

Division of Orthopaedic Surgery

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Children's Mercy Park



Children's Mercy Park



2016: A Year of Growth

Dear Colleagues,

At Children's Mercy Kansas City, the Division of Orthopaedic Surgery had another successful year. In 2016 the research program continued to grow in research studies and involved researchers. This past year we have been able to expand the quantity and quality of our research projects, still with a single research coordinator.

We continue to increase the number of medical students to 17 who have been involved in projects, 10 from the University of Missouri-Kansas City (UMKC), five from the University of Kansas Medical Center (KUMC) and two from the Kansas City University of Medicine and Biosciences (KCUMB). We had 13 orthopaedic residents participate in our growing research program—11 from UMKC. We have three funded research grants, four prospective registries, eight prospective clinical research projects, 11 retrospective clinical projects and five basic science research projects. There were 37 published or in press manuscripts in peer-reviewed journals, seven submitted pending a decision, 13 book chapters, 26 invited scientific podium presentations at national meetings and 11 poster presentations.

While 2016 was a big year, we anticipate further growth and maturity of all our faculty in 2017, as well as mentorship of our residents and medical student investigators. We plan to have our first one-year clinical research scholar, Dr. Wu, from Shanghi Xinhua Hospital, July 1, 2017 to June 30, 2018.

The following document provides an overview of the collaborative work our institution has supported as one of the nation's leading pediatric hospitals, including an overview, feature stories and key research.

To learn more about our research and program, visit childrensmercy.org/orthopaedicsurgery.

Sincerely,

Richard M. Schwend



Richard M. Schwend, MD, FAAP

Director, Orthopaedic Research Program; Professor Orthopaedic Surgery and Pediatrics, University of Missouri-Kansas City School of Medicine and University of Kansas School of Medicine



2016: An Overview |

Summer Scholars

2016 Division Accomplishments:

The level and quality of research being conducted, the outstanding mentorship several physicians provide for promising surgical talent, and the novel programs created in collaboration with other teaching institutions in the community have resulted in a robust Division of Orthopaedic Surgery at Children's Mercy Kansas City that prides itself on caring for the most complex pediatric cases in the region. Division accomplishments for 2016 include:

Research

- The Division of Orthopaedic Surgery has an every other month research meeting to review ongoing projects, review updates from the IRB, Research and Grants, and Compliance. There is an active Division Research Subcommittee that reviews all projects that utilize division resources, including use of the division's clinical research coordinator, Julia Leamon, MSN, RN, CPN.
- The Orthopaedic Research website continues to be updated to include studies and the Summer Scholar Program for students interested in orthopaedic research. The application deadline has been established as Dec. 15, with notification on Jan. 15 for the following summer.

Mentorship

- This past summer there were three summer scholars, all second-year medical students from KUMC: Molly Khoury, Robert Tung and Mason Uvodich. The division has two successful applicants to the summer scholar program from KU for the summer of 2017. Traditionally, each summer scholar is assigned a staff mentor who guides them in their work.
- Ning Tang, MD, was the division's five-month (May through September 2016) research fellow from the Peking Union Medical Center. Following this fellowship, Dr. Tang returned to Beijing as young faculty specializing in pediatric spine surgery.

Programs

- Kate Keeler, MD, and Brett McQueen continue to develop the operation of the Motion Analysis Lab, which serves as a platform for interdisciplinary learning and research through the Interdisciplinary Motion Analysis Group of Kansas City. The gait lab now has a permanent home at Sporting KC, and will continue to grow in clinical and research capacity.
- Other additions to the division's research capacity include the EOS 3-D imaging platform in the orthopaedic clinic. The Radiology Department has hired a 3-D technologist who provides EOS 3-D representations of AIS cases preop and six months postop. Neil Mardis, MD, Department of Radiology, has several 3-D printers and prints 3-D models for preoperative evaluation. This has tremendous research potential and is very useful for teaching purposes.
- The division started a monthly hip conference which has evolved into the Adolescent Hip Program staffed by Drs. Olney, Bergman and Schwend. The program has grown to include a monthly dedicated multidisciplinary clinic with a physical therapy presence.
- Dr. Schwend was faculty with Ken Fisher, PhD, and Ronald Dougherty, PhD, on the KU Mechanical Engineering Senior Design Proposal project titled: Rib Rod Connector Pediatric Spine Implant System. Senior KU Engineering students included: Jessica Robin, Jonathan Deckert, Wenbin Dong and Ding Zhang. This class spent the one-year program developing Dr. Schwend's spine implant prototype (U.S. Patent 9,463,050, Oct. 11, 2016) so that it could be further developed for in vitro testing.
- In June 2016, Dr. Schwend graduated from Harvard University Global Clinical Scholars Research Training Program (GCSRT).
- Dr. Nigel Price has been successfully enrolled in the master's in public health program at KU Medical Center.



The Motion Analysis Lab now has a permanent home at Sporting KC and will continue to grow in clinical and research capacity.

Richard M. Schwend, MD, Director, Orthopaedic Research Program, immediate past Chair, American Academy of Pediatrics Section on Orthopaedics and President-Elect Pediatric Orthopaedic Society North America, recently graduated from the Harvard Medical School Global Clinical Scholars Research Training Program.

The one-year program provides clinicians and clinician-scientists advanced training in the methods and conduct of clinical research. Clinical scientists from around the world participate. Participants must hold an MD, PhD, MBBS, DMD, DDS, PharmD, DNP or equivalent degree to be eligible for the program.

“I was fortunate to be accepted into this training, which will be essential for my job as Director of Orthopaedic Research at Children’s Mercy,” Dr. Schwend said. “Scholars completing the program are better able to perform both observational and experimental clinical research using the methods introduced in this program; plan and implement clinical research projects; and analyze, interpret and present clinical research data. I look forward to using what I learned in our clinical research program.”

REDCap Database. All of the division’s clinical research projects now utilize REDCap database for secure data collection, entry and retrieval. This keeps the division in IRB compliance, allows communication between researchers without depending on Excel sheets, and provides a permanent documentation of research. In addition, the division tracks its clinical research registries, projects, and ideas in REDCap for the division on a special REDCap registry. This process allows all researchers to register study ideas and projects, principal investigators needing a resident or student, and residents or students needing a project. Division leaders expect all projects, research ideas, completed projects and personnel will be able to be tracked.

REDCap has also been of great use as a registry of spine cases and is also being used as an operational registry of non-spine surgeries. In 2016 the division incorporated the UMKC research program into the REDCap database. There is now one unified database for the entire UMKC orthopaedic program. In 2017, the division will be requesting support to complete the spine registry dating back to 2007. This will allow for clinical research, especially measures of association between variables in question and outcome. SRS22r outcome measures in 2016 have been added to the spine registry, so the division now has functional outcomes information available. This was a specific question on the USNWR survey in 2015. With the development of the Young Adult Hip Program, the division is using REDCap for tracking of the three outcome questionnaires: UCLA activity score, Modified Harris Hip Score and the WOMAC. Renae Altenhofen, MSN, APRN, CPNP, is the nurse practitioner responsible for organizing the new hip program.

Registries. As a division, Orthopaedic Surgery continues to be involved with various orthopaedic registries. The spine group is involved in the Children’s Spine Study Group, which identifies spine subjects that have multiple spine issues, as well as the Growing Surgical Spine Group registry that evaluates early onset scoliosis patients 0-10 years of age prior to surgical intervention. The sports medicine team of Kevin Latz, MD, and Donna Paccica, MD, is involved with the Research in OsteoChondritis of the Knee registry that evaluates patients with osteochondritis desicans and tracks their treatment while the Pediatric Research in Sports Medicine registry reports common pediatric and adolescent sports medicine injuries. Lastly, the Registry of Orthopaedic Trauma in Children, led by Mark Sinclair, MD, identifies pediatric orthopaedic trauma treatment for long bone injuries.



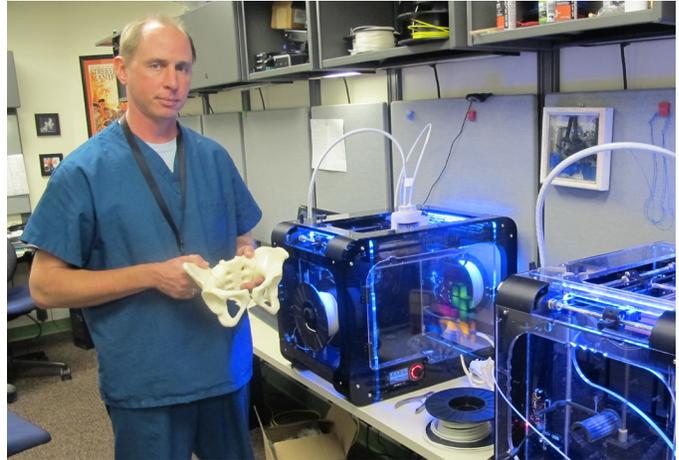
Dr. Schwend (third from left) with fellow graduates of the Harvard Medical School Global Clinical Scholars Research Training Program. Photo courtesy of Dr. Schwend.

Complex Care Program. The Orthopaedic Division cares for a large population of patients with complex medical conditions, who often need involved surgical procedures. Patients at the highest risk of death or disability from an intervention, such as surgery, are the ones most likely to benefit when done safely, suggesting the need for a high-risk pathway to get them through the perioperative period (McMahon LF. 2012). A High-Risk/Complex Care Program was started in 2014 with the goal to ensure safe and thorough preoperative coordination of care for these complex patients. The objectives identified for this program are:

- assist in ongoing development of the Complex Care/ High-Risk Orthopaedic Program
- proactively plan care coordination of patients referred into this program
- collaborate with members of the multidisciplinary health care team to ensure that patients with complex medical needs that are scheduled for orthopaedic surgery will have a thorough preoperative work-up to ensure that they enter into surgery in the optimal condition possible for their underlying condition
- track all preoperative appointments and discuss concerns with the surgeon early to avoid cancellation of surgeries at the last minute
- monthly multidisciplinary meetings are held to discuss planned surgeries for the following month.

Data from January to December 2016 includes:

- Referrals into HR Program
- Completed surgeries
- 30-day readmissions
- 90-day readmissions
- Number of discontinued surgeries



Top/Middle Right: Dr. Neil Mardis with the 3-D printers that produce models such as the pelvis and spine replicas he is holding.

Bottom Right: Dr. Schwend used the 3-D model Kevin Yintia is holding to plan and perform Kevin's anterior hip fusion surgery.

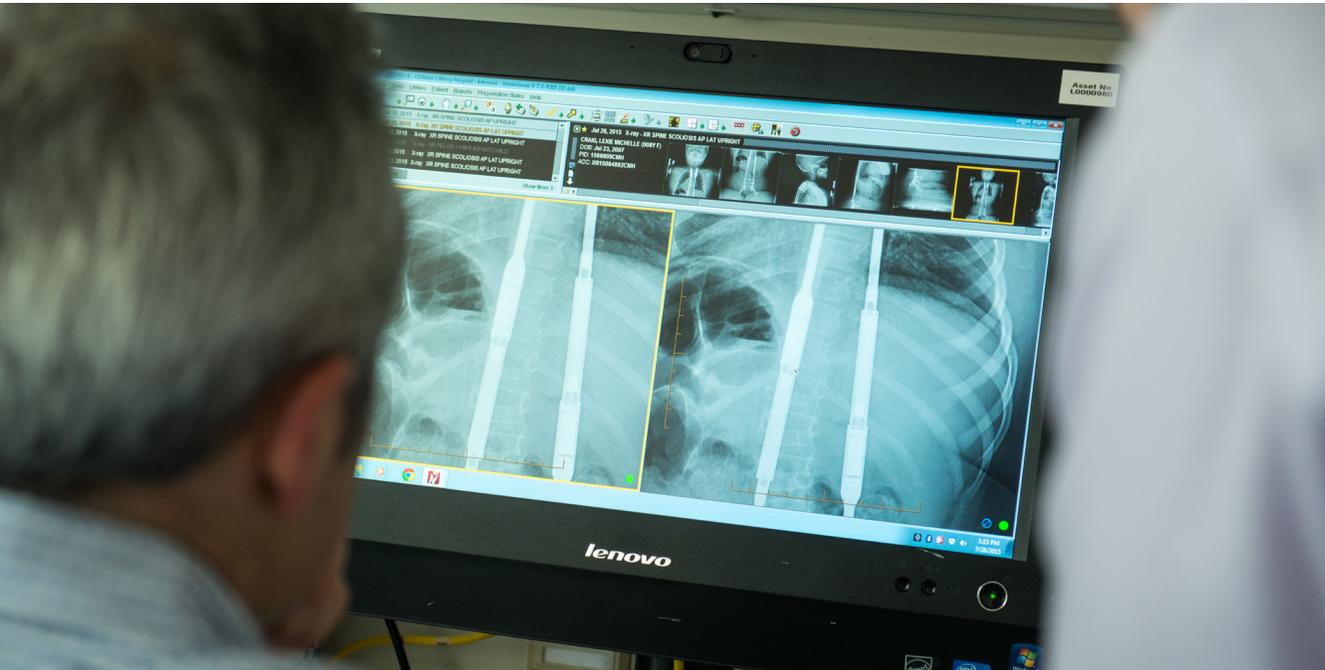
Goals for 2017

As research in the division grows, there are several goals to help learning and outcomes.

1. Grow the Summer Scholars program to meet Children's Mercy policy and procedure standards. Have program announcement on website. December 15 is application deadline. January 15, successful applicants are notified.
2. Update information on the Orthopaedic Surgery website at childrensmercy.org/orthopaedicsurgery.
3. Provide education to division faculty on research integrity and processes, as well as authorship and role of the PI at research meetings.
4. Access for all staff to REDCap, its utility in operative registries, tracking of all research projects, and utility in individual research projects.
5. Request internal grant request to further develop in-house spine surgery registry data.
6. Incorporate IOM data into spine registry database.
7. Develop IRB compliance with REDCap database.
8. Submit one SRS/POSNA grant request.
9. Three years ago, the division introduced the High-Risk Orthopaedic Program with Leah Jones as the High-Risk Coordinator. In 2017, plans are to integrate this program with orthopaedic research to help the high-risk coordinator in identifying QA/QI projects that show standard dashboards QA reporting: 30-day readmission, 90-day return to OR, Postop spine infections (early < one year, late > one year), IOM alerts and discontinued spine surgery.



Orthopaedic Research Education Objective Guides Researchers



As a robust teaching program, the Division of Orthopaedic Surgery at Children's Mercy Kansas City works with medical students and residents from a wide range of programs, including the University of Missouri-Kansas City School of Medicine, Truman Medical Center and the University of Kansas School of Medicine.

A requirement of their work at Children's Mercy is completion of a research project, a complex and long-term endeavor.

"What we have found is that the intricacies of medical research are not well understood by the residents and medical students," explained Julia Leamon, Clinical Research Coordinator, Division of Orthopaedics. "That includes the time frame necessary for bench, retrospective or prospective studies."

To help students better navigate research protocols at Children's Mercy, Leamon has worked closely with her colleague, Brett McQueen, Certified Athletic Trainer, as well as Richard Schwend, MD, FAAP, Director of the Orthopaedic Research Program, and James Bogener, MD, and Jon Dubin, MD, orthopaedic surgeons, Truman Medical Center. Together they have created the Orthopaedic Research Education Objective, better known as the OREO.

The OREO is a systematic and algorithmic procedure to assist students as they take a research project from concept

to completion. It guides students through several complex and vital steps in the research process, including:

- expected institutional paperwork to be able to participate in research
- design of a clinical question and research protocol
- submission steps to the institutional review board at Children's Mercy
- writing guidelines
- statistical aids
- ongoing project review
- project completion.

All novice researchers are assigned to an experienced principal investigator. Experienced researchers are expected to help guide and teach novice researchers to the best of their ability, with the OREO providing a framework for this guidance.

"We stress the importance of transparency within the research system from beginning to the end," Dr. Schwend said. "At the end of the day, our goal is to provide a positive influence to the body of literature, ultimately improving the quality and depth of care we provide to our patients."

The OREO is continually updated to reflect the latest guidelines. For a current copy, contact Leamon at jleamon@cmh.edu.

Recognition of Residents and Students |

The Division of Orthopaedic Surgery is honored to collaborate with many talented and dedicated students and residents to advance research. Listed below are the names of our partners and their respective programs.

University of Missouri Kansas City (UMKC) Residents:

James Barnes, MD
 Dane Church, MD
 Justin Colanese, MD, Handedness Study with Dr. Christine Cheng
 John Craw, MD
 John Eggers, MD
 Stephen Hiatt, MD
 Manesha Lankachandra, MD
 Michael Lillyquist, MD, Cadaver Study
 Sadie Markey, MD
 Luv Singh, MD, Distractor Study with Dr. Richard Schwend
 Christopher Shaw, MD, Cadaver Study

University of Kansas (KU) Residents:

Nichoals Wischmeier, MD
 Brandon Barnds, MD

UMKC Medical Students:

Zubair Chaudry
 Kent Doan
 Ian Greenberg
 Jeffrey Klott
 Raphael Lozano
 Andrew Thome
 Corey Wells
 Christopher Wester
 Jordahn Wirtz

KU Medical Students, Summer Scholars:

Alec Hermanson
 Molly Khoury
 Ogi Stevanovic
 Robert Tung
 Mason Uvodich



Will Wurster

“As a robust teaching program, the Division of Orthopaedic Surgery works with medical students and residents from a wide range of programs.”

I Summer Scholars Program Poses Orthopaedic Questions

Leaders in the Division of Orthopaedic Surgery at Children's Mercy Kansas City believe one of the best ways to answer the real-life questions that may improve the health of its patients is to involve students.

That's why the division created the Summer Scholars Program for medical, nursing and related health professions, encouraging students to perform research with orthopaedic staff and faculty.

The program began in 2009 and is directed by Richard Schwend, MD, FAAP, Orthopaedic Research Program, and Julia Leamon, clinical research coordinator for the division. Philanthropic funding supports a stipend for one to three scholars who devote 20 hours per week for the three months of the summer, or the equivalent spread throughout the academic year.

"At Children's Mercy, we have created an environment that's conducive to learning and research. Our vision is to select individuals who have a natural curiosity and to give them an opportunity to explore research," Dr. Schwend said. "They also get to spend time with us in the operating room, the clinic, on the floor and in the emergency room. That's where many great research ideas are generated."

The program also encourages interdisciplinary collaboration among staff and pairs the summer scholar with a mentor.

"Mentoring is probably one of the most important benefits of the program because these students have the opportunity to work with senior staff, as well as with recent summer scholars who have finished the program."

Because the cycle to complete a research project is often lengthy, each summer scholar is included on an IRB-approved study, then begins the writing process for a new study. Students pose their potential research topics in the REDCap (Research Electronic Data Capture) database, software used to design clinical and translational research projects.

"The summer scholars we select this year will help complete last year's research projects. Likewise, their research topics will begin while they are with us, but they will be completed next summer," Leamon said. "We establish long-term relationships with our summer scholars that we hope will last throughout their careers."

In fact, many of the summer scholars' projects have resulted in published research, presentations at professional meetings, as well as changes in clinical practice. These studies have included research into reduced blood loss

by utilizing the trauma sponge during surgery, plus some projects looking at outcomes related to estimating blood loss and operative times.

"I think it makes us better at what we do when we have students here who are learning and asking questions," Dr. Schwend said. "They come to us with open minds and the questions they ask can be powerful."



Molly Khoury

Current Ongoing Research Grants

Hutchison R, Resident Research Fund, Division of Orthopaedic Surgery, Children's Mercy Kansas City \$3,500.

Pacicca D, 2015/06/01-2016/12/31, CEMT Research Award, UMKC Center of Excellence in the Study of Dental and Musculoskeletal Tissues. The Impact of Diabetes on Bone Health in Children: A Genomic Approach (Co-PI) (\$10,000).

Price N, Schwend R, Bracing in Idiopathic Scoliosis Trial, Principle Investigator: Weinstein S, University of Iowa. IRB# 07 04-050 Funding: NIH.

ROTC Tracks Pediatric Orthopaedic Extremity Trauma

The Registry of Orthopaedic Trauma in Children is the pediatric arm of the Major Extremity Trauma Research Consortium. METRC was established in September 2009 with funding from the Department of Defense and the Orthopaedic Extremity Trauma Research Program to develop treatment guidelines for the optimal care of the wounded warrior.

According to Mark Sinclair, MD, Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine, and site coordinator at Children’s Mercy Kansas City, ROTC collects data on children who have suffered an extremity fracture requiring surgery or hospital admission.

“METRC has been a great resource, providing wounded soldiers with the best patient care practices and tracking their progress,” Dr. Sinclair said. “The creators of the consortium thought children also could benefit from a similar collaborative effort.”

Currently, six level I pediatric trauma centers across the nation are participating in the consortium, including Children’s Mercy. Other sites include: Carolinas Medical Center/Levine Children’s Hospital, Charlotte, N.C.; Helen DeVos Children’s Hospital, Grand Rapids, Mich.; Vanderbilt University Medical Center, Nashville, Tenn.; UCLA Medical Center, Los Angeles, Calif.; and Children’s Hospital and Medical Center Omaha/University of Nebraska, Omaha, Neb.

“We were asked to take part because we have a very busy level I trauma service at Children’s Mercy representing a diverse patient population, including urban, suburban and rural referrals,” Dr. Sinclair said.

In fact, of the nearly 2,900 patients enrolled in the registry since November 2015, approximately 29 percent are Children’s Mercy patients.

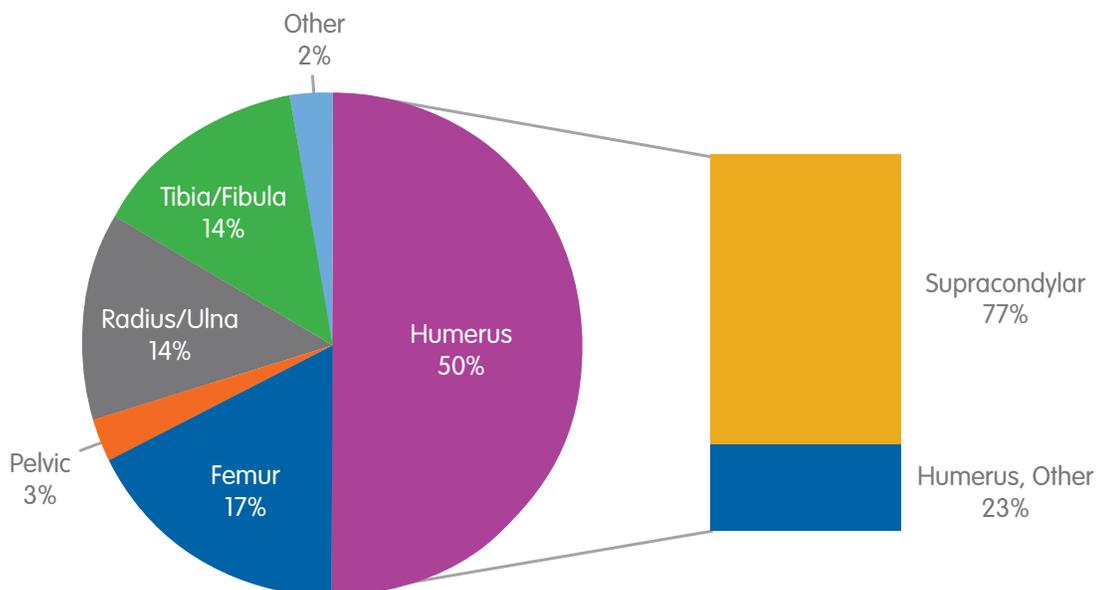
“This makes Children’s Mercy the busiest center enrolling in ROTC,” Dr. Sinclair said. “These are only patients who have sustained injuries from the wrist to the shoulder or pelvis to the ankle, and who have required hospitalization or surgery to treat the injury.”

Already, Dr. Sinclair said this database is providing valuable information regarding pediatric orthopaedic injury trends and best practices.

Currently, the consortium is looking at the rate of pathologic fractures that present to pediatric level I trauma centers, the mechanisms of injury for these fractures, and demographics of extremity injuries with an eye toward prevention.

“The collective power of this consortium is that it gives us the information to define best practices for children who experience common injuries,” he added. “But by pooling our patient data, we also can reach the critical mass necessary to analyze rare pediatric orthopaedic injuries, something none of us would be able to accomplish alone.”

ALL FRACTURES MEETING CRITERIA FOR ROTC, CMH 2016 (N=717)



I Pediatric Orthopaedic Registries

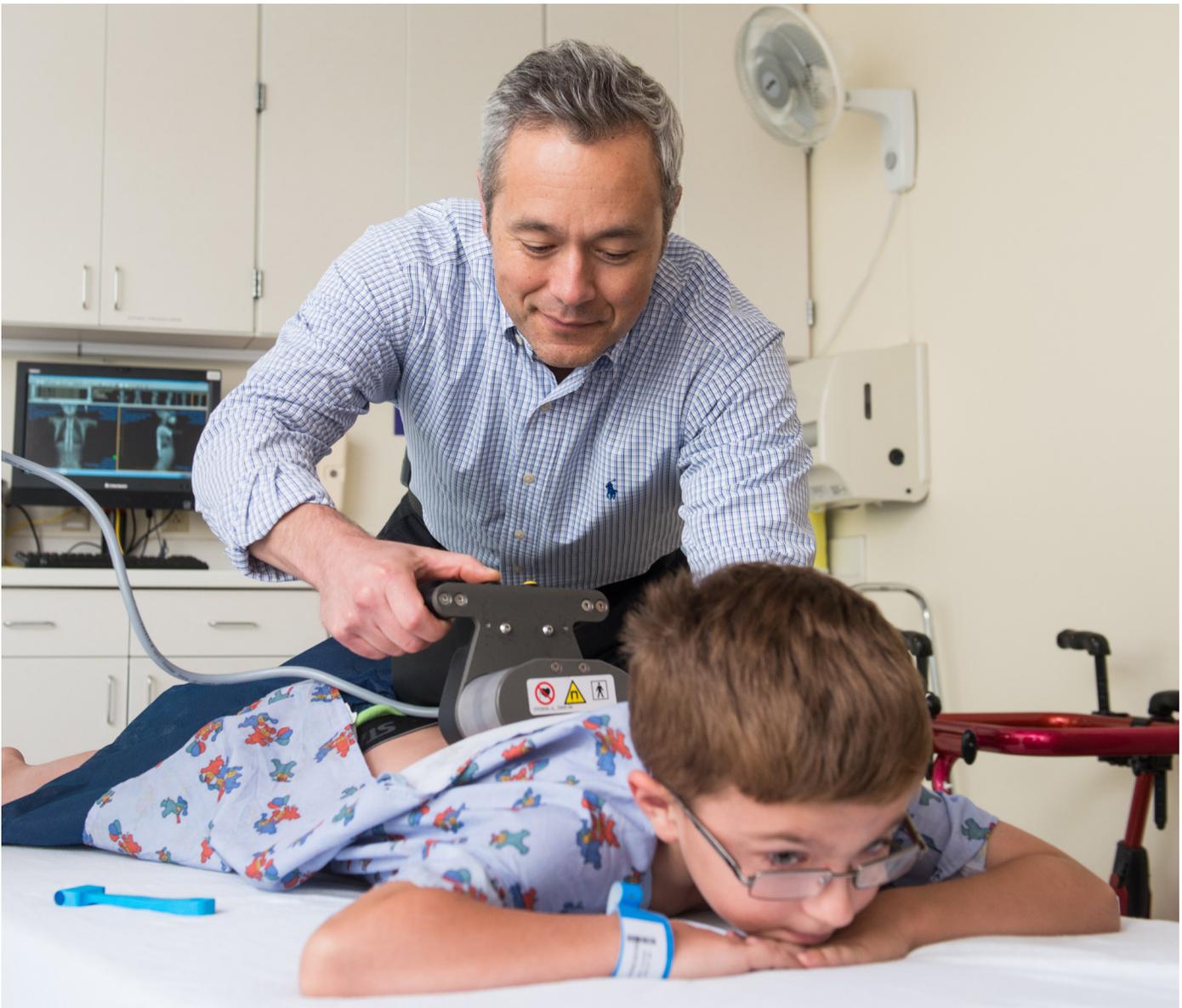
METRC- Registry of Orthopaedic Trauma in Children: Trauma registry name. Sinclair M, Leamon J, Lind A.

Growing Spine Study Group: Repository is comprised of several sites that collect data that will be used to study early onset scoliosis. The purpose of this database is to provide researchers with a global exchange of data for consortium members that will be used for future research for projects involving the study of early onset scoliosis. Schwend R, Price N, Anderson J.

Children's Spine Foundation Study Group: The Children's Spine Registry (CS Registry) is operated by Children's Spine Foundation (CSF) and collects patient data on children with

spine and chest wall deformities. Any type of spine and chest wall deformity as determined by the investigator may be entered. Schwend R, Price N, Anderson J.

Research in OsteoChondritis of the Knee: The purpose of the registry is to follow the cohort open over a 50-year period, during which the study ID link will be maintained for the purpose of truly assessing the long-term effects of OCD on future outcomes, with periodic research studies based on the data collected for the cohort along the way. Latz K, Pacicca D, Vanderpool A, McQueen B.



Dr. John Anderson



Ahead of the curve: Teen goes from back surgery to back flips

When Dr. Nigel Price received an e-mail from his former patient, Soleil Hernandez, he opened it immediately. "I had to see what Soleil has been up to," said Price, a...

NEWS.CHILDRENSMERCY.ORG

Ahead of the Curve: Teen Goes from Back Surgery to Back Flips

Seeing is believing: From being diagnosed with idiopathic scoliosis and a 15-degree curve, to corrective surgery at 16 years old, Soleil was given her self-confidence back while being able to continue life as a college student.

"I started with swimming, then progressed to cheering after several months," she said. "Every time Dr. Price told me he didn't know if I would be able to do something, I took it as a challenge. Then I would send him another video of me doing it."

To follow success stories, friend Children's Mercy Hospital on Facebook.

Current Prospective Clinical Studies

Comparison of Low Versus Medium Dose Naloxone Infusion Combined with Patient-Controlled Analgesia after Posterior Spine Fusion Surgery: A Randomized Controlled Trial. Pieters B, **Anderson JT, Schwend R, Price N, Leamon J.**

Surgeon-Patient Communication: A Pilot Study Validating a New Questionnaire Evaluating Adolescent Patient-Parent Dyad Comprehension of Adolescent Idiopathic Scoliosis. **Egekeze N*, Schwend RM, Anderson JT,** Williams K, Bernhardt M.

Mepilex Study for Pressure Ulcer Monitoring and Prevention in Pediatric Posterior Spinal Fusion Population. Garden J, Moran K, **Anderson, JT, Leamon, J,** et al. Prospective, randomized, double-blinded controlled trial evaluating the effectiveness of a foam dressing to decrease the incidence of pressure sores and meralgia parasthetica in adolescents undergoing posterior spinal fusion and instrumentation for adolescent idiopathic scoliosis.

Increasing Access to Influenza Vaccinations in Children. **Hutchison RL,** Danaher C, O'Rear J, **Olson-Burgess C,** Myers. This prospective study will determine whether immediate access to influenza vaccination for patients seen in Hand Surgery Clinic will change the rate and the timing of vaccination. This is a collaboration between the Section of Hand Surgery and the Division of Infectious Disease at Children's Mercy.

The Impact of Diabetes on Bone Health in Children: A Genomic Approach. **Pacicca D, Clements M, Farrow E.** The research seeks to identify genetic causes of decreased bone quality in patients with T1DM that could be used as screening tools to identify patients at high risk of bone disease. Additionally, the analysis of the full transcriptome in human patients with T1DM will allow for the identification of genes with altered expression that could potentially be novel therapeutic targets for bone health.

Bacterial Wound Contamination Prior to Closure: Povidone-Iodine Versus Saline Irrigation in Pediatric Spine Fusion Surgery. **Schwend R,** Gloszbecker M, Flynn J. This is a collaboration with Boston Children's Hospital and the Children's Hospital of Philadelphia.

Prospective Pain Diagrams in SCFE. **Schwend R, Uvodich M**.** Atypical pain leads to late diagnosis and more severe slip angles compared to typical hip pain.

Cost Savings of LEAN Spine Trays (QI). Schwend R, Carr N.

*Resident

**Medical Student

LEAN Project Reduces and Improves Orthopaedic Instrument Trays



“Children’s Mercy Kansas City orthopaedic surgeons and support staff members applied the LEAN principle, “Separate needed from unneeded items,” drastically reducing the number of trays in the operating room from 22 to six and lowering costs, with a total estimated savings of \$388,000 a year.”

Mentoring the Next Generation of Female Pediatric Orthopaedic Surgeons

According to the American Academy of Orthopaedic Surgeons, only 5 percent of its 28,000-plus members are female—an even smaller number specialize in pediatric orthopaedic surgery.

But at Children’s Mercy Kansas City, seven of the 16 pediatric orthopaedic surgery faculty members are women. They have expertise in everything from hand surgery to sports medicine to neuromuscular disease.

For Donna Pacicca, MD, Associate Professor of Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine, mentoring female orthopaedic surgeons is vital to the development of the profession.

“It’s tremendously important as a female orthopedic surgeon to serve in a mentoring role for other women who might be considering orthopaedic surgery as a career,” Dr. Pacicca said. “There are still many misconceptions about women in orthopaedics, so it’s valuable for students to see women actually in this role—operating, seeing patients and doing research—but also balancing work with family life.”

Recently, Dr. Pacicca has been mentoring Molly Khoury, a second-year medical student with the University of Kansas Medical Center who also served as a summer scholar at Children’s Mercy. Dr. Pacicca and Khoury have been collaborating on two research projects focused on looking at knee anatomy in pediatric patients using MRI to examine changes in growth and development, and how these changes relate to the surgeries available to patients. This research was accepted as a poster presentation at the prestigious 2017 Orthopaedic Research Society meeting.

“I believe in giving back to the community at large and I enjoy mentoring students like Molly because when you are teaching, you have to know your material inside and out,” Dr. Pacicca said.

“Medicine is constantly changing. Mentoring helps you stay sharp and current. Mentoring other women paves the way for the next generation of female orthopaedic surgeons.”

Other female members of the Division of Pediatric Orthopaedic Surgery at Children’s Mercy include:

- Christine J. Cheng, MD, MPH, Chief, Section of Hand Surgery; Pediatric Hand Surgeon; Clinical Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine



Dr. Dale Jarka and Dr. Amanda Fletcher

- Lisa M. Berglund, MD, Pediatric Orthopaedic Surgeon; Assistant Professor of Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine
- Margaret E. Gibson, MD, Assistant Professor of Pediatrics, University of Missouri-Kansas City School of Medicine; Primary Care Sports Medicine Fellowship Director and Head Team Physician, University of Missouri-Kansas City School of Medicine
- Dale E. Jarka, MD, Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine
- Kathryn A. Keeler, MD, Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine
- Natalie C. Stork, MD, Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine

I Current Retrospective Clinical Studies



Dr. Donna Pacicca

Intra-operative Asymmetric Rib-Pelvis Distraction in the Surgical Management of Severe Neuromuscular Scoliosis in Children. **Schwend RM, Anderson JT, Price N, Singh L, Leamon J.**

Pulmonary Function in Children Adolescent Idiopathic Scoliosis: Do Children with More Thoracic Kyphosis Have Greater BMIs and Less Affected Pulmonary Function? Lazono R, Uvodich M, **Tung R**, Moran K, Sherman A, Anderson JT.**

Outcomes of Conservative and Operative Treatment for Os Odontoideum in Children and Adolescents. Multi-center, International Retrospective Study. Helenius I, Sponseller P, Hedequist D, **Anderson JT,** et al.

Unplanned Return to the Emergency Department after Reduction and Casting of Forearm Fractures in Children. **Berglung L, Altenhofen R, Hutchison R.**

Comparison of Double and Single Fascicular Nerve Transfer for Elbow Flexion in Brachial Plexus Injuries—A Systematic Review of the Literature. **Cheng C, Song R**.**

Radiographic Indicators of a Shared Epiphysis in Preaxial Polydactyly—Predictive Analysis. **Hutchison RL, Barnes J*.**

Evaluation of Cruciate Ligament Anatomy as a Function of Growth and Relationship to the Physis. **Pacicca D.**

Evaluation of Isokinetic Testing in Pre/postop ACL Patients. **Pacicca D.**

Prevalence of Continued Convex Apical Thoracic Growth in Young Children after Vertebral Body Stapling. **Schwend R, Wells C**, Harvey M**, Tung R**.**

Adherence to AAOS AUC for Type 3 Supracondylar Fracture of the Humerus Among Pediatric Orthopaedic Surgeons at CMH. **Schwend R, Stevanovic O**, Klott J** Tung R**.**

“Keep Me Warm” Prevents Unintentional Hypothermic Events for Neuromuscular Patients

Kathryn Keeler, MD, Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine, often operates on children with cerebral palsy and other neuromuscular disorders.

“It is well-documented that these patients have more difficulty thermoregulating than other children due to neurological damage,” she said. “This can pose a problem in the operating room. Being cold puts these patients at increased risk for an unintentional hypothermic event, infection and blood loss.”

Unfortunately, warming them isn’t as simple as putting another blanket on the child. Increasing the operating room temperature also can pose a risk to a safe and comfortable working environment for the surgical team, and may compromise the room’s sterility.

Faced with this challenge, Dr. Keeler and Jessica Garden, RN, BS, CNOR, Orthopaedic Specialty Team, developed an innovative quality improvement project called “Keep Me Warm.”

“Keep Me Warm” is a multi-tiered approach to patient warming that begins before the child ever leaves home. The team began using the protocol in November 2016 for patients who have been diagnosed with spastic quadriplegia or diplegia with a GMSCF of 3 to 5. Typically, these are patients of Dr. Keeler or Brad Olney, MD, Division Chief, Orthopaedic Surgery, and Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine.

The protocol is comprehensive and includes:

1. The patient’s parents or caregiver receives a pre-operative phone call providing education regarding the disease process, the need to keep the child warm, and specific instructions about how to dress for the trip to the hospital on the day of surgery.
2. When the child arrives in Pre-op, their temperature is taken, then 30 minutes before surgery, they are dressed in a Bair Paws™ patient gown, a disposable gown connected to a forced-air warming unit that surrounds the child with warm air.
3. Also, while in Pre-op, IV fluids are warmed before being given to the child, helping reduce fluctuations in body temperature.

4. Once in surgery, the child is placed on an underbody Bair Hugger™, a raft-like device that sits on the surgical table, surrounding the child with warm air. The Bair Paws gown also can convert to an upper body Bair Hugger during surgery, providing the surgical team with access to the child’s limbs for the procedure.
5. The operating room temperature is maintained between 70 and 75 degrees Fahrenheit.
6. In Post-op, the Bair Paws gown and Bair Hugger continue to keep the child warm, if needed.

“At Children’s Mercy, we use the underbody Bair Huggers for other surgeries, but not the Bair Paws gown or the other warming measures included in this bundle,” Garden said. “We are the first at the hospital to trial this warming protocol for our cerebral palsy patients and may be one of the first in the country to use it specifically for this purpose.”

Through the quality improvement project, Dr. Keeler and Garden are tracking the patient’s body temperature pre-, intra- and post-operatively, as well as the room temperature during the procedure. To date, Garden said the “warming bundle” is reducing body temperature fluctuations for these patients, but additional analysis is needed before implementing the bundle as a best practice.

“This is a team effort that is much more than a comfort measure,” Garden said. “There is a physiological reason to keep these patients warm. We believe it will result in better patient outcomes. If the data bears that out, our goal is to begin using the warming bundle for our spine surgery patients, too.”

I Basic Science, Non-Clinical Research

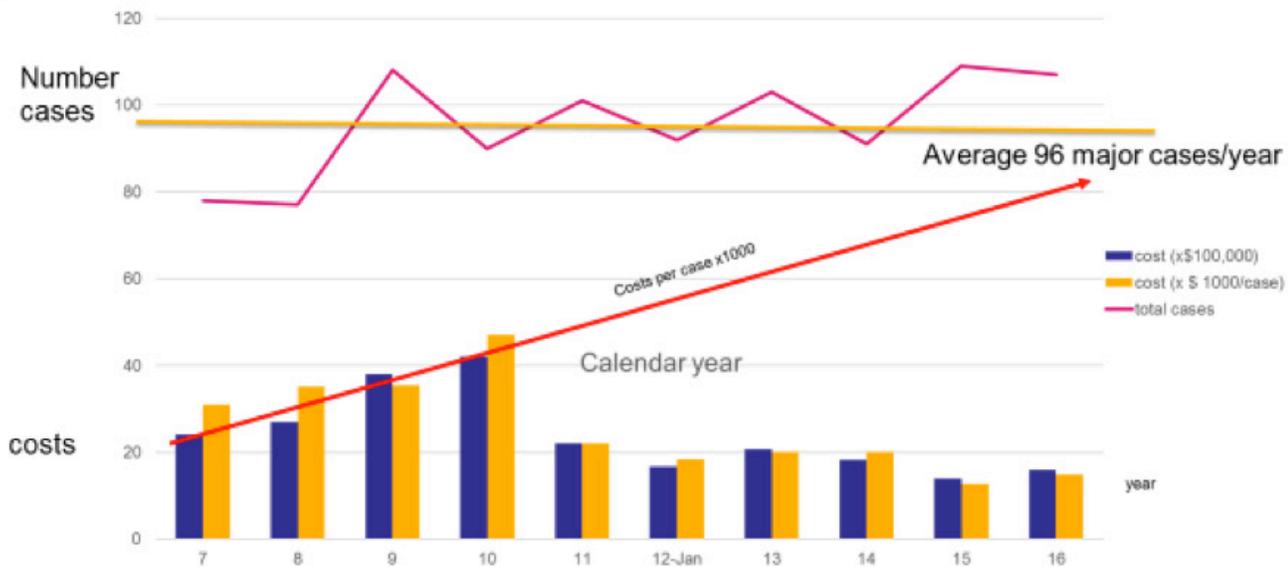
Biomechanical Comparison of Transverse Intermetacarpal K-Wires for the Fixation of Metacarpal Shaft Fractures. **Hutchison RL, Krumme J***, Thiagarajan, G. This is a collaboration between the Section of Hand Surgery and the Department of Civil Engineering, UMKC.

Isolation and Culture of Primary Human Osteocytes. **Pacicca D.**

The Effect of Diabetes on Osteocytes - In Vitro and In Vivo Using a Rat Model. **Pacicca D.**

Use of a Low-Fidelity Model of a Vertebra to Facilitate Learning to Place Pedicle Screws. **Schwend R, Greenberg I**, Wells C**.**

Comparison of OR Estimate Method to Hematocrit Method Blood Loss Estimation. **Schwend R, Stevanovich O**, Wurster W**, Robert Tung R**, Khoury M**, Uvodich M.**



The Division of Orthopaedic Surgery spine program performs over 100 multilevel spine procedures that utilize spinal implants. Titanium rods, screws, hooks and occasionally other devices are typically used. By far, the single largest expense in performing pediatric spine surgery is the cost of the implants. Between 2007 and 2010 the cost of implants to Children’s Mercy had doubled to over \$4 million per year and was approximately \$45,000 per case. This was not sustainable and was seriously affecting access for children needing spinal deformity surgery.

Spine Section, and Drs. Anderson and Schwend). This resulted in developing a competitive contracting system, using a single vendor, and switching to a new implant company. All three spine surgeons agreed to use one system for 80 percent of their cases and have done so for the past seven years. This resulted in a dramatic decrease in implant costs to under \$2 million per year. This represents a cost savings of over \$12 million over this time. This savings allows Children’s Mercy to reinvest in its programs to provide improved access and value to our patients.

To address this critical problem, Steve Elzey, Senior Director, Supply Chain Services met numerous times with the Section on Spine Surgery Dr. Price, Chief

Center for Sports Medicine Implements Suicide Screening |

Research from the National Collegiate Athletic Association (NCAA) has shown that suicide represents the fourth leading cause of death among student-athletes. Those who have suffered a sports injury may be at an even greater risk.

“Sports are such a big part of these student-athletes’ lives that they can become isolated and depressed when they are removed from their peers while recovering from an injury,” said Greg Canty, MD, Medical Director, Center for Sports Medicine and Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine.

Recognizing this growing trend and aware of efforts to identify children at risk for suicide in other Children’s Mercy clinics, Kevin Latz, MD, Chief, Section of Sports Medicine and Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine, approached Shayla Sullivant, MD, Child and Adolescent Psychiatrist and Assistant Professor of Pediatrics, University of Missouri-Kansas City, about implementing a suicide screening program for sports medicine patients. Dr. Sullivant’s expertise is in suicide prevention.

Immediately, Dr. Sullivant and her team began working with the Center for Sports Medicine team, implementing screening at the program’s Kansas location in 2015. When a patient age 12 and older visits one of these clinics, they are greeted by an athletic trainer or nurse who takes them to a private room where they ask them four yes-no questions using the Ask Suicide Screening Questions tool. The survey can be completed in about one minute by a trained staff member.

Questions include:

1. In the past few weeks, have you wished you were dead?
2. In the past few weeks, have you felt that you or your family would be better off if you were dead?
3. In the past week, have you been having thoughts about killing yourself?
4. Have you ever tried to kill yourself? If yes, how?

“Parents are not present for the initial screening questions,” Dr. Sullivant explained. “In order for this to work, the students have to answer honestly, and they are less likely to do so with a parent in the room. The sports medicine staff understands this and has implemented the ASQ as part of their workflow.”

If the staff identifies a patient as at-risk, they connect them to a social worker the same day who completes a more thorough evaluation. The child’s parents also are

informed of the screening results. If needed, the social worker provides recommendations for next steps and makes referrals.

Since beginning the suicide screening in Sports Medicine, approximately 2 percent of the clinics’ patients have demonstrated an elevated risk for suicide based on their responses. The project has now expanded to the sports medicine clinics at Children’s Mercy Blue Valley, East, North and soon the Adele Hall campus.

In addition, the Children’s Mercy Center for Sports Medicine is participating in a National Institute for Mental Health study to validate the ASQ screening tool, along with Boston Children’s Hospital. Dr. Sullivant serves as the principal investigator for this study at Children’s Mercy, which is designed to be certain the tool accurately identifies patients at risk for suicide.

“The Children’s Mercy sports medicine team understands the powerful mind-body connection of their patients, and that we must address both their mental and physical health for a full recovery,” Dr. Sullivant said. “They have quickly adopted this screening measure in an effort to identify youth at risk and improve outcomes for their patients.”

“The fact that we are screening our sports medicine patients for suicide is unique,” Dr. Canty said. “It demonstrates a more holistic approach to sports medicine, but most important, it’s the right thing to do for our student-athletes.”

I Scientific Publications: Original Published or in Press Research

Mechanical Contribution of the Rib Cage in the Cadaveric Thoracic Spine. Mannen EM, Johnson SN, **Anderson JT**, Friis EA. Spine 2015; 40: E760-766.

Mechanical Analysis of the Human Cadaveric Thoracic Spine with Intact Ribcage. Mannen EM, **Anderson JT**, Arnold PM, Friis EA. Journal of Biomechanics 2015; 48: 2060-2066.

The Effect of Scoliotic Deformity on Spine Kinematics in Adolescents. Galvis S, Burton D, Barnds B, **Anderson JT**, **Schwend RM**, **Price N**, Friis E, Wilson S. Scoliosis and Spinal Disorders 2016; 11: 1-6.

Biomechanical Evaluation of a Growth Friendly Rod Construct. Galvis SN, Arnold J, Mannen EM, Wong BM, Sis HL, Cadel ES, **Anderson JT**, Anderson DE, Arnold PM, Friis EA. Accepted for publication in Spine Deformity.

Does the Superior Articular Process of the Thoracic Vertebra Serve as a Useful Landmark for Determining the Angulation of Pedicle Screw Insertion in the Transverse Plane in Patients with Adolescent Idiopathic Scoliosis? **Stevanovic O****, **Hermanson A****, **Anderson JT**. Accepted for publication in Spine Deformity.

Influence of Sequential Ponte' Osteotomies in a Continuously Loaded Full Thoracic Spine Cadaveric Model with Attached Ribcage. Mannen EM, Arnold PM, **Anderson JT**, Friis EA. Accepted for publication in Spine Deformity.

Curve Flexibility in Cerebral Palsy-Related Neuromuscular Scoliosis: Does the Intraoperative Prone Radiograph Reveal More Flexibility than Preoperative Radiographs? **Chaudry Z****, **Anderson J**. Scoliosis and Spinal Disorders. In press.

Experience of a Care Process Model in the Evaluation of Pediatric Musculoskeletal Infections in a Pediatric Emergency Department. Patel L, Michael J, Schroeder L, **Berglund L**, Newland J. Pediatric Emergency Care. In press.

Forthcoming Ethics Rounds: Should School Boards Discontinue Support for High School Football? Marogolis LH, **Canty GS**, Halsted M, Lantos JD. Accepted for publication in Pediatrics.

Return to Play. **Canty GS**, Nilan LM. Pediatrics in Review, Oct 2015 Pediatr Rev. 2015 Oct; 36(10):438-46; quiz 447.

Are Sports-Related Concussions Giving You a Headache? Davis J, **Canty G**. May 2015 Mo Med 2015 May-Jun;112(3):187-91.

Survey of Alcohol Use and Effects on College Athletes Year 2. Glover D, Samuel SJ, Duncan K, Schultz J, Gerkovich M, **Gibson M**. Clinical Journal of Sport Medicine, Vol 26, Issue 2 e58-68.

Can Physical Examination Create a Stener Lesion? **Lankashandra* M**, **Eggers J***, Bogener J, **Hutchison RL**. Journal of Hand Surgery-Asian Pacific. In press accepted August 2016.

The Epidemiology of Injury in All-Female Flat Track Roller Derby. **Markey S***, **Hutchison RL**. Missouri Medicine. In press, accepted July 2016.

An Experimental Survey on the Effect of Using the CTS-6 Tool on the Diagnosis of Carpal Tunnel Syndrome by Hand Surgeons. Hutchison RL, **Hirthler MA**, **Hutchison AL**. Journal of Hand Surgery-Asian Pacific. In press, accepted Feb 2016.

Biomechanical Comparison of Two Methods of Intramedullary K-Wire Fixation of Transverse Metacarpal Shaft Fractures. **Hiatt S***; Begonia MT; Thiagarajan G; **Hutchison RL**. Journal of Hand Surgery (Am). 2015 August Volume 40, Issue 8, 1586-1590.

Prospective Comparison of the Six-item Carpal Tunnel Symptoms Scale and Portable Nerve Conduction Testing in Measuring the Outcomes of Treatment of Carpal Tunnel Syndrome with Steroid Injection. **Craw JR***; **Church DJ***; **Hutchison RL**. HAND 2015 March Volume 10, Issue 1, 49-53.

Cadaveric Analysis of the Distal Tibiofibular Syndesmosis. **Lilyquist M***, **Shaw A***, **Latz K**, Bogener J, Wentz B. Foot Ankle Int. 2016; 37(8): 882-90.

In Vivo Evaluation of Stem Cell Aggregates on Osteochondral Regeneration. Sridharan B, Laflin AD, Holtz MA, **Pacicca DM**, **Wischmeier NK***, Detamore MS. Journal of Orthopedic Research. Accepted 2016.

Combined Posterolateral Corner and Acute Anterior Cruciate Ligament Injuries in an Adolescent Cohort: A Magnetic Resonance Imaging Analysis. **Shaw KA****, Dunoski BS, Mardis NJ, **Pacicca DM**. Int Orthop. 2015 Nov 5. [Epub ahead of print] PMID: 26537394.

Knee Morphometric Risk Factors for Acute Anterior Cruciate Ligament Injury in Skeletally Immature Patients. **Shaw KA****, Dunoski B, Mardis N, **Pacicca D**. J Child Orthop. 9(2):161-8 April 2015.

Patterns of Rib Growth in the Human Child. **Schwend RM**, Schmidt JA, Reigrut JL, Blakemore LC, Akbarnia BA. Spine Deformity. July 2015;3(4):297-302.

Addressing the Global Disparities in the Delivery of Pediatric Orthopaedic Services: Opportunities for COUR and POSNA. Shirley ED, Sabharwal S, **Schwend RM**, Cabral C, Spiegel D. J Pediatr Orthop 2016 Jan;36(1):89-95.

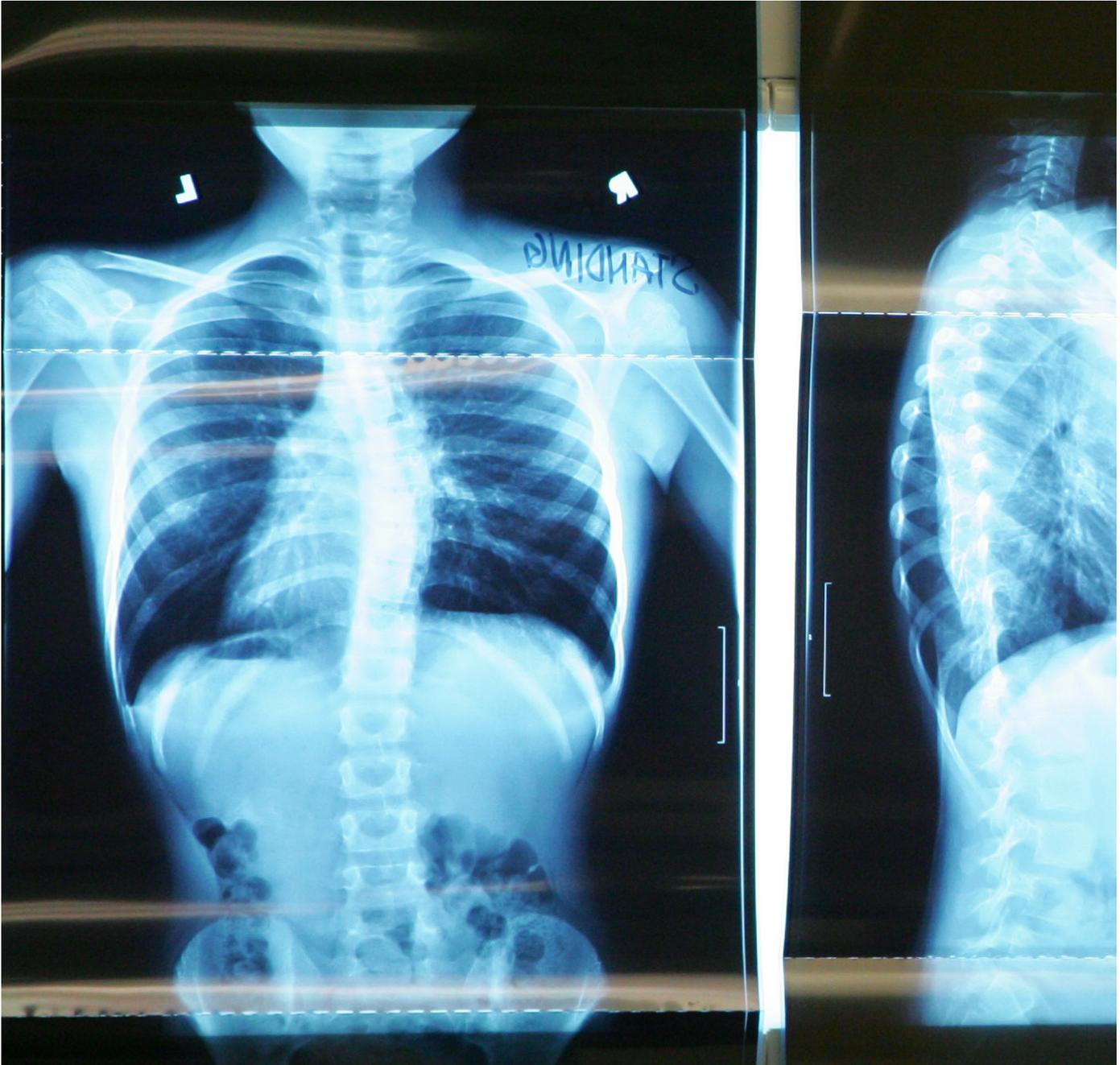
Defining the Differences in Transverse Plane Trajectories for Thoracic Pedicle Screw Insertion: Anatomic Versus Medial. Hotchkiss WR, **Schwend RM**, Bosch PB, Edgar HJH, Young BN. Spine Deformity 2016. In press.

Predictors of Variability in the Length of Surgery of Posterior Instrumented Arthrodesis in Patients with Adolescent Idiopathic Scoliosis. **Heller A****, **Schwend RM**. J Pediatric Orthopaedics B. In press.



Dr. Kate Keeler and Dr. Brad Olney

I Study Reviews Predictors of Length of Surgery



Ninety-five posterior instrumented spinal fusion procedures were reviewed to identify factors influencing operative duration for adolescent idiopathic scoliosis (AIS). The most significant factor influencing operative length in AIS patients was the surgeon performing the case.

Addressing the Global Disparities in the Delivery of Pediatric Orthopaedic Services: Opportunities for COUR and POSNA. Shirley ED, Sabharwal S, **Schwend RM**, Cabral C, Spiegel D. *J Pediatr Orthop*. 2016 Jan;36(1):89-95.

Defining the Differences in Transverse Plane Trajectories for Thoracic Pedicle Screw Insertion: Anatomic Versus Medial. Hotchkiss WR, **Schwend RM**, Bosch PB, Edgar HJH, Young BN. *Spine Deformity*. 2016;4(1):22-26.

The POSNA-COUR International Scholar Program. Results of the First 7 Years. Fornari ED, Sabharwal S, **Schwend RM**. *J Pediatr Orthop*. 2016 Jan 11. [Epub ahead of print] PMID 26756989.

Predictors of Variability in the Length of Surgery of Posterior Instrumented Arthrodesis in Patients with Adolescent Idiopathic Scoliosis. Heller A, Melvani R, Thome A, Leamon J, **Schwend RM**. *J Pediatric Orthopaedics B*. 2016 May;25(3):258-62.

AAOS Position Statement. Screening for the Early Detection of Idiopathic Scoliosis in Adolescents. Hresko MT, Talwalkar V, **Schwend RM**. *AAOS Now*. Jan 2016.

Management of Pediatric Trauma. Committee on Pediatric Emergency Medicine, Council on Injury, Violence, and Poison Prevention, Section on Critical Care, Section on Orthopaedics, Section on Surgery, Section on Transport Medicine, Pediatric Trauma Society and Society of Trauma Nurses Pediatric Committee. **Schwend RM**, Chair, AAP Section on Orthopaedics. *Pediatrics*. 2016 Aug;138(2). pii: e20161569. doi: 10.1542/peds.2016-1569. PMID:27456509.

Current Issues Affecting the Practice of Pediatric Orthopaedic Surgeons: Results of the 2014 Workforce Survey of the American Academy of Pediatrics Section on Orthopaedics. Hosseinzadeh P, Copley L, Ruch-Ross H, **Schwend RM**, Sawyer JR. *J Pediatr Orthop*. 2016 Sep 22. [Epub ahead of print] PMID:27662381.

AAOS Position Statement: Early Detection of Idiopathic Scoliosis in Adolescents. Hresko TM, Talwalkar V, **Schwend RM**. *JBJS-A*. Aug 2016;98:16e67.

How Does Differential Rod Contouring Contribute to 3-Dimensional Correction and Affect the Bone-Screw Forces in Adolescent Idiopathic Scoliosis Instrumentation? Wang X, Boyer L, LeNaveaux F, **Schwend RM**, Aubin CE. *Clinical Biomechanics*. 2016;39:115-121.

The Effect of Scoliotic Deformity on Spine Kinematics in Adolescents. Galvis SN, Burton D, Barnds BL, Anderson JT, **Schwend RM**, Price N, Wilson SE, Friis EA. *Scoliosis and Spinal Disorders* 2016;. 11:42. doi: 10.1186/s13013-016-0103.

To Cast, to Saw, and Not to Injure: Can Safety Strips Decrease Cast Saw Injuries. **Stork NC**, Lenhart RL, Nemeth BA, Noonan KJ, Halanski MA. *Clin Orthop Relat Res*. 2016. Jul;474(7):1543-52.

Pregame Sore Throat, Postgame Intensive Care Unit. **Stork NC**, Smoot MK. *Clin J Sport Med*. 2016. May;26(3)e71-3.

Submitted Manuscripts, Decisions Pending |

Influence of Severe Unilateral Congenital Hand Deficiencies on Preferred Handedness. **Cheng C**, **Colanese J***, **Doan K****.

Complications of Distal Phalanx Fractures in Children. **Lankashandra***, **Wells, C****, **Cheng, CJ**, **Hutchison RL**. *Journal of Hand Surgery (Am)*. In review.

Median Nerve Entrapment in the Ulna in a Both-Bone Pediatric Forearm Fracture—Case Report and Review of the Literature. **Wester, C****, **Hutchison, RL**. *Case Reports in Orthopedics*. In review.

Curve Flexibility in Cerebral Palsy-Related Neuromuscular Scoliosis: Does the Intraoperative Prone Radiograph Reveal More Flexibility than Preoperative Radiographs? **Chaudry Z****, **Anderson JT**. *Scoliosis and Spinal Disorders*. In review.

Predictors of Length of Surgery in Posterior Instrumented Arthrodesis for Adolescent Idiopathic Scoliosis (AIS). Submission to JPO 2014. **Heller A****, **Melvani R****, **Thome A****, **Leamon J**, **Schwend RM**. Submitted to JPOB July 2015. In review.

How Do Implant Costs Impact Access to Pediatric Spinal Deformity Surgery? An International Survey of Spine Surgeons. **Schwend R**, Nandyala S. In review.

Dynamic Rib Rod Connector System. **Schwend R**, Robin J, Deckert J, Wong W, Zhang D. In review.

I QI Summary – Hip Ultrasound Project

The orthopaedic team identified that the process to obtain an ultrasound to evaluate infants with developmental dysplasia of the hip (DDH) could be improved. The initial process required patients to receive an ultrasound prior to visiting the Orthopaedic Clinic by checking into Radiology, waiting for an available technologist to complete the ultrasound, then arriving at the Orthopaedic Clinic for the appointment. An official report from the radiologist was needed before the patient could see the orthopaedic surgeon.

This process included wait time and frustration for patients and families. The team established a goal of improving this process by performing ultrasounds in clinic with a consistent technician.

In January 2016, the process was evaluated and the team identified issues with the assessment of DDH patients. Issues included:

1. patients checked in with two separate departments for one visit
2. the patient/family traveled between two departments,

3. often getting lost between ultrasound and the clinic
3. patients had lengthy clinic visits
4. the physician waited on the ultrasound dictation before seeing the patient
5. ultrasound results varied between technicians
6. patients/families were dissatisfied.

The goals of this QI project were to decrease total visit time for the patient/family by decreasing the time from ultrasound to being seen by the physician, increase satisfaction, and have the physician present during ultrasound to review it in real time without waiting for the dictation. Process changes were implemented in March 2016 and tested with six clinic patients every other Wednesday. Currently, this has expanded to six patients every Wednesday.

This work has decreased the average time from ultrasound to being seen by a physician from 65.5 minutes to 22.4 minutes. Parents have provided positive feedback about the changes, no patients have needed additional clinic appointments, and the physician is now able to see two additional patients in Wednesday clinic.



Dr. Schwend uses a 3D model to discuss hip surgery.

Books and Book Chapters |

Spinal Deformity. **Anderson JT**. In: McInerney T, Adam HM, Campbell DE, Foy JM, Kamat, DM, and DeWitt TG, eds. AAP Textbook of Pediatric Care, 2nd Ed. Elk Grove Village, IL: American Academy of Pediatrics. 2016.

Sub-Axial Cervical Spine Injuries. The Management of Disorders of the Child's Cervical Spine. **Anderson JT**. In press.

Pediatric Fractures of the Lower Extremity in Children in AAOS Orthopaedic Knowledge Update Trauma 5, 2016. **Latz K**.

Osteochondroses. **Pacicca D**. In: McInerney T, Adam HM, Campbell DE, Foy JM, Kamat DM, and DeWitt TG, eds. AAP Textbook of Pediatric Care, 2nd Ed. Elk Grove Village, IL: American Academy of Pediatrics 2016.

Anterior Exposure of the Hip. **Schwend RM**. In: Wiesel SW, ed. Operative Techniques in Orthopaedic Surgery. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins; 2015.

Hip Exposures for Infection. **Schwend RM**. In: Wiesel SW, ed. Operative Techniques in Orthopaedic Surgery. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins; 2015.

Cavus Foot in Children. **Schwend RM, Olney B**. In: Wiesel SW, ed. Operative Techniques in Orthopaedic Surgery. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins; 2015.

What Can We Learn about Ribs and Vertebra Growth from an Osteological Collection? **Schwend RM, Akbarnia BA, Schmidt J, Blakemore L**. In: Akbarnia BA, Yazici M, Thompson GH ed. The Growing Spine. The Management of Spinal Disorders. Second Edition. Heidelberg. 2015.

Developmental Dysplasia of the Hip. **Schwend RM**. In: Gosselin RA, Spiegel DA, Foltz M Ed. Global Orthopaedics. Caring for Musculoskeletal Conditions and Injuries in Austere Settings. New York: Springer 2015.

Evaluation and Treatment of Angular Deformities. Sabharwal S, **Schwend RM**, Spiegel DA. Global Orthopaedics.

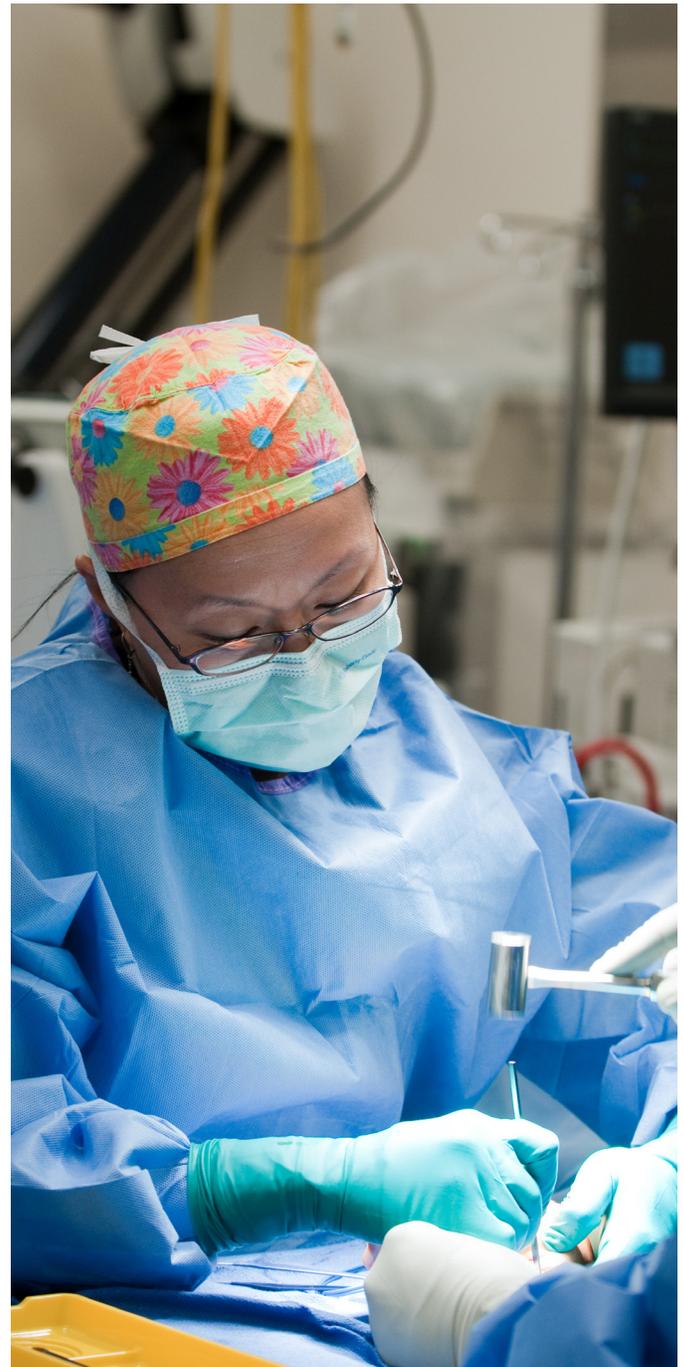
Caring for Musculoskeletal Conditions and Injuries in Austere Settings. New York: Springer 2015.

Spine. **Studemann A, Thomas V**. In: Nursing Care of the Pediatric Neurosurgery Patient, 3rd Edition.

Chapter 97: Postnatal Assessment of Common Prenatal Sonographic Findings. Campbell DE, Nemerofsky SL, Iyare

A, Mauch TJ, **Schwend RM**. In McInerney TK ed. American Academy of Pediatrics Textbook of Pediatric Care, 2nd Edition. Elk Grove Village, June 2016.

Temporary Splinting of a Fracture. Kelleher K, Baum R, **Schwend RM**. McInerney TK ed. American Academy of Pediatrics Textbook of Pediatric Care, 2nd Edition. Elk Grove Village, June 2016.



Dr. Christine Cheng

I Presentations at Professional Meetings

Spine Biomechanics in the Adolescent and the Effect of Scoliotic Deformity. Galvis S, Burton D, **Price N, Anderson JT, Schwend RM**, Wilson S, Friis E. Poster Presentation at the Society of Scoliosis Orthopaedic and Rehabilitation Treatment/International Research Society on Spine Deformities Meeting, May 25-28, 2016, Banff, Alberta Canada.

Sequential Ponte' Osteotomies Increase Sagittal Plane Flexibility in a Thoracic Cadaveric Model with Rib Cage. Mannen EM, Arnold PA, **Anderson JT**, Friis EA. Presented at the American Society of Biomechanics Meeting, Aug. 2-5, 2016, Raleigh, NC.

Comparison of Low versus Medium Dose Naloxone Infusion Combined with Patient Controlled Analgesia After Posterior Spine Fusion Surgery: A Randomized Controlled Trial. Pieters B, **Anderson JT, Schwend R, Price N, Leamon J**. Poster presentation at the International Anesthesia Research Society Meeting, San Francisco May 21-24 2016. Podium presentation at the 2016 American Academy of Pediatrics orthopaedic section meeting, San Francisco, Oct. 22, 2016.

Does the Superior Articular Process of the Thoracic Vertebra Serve as a Useful Landmark for Determining the Angulation of Pedicle Screw Insertion in the Transverse Plane in Patients with Adolescent Idiopathic Scoliosis? **Stevanovic O**, Hermanson A**, Anderson JT**. Accepted for publication in Spine Deformity. Presented at the AAP Orthopaedic section meeting, San Francisco, Oct. 22, 2016.

Injury Prevention Equipment in Youth Sports: Myths, Marketing & Evidence. **Canty, G**. National Athletic Trainer's Association 66th Clinical Symposia St. Louis, Mo., June 24, 2015.

Establishing a Sports Ultrasound Curriculum in a Primary Care Sports Medicine Fellowship and Residency Program. Schultz J, **Gibson M**. Poster Presentation at 48th Annual Society of Teachers of Family Medicine Spring Conference. Orlando, Fla., April 26, 2015.

Survey of Alcohol Use and Effects on College Athletes Year 2. Glover, D, Samuel SJ, Duncan, K, Schultz J, Gerkovich M, **Gibson M**. Clinical Journal of Sport Medicine, Vol 26, Issue 2 e58-68. American Medical Society for Sports Medicine Annual Meeting Dallas, April 2016.

Should On Call Schedule Become a Thing of the Past. Latz K, **Sinclair M**, Lind A. POSNA Annual Meeting, Indianapolis, Ind. April 2016. Podium Presentation.

The Bassett Ligament is not Abnormal. Bogener J, **Latz K**. AAOS Annual Meeting. Orlando, Fla. March 2016. Poster.

The Effect of Lateral Intraoperative Distraction on Deformity Correction for Severe Neuromuscular Scoliosis. **Singh LK, Greenberg I**, Kjørvestad T, Sherman A, Anderson J, Schwend R**. AAOS 2017 Annual Meeting, March 14-18, San Diego, Calif.

Can Physical Examination Create a Stener Lesion? **Lankashandra M*, Eggers J***, Bogener J, **Hutchison RL**. Annual Meeting of American Association of Hand Surgeons. Jan. 15, 2016.

Early MPFL Repair of Patellar Dislocation in Adolescents does not Treat Anatomic Risk Factors for Repeat Dislocation and Instability. **Singh L*, Greenberg I**, Merrill H*, Pacicca D**. Pediatric Orthopaedic Society of North America Annual Meeting, Indianapolis, Ind., April 27-30, 2016.

Advancement in Telemedicine. **Schwend R**. POSNA NP/PA Symposium. POSNA Annual Meeting. April 29-May 2, 2015, Atlanta, Ga.

Coupled Spinal Canal and Vertebral Body Growth; Observations from an Osteological Collection. **Schwend R**, L Blakemore, B Akbarnia, A Ahmed, M Dumas, J Schmidt. 14th International Phillip Zorab Symposium. British Scoliosis Research Foundation, Edinburgh, June 2015.

Dural Ectasia in NFI. What Do We Know? What Can We Do? **Schwend R**. 9th International Congress on Early Onset Scoliosis (ICEOS). Boston, Mass., Nov. 19-20, 2015.

Lessons Learned: Something I Wouldn't Do Again. Woos with Rib Bands. **Schwend R**. 9th International Congress on Early Onset Scoliosis (ICEOS). Boston, Mass., Nov. 19-20, 2015.

Use of a Femoral Distractor in Patients with Severe Spastic Neuromuscular Scoliosis. **Schwend R, Singh L***. Podium Presentation, AAOS, San Diego, Calif., March 2017.

Femur Fractures in Young Children: Defining the Cutoff for Non Accidental Trauma. Is it Ambulatory Age or 36 months? **Schwend R**. POSNA Annual Meeting, Subspecialty Day. Indianapolis, Ind., Friday, April 29, 2016.

Intra-operative Lateral Rib-Pelvis Distraction for Treating Severe Neuromuscular Scoliosis. **Schwend R, Singh L***. International Spine Deformity Conference, Beijing, China. June 25, 2016.

What We Have Learned about the Child's Ribs from Osteology Studies. **Schwend R**. 2016 Spine Deformity Conference. Peking Union Medical College (PUMC), June 25, 2016.

Intra-operative Lateral Rib-Pelvis Distraction for Treating Severe Neuromuscular Scoliosis. **Schwend R, Singh L***. The Emans Spine Symposium and Annual Harvard Grice Day. Children's Hospital, Boston, Mass., Nov. 8, 2016.

Visiting Professor. Evaluation and Referral for Developmental Dysplasia of the Hip in Infants. **Schwend R**. Recent AAP Clinical Report. Shanghai Jiao Tong University School of Medicine. Department of Pediatric Orthopaedics, Xin-Hua Hospital. Shanghai, China, Nov. 14, 2016.

Invited POSNA President-Elect to Represent POSNA and AAOS. **Schwend R**. Pain Location in Slipped Capital Femoral Epiphysis. The 11th International Congress of Chinese Orthopaedic Association (COA2016), Nov. 17-20, 2016. Beijing, China.

Early Detection of Idiopathic Scoliosis in Adolescents. A Consensus. Evaluation and Referral for Developmental Dysplasia of the Hip in Infants. Recent AAP Clinical Report. **Schwend R**. The 11th International Congress of Chinese Orthopaedic Association (COA2016), Nov. 17-20, 2016. Beijing, China.

Evaluation and Referral for Developmental Dysplasia of the Hip in Infants. Recent AAP Clinical Report. **Schwend R**. The 11th International Congress of Chinese Orthopaedic Association (COA2016), Nov. 17-20, 2016. Beijing, China.

Intra-operative Lateral Rib-Pelvis Distraction for Treating Severe Neuromuscular Scoliosis. **Singh L*, Schwend R**. Podium Presentation AAOS Annual Meeting, San Diego, Calif., March 2017.



Motion Analysis Lab

Section for Sports Medicine Offers Pediatric Sports Medicine Fellowship

Tiffany Chow, MBA, Graduate Medical Education

More than 3.5 million children and teens are injured each year on the playground, bicycle, during gymnastics, and general participation in sports or recreational activities. Emergency rooms treat more than 775,000 children ages 14 and younger for sports-related injuries, most of which occur due to falls, being struck by an object, impact and physical overexertion.

As children grow, injuries and medical conditions may have a direct effect on their ability to participate in sporting activities. Pediatric sports medicine physicians have specialized education and training that provides the opportunity to deliver expert clinical care to children, teens and young athletes who may experience an injury.

The Pediatric Sports Medicine Fellowship at Children's Mercy Kansas City is a one-year program accredited by the Accreditation Council for Graduate Medical Education. The program began with its inaugural fellow, Laura Nilan, DO, MS, July 1, 2016.

Led by Greg Canty, MD, Program Director, the fellow will work with a multidisciplinary team of faculty physicians, coaches, certified trainers, behavioral scientists, pharmacologists, exercise physiologists, nutritionists and physical therapists to learn sports medicine from a pediatric perspective. The 12-month program partners with the Kansas City Marathon, Hospital Hill 5K and Truman Lakewood Sports Medicine. The fellow will have access to

all team sports in the Kansas City, Mo., School District (five public high schools), Turner Kansas High School (public), St. Teresa's Academy (private, all-female), University Academy (charter school), and Brookside Soccer League (recreational and competitive).

The fellow will be the lead school/team physician for Lincoln College Preparatory Academy and expected to be available for team coverage of football, soccer (men's and women's), basketball (men's and women's), wrestling, track/field (men's and women's) and swimming. The fellow will also be expected to provide medical expertise and coverage of sporting events for Brookside Soccer League events with more than 2,000 participants. This broad-based exposure to both school-based and community-based teams should provide a wonderful breadth of experiences.

Fellows are also afforded the opportunity to stay current in their primary specialty. In Dr. Nilan's case, as a board-eligible pediatric emergency medicine physician, she also works in the Emergency Department as part of her fellowship.

"We are very excited to be one of 14 institutions in the U.S. offering a Pediatric Sports Medicine fellowship. Our goal is to train tomorrow's physician leaders in ways to help keep adolescents and youth healthy through safer sports participation," Dr. Canty added.



Children's Mercy is the official health care partner and sports medicine partner for Sporting Kansas City, a Major League Soccer club. Children's Mercy staff and patients participated in the pre-game ceremonies for the 2017 season opener at Children's Mercy Park.



Dr. Greg Canty, Ryleigh, ESPN Analyst Jessica Mendoza, and Nicole Fillingame.

WIN for KC: Extraordinary 12-year-old Ryleigh Defies Odds while Inspiring Others

Don't let the small stature fool you. Ryleigh Patience is an extraordinary girl with a fighting spirit, huge heart and an even bigger desire to be a part of the game. Diagnosed with a rare genetic disease at 3 years old, Ryleigh's positive spirit and contagious smile sparked cheers and tears at the WIN for KC Women's Sports Celebration. Learn more about Ryleigh on the Children's Mercy Facebook Page, and prepare to be inspired by this year's Youth Sports Girl Award honoree!

I Posters

A Survey of Alcohol Use and Abuse and Its Effects on Practice and Game Time Missed by Collegiate Athletes. Glover D, Jenks C, Duncan K, Gerkovich M, **Schultz J***, **Gibson M**. American Medical Society for Sports Medicine Annual Meeting, Hollywood, Fla., April 17, 2015.

Establishing a Sports Ultrasound Curriculum in a Primary Care Sports Medicine Fellowship and Residency Program. **Schultz J***, **Gibson M**. Poster Presentation at 48th Annual Society of Teachers of Family Medicine Spring Conference, Orlando, Fla., April 26, 2015.

Complications of Distal Phalanx Fractures in Children. **Lankashandra M***, **Hutchison, RL**. Annual Meeting of American Society for Surgery of the Hand, September 2016.

The Epidemiology of Injury in All-Female Flat Track Roller Derby. **Markey S***, **Hutchison RL**. Annual Meeting of the Society of Military Orthopedic Surgeons. Poster, December 2015.

The Bassett Ligament is not Abnormal. Bogener J, **Latz K** AAOS Annual Meeting, Orlando, Fla., March 2016, poster.

Effect of Streptozotocin on Osteoblast to Osteocyte Differentiation In Vitro. Sutherland A, Brown T, **Pacicca D**. American Society for Bone and Mineral Research Annual Meeting, Atlanta, Ga., Sept. 16-19, 2016.

Glucose Fluctuations in Diabetes Have Targeted Effects on the Osteocyte In Vitro and In Vivo. **Pacicca D**, Brown T, **Wirtz J****, Kover K, Yan Y, Watkins D, Tong P, Bonewald L. Midwest Society for Pediatric Research, Kansas City, Mo., Oct. 29-30, 2015.

Glucose Fluctuations in Diabetes Have Targeted Effects on the Osteocyte In Vitro and In Vivo. **Pacicca D**, Brown T, **Wirtz**

J**, **Kover K**, Yan Y, Watkins D, Tong P, Bonewald L. American Society for Bone and Mineral Research Annual Meeting 2015 Annual Meeting, Seattle, Wash., Oct. 9-12, 2015.

Monitoring of Collagen Replacement in a Transplant Model for Treatment of Osteogenesis Imperfecta Using GFP-Collagen Donor Mice. Hulbert M, Grillo M, Zhao H, **Pacicca D**, Campos R, Dallas S, Xie Y, Phillips C. American Society for Bone and Mineral Research Annual Meeting 2015, Seattle, Wash., Oct. 9-12, 2015.

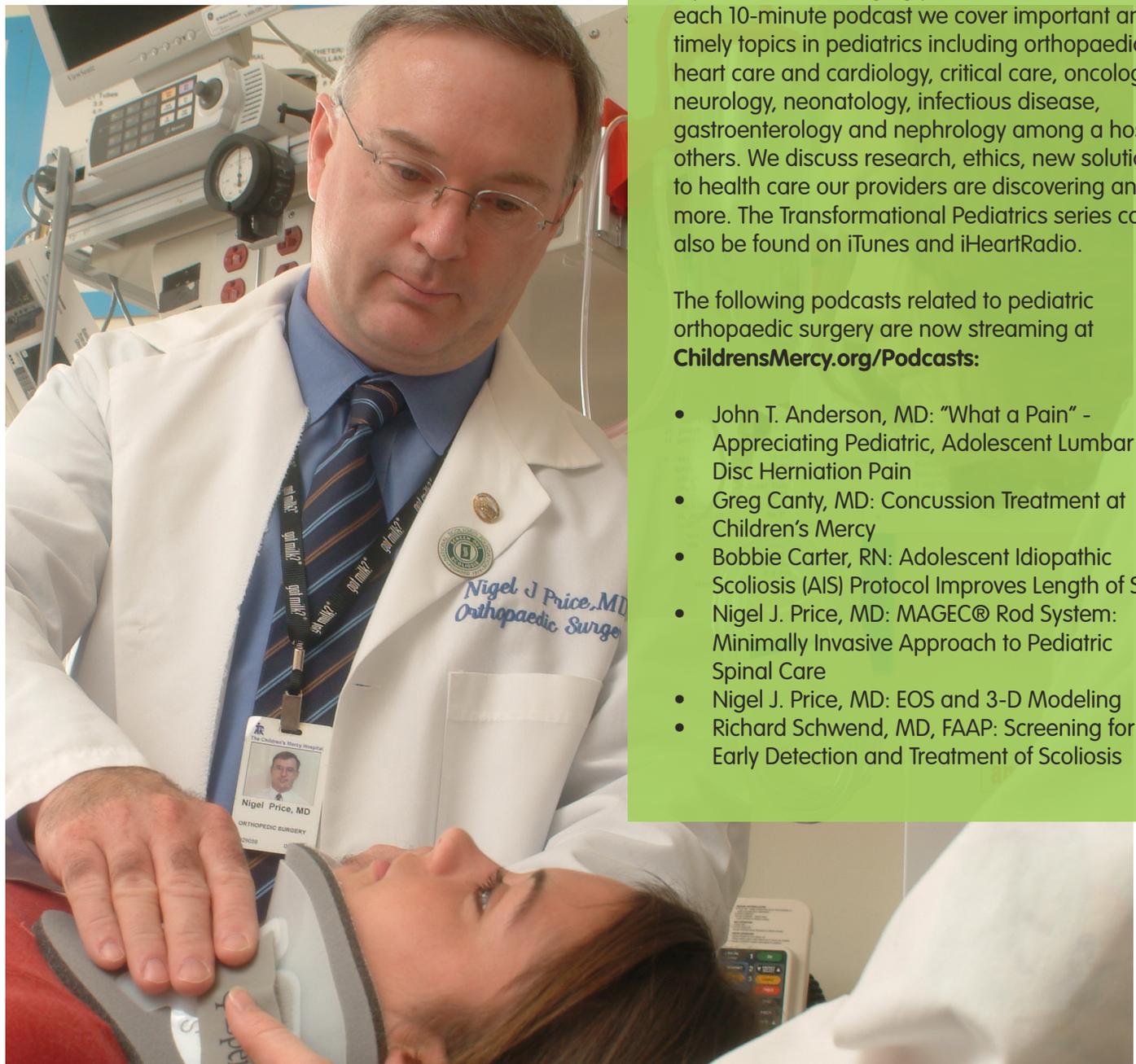
Dramatic Effects of High and Low Glucose on Osteocytes: A Model for the Effects of Glucose on Bone Loss. **Pacicca D**, Brown T, **Kover K**, Bonewald L. Orthopaedic Research Society 2015 Annual Meeting, Las Vegas, Nev., March 12-15, 2015.

Fracture in a 16-year-old Football Player or Something More? Moreland M, **Stork N**. AMSSM 25th Annual Meeting, Dallas, Texas, April.

I Future Posters

The Relationship of Anterior Cruciate Ligament Insertion Sites to the Distal Femoral Growth Centers: An MRI Study. **Khoury M****, Vincent Staggs V, Amie Robinson A, Dunoski B, **Pacicca D**. ORS, March 2017, San Diego, Calif.

The Relationship of the Posterior Cruciate Ligament Insertion Site to the Proximal Tibia Growth Centers: An MRI study. **Khoury M****, Staggs V, Robinson A, Dunoski B, **Pacicca D**. ORS, March 2017, San Diego, Calif.



Dr. Nigel Price

Tune In – Transformational Pediatrics

Transformational Pediatrics is a free podcast series for health care professionals featuring the specialists from Children’s Mercy covering topics that are changing pediatric medicine. In each 10-minute podcast we cover important and timely topics in pediatrics including orthopaedics, heart care and cardiology, critical care, oncology, neurology, neonatology, infectious disease, gastroenterology and nephrology among a host of others. We discuss research, ethics, new solutions to health care our providers are discovering and more. The Transformational Pediatrics series can also be found on iTunes and iHeartRadio.

The following podcasts related to pediatric orthopaedic surgery are now streaming at ChildrensMercy.org/Podcasts:

- John T. Anderson, MD: “What a Pain” - Appreciating Pediatric, Adolescent Lumbar Disc Herniation Pain
- Greg Canty, MD: Concussion Treatment at Children’s Mercy
- Bobbie Carter, RN: Adolescent Idiopathic Scoliosis (AIS) Protocol Improves Length of Stay
- Nigel J. Price, MD: MAGEC® Rod System: Minimally Invasive Approach to Pediatric Spinal Care
- Nigel J. Price, MD: EOS and 3-D Modeling
- Richard Schwend, MD, FAAP: Screening for Early Detection and Treatment of Scoliosis



Dr. John Anderson with a patient in the Spine Clinic

Submitted Presentations |

Should Obligatory Call Schedules Become a Thing of the Past? Kelly Vanderhave, **Sinclair M.** The 2015 POSNA Membership Survey Regarding Trauma Care. 2017 EPOSNA Annual Meeting, May 3-6, Barcelona, Spain.

A PICC Line, Inserted the Day Before Surgery, Decreases the Time from Induction to Incision for Spinal Deformity Surgery and Safely Provides Central Venous Access During Surgery: A Pilot Study. **Stuedemann, A, Schwend R, Thomas V, Leamon J.** Journal of Pediatric Orthopedics-B.

Other Publications |

Practical Pediatrics: A Case Study: Acute Knee Injury. **Latz K, Vanderpool A.** Children's Mercy Kansas City Newsletter, Sports Medicine, Fall 2015.

AAOS Position Statement. Screening for the Early Detection of Idiopathic Scoliosis in Adolescents. Hresko MT, Talwalkar V, **Schwend RM.** AAOS Now, Jan 2016.

Spotlight on Children's Mercy Kansas City Division of Orthopaedic Surgery:

Children's Mercy Kansas City provides answers for the most complex pediatric cases. Ranked by U.S. News & World Report as one of the nation's best pediatric hospitals, the Division of Orthopaedic Surgery, led by Bradford W. Olney, MD, Division Chief; Christine J. Cheng, MD, MPH, Chief,

Section of Hand Surgery; Kevin H. Latz, MD, Chief, Section of Sports Medicine; Greg S. Canty, MD, Medical Director, Center for Sports Medicine; and Nigel J. Price, MD, FAAP, Chief, Section of Spine Surgery; uses a multidisciplinary approach to answer the most complex pediatric cases.



From left to right:
Nigel J. Price, MD, FAAP;
Christine J. Cheng, MD, MPH;
Greg S. Canty, MD; and
Bradford W. Olney, MD.

Contact Info:

Visit childrensmercy.org/orthopaedicsurgery
 Orthopaedic Surgery Office:
 (816) 234-3075

For transport, admissions or phone consults,
 call: 1 (800) GO MERCY / 1 (800) 466-3729
childrensmercy.org/orthopaedicsurgery

Orthopaedic Surgery Faculty |

Division Director**Bradford W. Olney, MD**

Division Chief, Orthopaedic Surgery; The Dr. Rex and Lillian Diveley Endowed Chair in Pediatric Orthopaedic Surgery; Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine; Program Director, Orthopaedic Surgery Residency, University of Missouri-Kansas City School of Medicine

Faculty**John T. Anderson, MD, FAAP**

Assistant Professor of Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine; Clinical Assistant Professor of Orthopaedic Surgery, University of Kansas School of Medicine

Lisa M. Berglund, MD

Assistant Professor of Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine

Greg S. Canty, MD

Medical Director, Center for Sports Medicine; Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine

Christine J. Cheng, MD, MPH

Chief, Section of Hand Surgery; Pediatric Hand Surgeon; Clinical Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine

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Kevin H. Latz, MD

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Donna M. Pacicca, MD

Associate Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine; Adjunct Professor of Oral and Craniofacial Science, University of Missouri-Kansas City School of Dentistry

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Pediatric Orthopaedic Surgeon; Chief, Section of Spine Surgery; Associate Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine; Clinical Assistant Professor of Orthopaedic Surgery, University of Kansas School of Medicine; Orthopaedics Associate Program Director, Truman Medical Center

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Richard M. Schwend, MD, FAAP

Director, Orthopaedic Research Program; Professor Orthopaedic Surgery and Pediatrics, University of Missouri-Kansas City School of Medicine and University of Kansas School of Medicine

Mark R. Sinclair, MD

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Natalie C. Stork, MD

Assistant Professor of Pediatric Orthopaedic Surgery, University of Missouri-Kansas City School of Medicine



For children. For families. For answers.®

At Children's Mercy Kansas City, we're constantly finding answers for the most difficult cases and challenging conditions.

For more on how we're providing answers, visit childrensmercy.org/orthopaedicsurgery or contact the Division of Orthopaedic Surgery at (816) 234-3075.

In academic affiliation with the University of Missouri-Kansas City | EOE/AEE

Children's Mercy Kansas City

Children's Mercy Kansas City is an independent, non-profit, 367-bed pediatric health system, providing half a million encounters for patients from across the country. Children's Mercy is ranked by U.S. News & World Report as one of "America's Best Children's Hospitals" and has received Magnet recognition four times for excellence in nursing services. In affiliation with the University of Missouri-Kansas City, our medical staff of more than 750 pediatric subspecialists and researchers is actively involved in clinical care, pediatric research, and educating the next generation of pediatric subspecialists. And our leadership in pediatric genomic medicine and clinical pharmacology is driving research and innovation in neonatology, heart care, cancer treatment and other subspecialties to transform outcomes and provide answers for children here and around the world.



FOR MORE INFORMATION CONTACT:

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