TRANSITIONS

Welcome to a jam-packed summer edition of Vanderbilt Orthopaedia.

In the past six months we have accomplished a lot. The contents for this edition includes:

- Singing for the Pope
- Neighbors helping Neighbors for the Gatlinburg fire victims
- Health Care Policy comments
- Transitions

The transition of one academic year to another is always bitter-sweet. Socrates stated that “The secret to change is to focus all of your energy, not on fighting the old, but on building the new”. Some of the Department’s long time favorites decided to leave. Our five Chief residents graduated with a memorable black-tie dinner on July first. Their speeches were articulate and eloquent, bringing tears to the eyes of most. How quickly five years pass and yet, it reminds us of how important our task of educating the future healers of musculoskeletal injuries truly is.

For each prospective class of incoming residents, we search for the very best. The finest not only in terms of intelligence; but also in technical skills, interpersonal abilities, compassion, work ethic, research affinity and their potential to become a future leader. Periodically, we assess the Department’s outcome measures in achieving our educational objectives. All of our residents complete top shelf fellowships. It will be interesting to see what types of positions they hold in their communities once established.

The July edition of AAOS/Now reports on the results of the Academy’s 2016 census of U.S. orthopaedic surgeons. Surgeon density was greatest (>10.5 per 100,000 population) in WY, NH, MT, VT and AK (>13). In contrast AR, WV, NV, MS and TX had the lowest surgeon density at ≤7.5. Thirty-five percent of orthopaedic surgeons worked in a private practice group setting. Seventeen percent were employed at an academic hospital or medical center. Fifty-eight percent claimed to be specialist.

We are undertaking a Vanderbilt Orthopaedic Alumni census asking similar but more focused questions. I hope you will participate, so I can report back to you.

In these ‘dog days’ of summer, remember to concentrate on what is truly important for our families, our patients and our trainees. It helps smooth the ride.

Sincerely,

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Nashville was at the center of the August 21 solar eclipse, the first total solar eclipse to sweep across the entire United States in 99 years. Photo taken on Vanderbilt University’s campus.
Patient with Cancer Sings for Pope at Vatican

Sharon Edwards, a 58-year-old from Fairfield Glade, Tennessee, began the year with an extraordinary opportunity: a trip to the Vatican to sing for the Pope with the Festival Chorale of Fairfield Glade. The journey followed much personal challenge, though.

Edwards had only recently completed rehabilitation from a complex neck surgery and rounds of radiation and chemo to treat a cancerous tumor on her cervical spine, which had metastasized from breast cancer she thought was long gone. Her husband had also passed away just six months before she learned her cancer had returned and spread.

“The tumor involved most of the C2 vertebral body, both in front of and behind the spinal cord,” said her surgeon Bryon Stephens, M.D., of Vanderbilt Spine. In October 2016, he performed a posterior occipital to C5 fusion using a bone graft.

“[The tumor] was nearly circumferential to the spinal cord, which made the surgery technically difficult. The modern chemotherapy and radiation treatments offered at Vanderbilt-Ingram Cancer Center are truly remarkable and have significantly improved the life expectancy of patients with certain types of metastatic cancer, allowing us to consider surgery in situations that previously called for palliative treatment only.”

Stephens and the rest of the Edwards’ care team described her as remarkable, delightful, and determined. She said that although she realizes current medical treatments can’t cure her breast cancer, she knows that new treatments can prolong her life.

“I have a 3-year-old granddaughter and an 8-month-old grandson. I decided if I can just get five years so they can remember me, because right now they would have no memory,” she said.

Following her surgery, Edwards spent one week at Vanderbilt Stallworth Rehabilitation Hospital, where she worked to regain strength for her trip to the Vatican.

“I had told everyone from the beginning, ‘I can’t miss this trip to Italy.’ First of all, it is paid for, and, second of all, not everyone gets to sing for the Pope.”

Read the full story here.

Sethi Organizes Free Health Fairs for Wildfire Victims, Offers Comments on Health Policy

In February, Healthy Tennessee, a non-profit organization founded by Manish Sethi, M.D., Assistant Professor of Orthopaedics & Rehabilitation, and his wife Maya L. Sethi, organized a free health clinic for victims of the Sevier County wildfires and the Pigeon Forge community. Around 200 community members attended the health clinic, which was organized to demonstrate the ability of communities to help each other.

The event was staffed by five physicians and one medical student from Vanderbilt University Medical Center, along with doctors, nurses, and nursing students who volunteered from across East Tennessee, including East Tennessee State University, Lincoln Memorial University, and University of Tennessee College of Nursing, which had 40 students participating.

“We could not do this without the power of community and the local volunteers coming out,” Sethi said at the event. “We’ve got about a hundred folks on the ground today who have come out to help their fellow neighbors and their community because it’s all about, really, neighbors helping neighbors.”

Dr. Herbert Schwartz, chair of the Vanderbilt Department of Orthopaedics and Rehabilitation, echoed Sethi’s sentiments.

“We advertised this as neighbors helping neighbors, and I think there’s so many people that want to help and we’re just one of the hundreds (who) want to help in whatever form it takes,” Schwartz said.

Find more details and photos here.

Sethi was also recently interviewed for an April 2017 Medscape article titled “Republican Health Policy Offers a Mixed Bag for Orthopedists”, stating that “volunteer efforts are the best hope for the United States to help millions of people who can’t afford doctors, medicine, or surgery”.

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“Vanderbilt Orthopaedia”
**Dickinson, Kuhn Publish Article in Journal of Shoulder and Elbow Surgery**

Rebecca Dickinson, DPT, COMT, was first author on the article “A Systematic Review of Cost-Effective Treatment of Postoperative Rotator Cuff Tears,” published in the May 2017 issue of the *Journal of Shoulder and Elbow Surgery*. Co-authors on the paper were John Kuhn, M.D., M.S., Kenneth D. Schermerhorn Professor of Orthopedics and Rehabilitation, Director of Vanderbilt Sports Medicine, Chief of Shoulder Surgery, and head team physician for the Nashville Predators Hockey Club; Jamie Bergner, OTR/L, CHT, COMT; and Katherine Rizzone, M.D., MPH, Assistant Professor of Orthopaedics at the University of Rochester Medical Center.

**The objective of the study was to determine cost-effective, high-quality postoperative rehabilitation dosing and cryotherapy for rotator cuff repair.**

The objective of the study was to determine cost-effective, high-quality postoperative rehabilitation dosing and cryotherapy for patients undergoing rotator cuff repair. The authors performed a systematic review of level I and II articles in PubMed, Cochrane Databases, and PEDro, and also reviewed conference references and bibliographies. The review indicated that the existing research literature demonstrates variable findings regarding supervised versus unsupervised rehabilitation and the use of cryotherapy. The authors concluded that further studies are needed to determine effective dosing of physical therapy after rotator cuff repair, and that cryotherapy is favorable and cost-effective using simple methods for delivery.

**Archer Leads Effort to Measure Resiliency Among Injured Soldiers**

Kristin Archer, Ph.D., DPT, Associate Professor of Orthopaedic Surgery and Rehabilitation and Physical Medicine and Rehabilitation, received a $500,000, three-year grant from the U.S. Department of Defense (DoD) to develop a validated instrument that measures resiliency and risk of slow recovery among injured U.S. military personnel.

Archer and her colleagues will work with the DoD’s only Level I trauma center, the Brooke Army Medical Center in San Antonio, Texas, which maintains a patient registry that will enable the investigators to track relevant clinical outcomes. Extremity trauma is the largest burden of injury from current military conflicts, representing 64 percent of a projected $1.9 billion in disability benefit costs, and account largest percentage of days on limited duty. An accurate instrument to measure resiliency could help to identify injured military personnel who need additional support to achieve better clinical outcomes.

“If we can validate a tool that could predict those who do poorly, we could basically steer them in a direction where they get strategies that can boost resiliency and increase their confidence level early on,” Archer said. Read more here.

**Extremity trauma is the largest burden of injury from current military conflicts, representing 64% of a projected $1.9 billion in disability benefit costs.**

**Article by Schoenecker and Team Featured on Cover of JBMR**

A study led by Nicholas Mignemi, Ph.D., Masato Yuasa, M.D., Courtney Baker, Stephanie Moore, and Jonathan Schoenecker, M.D., Ph.D., Associate Professor of Orthopaedic Surgery and Rehabilitation, was featured on the cover of the *Journal of Bone and Mineral Research* February 2017 issue.

The paper, “Plasmin Prevents Dystrophic Calcification After Muscle Injury,” details the team’s discovery that plasmin protease activity prevents dystrophic calcification — the process that dissolves fibrin clots. Without sufficient plasmin activity, dystrophic calcifications persist after muscle injury and are sufficient to induce heterotopic ossification (HO). Downregulating the primary inhibitor of plasmin or treating with pyrophosphate analogues prevents dystrophic calcification and subsequent HO in vivo. Because plasmin also supports bone homeostasis and fracture repair, increasing plasmin activity represents the first pharmacologic strategy to prevent soft tissue calcification without adversely affecting systemic bone physiology or concurrent muscle and bone regeneration.

Pathologic calcification, which can induce bone formation (heterotopic ossification), has been poorly understood, and treatments for it are lacking.

“The most ideal treatment would be one that prevents calcification in soft tissue and is also good for bone biology,” Schoenecker said in a Vanderbilt news article.

“...and that’s what we have discovered. Plasmin prevents calcification in muscle, and it is also essential for fracture healing and protecting against diseases such as osteoporosis.”

The team has used a genetic therapy called antisense oligonucleotides (ASOs) to remove the plasmin inhibitor alpha2-antiplasmin. In mouse muscle injury models, the ASO therapy prevented soft tissue calcification and promoted muscle repair. The researchers are moving toward clinical studies with the ASO therapy, and they are working to purify recombinant plasmin for testing in animal models.

To explore the clinical importance of these findings, Schoenecker and his colleagues are now examining the systemic changes that happen in conditions most associated with muscle becoming bone — burn, blast, head and spinal cord injuries. In preliminary work with Edward Sherwood, M.D., Ph.D., Blair Summitt, M.D., and Lisa Rae, M.D., in the burn unit, they found that burn patients commonly experience a reduction in fibrolysis — the process that dissolves fibrin clots. Plasmin is the main protease responsible for fibrolysis, and levels of plasmin fall after severe injury. The researchers hope the current findings will lead to clinical trials designed to improve tissue repair and prevent calcification in these patients, Schoenecker said.
Jeffry Nyman, Ph.D., Associate Professor of Orthopaedic Surgery and Rehabilitation and a member of the Vanderbilt Center for Bone Biology, received an Exploratory/Developmental R21 grant from the National Institute of Arthritis, Musculoskeletal and Skin (NIAMS) to study biomarkers that might indicate fracture risk among patients with diabetes. Individuals with Type II diabetes are at increased risk for fracture, as well as therapeutic targets related to the biomarkers. Key personnel are Paul Vozyian, Ph.D., (Medicine, Nephrology), Dan Perrien, Ph.D., (Medicine, Clinical Pharmacology), imaging expert and Mark Does, Ph.D., (Biomedical Engineering). Read more here.

Nyman Receives NIH Grant to Identify Biomarkers for Fracture Risk in Diabetes Patients

Jeffry Nyman, Ph.D., Associate Professor of Orthopaedic Surgery and Rehabilitation and a member of the Vanderbilt Center for Bone Biology, received an Exploratory/Developmental R21 grant from the National Institute of Arthritis, Musculoskeletal and Skin (NIAMS) to study biomarkers that might indicate fracture risk among patients with diabetes. Individuals with Type II diabetes are known to be more susceptible to fractures, but the reason for this is not yet understood. Nyman’s research focuses on the extracellular matrix of the bone, specifically modifications to the collagen (which affects the bone water required for plasticity) as well as the non-collagenous proteins. The study could potentially lead to improved identification of diabetes patients who are at risk for fracture, as well as therapeutic targets related to the biomarkers. Key personnel are Paul Vozyian, Ph.D., (Medicine, Nephrology), Dan Perrien, Ph.D., (Medicine, Clinical Pharmacology), imaging expert and Mark Does, Ph.D., (Biomedical Engineering). Read more here.

Polkowski Chairs Workgroup on First AAOS Guidelines on Hip Osteoarthritis

In April, the American Academy of Orthopaedic Surgeons issued its first guidelines on hip osteoarthritis. Gregory Polkowski, M.D., Assistant Professor of Orthopaedics and Rehabilitation, chaired the workgroup for the clinical practice guidelines, which emphasize pre-surgical treatments to reduce pain and increase mobility, including corticosteroid injections and non-narcotic pain medication.

To develop the guidelines, the workgroup searched four databases for articles published between 1990 and 2016 about the surgical treatment of hip osteoarthritis in adults, and also manually searched bibliographies of selected articles. Following peer review and public comments, the draft guidelines were edited and approved by the AAOS Committee on Evidence-Based Quality and Value, the AAOS Council on Research and Quality, and the AAOS Board of Directors.

The guidelines represent a wider effort by the AAOS to systematically evaluate clinical evidence and provide clinical recommendations for practicing orthopaedic surgeons.

“Corticosteroid injections, physical therapy, and non-narcotic anti-inflammatory medications like ibuprofen and naproxen were all treatment modalities that had the highest levels of evidence to support their use prior to hip replacement surgery,” Polkowski recently told Medscape Medical News, which published an article on the guidelines.

The workgroup also looked at factors that contribute to complications associated with hip replacement surgery, such as infection, blood clots, dislocation, pain, and need for reoperation. They found that obesity, smoking, age, and type 2 diabetes were all associated with higher complication rates after surgery. The risk was exaggerated for patients who had poorly controlled diabetes.

Polkowski emphasized that the intent of identifying higher-risk groups was not to discourage surgery in these groups but to help doctors and patients better mitigate risks.

“That’s not to say that patients with those conditions don’t benefit from hip replacement surgery. They benefit tremendously, however, the complication rates are higher. We think it’s important for surgeons to counsel their patients to that effect and, if possible, try to modify those risk factors with their patients on an individual basis,” he said.

Unal Receives Orthopedic Research Society Award

Mustafa Unal, Ph.D., a postdoctoral research fellow at Vanderbilt University School of Medicine, has been selected by the Orthopedic Research Society to receive its 2017 Alice L. Jee Young Investigator Award for work that potentially will improve the clinical assessment of bone strength and quality.

Unal, who works in the lab of Jeffrey S. Nyman, Ph.D., Associate Professor of Orthopaedic Surgery and Rehabilitation, will receive the award during the society’s 47th International Musculoskeletal Workshop at Sun Valley, Idaho.

Unal joined Nyman’s lab and the Vanderbilt Center for Bone Biology in 2017. Nyman was a previous recipient of the society’s Young Investigator Award. Together they are currently translating Raman spectroscopy from a powerful laboratory tool into a useful and practical diagnostic instrument for bone evaluations. Accurate assessment of fracture risk is critical to the timely inception of therapy as well as to avoiding unnecessary therapy.

Unal has received several previous honors for his work including a Baxter Young Investigator Award from health care giant Baxter International in 2015. Read more here.
Broken Shoulder Leads to Carpal Tunnel Study Collaboration

Donald Lee, M.D., Professor of Orthopaedics and Rehabilitation, formed a surprising research collaboration with his patient and fellow Vanderbilt faculty member Gordon Logan, Ph.D., Centennial Professor of Psychology at Vanderbilt University. In 2009, Lee performed a shoulder replacement on Logan following an injury. Over the course of their clinical interactions related to Logan’s treatment, the two repeatedly found themselves talking about research; Logan was particularly interested in the practical issue of getting back to typing after surgery. Together, Lee and Logan then designed an experiment to assess how quickly patients regain their typing speed after undergoing carpal tunnel release surgery.

The experiment was performed by Vanderbilt University Medical Center orthopaedic resident Justin Zumsteg.

The results of the study were recently published in a paper titled “The Effect of Carpal Tunnel Release on Typing Performance” in The Journal of Hand Surgery.

“We found that people recovered their pre-operative typing speed two to three weeks after surgery,” Logan said. “This provides a benchmark for recovery that prospective patients can consider in deciding whether to have surgery or when to have it.”

“Since we found that patients regain their typing ability relatively quickly, we now allow them to go back to typing relatively early,” said Lee. “They may not be able to type for several hours at a time, but we don’t necessarily restrict them from typing around two to three weeks post op.”

Read the full news article about the study here.

VANDERBILT ORTHOPAEDICS PROMOTIONS

Jonathan Schoenecker, M.D., Ph. D., was promoted to Associate Professor of Orthopaedics and Rehabilitation on July 1, 2016.

Jeffrey E. Martus, M.D., M.S, was promoted to Associate Professor of Orthopaedics and Rehabilitation on October 1, 2016.

Archer, Obremskey, Teams Funded by New DoD, Major Extremity Trauma and Rehabilitation Consortium Award (METRC 3)

A new Major Extremity Trauma Research Consortium (METRC) award was recently funded by the Department of Defense. Established in 2009, the METRC consists of a network of clinical centers and one data-coordinating center that work together with the Department of Defense (DoD) to conduct multi-center clinical research studies relevant to the treatment and outcomes of orthopaedic trauma sustained in the military.

This award, (METRC 3), establishes an Orthopaedic Care and Rehabilitation Consortium. To signify the expanded agenda, the name of the Consortium has been changed to The Major Extremity Trauma and Rehabilitation Consortium (METRC). Kristin Archer, Ph.D., DPT, Associate Professor and Vice Chair of Research, serves as Principal Investigator for the Vanderbilt site and consortium PI for the Cognitive Behavioral Physical Therapy (CBPT) study, as well as serving on the Executive Committee and the Science Committee. William Obremskey, M.D., MPH, Professor, Vice Chair Orthopaedic Surgery and Co-Director Division of Orthopaedic Trauma, serves as Co-Principal Investigator for the Vanderbilt site and sits on the Publications Committee.

Together with Archer, Obremskey will provide senior leadership for the consortium and oversee the conduct of CBPT, PilotBIND and other METRC 3 projects implemented at Vanderbilt. The consortium is anchored by the Coordinating Center at the Johns Hopkins Bloomberg School of Public Health, Ellen MacKenzie, Ph.D., as Director and PI.

2017-18 Surgical Fellowships

Omega Medical Grants has awarded fellowship funding for 2017-18 to:

- Division of Hand and Upper Extremity Fellowship Program, Donald Lee, M.D., Director
- Division of Musculoskeletal Oncology, Ginger Holt, M.D., Director
- Division of Pediatric Orthopaedics, Gregory Mencia, M.D., Director
- Division of Orthopaedic Trauma, Cory Collinge, M.D., Director

- The Division of Orthopaedic Trauma has received additional funds from the Center for Orthopaedic Trauma Association (COTA) and AO North America/Trauma, in support of our Orthopaedic Trauma Fellowship program.

Sports Medicine has received funds from the Arthroscopy Association of North America and Smith and Nephew to support sports medicine surgical fellowships. Charles Cox, M.D., serves as Sports Medicine Surgical Fellowship Director.
Foundation Research Grants, Residents

Sandra Gebhart, M.D., current PGY-5, was awarded a one year Basic Science Grant from the American Foundation for Surgery of the Hand (AFSH) last October and a one year Resident Research Grant from the Orthopaedic Research and Education Foundation (OREF) in February. Gebhart’s AFSH study is titled Fibrolysis prevents adhesions following flexor tendon injury.

The overarching hypothesis of this work is that plasmin activity is the critical determinate of flexor tendon adhesion formation. To test this hypothesis in the first aim, plasminogen will be knocked down by use of a novel antisense oligonucleotide in order to examine the effect of diminished plasmin activity on adhesion size. The second aim of this proposal will focus on increasing plasmin activity by reducing the activity of its primary inhibitor, alpha 2-antiplasmin. If successful, these findings could lead to the development of novel therapeutics aimed at enhancing fibrinolytic potential that may supplant currently available surgical and rehabilitative techniques.

Mentoring Dr. Gebhart are Donald Lee, M.D., Professor and Co-PI of the grant, Mihir Desai, M.D., Assistant Professor and Co-investigator and Jonathan Schoenecker, M.D., Ph.D., Associate Professor, as Mentor/Consultant.

Regarding the OREF grant, titled Bisphosphonates Prevent Heterotopic Ossification in the Upper Extremity, Gebhart says, “With this particular study, we hope to further our understanding of the biology of dystrophic calcification and resulting heterotopic ossification that occurs after trauma to the upper extremity and results in dysfunction. Understanding bisphosphonates role in the prevention of HO and function of the extremity is extremely valuable across all specialties.”

Sandra Gebhart, M.D.

In June, Parker Abblitt, M.D., PGY-4, was awarded a one year Resident Research Award from OREF titled Alpha-defensin: Predictor of Successful Revision Total Joint Arthroplasty. The goal of this project is the development of a predictive model to establish those patients at highest risk for re-infection after revision surgery. By correlating current standard of care measurements of infection, his team hopes to identify the ideal predictor for future recurrent infection and thus minimize complications, give patients the best opportunity for a satisfactory outcome, while minimizing costs to the medical system.

This research will be conducted under the mentorship of Gregory Polkowski, M.D., Assistant Professor and Jonathan Schoenecker, M.D., Ph.D., Associate Professor.

Parker Abblitt, M.D.

Vanderbilt Orthopaedics honored service award recipients of 5, 10, 15, and 20 years of service with a banquet at the University Club of Nashville.

VUMC Celebrate You Day
Vanderbilt University Medical Center held an employee celebration event April 20-21. Demetria Allen, left, a Vanderbilt Orthopaedics Medical Assistant, participated.


Surgical Management and Treatment


Pathology Associated with Inferior Spindler KP, Are Bone Bruise
Scaramuzza EA, Huston LJ, Dunn WR, Lattermann C, Jacobs CA, Reinke EK.


Lee AK, DOD AC, Lakomkin N, Yarlagadda M, Collinge CA, Ostrembsky WT, Sethi MK. Corrigendum to “Adverse
Analysis to a Raman Spectroscopic Assessment of Fracture Toughness of Human Cortical Bone. Appl Spectrosc. 2017
Central PMCID: PMCP5661524.


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