

Sports Medicine Research at the 2016 AAOS Annual Meeting

Part One: Lower extremity, basic science, and cost-effectiveness

● JEREMY M. BURNHAM, MD, AND RACHEL M. FRANK, MD

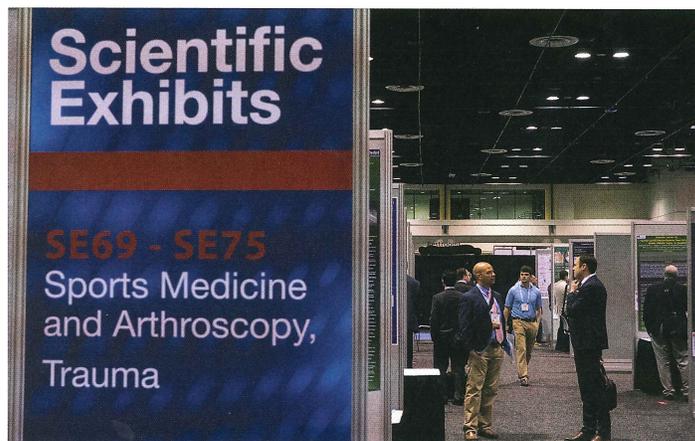
The 2016 Annual Meeting featured innovative and thought-provoking research in all fields of orthopaedics. Summarized here are highlights from sports medicine and arthroscopy presentations covering lower extremity, basic science, and cost-effectiveness. In May, we will feature studies focused on upper extremity, rehabilitation, and return-to-play issues.

Given the many high-quality presentations at this year's meeting, this review is far from comprehensive, but our hope is that it will serve as an illustrative cross-section.

Lower extremity

Robert Westermann, MD, et al looked at meniscal repairs performed at the time of anterior cruciate ligament (ACL) reconstruction, in Poster 402. In this meta-regression analysis, performed at the University of Iowa, the authors included 22 studies reporting on the outcomes following meniscal repair with either all-inside or inside-out techniques performed at the time of ACL reconstruction, with a minimum of 2-year follow-up. The study involved 1,100 patients and found that the failure rate of inside-out repairs at 2 years was 10 percent, while the failure rate of all-inside repairs was 16 percent. The authors recommended that inside-out repairs remain the gold standard when evaluating new treatment techniques. The relatively low volume of studies reporting outcomes after meniscus repairs underscores the need for further research in this area.

Several studies focused on the role of the anterolateral structures of the knee relative to rotatory stability in the setting of an ACL tear. Researchers at the University of Pittsburgh presented a multidisciplinary project to study the structure and function of the anterolateral capsule, in Scientific Exhibit 72. Anatomical, histological, and biomechanical properties of anterolateral structures were investigated in a multifaceted translational project that ranged from basic science to clinical care. Authors **Ata Rahneimai-azar, MD, and Volker Musahl,**



Posters at the 2016 Annual Meeting in Orlando featured a cross-section of research and innovation in sports medicine.

MD, summarized their findings, stating that the “lateral capsule has a secondary role in the rotatory stability of the knee; however, the decision to perform additional extra-articular reconstruction surgeries should be carefully determined, and future research is needed to appropriately address knee rotational instability for patients.”

In another knee study, Paper 362, **Timothy Lording, MD, et al** demonstrated that the lateral meniscus posterior root also provides substantial anterolateral stability in the setting of ACL injury. Further, in Paper 768, **Marco Nitri, MD, et al** observed that anterolateral ligament reconstruction performed concurrently with ACL reconstruction restored the rotatory stability of the knee better than ACL reconstruction alone.

Poster 434 by **Melissa M. Allen, MD, and colleagues** presented findings for second ACL injury in female athletes. In this study out of Mayo, 180 female athletes—90 female soccer players and 90 nonsoccer players—who had undergone ACL reconstruction were retrospectively reviewed. At an average 5.8-year follow-up, the authors found that the soccer cohort sustained significantly more ACL tears on both the surgical knee (11 percent versus 1 percent, $P < 0.01$) and contralateral knee (17 percent versus 4 percent, $P < 0.01$) compared to the nonsoccer players. Interestingly, return to

soccer as well as relatively older age (odds ratio of 1.9 per year) were significant risk factors for ACL re-tear, but not for contralateral ACL tear. This information will be helpful in counseling female athletes, particularly those participating in soccer, on their chances of re-rupture and contralateral knee injury following ACL reconstruction.

Basic science

In a study performed at the University of Missouri, **James L. Cook DVM, PhD, et al** compared canine knees with a normal ACL, a partially torn ACL, and a denervated ACL. In Paper 428, they reported that a canine knee with a denervated ACL showed similar joint dysfunction and osteoarthritic changes as that of a partially ACL-deficient knee.

Christopher Cooke, MD, et al exposed human chondrocytes to bupivacaine, ketolorac, morphine sulfate, and acetaminophen *in vitro*. Their findings, as reported in Poster 457, “Four Chemical Agents for Pain: Are They Cytotoxic for Osteoarthritic Human Chondrocytes?” demonstrated chondrotoxicity with exposure to bupivacaine and acetaminophen. The authors suggested that ketolorac and morphine sulfate may be better agents to use for intra-articular injection after arthroscopic surgery.

Cost-Effectiveness

In “The Cost-Effectiveness of

Anterior Cruciate Ligament Reconstruction in Competitive Athletes” (Poster 420), first author **Bruce Stewart, MD**, presenting author **Amit Momaya, MD**, and colleagues utilized Markov models to compare the cost-effectiveness of ACL reconstruction versus conservative management with physical therapy. The analysis calculated costs and outcomes over a 6-year time horizon, and was based on data from peer-reviewed publications as well as their own institu-

tional data. The incremental cost effectiveness ratio (ICER) for ACL reconstruction was \$22,702 per quality of life year (QALY) gained, lower than the \$50,000 per QALY “willingness to pay” threshold often cited in the literature. The ICER was sensitive to quality of life of returning to play or not returning to play, costs, and follow-up time. This study supported previous studies showing ACL reconstruction is the preferred method of treatment for ACL injury, and

demonstrates that it is a more cost-effective option as well.

Summary

In addition to the presentations highlighted here, there were dozens of video presentations and scientific exhibits that complement and augment the findings discussed in all of the original research podium and poster presentations. Hot topics this year appeared to involve advances in hip arthroscopy, techniques in advanced shoulder

reconstruction, and the growing use of biologic therapy across all areas of sports medicine and arthroscopy. **N**

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The Perioperative Surgical Home: Toward Seamless Patient Care

● **BRAD WADDELL, MD, AND SCOTT F. M. DUNCAN, MD, MPH, MBA**

In recent years, healthcare reform has taken center stage in both political and medical society debates. As healthcare providers seek a safer, more economical approach to treating their patients, we have begun to implement evidence-based, standardized practices and protocols. At the same time, lawmakers demand high-quality and low-cost solutions. Traditional surgical episodes are fragmented—into the preoperative episode, the operative episode, and the postoperative episode. These three episodes traditionally are managed by differing physicians, all led by the surgeon team leader.

In most surgical cases, a surgeon initially sees the patient and recommends surgery. The patient then sees an independent physician for medical clearance and meets the anesthesiologist for the first time right before surgery. Postoperatively, the patient is then cared for by the preoperative clearing physician, the operating surgeon, or another, independent hospitalist. This fragmentation can diminish the quality and efficiency of patient care through delays and gaps in longitudinal management, and increased lengths of stay.

The Perioperative Surgical Home

In an effort to combat these issues and add value and quality to patient care, the Perioperative Surgical Home (PSH) was created by the American Society of Anesthesiologists (ASA). The ASA describes the surgical home as “a patient-centered and physician-led multidisciplinary and team-based system of coordinated care that guides the patient throughout the entire surgical experience.” The concept

centers around the anesthesiologist as the “perioperativist.” After the surgeon recommends surgery, the patient will see the anesthesiologist preoperatively, who will then assume the role of the perioperativist. That role will extend throughout the operative episode and will enable the patient’s care to be managed by a single physician, rather than by multiple physicians.

The anesthesiologist is uniquely positioned to assume the role of leader in the care of the patient because of his or her understanding of the complex nature of medical issues surrounding the operative episode. Although surgeons should not and are not expected to relieve themselves of patient-care duties, their skills can be usefully augmented given the vast experience anesthesiologists bring to perioperative medical management.

For this system to succeed, a set of standard protocols must be developed, thereby removing extraneous tests, expediting care, and decreasing costs. Shared decision making and constant communication is necessary in the pre- and postoperative period.

The PSH divides perioperative care into three key episodes involved in patient care. Each of these contains key elements necessary and important to the success of the system.

- **Preoperative.** Admission should be centralized in a preoperative area or clinic. Standardized protocols for preoperative workup should be established as well as a central system for gathering patient health records. A triage system with a multidisciplinary approach should be utilized to identify complex issues in the

preoperative clearance and optimization of patients.

- **Intraoperative.** The main focus of the PSH intraoperatively is patient care and efficiency. Becoming familiar with the patient preoperatively enables the anesthesiologist to streamline the preoperative blocks and procedures for the case. All this, in turn, leads to fewer cancellations and increased throughput in the operating room.
- **Postoperative.** The postoperative episode is managed by the anesthesiologist with input from the surgeon. Key elements here include coordination of care between all services with mutual decision making. The anesthesiologist will coordinate pain management, discharge education, and discharge to home or rehabilitation facility.

Benefits

Numerous benefits exist with the implementation of standardized protocols and shifting the management of patient care to a single system. While studies are just beginning to emerge on the American version of the PSH, European physicians have experience with their “Enhanced Recovery After Surgery” (ERAS) protocol. This model uses a multimodal approach to standardize preoperative counseling, intraoperative anesthetic technique, and standardized postoperative recovery pathways to increase efficiency, strengthen patient care, and decrease length of stay. The ERAS system is a building block of the current PSH. Multiple studies out of Europe show decreased length of stay, decreased hospital costs, and increased patient safety

with the standardized process. Similarly, a goal of the PSH will be to increase quality of care and increase patient safety while decreasing unnecessary resource utilization.

Obstacles

As with any new system, there are potential road blocks. The most significant hurdle in this model lies in the amount of work required by all parties on the front end of implementation. Significant communication and time are required to develop consensus around the protocols that all parties must follow. Furthermore, it has been mentioned that some surgeons may feel as if they are not captain of the ship any longer for care of their patient. While this can be seen as a negative, having an experienced anesthesiologist augment the three episodes of care can be beneficial for all parties. Finally, this model is ever-changing. With new evidence and literature, the system and its participants must be amenable to change as necessary.

Future Direction

Just as high-performance organizations, such as nuclear power plants or airlines, rely on standardized protocols to increase efficiency and reduce errors, the future of surgical episodes should rely on organized protocols to deliver care. **N**

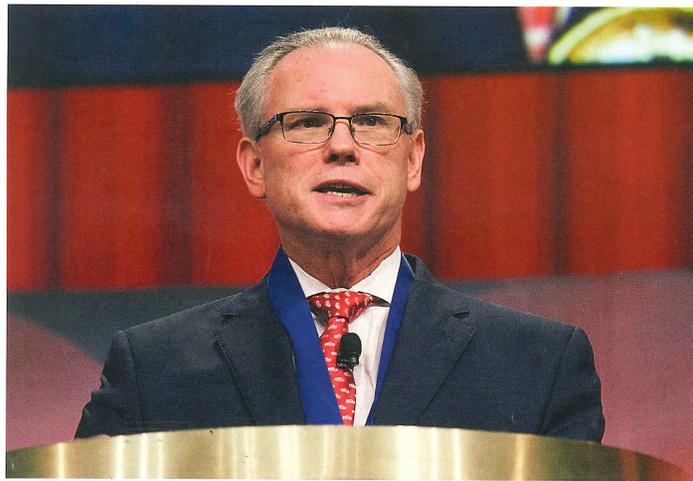
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Gerald R. Williams Jr, MD, Takes the Helm

● JENNIE MCKEE

When Gerald R. Williams Jr, MD, delivered his incoming presidential address during the 2016 AAOS Annual Meeting in Orlando last month, he made it clear that sustaining and encouraging unity in the orthopaedic profession would be a major focus in the coming year.

With a large contingent of his own family members in attendance, Dr. Williams emphasized the challenges and benefits of maintaining a close-knit orthopaedic community, drawing inspiration from Charles A. Rockwood Jr, MD, his residency chair, fellowship director, and mentor, who began his tenure as AAOS president in 1984.



Gerald R. Williams Jr, MD

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Academy to Public: When You're on Your Feet, Stay on Your Toes

New PSA campaign addresses distracted walking, promotes injury prevention and spine-impairment research

● TERRY STANTON

The Academy recently unveiled its 2016 public service announcement (PSA) campaign, which will be distributed to more than 9,000 media outlets across the country. This year's multimedia program—television, radio, and print PSAs—advises the public on how to prevent serious injuries, and emphasizes the following:

- The dangers of distracted walking;
 - The importance of safe, proper ladder use;
 - The significance of bicycle-riders and drivers sharing the road; and
 - Early intervention for spine-related impairment
- "The American Academy of Orthopaedic Surgeons champions the

interests of patients by promoting and advancing optimal musculoskeletal health, injury prevention, and the highest quality patient treatment and care," said AAOS President Gerald R. Williams Jr, MD. "This year's PSAs highlight four important safety topics aimed at elevating public awareness—from sprains, tears, and fractures to getting the proper treatment for spine-related impairment.

"We are a multitasking society, but that behavior can impair our ability to get from point A to point B safely," said Dr. Williams. "Texting, music playing, and technology-distracted pedestrians also are posing a significant public risk to themselves and to others." This year's television ad uses humorous

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FEATURES

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Studies focus on THA, TKA, and steroid injections for trigger finger.

25 Orthopaedic Medical Liability

Survey finds that two-thirds of respondents admit to practicing "defensive medicine" in response to the medical liability climate.



30 CPG on Carpal Tunnel Syndrome

Clinical practice guideline (CPG) represents a substantive update to the carpal tunnel syndrome guidelines originally issued in 2008 and revised in 2011.

34 Distraction City

Exhibit highlighted the Academy's distracted driving and distracted walking campaigns.



44 Professional Compliance Actions

Board of Directors recently considered three grievances filed under the AAOS Professional Compliance Program, as well as a compliance matter not related to the AAOS Standards of Professionalism.



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