy: Results from Two Prospective Multi-center Cohort Studies.** Parker E. Bohm; Michael G. Fehlings; Branko Kopjar; Lindsay A. Tetreault; Alexander R. Vaccaro; Karen K. Anderson; Paul M. Arnold; Paul M. Arnold. *The Spine Journal*, February 2017.
- **Association of Pain, Social Support and Socioeconomic Indicators in Patients with Spinal Cord Injury in Iran.** Z. Khazaeipour; E. Ahmadipour; V. Rahimi-Movaghar; F. Ahmadipour; Alexander R. Vaccaro; B. Babakhani. *Spinal Cord*, February 2017.
- **The Effect of Dynamic Versus Static Plating Systems on Fusion Rates and Complications in 1-Level and/or 2-Level Anterior Cervical Discectomy and Fusion: A Systematic Review.** Gregory D. Schroeder; Christopher K. Kepler; Douglas A. Hollern; Ricardo Rodrigues-Pinto; Mark F. Kurd; Jefferson R. Wilson; Mitchell G. Maltenfort; Jonathan T. Paul; Andrew N. Fleischman; Kathryn Dwight; Paul W. Millhouse; Alexander R. Vaccaro. *Clinical Spine Surgery*, February 2017.
- **Perioperative Complications of Spinal Metastases Surgery.** Panya Luksanapraksa; Jacob M. Buchowski; Lukas P. Zebala; Christopher K. Kepler. Weerasak Singhatanadgige; David B. Bumpass. *Clinical Spine Surgery*, February 2017.
- **Is Neuromonitoring Necessary for All Patients Undergoing Anterior Cervical Discectomy and Fusion?** Jetan Badhiwala; Jefferson R. Wilson; Tyler M. Kreitz; Alan S. Hilibrand. *Clinical Spine Surgery*, February 2017.
- **National Database Research in Spine Surgery: Limitations in the Current Literature.** Arjun S. Sebastian. *Clinical Spine Surgery*, February 2017.
- **Cervical Spine Injuries in the Athlete.** Gregory D. Schroeder; Alexander R. Vaccaro. *Instructional Course Lectures*, February 2017.
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- **Controversies in Spinal Trauma and Evolution of Care.** James S. Harrop; George N. Rymarczuk; Alexander R. Vaccaro; Michael P. Steinmetz; Lindsay A. Tetreault; Michael G. Fehlings. *Neurosurgery*, March 2017.
- **Intervertebral Disk Degeneration and Repair.** James Dowdell; Mark Erwin; Theodoe Choma; Alexander R. Vaccaro; James Latridis; Samuel K. Cho. *Neurosurgery*, March 2017.
- **Value-based Insurance Design.** Alok D. Sharan; Gregory D. Schroeder; Michael E. West; Alexander R. Vaccaro. *Clinical Spine Surgery*, March 2017.
- **Comparing the Treatment Algorithm and Complications for Patients Undergoing an Anterior Cervical Discectomy and Fusion at a Physician-owned Specialty Hospital and a University-Owned Tertiary Care Hospital.** Gregory D. Schroeder; Mark F. Kurd; Christopher K. Kepler; Kris E. Radcliff; Jeffery A. Rihn; D. Greg Anderson; Alan S. Hilibrand; Alexander R. Vaccaro. *American Journal of Medical Quality*, March 2017.
- **Cervical Spine Surgery Complications and Risks in the Elderly.** Kris Radcliff; Kevin L. Ong; Scott Lovald; Edmund Lau; Mark Kurd. *Spine*, March 2017.
- **The Drivers of Medicare Reimbursement for Thoracolumbar Fusion: An Analysis of Data From The Centers For Medicare and Medicaid Services.** Krishn Khanna; Eric M. Padegimas; Benjamin Zmistowski; Michael Howley; Kushagra Vema. *Spine*, March 2017.
- **Evidence-Based Recommendations for Spine Surgery.** Alexander R. Vaccaro; Charles G. Fisher; Alpesh A. Patel; Srinivas K. Prasad; John Chi; Kishore Mulpuri; Kenneth C. Thomas; Peter G. Whang. *Spine*, April 2017.
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- **The Role of Multimodal Analgesia in Spine Surgery.** Mark F. Kurd; Tyler Kreitz; Gregory Schroeder; Alexander R. Vaccaro. *Journal of the American Academy of Orthopaedic Surgeons*, April 2017.
- **Rare Complications of Cervical Spine Surgery: Pseudomeningocele.** Tamir Ailon; Justin S. Smith; Ahmad Nassr; Zachary A. Smith; Wellington K. Hsu; Michael G. Fehlings; David E. Fish; Jeffrey C. Wang; Alan S. Hilibrand; Praveen V. Mummaneni; Dean Chou; Rick C. Sasso; Vincent C. Traynelis; Paul M. Arnold; Thomas E. Mroz; Zorica Buser; Elizabeth L. Lord; Eric M. Massicotte; Arjun S. Sebastian; Khoi D. Than; Michael P. Steinmetz; Gabriel A. Smith; Jonathan Pace; Mark Corriveau; Sungho Lee; K. Daniel Riew; Christopher Shaffrey. *Global Spine Journal*, April 2017.
- **Epidural Hematoma Following Cervical Spine Surgery.** Gregory D. Schroeder; Alan S. Hilibrand; Paul M. Arnold; David E. Fish; Jeffrey C. Wang; Jeffrey L. Gum; Zachary A. Smith; Wellington K. Hsu; Ziya L. Gokaslan; Robert E. Isaacs; Adam S. Kanter; Thomas E. Mroz; Ahmad Nassr; Rick C. Sasso; Michael G. Fehlings; Zorica Buser; Mohamad Bydon; Peter I. Cha; Dhananjay Chatterjee; Erica L. Gee; Elizabeth L. Lord; Erik N. Mayer; Owen J. McBride; Emily C. Nguyen; Allison K. Roe; P. Justin Tortolani; D. Alex Stroh; Marisa Y. Yanez; K. Daniel Riew. *Global Spine Journal*, April 2017.
- **Epidemiology and Outcomes of Vertebral Artery Injury in 16582 Cervical Spine Surgery Patients: An AOSpine North America Multi-center Study.** Wellington K. Hsu; Abhishek Kannan; Harry T. Mai; Michael G. Fehlings; Zachary A. Smith; Vincent C. Traynelis; Ziya L. Gokaslan; Alan S. Hilibrand; Ahmad Nassr; Paul M. Arnold; Thomas E. Mroz; Mohamad Bydon; Eric M. Massicotte; Wilson Z. Ray; Michael P. Steinmetz; Gabriel A. Smith; Jonathan Pace; Mark Corriveau; Sungho Lee; Robert E. Isaacs; Jeffrey C. Wang; Elizabeth L. Lord; Zorica Buser; K. Daniel Riew. *Global Spine Journal*, April 2017.
- **Incidence and Outcomes of Acute Implant Extrusion Following Anterior Cervical Spine Surgery.** Gabriel A. Smith; Jonathan Pace; Mark Corriveau; Sungho Lee; Thomas E. Mroz; Ahmad Nassr; Michael G. Fehlings; Robert A. Hart; Alan S. Hilibrand; Paul M. Arnold; David B. Bumpass; Ziya Gokaslan; Mohamad Bydon; Jeremy L. Fogelson; Eric M. Massicotte; K. Daniel Riew; Michael P. Steinmetz. *Global Spine Journal*, April 2017.
- **Misplaced Cervical Screws Requiring Reoperation.** Jeremy C. Peterson; Paul M. Arnold; Zachary A. Smith; Wellington K. Hsu; Michael G. Fehlings; Robert A. Hart; Alan S. Hilibrand; Ahmad Nassr; Ra'Kerry K. Rahman; Chadi A. Tannoury; Tony Tannoury; Thomas E. Mroz; Bradford L. Currier; Anthony F. De Giacomo; Jeremy L. Fogelson; Bruce C. Jobse; Eric M. Massicotte; K. Daniel Riew. *Global Spine Journal*, April 2017.
- **C5 Palsy After Cervical Spine Surgery: A Multi-center Retrospective Review of 59 Cases.** Sara E. Thompson; Zachary A. Smith; Wellington K. Hsu; Ahmad Nassr; Thomas E. Mroz; David E. Fish; Jeffrey C. Wang; Michael G. Fehlings; Chadi A. Tannoury; Tony Tannoury; P. Justin Tortolani; Vincent C. Traynelis; Ziya Gokaslan; Alan S. Hilibrand; Robert E. Isaacs; Praveen V. Mummaneni; Dean Chou; Sheeraz A. Qureshi; Samuel K. Cho; Evan O. Baird; Rick C. Sasso; Paul M. Arnold; Zorica Buser; Mohamad Bydon; Michelle J. Clarke; Anthony F. De Giacomo; Adeb Derakhshan; Bruce Jobse; Elizabeth L. Lord; Daniel Lubelski; Eric M. Massicotte; Michael P. Steinmetz; Gabriel A. Smith; Jonathan Pace; Mark Corriveau; Sungho Lee; Peter I. Cha; Dhananjay Chatterjee; Erica L. Gee; Erik N. Mayer; Owen J. McBride; Allison K. Roe; Marisa Y. Yanez; D. Alex Stroh; Khoi D. Than; K. Daniel Riew. *Global Spine Journal*, April 2017.
- **Latrogenic Spinal Cord Injury Resulting From Cervical Spine Surgery.** Alan H. Daniels; Robert A. Hart; Alan S. Hilibrand; David E. Fish; Jeffrey C. Wang; Elizabeth L. Lord; Zorica Buser; P. Justin Tortolani; D. Alex Stroh; Ahmad Nassr; Bradford L. Currier; Arjun S. Sebastian; Paul M. Arnold; Michael G. Fehlings; Thomas E. Mroz; K. Daniel Riew. *Global Spine Journal*, April 2017.

- **Demineralized Bone Matrix in Anterior Cervical Discectomy and Fusion: A Systematic Review.** Shayan Abdollah Zadegan; Aidin Abedi; Seyed Behnam Jazayeri; Alexander R. Vaccaro; Vafa Rahimi-Movaghar. *European Spine Journal*, April 2017.
- **Randomization Strategies.** Chris K Kepler. *Clinical Spine Surgery*, April 2017.
- **Organizational Structural Design in Spine Care.** Alok D. Sharan; Gregory D. Schroeder; Michael E. West; Alexander R. Vaccaro. *Clinical Spine Surgery*, April 2017.
- **The Value of CT and MRI in the Classification and Surgical Decision-Making Among Spine Surgeons in Thoracolumbar Spinal Injuries.** Shanmuganathan Rajasekaran; Alexander R. Vaccaro; Rishi Mugesh Kanna; Gregory D. Schroeder; Frank Cumhur Oner; Luiz Vialle; Jens Chapman; Marcel Dvorak; Michael Fehlings; Ajoy Prasad Shetty; Klaus Schnake; Anupama Maheshwaran; Frank Kandziara. *European Spine Journal*, May 2017.
- **Reliability assessment of AOSpine thoracolumbar spine injury classification system and Thoracolumbar Injury Classification and Severity Score (TLICS) for thoracolumbar spine injuries: results of a multi-center study.** Rahul Kaul; Harvinder Singh Chhabra; Alexander R. Vaccaro; Rainer Abel; Sagun Tuli; Ajoy Prasad Shetty; Kali Dutta Das; Bibhudendu Mohapatra; Ankur Nanda; Gururaj M. Sangondimath; Murari Lal Bansal; Nishit Patel. *European Spine Journal*, May 2017.
- **Understanding Traditional Research Impact Metrics.** Joseph S. Butler; Arjun S. Sebastian; I. David Kaye; Scott C. Wagner; Patrick B. Morrissey; Gregory D. Schroeder; Christopher K. Kepler; Alexander R. Vaccaro. *Clinical Spine Surgery*, May 2017.
- **A New Partnership: The Need for Greater Collaboration and Integration.** Alexander R. Vaccaro; James N. Weinstein. *Clinical Spine Surgery*, May 2017.
- **Is An Isolated Intervertebral Disk With Significant Degeneration Magnetic Resonance Imaging A Cause of Low Back Pain That Requires No Confirmatory Diagnostic Tests?** George M. Ghorbali; Joshua Heller; Daniel Cataldo; Christopher K. Kepler. *Clinical Spine Surgery*, May 2017.
- **Evidence-based Prevention and Treatment of Osteoporosis After Spinal Cord Injury: A Systematic Review.** Saeed Soleymann-Jahi; Ali Yousefian; Radin Maheronnaghsh; Farhad Shokraneh; Shayan Abdollah Zadegan; Akbar Soltani; Seyed Mostafa Hosseini; Alexander R. Vaccaro; Vafa Rahimi-Movaghar. *European Spine Journal*, May 2017.
- **Blunt Vertebral Vascular Injury in Trauma Patients: ATLS® Recommendations and Review of Current Evidence.** Roozbeh Shafafy; Sukrit Suresh; John O. Afolayan; Alexander R. Vaccaro; Jaykar R. Panchmatia. *Journal of Spine Surgery*, June 2017.
- **Does the Spine Surgeon's Experience Affect Fracture Classification, Assessment of Stability, and Treatment Plan in Thoracolumbar Injuries?** Shanmuganathan Rajasekaran; Rishi Mugesh Kanna; Gregory D. Schroeder; Frank Cumhur Oner; Luiz Vialle; Jens Chapman; Marcel Dvorak; Michael Fehlings; Ajoy Prasad Shetty; Klaus Schnake; Frank Kandziara; Alexander R. Vaccaro. *Global Spine Journal*, June 2017.
- **Clinical Application of Ceramics in Anterior Cervical Discectomy and Fusion: A Review and Update.** Shayan Abdollah Zadegan; Aidin Abedi; Seyed Behnam Jazayeri; Hirbod Nasiri Bonaki; Alexander R. Vaccaro; Vafa Rahimi-Movaghar. *Global Spine Journal*, June 2017.
- **Adjacent Level Disease-background and Update Based on Disc Replacement Data.** I. David Kaye; Alan S. Hilibrand. *Current Reviews in Musculoskeletal Medicine*, June 2017.
- **Bias In Cervical Total Disc Replacement Trials.** Kristen Radcliff; Sean Siburn; Hamadi Murphy; Barrett Woods; Sheeraz Qureshi. *Current Reviews in Musculoskeletal Medicine*, June 2017.
- **Cervical Disc Replacement Surgery: Indications, Technique, and Technical Pearls.** Dante Leven; Joshua Meaiki; Kris Radcliff; Sheeraz Qureshi. *Current Reviews in Musculoskeletal Medicine*, June 2017.
- **Comparative Effectiveness of Treatments for Chronic Low Back Pain: A Multiple Treatment Comparison Analysis.** Jeffrey A. Rihn; Kristen Radcliff; Daniel C. Norvell; Robert Eastlack; Frank M. Phillips; Daniel Berland; Ned Sherry; Mitchell Freedman; Alexander R. Vaccaro. *Clinical Spine Surgery*, June 2017.
- **The Evolution of Current Research Impact Metrics: From Bibliometrics to Altmetrics?** Joseph S. Butler; I. David Kaye; Arjun S. Sebastian; Scott C. Wagner; Patrick B. Morrissey; Gregory D. Schroeder; Christopher K. Kepler; Alexander R. Vaccaro. *Clinical Spine Surgery*, June 2017.
- **Is the SIJ a Cause of Pain that can be Accurately Identified and Treated With an SI Fusion?** Glenn S. Russo; Peter G. Whang; Barrett I. Woods; Kristen Radcliff. *Clinical Spine Surgery*, June 2017.
- **Does Medicaid Insurance Confer Adequate Access to Adult Orthopaedic Care in the Era of the Patient Protection and Affordable Care Act?** Joseph T. Labrum IV; Taylor Paziuk; Theresa C. Rihn; Alan S. Hilibrand; Alexander R. Vaccaro; Mitchell G. Maltenfort; Jeffrey A. Rihn. *Clinical Orthopaedics and Related Research*, June 2017.
- **The Effect of Postoperative Spinal Infections on Patient Mortality.** David S. Casper; Benjamin Zmistowski; Douglas A. Hollern; Alan S. Hilibrand; Alexander R. Vaccaro; Gregory D. Schroeder; Christopher K. Kepler. *Spine*, June 2017.
- **Risk Factors for and Complications after Surgical Delay in Elective Single-Level Lumbar Fusion.** Scott C. Wagner; Joseph S. Butler; Ian D. Kaye; Arjun Sebastian; Patrick B. Morrissey; Christopher Kepler. *Spine*, June 2017.
- **Are Patient-reported Outcomes Predictive of Patient Satisfaction 5 Years After Anterior Cervical Spine Surgery?** Gregory D. Schroeder; Dom Coric; Han Jo Kim; Todd J. Albert; Kris E. Radcliff. *Spine*, July 2017.
- **P15 Peptide Stimulates Chondrogenic Commitment and Endochondral Ossification.** Jun Zhang; Peter Eisenhauer; Ozcan Kaya; Alexander R. Vaccaro; Carol Diallo; Andrzej Fertala; Theresa A. Freeman. *International Orthopaedics*, July 2017.
- **Resource Utilization for Non-operative Cervical Radiculopathy: Management by Surgeons Versus Non-surgeons.** Sophie H. Chung; Daniel D. Bohl; Jonathan T. Paut; Jeffrey A. Rihn; James S. Harrop; Zoher Ghogawala; Alan S. Hilibrand; Jonathan N. Grauer. *Clinical Neurology and Neurosurgery*, July 2017.
- **Evidence-based Evaluation of Early Versus Late Surgical Decompression in Cervical Spinal Cord Injury.** Mahdi Sharif-Alhoseini; Alexander R. Vaccaro; Vafa Rahimi-Movaghar. *Asian Journal of Neurosurgery*, July 2017.
- **Social Support and its Association with Depression, Gender and Socioeconomic Indicators in Individuals with Spinal Cord Injury in Iran.** Z. Khazaeipour, M. Hajiaghbabaei; B. Mirminachi; Alexander R. Vaccaro; V. Rahimi-Movaghar. *Spinal Cord*, July 2017.
- **Bone Morphogenetic Proteins in Anterior Cervical Fusion: A Systematic Review and Meta-Analysis.** Shayan Abdollah Zadegan; Aidin Abedi; Seyed Behnam Jazayeri; Hirbod Nasiri Bonaki; Seyed Behzad Jazayeri; Alexander R. Vaccaro; Vafa Rahimi-Movaghar. *World Neurosurgery*, August 2017.
- **Maximum Pain on Visual Analog Scales in Spinal Disorders.** Caleb J. Behrend; Etienne M. Schönbach; Alexander R. Vaccaro; Ellen Coyne; Mark L. Prasarn; Glenn R. Rehtine. *The Spine Journal*, August 2017.
- **The Cortical Bone Trajectory for Pedicle Screw Insertion.** I. David Kaye; Srinivas K. Prasad; Alex R. Vaccaro; Alan S. Hilibrand. *JBJS Reviews*, August 2017.
- **Novel Index to Quantify the Risk of Surgery in the Setting of Adult Spinal Deformity: A Study on 10,912 Patients From the Nationwide Inpatient Sample.** Bassel G. Diebo; Cyrus M. Jalai; Vincent Challier; Bryan J. Marascalchi; Samantha R. Horn; Gregory W. Poorman; Olivia J. Bono; Denis Cherkalin; Nancy Worley; Jason Oh; Qais Naziri; Allison Spitzer; Kris Radcliff; Ashish Patel; Virginie Lafage; Carl B. Paulino; Peter G. Passias. *Clinical Spine Surgery*, August 2017.
- **Feasibility and Data Quality of the National Spinal Cord Injury Registry of Iran (NSCIR-IR): A Pilot Study.** Naghdi K, Azadmanjir Z, Saadat S, Abedi A, Koohi Habibi S, Derakhshan P, Safdarian M, Abdollah Zadegan S, Amirjamshidi A, Sharif-Alhoseini M, Arab Kheradmand J, Mohammadzadeh M, Zendehelel K, Khazaeipour Z, Hashemi SMR, Saberi H, Karimi Yarandi K, Ketabchi SE, Yousefzadeh-Chabok S, Heidari H, Sotodeh A, Pestei K, Ghodsi Z, Sadeghian F, Noonan V, Benzel EC, Oreilly G, Chapman J, Hagen EM, Fehlings MG, Vaccaro AR, Faghieh Jooybari M, Zarei MR, Zafarghandi MR, Salamati P, Nezareh S, Khormali M, Sadeghi-Naini M, Jazayeri SB, Aarabi B, Rahimi-Movaghar V.
- **The Effect of Hospital Ownership on Health Care Utilization in Orthopedic Surgery.** Gregory D. Schroeder; Mark F. Kurd; Christopher K. Kepler; Kris E. Radcliff; Mitchell G. Maltenfort; Hamadi Murphy; Jeffery A. Rihn; D. Greg Anderson; Alan S. Hilibrand; Alexander R. Vaccaro. *Clinical Spine Surgery*, August 2017.

- **The Effect of Preoperative Lumbar Epidural Corticosteroid Injection on Postoperative Infection Rate in Patients Undergoing Single-Level Lumbar Decompression.** Jonathan G. Seavey; George C. Balazs; Theodore Steelman; Melvin Helgeson; David E. Gwinn; Scott C. Wagner. *The Spine Journal*, September 2017.
- **Spine Trauma-What Are the Current Controversies?** Cumhur Oner; Shanmuganathan Rajasekaran; Jens R. Chapman; Michael G. Fehlings; Alexander R. Vaccaro; Gregory D. Schroeder; Said Sadiqi; James Harrop. *Journal of Orthopaedic Trauma*, September 2017.
- **Spinal Cord Injury-What Are the Controversies?** Christopher S. Ahuja; Gregory D. Schroeder; Alexander R. Vaccaro; Michael G. Fehlings. *Journal of Orthopaedic Trauma*, September 2017.
- **AOSpine Classification Systems (Subaxial, Thoracolumbar).** Klaus J. Schnake; Gregory D. Schroeder; Alexander R. Vaccaro; Cumhur Oner. *Journal of Orthopaedic Trauma*, September 2017.
- **Application of AOSpine Subaxial Cervical Spine Injury Classification in Simple and Complex Cases.** Bizhan Aarabi; Cumhur Oner; Alexander R. Vaccaro; Gregory D. Schroeder; Noori Akhtar-Danesh. *Journal of Orthopaedic Trauma*, September 2017.
- **The Need of Validated Disease-Specific Outcome Instruments for Spine Trauma.** Cumhur Oner; Said Sadiqi; Anne Mechteld Lehr; Gregory D. Schroeder; Alexander R. Vaccaro. *Journal of Orthopaedic Trauma*, September 2017.
- **Does Surgical Intervention or Timing of Surgery Have an Effect on Neurological Recovery in the Setting of a Thoracolumbar Burst Fracture?** So Kato; Jean-Christophe Murray; Brian K. Kwon; Gregory D. Schroeder; Alexander R. Vaccaro; Michael G. Fehlings. *Journal of Orthopaedic Trauma*, September 2017.
- **Controversies in the Management of Geriatric Odontoid Fractures.** Scott C. Wagner; Gregory D. Schroeder; Christopher K. Kepler; Alexander J. Schupper; Frank Kandziora; Emiliano N. Vialle; Cumhur Oner; Michael G. Fehlings; Alexander R. Vaccaro. *Journal of Orthopaedic Trauma*, September 2017.
- **Osteoporotic Thoracolumbar Fractures – How Are They Different? – Classification and Treatment Algorithm.** Shanmuganathan Rajasekaran; Rishi M. Kanna; Klaus J. Schnake; Alexander R. Vaccaro; Gregory D. Schroeder; Said Sadiqi; Cumhur Oner. *Journal of Orthopaedic Trauma*, September 2017.
- **Fractures in Spinal Ankylosing Disorders: A Narrative Review of Disease and Injury Types, Treatment Techniques, and Outcomes.** Tarush Rustagi; Doniel Drazin; Cumhur Oner; Jonathan York; Gregory D. Schroeder; Alexander R. Vaccaro; Rod J. Oskoui; Jens R. Chapman. *Journal of Orthopaedic Trauma*, September 2017.
- **Do Formal Laminectomy and Timing of Decompression for Patients With Sacral Fracture and Neurologic Deficit Affect Outcome?** Christopher K. Kepler; Gregory D. Schroeder; Douglas A. Hollern; Jens R. Chapman; Michael G. Fehlings; Marcel Dvorak; Carlo Bellabarba; Alexander R. Vaccaro. *Journal of Orthopaedic Trauma*, September 2017.
- **Atlas Fractures and Atlas Osteosynthesis: A Comprehensive Narrative Review.** Frank Kandziora; Jens R. Chapman; Alexander R. Vaccaro; Gregory D. Schroeder; Matti Scholz. *Journal of Orthopaedic Trauma*, September 2017.
- **Management of Hangman's Fractures: A Systematic Review.** Hamadi Murphy; Gregory D. Schroeder; Weilong J. Shi; Christopher K. Kepler; Mark F. Kurd; Andrew N. Fleischman; Frank Kandziora; Jens R. Chapman; Lorin M. Benneker; Alexander R. Vaccaro. *Journal of Orthopaedic Trauma*, September 2017.
- **Geographic Variations in Clinical Presentation and Outcomes of Decompressive Surgery in Patients With Symptomatic Degenerative Cervical Myelopathy: Analysis of a Prospective, International Multi-Center Cohort Study of 757 Patients.** Michael G. Fehlings; Branko Kopjar; Ahmed Ibrahim; Lindsay A. Tetreault; Paul M. Arnold; Helton Defino; Shashank Sharad Kale; S. Tim Yoon; Giuseppe M. Barbagallo; Ronald H.M. Bartels; Qiang Zhou; Alexander R. Vaccaro; Mehmet Zileli; Gamaliel Tan; Yasutsugu Yukawa; Darrel S. Brodke; Christopher I. Shaffrey; Osmar Santos de Moraes; Eric J. Woodard; Massimo Scerrati; Masato Tanaka; Tomoaki Toyone; Rick C. Sasso; Michael E. Janssen; Ziya L. Gokaslan; Manuel Alvarado; Ciaran Bolger; Christopher M. Bono; Mark B. Dekutoski. *The Spine Journal*, September 2017.
- **i-Factor™ Bone Graft versus Autograft in Anterior Cervical Discectomy and Fusion: 2-Year Follow-up of the Randomized Single-Blinded Food and Drug Administration Investigational Device Exemption Study.** Paul M. Arnold; Rick C. Sasso; Michael E. Janssen; Michael G. Fehlings; Robert F. Heary; Alexander R. Vaccaro; Branko Kopjar. *Neurosurgery*, September 2017.
- **Incidence, Risk Factors, and Impact of Clostridium Difficile Colitis After Spine Surgery: An Analysis of a National Database.** Patawut Bovonratwet; Daniel D. Bohrt; Glenn S. Russo; Nathaniel T. Ondeck; Kern Singh; Jonathan N. Grauer. *Spine*, September 2017.
- **Two-Year Results of the Prospective Spine Treatment Outcomes Study: Analysis of Postoperative Clinical Outcomes Between Patients with and without a History of Previous Cervical Spine Surgery.** Kris Radcliff; Cyrus Jalai; Shaleen Vira; Sun Yang; Anthony J. Boniello; Kristina Bianco; Cheongun Oh; Michael Gerling; Gregory Poorman; Samantha R. Horn; John A. Buza III; Robert E. Isaacs; Alexander R. Vaccaro; Peter G. Passias. *World Neurosurgery*, September 2017.
- **Two-Year Results of the Prospective Spine Treatment Outcomes Study: An Analysis of Complication Rates, Predictors of Their Development, and Effect on Patient Derived Outcomes at 2 Years for Surgical Management of Cervical Spondylotic Myelopathy.** Michael C. Gerling; Kris Radcliff; Robert Isaacs; Kristina Bianco; Cyrus M. Jalai; Nancy J. Worley; Jaspreet Parmar; Gregory W. Poorman; Samantha R. Horn; John Y. Moon; Paul M. Arnold; Alexander R. Vaccaro; Peter Passias. *World Neurosurgery*, October 2017.
- **Sacral Fractures and Associated Injuries.** Ricardo Rodrigues-Pinto; Mark F. Kurd; Gregory D. Schroeder; Christopher K. Kepler; James C. Krieg; Jörg H. Holstein; Carlo Bellabarba; Reza Firoozabadi; F. Cumhur Oner; Frank Kandziora; Marcel F. Dvorak; Conor P. Kleweno; Luiz R. Vialle; S. Rajasekaran; Klaus J. Schnake; Alexander R. Vaccaro. *Global Spine Journal*, October 2017.
- **Which Domains of the ODI Best Predict Change in Physical Function in Patients after Surgery for Degenerative Lumbar Spondylolisthesis?** Hamadi A. Murphy; Eugene Warnick; Richard McGintee; Kristen Nicholson; Douglas A. Hollern; Christie Stawicki; Daniel Tarazona; Gregory D. Schroeder; Barrett I. Woods; Mark F. Kurd; Jeffrey A. Rihn; Greg D. Anderson; Christopher K. Kepler; Alan S. Hilibrand; Alexander R. Vaccaro; Kris E. Radcliff. *Spine*, October 2017.

Joint

- **Local Antimicrobial Treatment in Orthopaedic Surgery.** Antonia F Chen; Heinz Winkler. *Journal of Bone and Joint Infection*, January 2017.
- **Local Intra-wound Administration of Powdered Antibiotics in Orthopaedic Surgery.** Andrew N Fleischman; Matthew S. Austin. *Journal of Bone and Joint Infection*, January 2017.
- **A Current Procedural Terminology Code for "Knee Conversion" Is Needed to Account for the Additional Surgical Time Required Compared to Total Knee Arthroplasty.** Tyler M. Kreitz; Carl A. Deirmengian; Gregory S. Penny; Mitchell G. Maltenfort; Gregory K. Deirmengian. *Journal of Arthroplasty*, January 2017.
- **The Mark Coventry, Award: Oral Antibiotics Reduce Reinfection After Two-Stage Exchange: A Multi-center, Randomized Controlled Trial.** Jonathan M. Frank; Erdan Kayupov; Mario Moric; John Segreti; Erik Hansen; Curtis Hartman; Kamil Okroj; Katherine Belden; Brian Roslund; Randi Silibovsky; Javad Parvizi; Craig J. Della Valle; The Knee Society Research Group. *Clinical Orthopedics and Related Research*, January 2017.
- **The Role of Biomarkers for the Diagnosis of Implant-Related Infections in Orthopaedics and Trauma.** Abtin Alvand; Maryam Rezapoor; Javad Parvizi. *Advances in Experimental Medicine and Biology*, January 2017.
- **Direct Anterior Approach: Risk Factor for Early Femoral Failure of Cementless Total Hip Arthroplasty: A Multi-center Study.** R. Michael Meneghini; Addison S. Elston; Antonia F. Chen; Michael M. Kheir; Thomas K. Fehring; Bryan D. Springer. *The Journal of Bone and Joint Surgery*, January 2017.
- **Patient-Controlled Fentanyl Iontophoretic Transdermal System Improved Postoperative Mobility Compared to Intravenous Patient-Controlled Analgesia Morphine: A Pooled Analysis of Randomized, Controlled Trials.** Ali Oliashirazi; Timothy Wilson-Byrne; Franklin D. Shuler; Javad Parvizi. *Pain Practice*, February 2017.
- **Periarticular Injection of Liposomal Bupivacaine Offers No Benefit Over Standard Bupivacaine in Total Knee Arthroplasty: A Prospective, Randomized, Controlled Trial.** Pouya Alijanipour; Timothy L. Tan; Christopher N. Matthews; Jessica R. Viola; James J. Purtill; Richard H. Rothman; Javad Parvizi; Matthew S. Austin. *Journal of Arthroplasty*, February 2017.

- **Bilateral Total Hip Arthroplasty: 1-Stage or 2-Stage? A Meta-Analysis.** Hongyi Shao; Chilung Chen; Mitchell G Maltenfort; Camilo Restrepo; Richard H Rothman; Antonia F Chen. *Journal of Arthroplasty*, February 2017.
- **Routine Workup of Postoperative Pyrexia Following Total Joint Arthroplasty Is Only Necessary in Select Circumstances.** Je-Hyun Yoo; Camilo Restrepo; Antonia F Chen; Javad Parvizi. *Journal of Arthroplasty*, February 2017.
- **Otto Aufranc Award: A Multi-center, Randomized Study of Outpatient versus Inpatient Total Hip Arthroplasty.** Nitin Goyal; Antonia F. Chen; Sarah E. Padgett; Timothy L. Tan; Michael M. Kheir; Robert H. Hopper, Jr; William G. Hamilton; William J. Hozack. *Clinical Orthopaedics and Related Research*, February 2017.
- **CORR Insights: Otto Aufranc Award: A Multi-center, Randomized Study of Outpatient versus Inpatient Total Hip Arthroplasty.** Javad Parvizi. *Clinical Orthopaedics and Related Research*, February 2017.
- **CORR Insights: One-stage Revision With Catheter Infusion of Intraarticular Antibiotics Successfully Treats Infected THA.** Antonia F. Chen. *Clinical Orthopaedics and Related Research*, February 2017.
- **Patellofemoral Arthroplasty: An Evolving Science.** Jess H. Lonner. *Instructional Course Lectures*, February 2017.
- **What Are the Frequency, Associated Factors, and Mortality of Amputation and Arthrodesis After a Failed Infected TKA?** Min-Sun Son; Edmund Lau; Javad Parvizi; Michael A. Mont; Kevin J. Bozic; Steven Kurtz. *Clinical Orthopaedics and Related Research*, February 2017.
- **Do Conversion Total Hip Arthroplasty Yield Comparable Results to Primary Total Hip Arthroplasty?** Ran Schwarzkopf; Garwin Chin; Kelvin Kim; Dermot Murphy; Antonia F. Chen. *Journal of Arthroplasty*, March 2017.
- **Periprosthetic Joint Infections Caused by Enterococci Have Poor Outcomes.** Michael M. Kheir; Timothy L. Tan; Carlos Higuera; Jaiben George; Craig J. Della Valle; Mary Shen; Javad Parvizi. *Journal of Arthroplasty*, March 2017.
- **In-Hospital Mortality in Patients With Periprosthetic Joint Infection.** Alisina Shahi; Timothy L. Tan; Antonia F. Chen; Mitchell G. Maltenfort; Javad Parvizi. *Journal of Arthroplasty*, March 2017.
- **Dual Mobility Acetabular Cup for Total Hip Arthroplasty: Use With Caution.** Hamed Vahedi; Asim M. Makhdom; Javad Parvizi. *Expert Review of Medical Devices*, March 2017.
- **CORR Insights: Antibacterial and Biocompatible Titanium-Copper Oxide Coating May Be a Potential Strategy to Reduce Periprosthetic Infection: An In Vitro Study.** Carl A Deirmengian. *Clinical Orthopaedics and Related Research*, March 2017.
- **The Role of Biomarkers in the Diagnosis of Periprosthetic Joint Infection.** Alisina Shahi; Javad Parvizi. *EFORT Open Reviews*, March 2017.
- **Revision Total Knee Arthroplasty With Porous-Coated Metaphyseal Sleeves Provides Radiographic Ingrowth and Stable Fixation.** Catherine J. Fedorka; Antonia F. Chen; Michael R. Pagnotto; Lawrence S. Crosssett; Brian A. Klatt. *Knee Surgery, Sports Traumatology, Arthroscopy*, March 2017.
- **Patients With Failed Prior Two-Stage Exchange Have Poor Outcomes After Further Surgical Intervention.** Michael M. Kheir; Timothy L. Tan; Miguel Gomez; Antonia F. Chen; Javad Parvizi. *Journal of Arthroplasty*, April 2017.
- **The Incidence and Economic Burden of In-Hospital Venous Thromboembolism in the United States.** Alisina Shahi; Antonia F. Chen; Timothy L. Tan; Mitchell G. Maltenfort; Fatih Kucukdurmaz; Javad Parvizi. *Journal of Arthroplasty*, April 2017.
- **Is There Still a Role for Irrigation and Debridement With Liner Exchange in Acute Periprosthetic Total Knee Infection?** Andres F. Duque; Zachary D. Post; Rex W. Lutz; Fabio R. Orozco; Sergio Pulido; Alvin C. Ong. *Journal of Arthroplasty*, April 2017.
- **Improvements in Sexual Activity After Total Knee Arthroplasty.** Gregory S. Kazarian; Jess H. Lonner; William J. Hozack; Laura Woodward; Antonia F. Chen. *Journal of Arthroplasty*, April 2017.
- **Effect of Inner Taper Angle of Acetabular Metal Shell on the Malseating and Dissociation Force of Ceramic Liner.** Young-Kyun; Lee; Ki-Chul Kim; Woo-Lam Jo; Yong-Chan Ha; Javad Parvizi; Kyung-Hoi Koo. *Journal of Arthroplasty*, April 2017.
- **Heterotopic Ossification in Primary Total Hip Arthroplasty Using the Direct Anterior vs Direct Lateral Approach.** Pouya Alijanipour; Ripal Patel; Tejal U. Naik; Javad Parvizi. *Journal of Arthroplasty*, April 2017.
- **Should Preoperative Antibiotics Be Tailored According to Patient's Comorbidities and Susceptibility to Organisms?** Timothy L. Tan; Miguel M. Gomez; Michael M. Kheir; Mitchell G. Maltenfort; Antonia F. Chen. *Journal of Arthroplasty*, April 2017.
- **Do Stem Taper Microgrooves Influence Taper Corrosion in Total Hip Arthroplasty? A Matched Cohort Retrieval Study.** Christina M. Arnholt; Daniel W. MacDonald; Richard J. Underwood; Eric P. Guyer; Clare M. Rimnac; Steven M. Kurtz and The Implant Research Center Writing Committee; Michael A. Mont; Gregg R. Klein; Gwo-Chin Lee; Antonia F. Chen; Brian R. Hamlin; Harold E. Cate; Arthur L. Malkani; Matthew J. Kraay. *Journal of Arthroplasty*, April 2017.
- **Statistics In Brief: Minimum Clinically Important Difference – Availability of Reliable Estimates.** Mitchell G. Maltenfort; Claudio Diaz-Ledezma. *Clinical Orthopaedics and Related Research*, April 2017.
- **Prevention of Periprosthetic Joint Infection: New Guidelines.** Javad Parvizi; Noam Shohat; Thorsten Gehrke. *Bone and Joint Journal*, April 2017.
- **Postoperative Analgesia in Patients Undergoing Primary or Revision Knee Arthroplasty with Adductor Canal Block.** Alexander E. Grant; Eric S. Schwenk; Marc C. Torjman; Richard Hillesheim; Antonia F. Chen. *Anesthesiology and Pain Medicine*, April 2017.
- **Formal Physical Therapy After Total Hip Arthroplasty Is Not Required: A Randomized Controlled Trial.** Matthew S. Austin; Brian T. Urbani; Andrew N. Fleischman; Navin D. Fernando; James J. Purtill; William J. Hozack; Javad Parvizi; Richard H. Rothman. *Journal of Bone and Joint Surgery*, April 2017.
- **Reactive Scoliosis: A Challenging Phenomenon in Adolescent Patients With Hip Arthritis.** Madhav Chowdhry; Laura Matsen Ko; Corinna Franklin; Javad Parvizi. *Arthroplasty Today*, April 2017.
- **Introduction to the Centers for Disease Control and Prevention and Healthcare Infection Control Practices Advisory Committee Guideline for Prevention of Surgical Site Infection: Prosthetic Joint Arthroplasty Section.** John Segreti; Javad Parvizi; Elie Berbari; Philip Ricks; Sandra I. Berrios-Torres. *Surgical Infections*, May 2017.
- **Future Research Opportunities in Peri-Prosthetic Joint Infection Prevention.** Elie Berbari; John Segreti; Javad Parvizi; Sandra I. Berrios-Torres. *Surgical Infections*, May 2017.
- **Radiographic Imaging in the Postanesthesia Care Unit is Unnecessary After Partial Knee Arthroplasty.** Andrew S. Longenecker; Gregory S. Kazarian; Giovanni P. Boyer; Jess H. Lonner. *Journal of Arthroplasty*, May 2017.
- **Choosing a Femoral Head: A Survey Study of Academic Adult Reconstructive Surgeons.** Sumon Nandi; Matthew S. Austin. *Journal of Arthroplasty*, May 2017.
- **Modular Versus Nonmodular Tibial Inserts in Total Knee Arthroplasty: What Are the Differences?** Asim M. Makhdom; Javad Parvizi. *Annals of Translational Medicine*, May 2017.
- **Broach Handle Design Changes Force Distribution in the Femur During Total Hip Arthroplasty.** Dustin A. Greenhill; Dustin A. Greenhill; Pooyan Abbasi; Kurosh Darvish; Andrew M. Star. *Journal of Arthroplasty*, June 2017.
- **Leukocyte Esterase Strip Test Can Predict Subsequent Failure Following Reimplantation in Patients With Periprosthetic Joint Infection.** Michael M. Kheir; Colin T. Ackerman; Timothy L. Tan; Andrea Benazzo; Eric H. Tischler; Javad Parvizi. *Journal of Arthroplasty*, June 2017.
- **Preoperative Patellofemoral Chondromalacia is Not a Contraindication for Fixed-Bearing Medial Unicompartmental Knee Arthroplasty.** Alexander J. Adams; Gregory S. Kazarian; Jess H. Lonner. *Journal of Arthroplasty*, June 2017.
- **Venous Thromboembolism Following Hip and Knee Arthroplasty: The Role of Aspirin.** Javad Parvizi; Hasan H. Ceylan; Fatih Kucukdurmaz; Geno Merli; Ibrahim Tuncay; David Beverland. *Journal of Bone and Joint Surgery*, June 2017.
- **Trochantoplasty for Total Hip Arthroplasty in Patients With Coxa Vara Deformity.** Jun-Il Yoo; Javad Parvizi; Ji-ung Song; Yong-Chan Ha; Young-Kyun Lee; Kyung-Hoi Koo. *Journal of Arthroplasty*, July 2017.

- **Management of Periprosthetic Joint Infection: The More We Learn, the Less We Know.** Robert A. Henderson; Matthew S. Austin. *Journal of Arthroplasty*, July 2017.
- **Surgical Case Order Has an Effect on the Risk of Subsequent Periprosthetic Joint Infection.** Antonia F. Chen; Michael M. Kheir; Joshua M. Greenbaum; Camilo Restrepo; Mitchell G. Maltenfort; Javad Parvizi. *Journal of Arthroplasty*, July 2017.
- **Utilization of Total Joint Arthroplasty in Physician-Owned Specialty Hospitals vs Acute Care Facilities.** Antonia F. Chen; Emily Pflug; Daniel O'Brien; Mitchell G. Maltenfort; Javad Parvizi. *Journal of Arthroplasty*, July 2017.
- **Prevention of Periprosthetic Joint Infection: Examining the Recent Guidelines.** Noam Shohat; Javad Parvizi. *Journal of Arthroplasty*, July 2017.
- **Periprosthetic Joint Infection: The Current Hot Topic.** Javad Parvizi. *Journal of Arthroplasty*, July 2017.
- **In Search of the Optimal Wound Dressing Material Following Total Hip and Knee Arthroplasty: A Systematic Review and Meta-Analysis.** Gaurav Sharma; Sang Wook Lee; Oliver Atanacio; Javad Parvizi; Tae Kyun Kim. *International Orthopaedics*, July 2017.
- **Surgical Approaches for Total Hip Arthroplasty.** Vincent M. Moretti; Zachary D. Post. *Indian Journal of Orthopaedics*, July 2017.
- **Vancomycin Prophylaxis for Total Joint Arthroplasty: Incorrectly Dosed and Has a Higher Rate of Periprosthetic Infection Than Cefazolin.** Michael M. Kheir; Timothy L. Tan; Ibrahim Azboy; Dean D. Tan; Javad Parvizi. *Clinical Orthopaedics and Related Research*, July 2017.
- **Corrosion and Tribology of Materials Used in a Novel Reverse Hip Replacement.** Linda Braddon; Zafer Termanini; Steven MacDonald; Javad Parvizi; Jay Lieberman; Victor Frankel; Joseph Zuckerman. *Materials*, July 2017.
- **Incidence and Risk Factors for Postoperative Urinary Retention in Total Hip Arthroplasty Performed Under Spinal Anesthesia.** Charles M. Lawrie; Alvin C. Ong; Victor H. Hernandez; Samuel Rosas; Zachary D. Post; Fabio R. Orozco. *Journal of Arthroplasty*, July 2017.
- **Are Revision Hip Arthroplasty Patients at Higher Risk for Venous Thromboembolic Events Than Primary Hip Arthroplasty Patients?** P. Maxwell Courtney; Anthony J. Boniello; Brett R. Levine; Neil P. Sheth; Wayne G. Paprosky. *Journal of Arthroplasty*, July 2017.
- **Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017.** Sandra I. Berríos-Torres; Craig A. Umscheid; Dale W. Bratzler; Brian Leas; Erin C. Stone; Rachel R. Kelz; Caroline E. Reinke; Sherry Morgan; Joseph S. Solomkin; John E. Mazuski; E. Patchen Dellinger; Kamal M. F. Itani; Elie F. Berbari; John Segreti; Javad Parvizi; Joan Blanchard; George Allen; Jan A. J. W. Kluytmans; Rodney Donlan; William P. Schechter, for the Healthcare Infection Control Practices Advisory Committee. *JA Surgery*, August 2017.
- **Comparison of Short-Term Outcomes After Total Hip Arthroplasty Between an Orthopedic Specialty Hospital and General Hospital.** Eric M. Padegimas; Tyler M. Kreitz; Benjamin M. Zmistowski; Alexander J. Girden; William J. Hozack; Antonia F. Chen. *Journal of Arthroplasty*, August 2017.
- **Improving Value in Total Hip and Knee Arthroplasty: The Role of High Volume Hospitals.** P. Maxwell Courtney; Nicholas B. Frisch; Daniel D. Bohl; Craig J. Della Valle. *Journal of Arthroplasty*, August 2017.
- **2017 American College of Rheumatology/American Association of Hip and Knee Surgeons Guideline for the Perioperative Management of Antirheumatic Medication in Patients With Rheumatic Diseases Undergoing Elective Total Hip or Total Knee Arthroplasty.** Susan M. Goodman; Bryan Springer; Gordon Guyatt; Matthew P. Abdel; Vinod Dasa; Michael George; Ora Gewurz-Singer; Jon T. Giles; Beverly Johnson; Steve Lee; Lisa A. Mandl; Michael A. Mont; Peter Sculco; Scott Sporer; Louis Stryker; Marat Turgunbaev; Barry Brause; Antonia F. Chen; Jeremy Gilliland; Mark Goodman; Arlene Hurley-Rosenblatt; Kyriakos Kirou; Elena Losina; Ronald MacKenzie; Kaleb Michaud; Ted Mikuls; Linda Russell; Alexander Sah; Amy S. Miller; Jasvinder A. Singh; Adolph Yates. *Arthritis and Rheumatology*, August 2017.
- **Environment of Care: Is it Time to Reassess Microbial Contamination of the Operating Room Air as a Risk Factor for Surgical Site Infection in Total Joint Arthroplasty?** Javad Parvizi; Sue Barnes; Noam Shohat; Charles E. Edmiston Jr. *American Journal of Infection Control*, August 2017.
- **Periarticular Liposomal Bupivacaine Injection Versus Intra-Articular Bupivacaine Infusion Catheter for Analgesia After Total Knee Arthroplasty: A Double-blinded, Randomized Controlled Trial.** Eric B. Smith; Gregory S. Kazarian; Mitchell G. Maltenfort; Jess H. Lonner; Peter F. Sharkey; Robert P. Good. *Journal of Bone and Joint Surgery*, August 2017.
- **Comparison of Quadriceps-Sparing and Medial Parapatellar Approaches in Total Knee Arthroplasty: A Meta-Analysis of Randomized Controlled Trials.** Gregory S. Kazarian; Matthew Y. Siow; Antonia F. Chen; Carl A. Deirmengian. *Journal of Arthroplasty*, August 2017.
- **Complications and Mortality Following Total Hip Arthroplasty in the Octogenarians: An Analysis of a National Database.** Anthony J. Boniello; Matthew S. Simon; Chijindu C. Emenari; Paul M. Courtney. *Journal of Arthroplasty*, August 2017.
- **The Impact of Incorporating Antimicrobials into Implant Surfaces.** Noreen J. Hickok; Irving M. Shapiro; Antonia F. Chen. *Journal of Dental Research*, September 2017.
- **A Comparison of Two Dosing Regimens of ASA Following Total Hip and Knee Arthroplasties.** Michael J. Feldstein; Sara L. Low; Antonia F. Chen; Laura A. Woodward; William J. Hozack. *Journal of Arthroplasty*, September 2017.
- **Stepping Toward Objective Outcomes: A Prospective Analysis of Step Count After Total Joint Arthroplasty.** Meredith P. Crizer; Gregory S. Kazarian; Andrew N. Fleischman; Jess H. Lonner; Mitchell G. Maltenfort; Antonia F. Chen. *Journal of Arthroplasty*, September 2017.
- **Utility of Synovial White Blood Cell Count and Differential Before Reimplantation Surgery.** Benjamin M. Zmistowski; Corey T. Clyde; Elie S. Ghanem; James R. Gotoff; Carl A. Deirmengian; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Interpretation of Leukocyte Esterase for the Detection of Periprosthetic Joint Infection Based on Serologic Markers.** Majd Tarabichi; Andrew N. Fleischman; Alisina Shahi; Shaoqi Tian; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Effect of Stem Size and Fixation Method on Mechanical Failure After Revision Total Knee Arthroplasty.** Andrew N. Fleischman; Ibrahim Azboy; Michael Fuery; Camilo Restrepo; Hongyi Shao; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Povidone-Iodine-Based Solutions for Decolonization of Nasal Staphylococcus aureus: A Randomized, Prospective, Placebo-Controlled Study.** Maryam Rezapoor; Thema Nicholson; Reza Mostafavi Tabatabaee; Antonia F. Chen; Mitchell G. Maltenfort; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Optimizing Mechanical Alignment With Modular Stems in Revision TKA.** Andrew N. Fleischman; Ibrahim Azboy; Camilo Restrepo; Mitchell G. Maltenfort; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Determining the Threshold for HbA1c as a Predictor for Adverse Outcomes After Total Joint Arthroplasty: A Multi-center, Retrospective Study.** Majd Tarabichi; Noam Shohat; Michael M. Kheir; Muyibat Adelani; David Brigati; Sean M. Kearns; Pankajkumar Patel; John C. Clohisy; Carlos A. Higuera; Brett R. Levine; Ran Schwarzkopf; Javad Parvizi; William A. Jiranek. *Journal of Arthroplasty*, September 2017.
- **Fretting and Corrosion Damage in Taper Adapter Sleeves for Ceramic Heads: A Retrieval Study.** Daniel W. MacDonald; Antonia F. Chen; Gwo-Chin Lee; Gregg R. Klein; Michael A. Mont; Steven M. Kurtz, and the Taper Corrosion Writing Committee; Harold E. Cates; Matthew J. Kraay; Clare M. Rimnac. *Journal of Arthroplasty*, September 2017.
- **Diagnosing Periprosthetic Joint Infection: And the Winner Is?** Alisina Shahi; Timothy L. Tan; Michael M. Kheir; Dean D. Tan; Javad Parvizi. *Journal of Arthroplasty*, September 2017.
- **Positive Blood Cultures in Periprosthetic Joint Infection Decrease Rate of Treatment Success.** Mitchell R. Klement; Ahmed Siddiqi; Justin M. Rock; Antonia F. Chen; Michael P. Bolognesi; Thorsten M. Seyler. *Journal of Arthroplasty*, September 2017.
- **Serum D-Dimer Test Is Promising for the Diagnosis of Periprosthetic Joint Infection and Timing of Reimplantation.** Alisina Shahi; Michael M. Kheir; Majd Tarabichi; Hamid R.S. Hosseinzadeh; Timothy L. Tan; Javad Parvizi. *The Journal of Bone and Joint Surgery*, September 2017.

- **Survivorship and Complications of Total Hip Arthroplasty in Patients With Dwarfism.** Ronuk Modi; Michael M Kheir; Timothy L Tan; Gregory S Penny; Chilung Chen; Hongyi Shao; Antonia F Chen. *Hip International*, September 2017.
- **Clinical Outcomes and Survivorship of Lateral Unicompartmental Knee Arthroplasty: Does Surgical Approach Matter?** Tori A. Edmiston; Gregory C. Manista; P. Maxwell Courtney; Scott Sporer; Craig Della Valle; Brett R. Levine. *Journal of Arthroplasty*, September 2017.
- **Tibial Shaft Anatomy Differs Between Caucasians and East Asian Individuals.** Hongyi Shao; Chilung Chen; Daniel Scholl; Ahmad Faizan; Antonia F. Chen. *Knee Surgery, Sports Traumatology, Arthroscopy*, September 2017.
- **Acute Kidney Injury After First-Stage Joint Revision for Infection: Risk Factors and the Impact of Antibiotic Dosing.** Jeffrey A. Geller; Gregory Cunn; Thomas Herschmiller; Taylor Murtaugh; Antonia Chen. *Journal of Arthroplasty*, October 2017.
- **Reduced Incidence of Intraoperative Femur Fracture With a Second-Generation Tapered Wedge Stem.** Andrew N. Fleischman; Max M. Schubert; Camilo Restrepo; Antonia F. Chen; Richard H. Rothman. *Journal of Arthroplasty*, November 2017.
- **Midterm Survivorship and Complications of Total Knee Arthroplasty in Patients With Dwarfism.** Timothy L. Tan; Michael M. Kheir; Ronuk Modi; Chi-Lung Chen; Hongyi Shao; Antonia F. Chen. *Journal of Arthroplasty*, November 2017.
- **Mini C-Arm Fluoroscopy: Does Its Configuration Matter for Radiation Exposure to the Surgeon?** Talia Chapman; Dennis P. Martin; Christopher Williamson; Brian Tinsley; Mark L. Wang; Asif M. Ilyas. *Hand*, June 2017.
- **Fluoroscopic Exposure With Use of Mini-C-Arm During Routine Hand Surgery: A Prospective Comparison of Hand Versus Eye Radiation Dosage.** Mark L. Wang; C. Edward Hoffer; Asif M. Ilyas; Pedro K. Beredjikian; Charles F. Leinberry. *Journal of Surgical Orthopaedic Advances*, July 2017.
- **An Economic Analysis of C Versus WALANT: A Trigger Finger Release Surgery Case Study.** Jason L. Coddling; Suneel B. Bhat; Asif M. Ilyas. *Hand*, July 2017.
- **Open Carpal Tunnel Release Outcomes: Performed Wide Awake Versus With Sedation.** J Tulipan; Nayoung Kim; Jack Abboudi; Christopher Jones; Fred Liss; William Kirkpatrick; Michael Rivlin; Mark Wang; Jonas Matzon; Asif M Ilyas. *Journal of Hand and Microsurgery*, August 2017.
- **Preemptive Analgesia in Thumb Basal Joint Arthroplasty: Immediate Postoperative Pain with Preincision versus Postincision Local Anesthesia.** J. Labrum; Asif M. Ilyas. *Journal of Hand and Microsurgery*, August 2017.
- **Patient-Reported Disability Measures Do Not Correlate with Electrodiagnostic Severity in Carpal Tunnel Syndrome.** Jacob E. Tulipan; Kevin F. Lutsky; Mitchell G. Maltenfort; Mitchell K. Freedman; Pedro K. Beredjikian. *PRS Global Open*, August 2017.

Hand & Wrist

- **Prospective Evaluation of Opioid Consumption Following Carpal Tunnel Release Surgery.** Talia Chapman; Nayoung Kim; Mitchell G. Maltenfort; Asif M. Ilyas. *Hand*, January 2017.
- **Frequency of Incidental Median Thenar Motor Nerve Branch Visualization During Mini-Open and Endoscopic Carpal Tunnel Release.** Kevin F. Lutsky; Christopher M. Jones; Nayoung Kim; Juana Medina; Jonas L. Matzon; Pedro K. Beredjikian. *Hand*, January 2017.
- **Hand Surgeons and Orthopedic Trauma Surgeons Call Coverage of Acute Upper Extremity Injuries: Where Should the Line Be Drawn?** Matthew B. Cantlon; Andrew J. Miller; Asif M. Ilyas. *Hand*, January 2017.
- **Prospective Evaluation of Opioid Consumption After Distal Radius Fracture Repair Surgery.** Joseph T. O'Neil; Mark L. Wang; Nayoung Kim; Mitchell Maltenfort; Asif M. Ilyas. *The American Journal of Orthopedics*, January 2017.
- **Interosseous Ligament and Transverse Forearm Stability: A Biomechanical Cadaver Study.** Christina J. Gutowski; Kurosh Darvish; Asif M. Ilyas; Christopher M. Jones. *The Journal of Hand Surgery*, February 2017.
- **Clinical Faceoff: Distal Biceps Rupture: Operative Versus Nonoperative Treatment.** David Ring; John D. Lubahn; Pedro Beredjikian. *Clinical Orthopaedics and Related Research*, February 2017.
- **Shelf Pricing for Distal Radius Fracture Implants.** Pedro K. Beredjikian. *Clinical Orthopaedics and Related Research*, March 2017.
- **A Mobile-Based Surgical Simulation Application: A Comparative Analysis of Efficacy Using a Carpal Tunnel Release Module.** Kamil M. Amer; Taha Mur; Asif M. Ilyas. *Journal of Hand Surgery*, May 2017.
- **Prospective Evaluation of Sleep Improvement Following Carpal Tunnel Release Surgery.** Jacob E. Tulipan; Nayoung Kim; Jack Abboudi; Christopher Jones; Frederic Liss; William Kirkpatrick; Jonas Matzon; Michael Rivlin; Mark L. Wang; Asif M. Ilyas. *Journal of Hand Surgery*, May 2017.
- **An Assessment of Online Reviews of Hand Surgeons.** William Kirkpatrick; Jack Abboudi; Nayoung Kim; Juana Medina; Mitchell Maltenfort; Daniel Seigerman; Kevin Lutsky; Pedro K. Beredjikian. *The Archives of Bone and Joint Surgery*, May 2017.
- **5 Points on Pyogenic Flexor Tenosynovitis of the Hand.** Talia Chapman; Asif M. Ilyas. *American Journal of Orthopedics*, May 2017.
- **Patterns of Production of Collagen-Rich Deposits in Peripheral Nerves in Response to Injury: A Pilot Study in a Rabbit Model.** Michael Rivlin; Andrew Miller; Jacob Tulipan; Pedro K. Beredjikian; Mark L. Wang; Jolanta Fertala; Andrzej Steplewski; James Kostas; Andrzej Fertala. *Brain and Behavior*, May 2017.
- **Neurolysis with Amniotic Membrane Nerve Wrapping for Treatment of Secondary Wartenberg Syndrome: A Preliminary Report.** Michael P. Gaspar; Patrick M. Kane; Michael M. Vosbikian; Constantinos Ketonis; Mark S. Rekan. *Journal of Hand Surgery Asian Pacific*, June 2017.

- **Safe Return to Driving After Volar Plating of Distal Radius Fractures.** Christopher M. Jones; Randle W. Ramsey; Asif Ilyas; Jack Abboudi; William Kirkpatrick; Thomas Kalina; Charles Leinberry. *Journal of Hand Surgery*, September 2017.
- **Technique for Intramedullary Stabilization of Ulnar Neck Fractures.** Jack Abboudi; Scott M. Sandilands; C. Edward Hoffer II; William Kirkpatrick; William Emper. *Hand*, September 2017.
- **A Prospective Randomized Study Comparing Marcaine Versus Exparel for Pain Management After Distal Radius Fracture Repair Surgery.** Todd H. Alter; Frederic E. Liss; Asif M. Ilyas. *Journal of Hand Surgery*, September 2017.
- **Incidence of Glove Perforation During Hand Surgical Procedures.** Kevin F. Lutsky; Christopher Jones; Jack Abboudi; William Kirkpatrick; Fred Liss; Charles Leinberry; Asif Ilyas; Dennis Martin; Pedro K. Beredjikian. *Journal of Hand Surgery*, October 2017.

Foot & Ankle

- **Treatment of Plantar Fasciitis With Botulinum Toxin.** Jamal Ahmad; Stacy H. Ahmad; Kennis Jones. *Foot & Ankle International*, January 2017.
- **Operative Treatment of Lateral Ligament Instability.** Rachel J. Shakked; Sydney Karnovsky; Mark C. Drakos. *Current Reviews in Musculoskeletal Medicine*, March 2017.
- **Tarsal Navicular Stress Fractures.** Rachel J. Shakked; Emily E. Walters; Martin J. O'Malley. *Current Reviews in Musculoskeletal Medicine*, March 2017.
- **Bilateral Posterior Tibial Tendon and Flexor Digitorum Longus Dislocations.** Eric M. Padegimas; David M. Beck; David I. Pedowitz. *Foot & Ankle Specialist*, April 2017.
- **Tibialis Anterior Tendon Reconstruction Using Augmented Half-Thickness Tendon Segment Transposition.** Christopher W. Reb; James F. Stenson IV; Joseph N. Daniel. *Foot & Ankle Specialist*, April 2017.
- **Midterm Outcome of the Agility Total Ankle Arthroplasty.** Steven M. Raikin; Kristin Sandrowski; Justin M. Kane; David Beck; Brian S. Winters. *Foot and Ankle International*, June 2017.
- **Factors Contributing to Hospital Stay and Total Inpatient Charges in Total Ankle Arthroplasty: Review of the National Inpatient Sample.** Jason L. Coddling; Benjamin M. Zmistowski; Daniel E. Davis; Mitchell G. Maltenfort; David I. Pedowitz. *Foot & Ankle Specialist*, July 2017.
- **Content Relevance of the Foot and Ankle Ability Measure in Patients With Achilles Tendon Diseases.** Christopher W. Reb; Sundeep S. Saini; James F. Stenson; Mohamed F. Albana; David I. Pedowitz; Steven M. Raikin; Joseph N. Daniel. *Foot & Ankle Specialist*, July 2017.
- **Outcomes After Percutaneous Reduction and Fixation of Low-Energy Lisfranc Injuries.** Michael Vosbikian; Joseph T. O'Neil; Christine Piper; Ronald Huang; Steven M. Raikin. *Foot & Ankle International*, July 2017.

- **Adult-Acquired Flatfoot Deformity: Etiology, Diagnosis, and Management.** Mostafa M. Abousayed; Maxwell C. Alley; Rachel Shakked; Andrew J. Rosenbaum. *JBJS Reviews*, August 2017.
- **Predicting Failure of Nonoperative Treatment for Insertional Achilles Tendinosis.** James F. Stenson; Christopher W. Reb; Joseph N. Daniel; Sundeep S. Saini; Mohammed F. Albana. *Foot & Ankle Specialist*, September 2017.
- **Driving After Hallux Valgus Surgery.** Elizabeth McDonald; Rachel Shakked; Joseph Daniel; David I. Pedowitz; Brian S. Winters; Christopher Reb; Mary-Katherine Lynch; Steven M. Raikin. *Foot & Ankle International*, September 2017.
- **Economic Burden of Inpatient Admission of Ankle Fractures.** Justin D. Stull; Suneel B. Bhat; M. Phil; Justin M. Kane; Steven M. Raikin. *Foot & Ankle International*, September 2017.
- **Incidence and Risk Factors of Venous Thromboembolism After Orthopaedic Foot and Ankle Surgery.** Jamal Ahmad; Mary-Katherine Lynch; Mitchell Maltenfort. *Foot & Ankle Specialist*, October 2017.
- **Total Ankle Arthroplasty: Comparing Perioperative Outcomes When Performed at an Orthopaedic Specialty Hospital Versus an Academic Teaching Hospital.** David M. Beck; Eric M. Padegimas; David I. Pedowitz; Steven M. Raikin. *Foot & Ankle Specialist*, October 2017.

Shoulder & Elbow

- **The Use of Indomethacin in the Prevention of Postoperative Radioulnar Synostosis After Distal Biceps Repair.** Callista L. Costopoulos; Joseph A. Abboud; Matthew L. Ramsey; Charles L. Getz; Daniel S. Sholder; John P. Taras; Daniel Huttman; Mark D. Lazarus. *Journal of Shoulder and Elbow Surgery*, February 2017.
- **Shoulder Synovial Fluid Lipoprotein Levels and Their Relationship to the Rotator Cuff.** Daniel E. Davis; Alexa Narzikul; Daniel Sholder; Mark Lazarus; Surena Namdari; Joseph Abboud. *Medicine & Science in Sports & Exercise*, March 2017.
- **Classifications in Brief: Hamada Classification of Massive Rotator Cuff Tears.** Tyler J. Brodin; Gary F. Updegrave; John G. Horneff. *Clinical Orthopaedics and Related Research*, April 2017.
- **Randomized Controlled Trial of Interscalene Block Compared with Injectable Liposomal Bupivacaine in Shoulder Arthroplasty.** Surena Namdari; Thema Nicholson; Joseph Abboud; Mark Lazarus; Dean Steinberg; Gerald Williams. *Journal of Bone and Joint Surgery*, April 2017.
- **Locking Cap Designs Improve Fatigue Properties of Polyaxial Screws in Upper Extremity Applications.** Surena Namdari; Samir Mehta; Ann Tierney; Michael W. Hast. *Journal of Orthopaedic Trauma*, May 2017.
- **Blocking Collagen Fibril Formation in Injured Knees Reduces Flexion Contracture in a Rabbit Model.** Andrzej Steplewski; Jolanta Fertala; Pedro K. Beredjicklian; Joseph A. Abboud; Mark L. Y. Wang; Surena Namdari; Jonathan Barlow; Michael Rivlin; William V. Arnold; James Kostas; Cheryl Hou; Andrzej Fertala. *Journal of Orthopaedic Research*, May 2017.
- **Humeral Shaft Fractures: National Trends in Management.** Bradley S. Schoch; Eric M. Padegimas; Mitchell Maltenfort; James Krieg; Surena Namdari. *Journal of Orthopaedics and Traumatology*, May 2017.
- **Evaluation and Management of Axillary Artery Injury: The Orthopaedic and Vascular Surgeon's Perspective.** Eric M. Padegimas; Bradley S. Schoch; Jeon Kwon; Paul J. DiMuzio; Gerald R. Williams; Surena Namdari. *JBJS Reviews*, May 2017.
- **Future Surgery After Revision Shoulder Arthroplasty: The Impact of Unexpected Positive Cultures.** Eric M. Padegimas; Cassandra Lawrence; Alexa C. Narzikul; Benjamin M. Zmistowski; Joseph A. Abboud; Gerald R. Williams; Surena Namdari. *Journal of Shoulder and Elbow Surgery*, June 2017.
- **An Analysis of Surgical and Nonsurgical Operating Room Times in High-Volume Shoulder Arthroplasty.** Eric M. Padegimas; Benjamin A. Hendy; Cassandra Lawrence; Richard Devasagayaraj; Benjamin M. Zmistowski; Joseph A. Abboud; Mark D. Lazarus; Gerald R. Williams; Surena Namdari. *Journal of Shoulder and Elbow Surgery*, June 2017.
- **Defining Optimal Calcar Screw Positioning in Proximal Humerus Fracture Fixation.** Eric M. Padegimas; Benjamin Zmistowski; Cassandra Lawrence; Aaron Palmquist; Thema A. Nicholson; Surena Namdari. *Journal of Shoulder and Elbow Surgery*, July 2017.

- **Classifying glenohumeral synovitis: A Novel Intraoperative Scoring System.** Daniel E. Davis; Mitchell Maltenfort; Joseph A. Abboud; Charles Getz; Rothman Institute Shoulder Consortium Group and the Association of Clinical Elbow and Shoulder Surgeons. *Journal of Shoulder and Elbow Surgery*, July 2017.
- **Stemless Shoulder Arthroplasty: Review of Early Clinical and Radiographic Results.** Tyler J. Brodin; Ryan M. Cox; Joseph A. Abboud; Surena Namdari. *JBJS Reviews*, August 2017.
- **Routine Cultures for Seemingly Aseptic Revision Shoulder Arthroplasty: Are They Necessary?** Tyler J. Brodin; Daniel J. Hackett; Joseph A. Abboud; Jason E. Hsu; Surena Namdari. *Journal of Shoulder and Elbow Surgery*, August 2017.
- **Glenohumeral Mismatch in Anatomic Total Shoulder Arthroplasty.** Bradley Schoch; Joseph Abboud; Surena Namdari; Mark Lazarus. *JBJS Reviews*, September 2017.
- **Preoperative Doxycycline Does Not Decolonize Propionibacterium Acnes from the Skin of the Shoulder: A Randomized Controlled Trial.** Surena Namdari; Thema Nicholson; Javad Parvizi; Matthew Ramsey. *Journal of Shoulder and Elbow Surgery*, September 2017.
- **Results of Total Elbow Arthroplasty in Patients Less Than 50 Years Old.** Bradley Schoch; Justin Wong; Joseph Abboud; Mark Lazarus; Charles Getz; Matthew Ramsey. *The Journal of Hand Surgery*, October 2017.
- **A Prospective Randomized Study Analyzing Preoperative Opioid Counseling in Pain Management After Carpal Tunnel Release Surgery.** Todd H. Alter; Asif M. Ilyas. *The Journal of Hand Surgery*, October 2017.
- **Survivorship of Hemiarthroplasty With Concentric Glenoid Reaming for Glenohumeral Arthritis in Young, Active Patients With a Biconcave Glenoid.** Charles L. Getz; Kenneth A. Kearns; Eric M. Padegimas; Peter S. Johnston; Mark D. Lazarus; Gerald R. Williams. *Journal of the American Academy of Orthopaedic Surgeons*, October 2017.
- **Functional Outcomes of Distal Triceps Tendon Repair Comparing Transosseous Bone Tunnels With Suture Anchor Constructs.** John G. Horneff III; Alexander Aleem; Thema Nicholson; Gregory Lervick; Anand Murthi; Paul Sethi; Charles Getz; Mark D. Lazarus; Matthew L. Ramsey; Joseph A. Abboud; Robert Tashjian. *Journal of Shoulder and Elbow Surgery*, October 2017.

Trauma

- **Management and Radiographic Outcomes of Femoral Head Fractures.** John A. Sclaro; Geoffrey Marecek; Reza Firoozabadi; James C. Krieg; Milton Lee Routt. *Journal of Orthopaedics and Traumatology*, February 2017.
- **Medicare Reimbursement and Orthopedic Surgery: Past, Present, And Future.** R. Carter Clement; Suneel B. Bhat; Meredith E. Clement; James C. Krieg. *Current Reviews in Musculoskeletal Medicine*, June 2017.

Sports Medicine

- **Avoiding Tommy John Surgery.** Brian J. Rebolledo; Jeffrey R. Dugas; Asheesh Bedi; Michael G. Ciccotti; David W. Altchek; Joshua S. Dines. *American Journal of Sports Medicine*, March 2017.
- **Epidemiology and Impact of Abdominal Oblique Injuries in Major and Minor League Baseball.** Christopher L. Camp; Stan Conte; Steven B. Cohen; Matthew Thompson; John D' Angelo; Joseph T. Nguyen; Joshua S. Dines. *Orthopaedic Journal of Sports Medicine*, March 2017.
- **Length of Time Between Surgery and Return To Sport After Ulnar Collateral Ligament Reconstruction in Major League Baseball Pitchers Does Not Predict Need for Revision Surgery.** Brandon J. Erickson; Peter N. Chalmers; Bernard R. Bach, Jr; Joshua S. Dines; Nikhil N. Verma; Charles A. Bush-Joseph; Steven B. Cohen; Anthony A. Romeo. *Journal of Shoulder and Elbow Surgery*, April 2017.
- **Anatomic Anterior Cruciate Ligament Reconstruction via Independent Tunnel Drilling: A Systematic Review of Randomized Controlled Trials Comparing Patellar Tendon and Hamstring Autografts.** Michael C. Ciccotti; Eric Secrist; Fotios Tjoumakaris; Michael G. Ciccotti; Kevin B. Freedman. *Arthroscopy*, May 2017.
- **Pain Management After Outpatient Shoulder Arthroscopy: A Systematic Review of Randomized Controlled Trials.** William J. Warrender; Usman Ali M. Syed; Sommer Hammoud; William Emper; Michael G. Ciccotti; Joseph A. Abboud; Kevin B. Freedman. *The American Journal of Sports Medicine*, June 2017.

- **Rehabilitation Protocols After Isolated Meniscal Repair: A Systematic Review.** Kevin O'Donnell; Kevin B. Freedman; Fotios P. Tjoumakaris. *The American Journal of Sports Medicine*, June 2017.
- **Long-term Correction in Sleep Disturbance Is Sustained After Arthroscopic Rotator Cuff Repair.** John G. Horneff; Fotios Tjoumakaris; Charles Wowkanech; Matthew Pepe; Bradford Tucker; Luke Austin. *The American Journal of Sports Medicine*, June 2017.
- **Return-to-Play Guidelines After Medial Patellofemoral Ligament Surgery for Recurrent Patellar Instability: A Systematic Review.** Saif Zaman; Alex White; Weilong J. Shi; Kevin B. Freedman; Christopher C. Dodson. *The American Journal of Sports Medicine*, June 2017.
- **Long-Term Outcomes in Anterior Cruciate Ligament Reconstruction: A Systematic Review of Patellar Tendon Versus Hamstring Autografts.** Kirsten L. Poehling-Monaghan; Hytham Salem; Kirsten E. Ross; Eric Secrist; Michael C. Ciccotti; Fotios Tjoumakaris; Michael G. Ciccotti; Kevin B. Freedman. *Orthopaedic Journal of Sports Medicine*, June 2017.
- **Female Runner With Painful Left Thigh Swelling: A Case of May-Thurner Syndrome.** Ziva Petrin; Charles Wowkanech; Anupam N. Sinha; Sunny Gupta; Mitesh K. Patel. *Physical Medicine & Rehabilitation*, June 2017.
- **Appropriate Use Criteria for Hyaluronic Acid in the Treatment of Knee Osteoarthritis in the United States.** Arup K. Bhadra; Roy Altman; Vinod Dasa; Karen Myrick; Jeffrey Rosen; Vijay Vad, Peter Vitanzo; Michelle Bruno; Hillary Kleiner; Caryn Just. *Cartilage*, July 2017.
- **Knee Squeaking Secondary to Intra-articular Nonabsorbable Suture: A Report of 2 Cases.** Jake Zarah; Zaira S. Chaudhry; Kevin B. Freedman; Paul Marchetto; Sommer Hammoud. *Orthopaedic Journal of Sports Medicine*, July 2017.
- **Magnetic Resonance Imaging for Assessing Hamstring Injuries: Clinical Benefits And Pitfalls – A Review of the Current Literature.** Max Greenky; Steven B Cohen. *Open Access Journal of Sports Medicine*, July 2017.
- **Intraoperative Radiation Exposure During Hip Arthroscopy.** John P. Salvo; Jake Zarah; Zaira S. Chaudhry; Kirsten L. Poehling-Monaghan. *Orthopaedic Journal of Sports Medicine*, July 2017.
- **Early Single-Sport Specialization: A Survey of 3090 High School, Collegiate, and Professional Athletes.** Patrick S. Buckley; Meghan Bishop; Patrick Kane; Michael C. Ciccotti; Stephen Selverian; Dominique Exume; William Emper; Kevin B. Freedman; Sommer Hammoud; Steven B. Cohen; Michael G. Ciccotti. *Orthopaedic Journal of Sports Medicine*, July 2017.
- **Radiographic Femoral Bicondylar Width Predicts Anterior Cruciate Ligament Insertion Site Sizes.** Christopher D. Murawski; Antonia F. Chen; Freddie H. Fu. *Knee Surgery, Sports Traumatology, Arthroscopy*, August 2017.
- **Elbow Injuries in Professional Baseball: Epidemiological Findings From the Major League Baseball Injury Surveillance System.** Michael G. Ciccotti; Keisha M. Pollack; Michael C. Ciccotti; John D'Angelo; Christopher S. Ahmad; David Altchek; James Andrews; Frank C. Curriero. *The American Journal of Sports Medicine*, August 2017.
- **Incidence and Characterization of Hypoesthesia in the Distribution of the Infrapatellar Branch of the Saphenous Nerve after Anterior Cruciate Ligament Reconstruction: A Prospective Study of Patient-Reported Numbness.** Steven Brad Cohen; Russell Flato; Jocelyn Wascher; Ryan Watson; Matthew Salminen; Daniel O'Brien; Fotios Tjoumakaris; Michael Ciccotti. *Journal of Knee Surgery*, August 2017.
- **Biologic Injections for Osteoarthritis and Articular Cartilage Damage: Can We Modify Disease?** Weilong J. Shi; Fotios P. Tjoumakaris; Mayan Lendner; Kevin B. Freedman. *The Physician and Sportsmedicine*, September 2017.
- **National Football League Skilled and Unskilled Positions Vary in Opportunity and Yield in Return to Play After an Anterior Cruciate Ligament Injury.** JaeWon Yang; Jonathan D. Hodax; Jason T. Machan; Eric S. Secrist; Wesley M. Durand; Brett D. Owens; Adam E.M. Eltorai; Christopher C. Dodson. *Orthopaedic Journal of Sports Medicine*, September 2017.
- **The Effect of Obesity on Surgical Treatment of Achilles Tendon Ruptures.** Jamal Ahmad; Kennis Jones. *Journal of the American Academy of Orthopaedic Surgeons*, September 2017.
- **Cartilage Restoration of the Patellofemoral Joint.** Patrick W. Kane; Bradford S. Tucker; Robert Frederick; Michael G. Ciccotti; Kevin B. Freedman. *JBJS Reviews*, October 2017.

Physical Medicine & Rehabilitation

- **Successful Repeat Sacroplasty in a Patient With a Recurrent Sacral Insufficiency Fracture: A Case Presentation.** Jeremy I. Simon; David E. Surrey; Paul Kitei; Matthew Sonagere; Jeffrey Gehret; George Young; David Smoger. *Physical Medicine & Rehabilitation*, April 2017.
- **The Space of Okada with Bilateral Facet Joint Arthrograms During a Lumbar Interlaminar Epidural Injection.** David S. Stolzenberg; Ari C. Greis. *Pain Medicine*, July 2017.

Oncology

- **Clinical Impact of Second-Opinion Musculoskeletal Subspecialty Interpretations During a Multidisciplinary Orthopedic Oncology Conference.** Aleksandr Rozenberg; Barry E. Kenneally; John A. Abraham; Kristin Strogus; Johannes B. Roedel; William B. Morrison; Adam C. Zoga. *Journal of The American College of Radiology*, July 2017.
- **Posttreatment Imaging in Orthopedic Oncology.** George J. Watts; Adam C. Zoga; John A. Abraham. *Seminars in Roentgenology*, October 2017.

3B Orthopaedics at Jefferson Joint

- **Global Forum: An International Perspective on Outpatient Surgical Procedures for Adult Hip and Knee Reconstruction.** J. N. Argenson; H. Husted; A. Lombardi, Jr; R.E. Booth, Jr.; E. Thienpont; *J Bone Joint Surg Am*. 2016 Jul 6;98(13):e55. doi: 10.2106/JBJS.15.00998. Review. PMID: 27385689

Knee

- **Surgical Predictors of Clinical Outcomes After Revision Anterior Cruciate Ligament Reconstruction.** RS Group; C.R. Allen; A.F. Anderson; D.E. Cooper; T.M. DeBerardino; W.R. Dunn; A.K. Haas; L.J. Huston; Lantz; B. Mann; S.K. Nwosu; K.P. Spindler; M.J. Stuart; R.W. Wright; J.P. Albright; A.N. Amendola; J.T. Andrich; C.C. Annunziata; R.A. Arciero; B.R. Bach, Jr; C.L. Baker, III; A.R. Bartolozzi; K.M. Baumgarten; J.R. Bechler; J.H. Berg; G.A. Bernas; S.F. Brockmeier; R.H. Brophy; C.A. Bush-Joseph; J.B. Butler, V; J.D. Campbell; J.L. Carey; J.E. Carpenter; B.J. Cole; J.M. Cooper; C.L. Cox; R.A. Creighton; D.L. Dahm; T.S. David; D.C. Flanigan; R.W. Frederick; T.J. Ganley; E.A. Garofoli; C.J. Gatt, Jr; S.R. Gecha; J.R. Giffin; S.L. Hame; J.A. Hannafin; C.D. Harner; N.L. Harris, Jr; K.S. Hechtman; E.B. Hershman; R.G. Hoellrich; T.M. Hosea; .D.C. Johnson; T.S. Johnson; M.H. Jones; C.C. Kaeding; G.V. Kamath; T.E. Klootwyk; B.A. Levy; C.B. Ma; G.P. Maiers, II; R.G. Marx; M.J. Matava; G.M. Mathien; D.R. McAllister; E.C. McCarty; R.G. McCormack; B.S. Miller; C.W. Nissen; D.F. O'Neill; B.D. Owens; R. D. Parker; M.L. Purnell; A.J. Ramappa; M.A. Rauh; A.C. Rettig; J.K. Sekiya; K.G. Shea; O.H. Sherman; J.R. Slauterbeck; M.V. Smith; J.T. Spang; S.J. Svoboda; T.N. Taft; J.J. Tenuta; E.M. Tingstad; A.F. Vidal; D.G. Viskontas; R.A. White; J.S. Williams, Jr; M.L. Wolcott; B.R. Wolf; J.J. York. *Am J Sports Med*. 2017 Jun 1;363546517712952. doi: 10.1177/0363546517712952. [Epub ahead of print] PMID:28696164
- **Subsequent Surgery After Revision Anterior Cruciate Ligament Reconstruction: Rates and Risk Factors from a Multi-center Cohort.** RS Group; D.Y. Ding; A.L. Zhang; C.R. Allen; A.F. Anderson; D.E. Cooper; T.M. DeBerardino; W.R. Dunn; A.K. Haas; L.J. Huston; B.B.A. Lantz; B. Mann; K.P. Spindler; M.J. Stuart; R.W. Wright; J.P. Albright; A.N. Amendola; J.T. Andrich; C.C. Annunziata; R.A. Arciero; B.R. Bach, Jr; C.L. Baker, III; A.R. Bartolozzi; K.M. Baumgarten; J.R. Bechler; J.H. Berg; G.A. Bernas; S.F. Brockmeier; R.H. Brophy; C.A. Bush-Joseph; J.B. Butler, V; J.D. Campbell; J.L. Carey; J.E. Carpenter; B.J. Cole; J.M. Cooper; C.L. Cox; R.A. Creighton; D.L. Dahm; T.S. David; D.C. Flanigan; R.W. Frederick; T.J. Ganley; E.A. Garofoli; C.J. Gatt, Jr; S.R. Gecha; J.R. Giffin; S.L. Hame; J.A. Hannafin; C.D. Harner; N.L. Harris, Jr; K.S. Hechtman; E.B. Hershman; R.G. Hoellrich; T.M. Hosea; D.C. Johnson; T.S. Johnson; M.H. Jones; C.C. Kaeding; G.V. Kamath; T.E. Klootwyk; B.A. Levy; C.B. Ma; G.P. Maiers, II; R.G. Marx; M.J. Matava; G.M. Mathien; D.R. McAllister; E.C. McCarty; R.G. McCormack; B.S. Miller; C.W. Nissen; D.F. O'Neill; B.D. Owens; R.D. Parker; M.L. Purnell; A.J. Ramappa; Rauh, A.C. Rettig; J.K. Sekiya; K.G. Shea; O.H. Sherman; J.R. Slauterbeck; M.V. Smith; J.T. Spang; S.J. Svoboda; T.N. Taft; J.J. Tenuta; E.M. Tingstad; A.F. Vidal; D.G. Viskontas; R.A. White; J.S. Williams, Jr; M.L. Wolcott; B.R. Wolf; J.J. York. *Am J Sports Med*. 2017 Jul;45(9):2068-2076. doi: 10.1177/0363546517707207. Epub 2017 May 30. PMID:28557557
- **Meniscal and Articular Cartilage Predictors of Clinical Outcome After Revision Anterior Cruciate Ligament Reconstruction.** RS Group. *Am J Sports Med*. 2016 Jul;44(7):1671-9. doi: 10.1177/0363546516644218. Epub 2016 May 9. PMID:27161867

Philadelphia Hand to Shoulder Center at Jefferson

Hand & Wrist

- **Relative Contributions of the Midcarpal and Radiocarpal Joints to Dart Throwers' Motion at the Wrist.** P.M. Kane; B.G. Vopat; P.K. Mansuripur; M.P. Gaspar; S.W. Wolfe; J.J. Crisco; C. Got. *Journal of Hand Surgery*; E-publication Nov 2017. doi: 10.1016/j.jhsa.2017.10.017.
- **Sleep Disturbance and Response to Surgical Decompression in Patients with Carpal Tunnel Syndrome: A Prospective Randomized Pilot Comparison of Open versus Endoscopic Release.** M.P. Gaspar; M.N. Osterman; E.K. Shin; A.L. Osterman; P.M. Kane. *Acta Biomedica*; Accepted, in press.
- **Midterm Outcomes of Standard Proximal Row Carpectomy Versus Proximal Row Carpectomy With Dorsal Capsular Interposition for Treatment of Late- Stage Wrist Arthropathy.** M.P. Gaspar; P.P. Pham; S.M. Jacoby; E.K. Shin; A.L. Osterman; P.M. Kane. *Bone and Joint Journal*; Accepted, in press.
- **Dual Antegrade Intramedullary Headless Screw Fixation for Treatment of Unstable Proximal Phalanx Fractures.** M.P. Gaspar; S.D. Gandhi; P.M. Kane; R.W. Culp. *HAND*; Accepted, in press.
- **Osteochondral Autograft Transplantation for Proximal Lunate Articular Defects.** M.P. Gaspar; S.M. Jacoby; P.A. Marchetto; P.F. DeLuca; R.W. Culp. *Journal of Wrist Surgery*; 2017 Nov; 6(4):329-333.
- **Neurolysis With Amniotic Membrane Nerve Wrapping for Treatment of Secondary Wartenberg Syndrome.** M.P. Gaspar; P.M. Kane; M.M. Vosbikian; C. Ketonis; M.S. Rekant. *Journal of Hand Surgery Asian Pacific Volume*; 2017 Jun; 22(2):222-228.
- **Predictors of Return to Work after Carpal Tunnel Release in a Workers' Compensation Population.** Kho JY; M.P. Gaspar; P.M. Kane; S.M. Jacoby; E.K. Shin. *HAND*; 2017 May;12(3):246-251.
- **Dorsal Versus Lateral Plate Fixation of Finger Proximal Phalangeal Fractures: A Retrospective Study.** Robinson LP; M.P. Gaspar; A.B. Strohl; Teplitzky SL; Gandhi SD; P.M. Kane; A.L. Osterman. *Archives of Orthopaedic and Trauma Surgery*; 2017 Apr; 137(4):567-572.
- **Modified Long Toe Extensor Tendon Harvest for Use as Intercalary Graft in Upper Extremity Reconstruction.** M.P. Gaspar; Wilbur DM; P.J. Stern; R.W. Culp. *Journal of Hand Surgery*; 2017 Mar; 42(3):e209-e213.
- **Osteochondral Autograft Transplantation for Proximal Lunate Articular Defects.** M.P. Gaspar; S.M. Jacoby; P.A. Marchetto; P.F. DeLuca; R.W. Culp. *Journal of Wrist Surgery*; E-publication Mar 2017. doi: 10.1055/s-0037-1599215.
- **Challenges in Evaluating Sleep Disturbances in Patients with Hand and Upper Extremity Disease.** M.P. Gaspar; P.M. Kane; S.M. Jacoby; A.L. Osterman. *Archives of Bone and Joint Surgery*; 2017; Mar; 5(2):129-130.
- **Distal Interphalangeal Joint Arthrodesis Complicated by Post-Operative Infection: A Rare Presentation of Disseminated Herpes Simplex Virus.** M.N. Osterman; M.P. Gaspar. *Journal of Hand Surgery*; 2017 Jan; 42(1):e57-e60.
- **Multifocal Neuropathy: Expanding the Scope of Double Crush Syndrome.** B.H. Cohen; M.P. Gaspar; A.H. Daniels; E. Akelman; P.M. Kane. *Journal of Hand Surgery*; 2016 Dec; 41(12):1171-1175.
- **Evaluation and Management of Sleep Disorders in the Hand Surgery Patient.** M.P. Gaspar; P.M. Kane; S.M. Jacoby; P.S. Gaspar; A.L. Osterman. *Journal of Hand Surgery*; 2016 Oct; 41(10):1019-1026.
- **Geographic and Age-Based Discrepancies in Medicare Reimbursement Among ASSH Members.** M.P. Gaspar; P.M. Kane; G.B. Honik; S.M. Jacoby; E.K. Shin; A.L. Osterman. *HAND*; 2016 Sep; 11(3):347-352.
- **Metacarpophalangeal and Interphalangeal Arthroplasty Using Osteochondral Autograft Transfer: Technique.** A.J. Micev; M.P. Gaspar; R.W. Culp. *Techniques in Hand and Upper Extremity Surgery*; 2016 Sep; 20(3):108-112.
- **Single Incision Carpal Tunnel Release and Distal Radius Open Reduction Internal Fixation: A Cadaveric Study.** M.P. Gaspar; B.A. Sessions; B.S. Dudoussat; P.M. Kane. *Journal of Wrist Surgery*; 2016 Aug; 5(3):241-246.
- **Arthroscopic Trapeziectomy with Suture Button Suspensionplasty (AT): A Retrospective Review of 153 Cases.** G. Landes; M.P. Gaspar; P. Goljan; S.M. Jacoby; A. Bachoura; R.W. Culp. *HAND*; 2016 Jun; 11(2): 232-237.
- **Predicting Revision Following In-Situ Ulnar Nerve Decompression for Patients with Idiopathic Cubital Tunnel Syndrome.** M.P. Gaspar; P.M. Kane; D. Putthiwara; S.M. Jacoby; A.L. Osterman. *Journal of Hand Surgery*; 2016 Mar; 41(3):427-435.
- **Variables Prognostic for Delayed Union and Nonunion Following Ulnar Shortening fixed with a Dedicated Osteotomy Plate.** M.P. Gaspar; P.M. Kane; R.C. Zohn; T.B. Buckley; S.M. Jacoby; E.K. Shin. *Journal of Hand Surgery*; 2016 Feb; 41(2):237-243.e2.
- **Following Partial and Total Wrist Arthroplasty: A Single-Center Retrospective Review.** M.P. Gaspar; J. Lou; P.M. Kane; S.M. Jacoby; A.L. Osterman; R.W. Culp. *Complications Journal of Hand Surgery*; 2016 Jan; 41(1):47-53.e4.
- **Friction Blisters on the Hand Treated Successfully Using 2-Octyl Cyanoacrylate: A Case Report.** P.A. Gearhart; M.P. Gaspar; S.M. Jacoby. *Journal of Cutaneous Medicine and Surgery*; 2017; 21(3):253-255. doi: 10.1177/1203475416677726.
- **Plemorphic Hyalinizing Angiectatic Tumor Arising in the Hand.** P.M. Kane; M.P. Gaspar; B.B. Whiting; R.W. Culp. *HAND*; 2016 Sep; 11(3):NP20-NP23.
- **Novel Treatment of a Scapholunate Ligament Injury with Proximal Pole Scaphoid Nonunion.** M.P. Gaspar; P.M. Kane; S.M. Jacoby; R.W. Culp. *Journal of Hand and Microsurgery*; 2016 Apr; 8(1):52-56.

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- **Interosseous Membrane Reconstruction Using Bone-Patellar Tendon-Bone Graft for the Chronic Essex-Lopresti Injury: Outcomes at Mean Ten-Year-Follow-Up.** M.P. Gaspar; J.E. Adams; R.C. Zohn; S.M. Jacoby; R.W. Culp; A.L. Osterman; P.M. Kane. *Journal of Bone and Joint Surgery*; Accepted, in press.
- **Single- versus Double- bundle Suture Button Reconstruction of the Forearm Interosseous Membrane for the Chronic Essex-Lopresti Lesion.** M.P. Gaspar; K.A. Kearns; R.W. Culp; A.L. Osterman; P.M. Kane. *Eur J Orthop Surg Traumatol*. 2017 Oct 6. doi: 10.1007/s00590-017-2051-4. [Epub ahead of print].
- **Orthogonal Plating with Corrective Osteotomy for Treatment of Distal Radius Fracture Malunion.** M.P. Gaspar; Kho JY; P.M. Kane; H. Abdelfattah; R.W. Culp. *Journal of Hand Surgery*; 2017 Jan; 42(1):e1-e10.
- **Recurrent Cubital Tunnel Syndrome Treated With Revision Neurolysis and Amniotic Membrane Nerve Wrapping.** M.P. Gaspar; H. Abdelfattah; I.W. Welch; M.M. Vosbikian; P.M. Kane; M.S. Rekant. *Journal of Shoulder and Elbow Surgery*; 2016 Dec; 25(12):2057-2065.
- **Interosseous Membrane Reconstruction with a Suture-Button Construct for Treatment of Chronic Forearm Instability.** M.P. Gaspar; P.M. Kane; E.M. Pflug; S.M. Jacoby; A.L. Osterman; R.W. Culp. *Journal of Shoulder and Elbow Surgery*; 2016 Sep; 25(9):1491-1500.
- **Exploring the Orthopaedic and Rheumatologic Manifestations of Inflammatory Bowel Disease.** M.P. Gaspar; J.P. Gaspar; P.M. Kane. *The Joint-Gut Axis: Bulletin of the Hospital for Joint Diseases*; 2016 Sep; 74(3):185-192.
- **Risk Factors Predicting Revision Surgery After Medial Epicondylectomy for Primary Cubital Tunnel Syndrome.** M.P. Gaspar; P.M. Kane; S.M. Jacoby; A.L. Osterman. *Journal of Shoulder and Elbow Surgery*; 2016 Apr; 25(4):681-687.



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