Le Bonheur Children's Hospital
Memphis, Tennessee

PEDIATRIC ORTHOPAEDICS

Campbell Clinic
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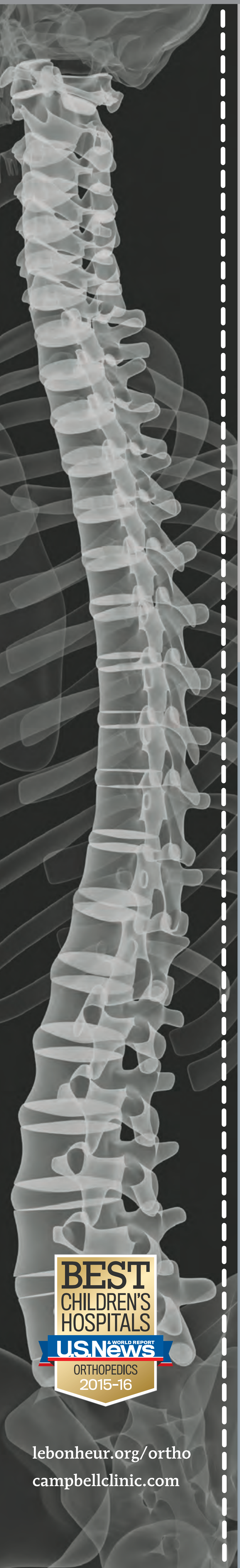

Research boom leads to increased multi-center collaboration

In the last six years, the Le Bonheur/Campbell Clinic Pediatric Orthopaedic team has become a major research center. Thanks to a concerted effort to increase research in order to better innovate, research volume has quadrupled since 2009. The team produces more than 10 high-level, peer-reviewed publications and dozens of presentations nationally and internationally each year – on a wide range of orthopaedic clinical topics – but all centered on pediatric orthopaedic results and ways to optimize outcomes for patients.

The effects of this growth in research are far flung, but one rather interesting development has been the team's involvement in a number of multi-center studies focusing on rare diseases and disorders, specialized treatments and standardization of practices. Examples of Le Bonheur/Campbell Clinic specialists' collaboration with other national leaders include treatment of clavicle fractures, perthes disease and early-onset scoliosis.

Le Bonheur/Campbell Clinic is one of eight centers involved in the FACTS (Function after Adolescent Clavicle

continued on page 2, Research boom

Le Bonheur/Campbell Clinic Pediatric Orhopaedic research has quadrupled since 2009. Results help optimize outcomes for patients.

Oh, the places you will go

Increased research also leads to increasing presentation on national and international levels.

This year, Le Bonheur/Campbell Clinic physicians presented at various orthopaedic conferences and meetings in Las Vegas, Atlanta, Minneapolis, Seattle, San Diego, Boston and Maseille, France.

Case Study: Zo'Ron Frye

A star athlete at White Station High School in Memphis, Tenn., football player Zo'Ron "Rudie" Frye hurt his wrist after a fall and then played through the pain for two years.

The injury only worsened, and the summer before his senior year, Zo'Ron and his parents came to the Emergency Department at Le Bonheur Children's Hospital for help. Zo'Ron, then 17, was given a removable soft spica cast and referred to the Le Bonheur/Campbell Clinic Pediatric Hand Clinic for further evaluation.

Zo'Ron came to the clinic in July 2014. X-rays revealed a left scaphoid fracture that had progressed to a nonunion. The clinical team discussed surgical and non-surgical options with Zo'Ron and his family.

Because it was Zo'Ron's senior year, and he was being heavily recruited to play college football, he and his family elected to wait until the end of the season to have surgery. In November, Zo'Ron committed to Southeast Missouri, over Georgia State, Cincinnati, Tennessee State, UT Martin, Eastern Illinois and Jacksonville State, among others.

In January 2015, Orthopaedic Surgeon Benjamin Mauck, MD, performed an open reduction, internal fixation of the left scaphoid fracture with iliac crest bone grafting. Zo'Ron was immobilized in a thumb spica splint while his hand healed.

That spring, Zo'Ron was cleared to resume sports activities.

"What Dr. Mauck did was amazing – he took a bone out of my hip and put it in my wrist," said Zo'Ron. "I'm able to do what I was before; I'm even better now. I'm really happy with how it turned out."

Zo'Ron is majoring in biomedical sciences and says he plans to enter the medical field after college, inspired by the care he received from his stellar orthopaedic team.

Hand clinic handles regional needs

Since opening in February 2013, the Le Bonheur/Campbell Clinic Pediatric Hand Clinic has helped fill a gap in regional coverage for the care of children with congenital abnormalities or traumatic injuries of the hand and upper extremities. The clinic is the only one of its kind in the Mid-South, serving a nearly 300-mile radius around Memphis, Tenn. The clinic draws patients from West and Middle Tennessee, Southeast Missouri, Eastern Arkansas and Northern Alabama.

Orthopaedic Surgeon Benjamin Mauck, MD, who leads the clinic, joined the Le Bonheur/Campbell Clinic team in 2012 after completing a hand surgery fellowship at the University of Texas Health Science Center in San Antonio.

Common abnormalities Mauck sees in clinic include duplicated digits, syndactyly, growth deficiencies and more. The clinic sees patients from as young as one-month old to age 18. Mauck is working to raise awareness in the pediatric community about the importance of seeing a specialist as soon as congenital hand deformities are recognized, due to heart abnormalities or other associated conditions.

"The earlier I see a child the better, because we screen for associated problems that, if we catch early on, make a huge difference in outcomes and overall development," Mauck said.

In addition to the most advanced surgical and non-surgical treatment options, patients have access to a specialized care team that includes pediatric radiologists, an occupational therapist and child life specialists.

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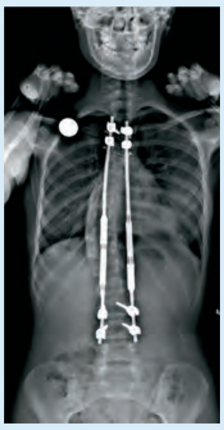
LE BONHEUR/CAMPBELL CLINIC SPINE CENTER ON FOREFRONT OF SURGICAL ADVANCES

The Le Bonheur/Campbell Clinic Pediatric Spine Center became one of the first in the country to offer Magnetic Expansion Control (MAGEC) for children with scoliosis and has remained on the cutting edge by serving on the product development and teaching team.

More than 200 children receive spinal surgery each year at the Le Bonheur/Campbell Clinic Pediatric Spine Center, which is No. 7 in the country in terms of volume for MAGEC procedures. MAGEC allows surgeons to straighten a patient's spine gradually and non-invasively – using an external magnet. It's one of a number of tools and technologies the team is able to offer thanks to a commitment made years ago to build a comprehensive spine program.



The Spine Center is also one of a handful in the United States on the product design and teaching team, drawing visiting surgeons from across the country.

"We're looking at early outcomes in the United States, and then we're using that to develop better and safer products," said Orthopaedic Surgeon Jeffrey Sawyer, MD. "We have access to the latest information and we will see our input in the design of the next version of the device."

The center's surgeons also collaborate with some of the brightest minds in biomedical engineering. Medical technology companies like Medtronic, Medicrea and Depuy Synthes regularly invite the team to consult on their work. The Pediatric Spine Center has recently partnered with Medtronic on an outreach initiative designed to help local schools identify scoliosis. They hope the program, called Spine Check, will lead to earlier and more effective treatment for children with scoliosis.

Le Bonheur/Campbell Clinic team gains insight from gait analysis expert

As part of the Campbell Clinic invited lecture series, Medical Director of Performance Improvement and the Movement Science Lab at Texas Scottish Rite Hospital, Lori Karol, MD, visited Le Bonheur Children's Hospital at the end of November to review cases with the orthopaedic team before delivering a keynote address to the group. Karol, a world-renowned expert on gait analysis, is also the first female president of the Pediatric Orthopaedic Society of North America (POSNA). The Le Bonheur/Campbell Clinic team, ever inspired by nationally-renowned peers, was thrilled to welcome Karol to Memphis for an excellent local learning experience.

Ortho recognized by *U.S. News & World Report*

BEST
CHILDREN'S
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U.S. News & World Report again has named the Le Bonheur/Campbell Clinic team among the nation's top pediatric orthopaedic programs.

"We are thrilled to be recognized as one of the country's best children's hospitals," said Le Bonheur Children's President and CEO Meri Armour, MSN/MBA. "We use the *U.S. News* process as a way to improve the care we offer children. It is our responsibility as health experts to give our children every opportunity to grow up healthy and strong."

Fellowship Spotlight: Pediatric Orthopaedic Fellow Rodrigo Mendoca, MD

The Le Bonheur/Campbell Clinic Pediatric Orthopaedic program continues to attract international students and fellows. The program offers a one-year fellowship opportunity that combines clinical training and research to prepare a surgeon for a career in both private practice and academic settings. Since its inception, the program has drawn trainees on an international level.

Rodrigo Mendoca, MD

Rodrigo Mendoca, MD, is the program's newest research fellow. Mendoca, who comes to Memphis, Tenn., from Brazil, was attracted to Le Bonheur/Campbell Clinic because of its reputation as a world leader in orthopaedic care.

"For us, Campbell Clinic textbook is the most important orthopaedics reference in the world. In Brazil, we read — more than once — the four volumes of the book and cited these authors in daily conferences and discussions. I was thrilled when I met some of them," he said.

Mendoca graduated from the Santa Casa de Sao Paulo medical school and completed a residency in orthopaedics and traumatology. After finishing a two-year fellowship in spine surgery in Brazil, Mendoca knew he wanted to expand his knowledge in the field of orthopaedics. That's when he sought out the Le Bonheur/Campbell Clinic program.

Mendoca plans to return to Brazil to practice. He says conducting medical research alongside the Le Bonheur/Campbell Clinic team and participating in clinic and surgical cases will make him a better doctor and professional.

"I believe in the constant search for knowledge," says Mendoca.

Research boom, continued from page 1

Trauma & Surgery) study group. The group consists of Level 1 Pediatric Trauma Centers that have established a formal prospective, multi-center adolescent clavicle registry, with standardized radiographic assessment and prospective collection of validated outcome measures, complications data and direct and indirect cost statistics for all patients, ages 10-18, treated for clavicle shaft fractures, operatively and non-operatively. Orthopaedic Surgeon David Spence, MD, said the group's research focuses on the long-term outcomes of surgical and non-surgical approaches to clavicle shaft fracture management.

"Information from this registry will help develop better understanding of the treatment of clavicle shaft fractures, healing, costs and the best treatment options for patients with clavicle shaft fractures," said Spence.

Le Bonheur/Campbell Clinic is also part of the International Perthes Study Group, which includes about 45 well-respected pediatric orthopaedic surgeons and researchers from around the world.

"Our goal is to better understand which treatments work best with different patient groups," said Orthopaedic Surgeon Derek Kelly, MD.

Through enrollment of patients in various protocols, the study group is working to advance knowledge of the rare disease and provide that information to patients and families and throughout the medical community.

The Le Bonheur/Campbell Clinic Pediatric Spine Center is also part of several multi-center spine study groups, including a recently formed Magnetic Expansion Control (MAGEC) study, as well as a multi-center retrospective analysis of Vertical Expandable Titanium Rib (VEPTR) surgery infection rates. This allows the team to not only help develop care guidelines and protocols, but also to access the latest information on diagnosis and treatment before it even is presented at meetings or published in medical journals.

New research fund honors Campbell Clinic AAOS past presidents

Terry Canale, MD

The new Canale Presidential Research Fund was announced in October. The fund, established by Frederick Azar, MD, James Beaty, MD, and Terry Canale, MD, was funded from their AAOS presidential service.

Canale, who also serves as editor-in-chief of AAOS Now, recently celebrated 40 years with the Campbell Clinic. In total, Campbell Clinic has had eight staff members or surgeons who trained here serve as AAOS president – historically the most of any other group in the world. Campbell Clinic's founder, Willis C. Campbell, MD, served as the first elected president of the group more than 80 years ago. The new research fund is an investment in future research and a signifier of the team's dedication to orthopaedic innovation.

Research Spotlight: 2015

A deep-dive into football-related injuries

Recent research from the Le Bonheur/Campbell Clinic Pediatric Orthopaedic team has focused on understanding sports-related injuries and their effect on a pediatric population. Le Bonheur treats nearly 4,000 patients each year due to a sports injury.

One of the team's recent studies – "Football-related concussions and lower extremity injuries: Have changes in the NFL had any effect on the pediatric population?" – found that football-related concussions in youth sports continue to increase, despite recent changes in the sport designed to improve safety and reduce injury. Football-related lower extremity injuries remain constant.

The team hypothesized that the new regulations, which encourage lower hits to avoid head injury, would result in fewer concussions and more injuries to lower extremities. Researchers used the National Electronic Injury Surveillance System (NEISS) database to determine the number of ED visits for football-related concussions and lower extremity injuries at three time points in time: 2006, 2009 and 2012.

Emergency department (ED) visits for football-related concussions (Figure 1) climbed from 12,238 in 2006 to 27,933 in 2012. However, football-related lower extremity injuries have remained relatively constant – accounting for nearly 90,000 ED visits each year.

A second study, "Characterization of collision sports injuries in children and adolescents," found that age appears to affect the rate of certain football-related injuries in children and adolescents. Fracture rates decrease with age, while the rate of soft tissue trauma increases the older the child gets. Findings also showed an increasing rate of closed head injuries and hospital admissions in younger children (younger than age 8).

The team conducted reviewed visits to Le Bonheur Children's Hospital's Level 1 Trauma Center and Emergency Department and nearby urgent care clinics from January 2010 to January 2014 (Figure 2). Patients coded for tackle football-related injuries (1,707 patients) were included in the study and divided into four age groups: young than 8 years old, 8-11 years, 12-14 years and 15-18 years. The team analyzed diagnoses, procedure codes and injury patterns.

"Youth participation in football in the United States continues to gain popularity. There is little information in the medical literature focusing on the age-related injury patterns of this sport on pediatric participants. Our purpose was to evaluate the types of football-related injuries in pediatric patients and to assess which patient characteristics, if any, affect injury pattern," said Orthopaedic Surgeon Derek Kelly, MD.

Demographics and changing trends in spinal surgery

Le Bonheur/Campbell Clinic surgeons are working to better understand patient needs and improve outcomes for kids. The team recently conducted two studies focusing on the pediatric populations receiving spinal surgery. One looked at scoliosis in African-American teenagers, and another, funded by a $10k grant from the National Spine Foundation, took an overarching look at pediatric spinal surgery over the last decade to identify changes and trends.

Currently, information is limited on the role that a patient's race plays in the risk of curve progression of adolescent idiopathic scoliosis (AIS), and existing studies have conflicting results. Thus, the Le Bonheur/Campbell Clinic team worked to determine whether certain risk factors (age, curve magnitude, skeletal maturity, pubertal status, sex, and curve pattern) traditionally associated with curve progression and surgical intervention in the general population apply equally to African-Americans.

The team used a retrospective search of records to identify patients who were African-American, had been diagnosed with AIS, had a major curve Cobb angle of 10 degrees or more and had at least two clinical visits with spinal radiographs at least 90 days apart. Patients with a medical condition likely to cause scoliosis were excluded.

Researchers found that, as is true in other scoliosis populations, age and curve magnitude at presentation were significantly associated with both curve progression and surgery. In contrast to studies in other populations, however, no significant association was observed between curve progression and curve type or between surgery and curve type.

A second study, "Changing Trends in Pediatric Spine Surgery in the United States" examined pediatric spinal deformity surgery over the past decade. Researchers tapped The KID database of inpatient hospitalizations for children from 0 to 17 years of age in order to study a sample of more than 7 million pediatric discharges from approximately 4,100 United States hospitals. KID has been widely used in pediatric orthopaedics, is limited to inpatient admissions, and is based on ICD-9 codes.

Researchers found that increased awareness and understanding of pediatric spinal deformity, especially early-onset scoliosis and its relationship to thoracic insufficiency syndrome (TIS), and technical advances have dramatically changed the treatment of these deformities over the past 15 years. This has led to a greater volume of spine surgery for all etiologies and age groups that is greater than expected based on population growth alone. While the greatest increase in volume is related to the treatment of AIS, the greatest relative change is in the treatment of early-onset scoliosis (EOS). Due to the continually changing healthcare environment in the United States, these trends will need to be followed to aid in resource allocation and planning.

"Spine surgery is very expensive, and a trend we're seeing is that about 50 percent of the spine surgery children receive is paid through Medicaid. This means that as spine surgeons, we need to prove the quality and value of what we do," said Orthopaedic Surgeon Jeffrey Sawyer, MD. "We need to tell the story of how, when we intervene in the life of a 5-year-old, we're giving them 70 productive years. That's really dramatic, compared to, say, hip replacement in an 80-year-old."

Trauma in relation to child-safety restraint use

While we know that morbidity and mortality in children increases in motor vehicle collisions (MVC) if child safety restraints are not used, there's no data correlating specific injuries with proper or improper use of safety restraints or age. The Le Bonheur/Campbell Clinic team wondered if certain age groups were more likely to suffer traumas based on improper use of restraints and were curious about resulting injuries.

The team reviewed charts from Le Bonheur Children's Hospital's Level 1 Trauma Center for 967 patients under the age of 12. Patients were grouped by age, restraint use, and injuries.

Researchers found that improper restraint was most common in the the 4-8 year age group. Unrestrained patients were most commonly found in the 9-12 year age group. A statistically significant difference was not observed for orthopaedic injuries among the restraint groups, but internal thoracic injuries, open head wound and open upper extremity wounds were significantly more common in improperly or unrestrained patients. Improperly restrained infants had a significantly higher rate of intracranial bleeds and abrasions than those properly restrained. Unrestrained and improperly restrained 9-12 year-olds had significantly more open head, open upper extremity and vascular injuries. When comparing injury types with age groups, upper extremity fractures, femoral fractures, dislocations and spinal fractures were found to be significantly higher in older-age children.

The team found a continued need to reinforce the importance of proper use of child safety devices to parents. They concluded that preventing orthopaedic injuries in older children may be accomplished through changes in regulations or automotive safety equipment. Rear-facing child safety seats could possibly be improved to prevent head trauma in the youngest patients. Additionally, knowledge of the patient's age, along with restraint status, might aid in diagnosis of less obvious MVC injuries.

Figure 1

	2006	2009	2012
Football-related ED visits for concussions	12,238	16,768	27,933
Football-related ED visits for lower extremity injuries	91,184	86,957	89,971

Figure 2

Type of Injury	Number of Cases
Upper extremity injury	740
Lower extremity injury	606
Appendicular skeleton fracture	596
Sprain	311
Contusion	247
Closed head injury	169
Dislocation	64
Spinal cord injury	10
Solid organ injury	8

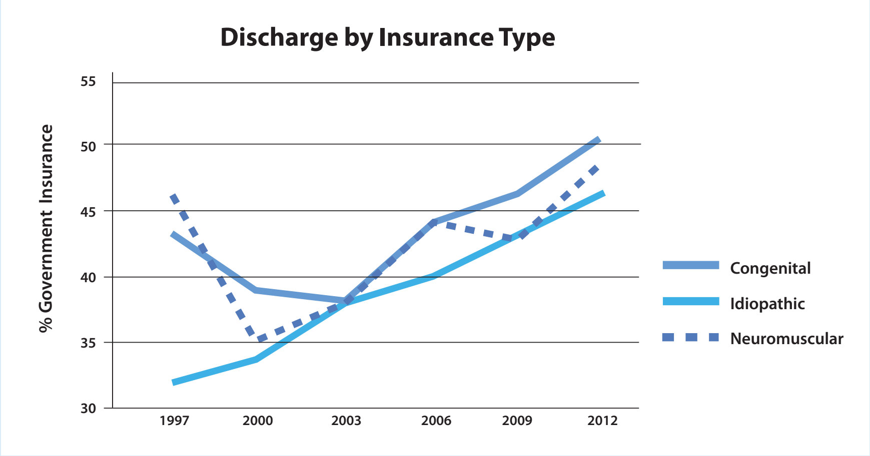

Table 1. Discharge volume by Etiology

	1997	2000	2003	2006	2009	2012	Change	% Change
Idiopathic	10,283	11,729	13,557	16,859	20,616	23,888	13,605	132
Congenital	1,878	2,253	2,325	2,615	3,050	2,935	1,057	56
Neuro	244	166	208	375	827	1,241	997	409
Total	**12,405**	**14,148**	**16,090**	**19,849**	**24,493**	**28,064**	**15,659**	**126**

Table 2. EOS Discharge volume by Etiology

	1997	2000	2003	2006	2009	2012	Change	% Change
Idiopathic	1,493	1,735	2,258	3,198	4,284	4,927	3,434	230
Congenital	1,056	1,330	1,339	1,542	1,852	1,832	776	73
Neuro	62	0	45	88	236	333	271	437
Total	**2,611**	**3,065**	**3,642**	**4,828**	**6,372**	**7,092**	**4,481**	**172**

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Research, Publications and Presentations

Le Bonheur Children's Hospital and Campbell Clinic's five surgeons are actively involved in research and presentations in the pediatric orthopaedic field. Highlights from their work are listed below:

Publications

Levels of Evidence in the Journal of Pediatric Orthopaedics: Update and Comparison to the Journal of Bone and Joint Surgery. Murphy RF, Cibulas AM, Sawyer JR, Spence DD, Kelly DM. J Pediatr Orthop. 2015 Oct/Nov 35(7):779-781

Business and Practice Management Knowledge Deficiencies in Graduating Orthopedic Residents. Miller DJ, Throckmorton TW, Azar FM, Beaty JH, Canale ST, Richardson DR. Am J Orthop (Belle Mead NJ). 2015 Oct;44(10):E373-8.

Reliability analysis of Cobb angle measurements of congenital scoliosis using X-ray and 3D-CT images. Tauchi R, Kawakami N, Tsuji T, Cahill PJ,Flynn JM, Flynn, Glotzbecker M, El-Hawary R, Heflin JA, Imagama S, Joshi AP, Nohara A, Ramirez N, Roye DP, Saito T, Sawyer JR, Smith JT. Eur J Orthop Surg Traumatol. 2015 Sep 16. [Epub ahead of print]

Changes in the Treatment of Pediatric Femur Fractures: Trends from United States Kids' Inpatient Database (KID). Naranje SM, Stewart MG, Kelly DM, Jones TL, Spence DD, Warner WC Jr, Beaty JH, Sawyer JR. J Pediatr Orthop. 2015 Aug 28. [Epub ahead of print]

Epidemiology of pediatric fractures presenting to Emergency Department for United States population. Sameer M Naranje, Richard A Erali, DDS, WCW, JHB, JRS, DMS. J Pediatr Orthop. 2015 Jul 14. [Epub ahead of print].

Uniplanar Versus Taylor Spatial Frame External Fixation For Pediatric Diaphyseal Tibia Fractures: A Comparison of Cost and Complications. Shore BJ, DiMauro JP, Spence DD, Miller PE, Glotzbecker MP, Spencer S, Hedequist D. J Pediatr Orthop. 2015 Jun 17. [Epub ahead of print]

Atypical Neurologic Deficits Following Posterior Spinal Fusion Including Ponte Osteotomies for Idiopathic Scoliosis-A Report of Two Cases (UTHSC IRB#12-02297-XM). Barkoh K, Kelly DM, Warner WC Jr., Meier J, Sawyer JR , Chan G. Campbell Orthopaedic Journal 2015.

Use of Vertical Expandable Prosthetic Titanium Rib (VEPTR) in the Treatment of Congenital Scoliosis Without Fused Ribs. Murphy RF, Moisan A, Kelly DM, Warner WC Jr, Jones TL, Sawyer JR. J Pediatr Orthop. 2015 Apr 13. [Epub ahead of print]

Early Career Experience of Pediatric Orthopaedic Fellows: What to Expect and Need for Their Services. Glotzbecker M, Shore B, Fletcher N, Larson N, Hydorn C, Sawyer JR. Published JPO 2015 Mar 3. [Epub ahead of print]

Interobserver and intraobserver reliability of the modified waldenström classification system for staging of legg-calvé-perthes disease. Hyman JE, Trupia EP, Wright ML, Matsumoto H, Jo CH, Mulpuri K, Joseph B, Kim HK; International Perthes Study Group Members. J Bone Joint Surg Am. 2015 Apr 15;97(8):643-50. doi: 10.2106/JBJS.N.00887.

Outcomes and Complications of Tibial Tubercle Fractures in Pediatric Patients: A Systematic Review of the Literature. Pretell-Mazzini J, Kelly DM, Sawyer JR, Esteban EM, Spence DD, Warner WC Jr, Beaty JH. J Pediatr Orthop. 2015 Apr 10. [Epub ahead of print]

Osteonecrosis After Femoral Neck Fractures in Children and Adolescents: Analysis of Risk Factors. Spence DD; DiMauro JP; Miller P, Glotzbecker MP; Hedequist D, Shore BJ.

Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children. Kelly DM, Murphy R, Warner WC Jr., Moisan A, Thompson N, Spence DD, Beaty JH, Sawyer JR. J Bone Joint Surg Am. 2015 Jan 21;97(2):106-11.

Gunshot-associated fractures in children and adolescents treated at two Level 1 pediatric trauma centers UTHSC IRB 11-01515-XM (1/18/12). Naranje SM, Stewart MG, Rush JK, Bleakney C , Mckay , Gilbert SR, Spence DD, Warner WC, Sawyer JR. J Pediatr Orthop. 2015 Jan 28. [Epub ahead of print].

A multidisciplinary approach to providing care to adolescents with spinal cord trauma resulting from all-terrain vehicle (ATV) accidents: A case study. Rhodes LN, Weatherford B, Locke LN, Chung HS, Tidwell C, Paton E, Lee S. J Trauma Nurs. 2015 Jan-Feb;22(1):23-7.

Sub-axial cervical spine injuries in children and adolescents UTHSC IRB: 13-02544-XM. Murphy RF, Davidson AR, Warner WC Jr, MD, Kelly DM, Spence DD, Sawyer JR. J Pediatr Orthop. 2015 Mar;35(2):136-9.

Altered lower extremity fracture characteristics in obese pediatric trauma patients. Gilbert SR, Maclennan PA, Backstrom I, Creek A, Sawyer J. J Orthop Trauma. 2015 Jan;29(1):e12-7.

Supracondylar Fractures with Isolated Anterior Interosseous Nerve Injuries: Are they Urgent Cases? UTHSC IRB#13-02587-XM 7/23/2013. Barrett KK, Skaggs DL, Sawyer JR, Andras L, Moisan A, Goodbody C, Flynn J. J Bone Joint Surg Am, 2014 Nov 05;96(21):1793-1797.

Unicameral Bone Cysts: General Characteristics and Management Controversies. Juan Pretell, Robert F Murphy,Indranil Kushare, DNB, DOrtho, John P. Dormans, MD. JAAOS May 1, 2014; 22 (5).

Surgical Treatment of Symptomatic Accessory Navicular in Children and Adolescents. (UTHSC IRB# 12-02032-XM 9-4-2012). Pretell, Murphy, Sawyer, Spence, Warner, Beaty, Moisan, Kelly. A J Ortho. 2014 Mar;43(3):110-3.

Intraobserver and Interobserver Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Young Children. Thompson NB, Kelly DM, Warner WC Jr, Rush JK, Moisan A, Hanna WR Jr, Beaty JH, Spence DD, Sawyer JR. J Pediatr Orthop. 2014 Apr-May;34(3):352-8.

Characterization of Radiation Exposure in Early-Onset Scoliosis Patients Treated With the Vertical Expandable Prosthetic Titanium Rib (VEPTR). Cannon TA, Neto NA, Kelly DM, Warner WC Jr, Sawyer JR. J Pediatr Orthop. 2014 Mar;34(2):179-84.

The Efficacy of Rib-Based Distraction with VEPTR in Treatment of Early_Onset Scoliosis in Patients with Arthrogryposis. MHIRB 2006-022 (5/25/06). Flynn, John M; Flynn, John M.; Glotzbecker, Michael; van Bosse, Harold J.; Hoashi, Jane S.; d'Amato, Charles R.;Moisan, Alice; Kelly, Derek M.; Warner, William C.; Sawyer, Jeffrey R. J Pediatr Orthop. 2014 Jan;34(1):8-13.

Murphy RF1, Cibulas AM, Sawyer JR, Spence DD, Kelly DM. Levels of Evidence in the Journal of Pediatric Orthopaedics: Update and Comparison to the Journal of Bone and Joint Surgery. J Pediatr Orthop. 2014 Nov 19. [Epub ahead of print]

Murphy RF, Davidson AR, Kelly DM, Warner WC Jr, Sawyer JR. Subaxial Cervical Spine Injuries in Children and Adolescents. J Pediatr Orthop. 2014 Nov 6. [Epub ahead of print]

Barrett KK, Skaggs DL, Sawyer JR, Andras L, Moisan A, Goodbody C, Flynn JM. Supracondylar Humeral Fractures with Isolated Anterior Interosseous Nerve Injuries: Is Urgent Treatment Necessary? J Bone Joint Surg Am, 2014 Nov 05;96(21):1793-1797.

Murphy W, Naranje SM, Kelly DM, Spence DS, Warner WC Jr, Beaty JH, Sawyer JR. Nonaccidental traumatic dislocation of the hip in a 3-year-old child: a report of a rare pediatric injury. Am J Orthop (Belle Mead NJ). 2014 Aug;43(8):374-6.

Rhodes L, Nash C, Moisan A, Scott DC, Barkoh K, Warner WC Jr, Sawyer JR, Kelly DM. Does Preoperative Orientation and Education Alleviate Anxiety in Posterior Spinal Fusion Patients? A Prospective, Randomized Study. J Pediatr Orthop. 2014 Jul 17. [Epub ahead of print]

Systemic Clostridium Toxicity Resulting from a Knee Laceration in a Pediatric Patient. Fesmire A, Sawyer JR, Warner WC, Buckingham S, Bagga B, Anand K, Kelly DM. Journal of Pediatric Infectious Diseases 9 (2014) 31-35

The Use of Magnetic Resonance Imaging in the Evaluation of Spondylolysis. Rush JK, Astur N, Scott S, Kelly DM, Sawyer JR, Warner WC. Jr. J Pediatr Orthop. 2014 June 24. [Epub ahead of print]

Accessibility and Quality of Online Information for Pediatric Orthopaedic Surgery Fellowships. Davidson AR, Murphy RF, Spence DD, Kelly DM, Warner WC Jr, Sawyer JR. J Pediatr Orthop. 2014 May 19. [Epub ahead of print]

Traumatic Atlanto-occipital Dislocation in Children. Astur N, Sawyer JR, Klimo P, Kelly DM, Muhlbauer M, Warner WC. *J Am Acad Orthop Surg* May 2014 ; 22:274-282.; doi:10.5435/JAAOS-22-05-274

Altered lower extremity fracture characteristics in obese pediatric trauma patients. Gilbert SR, Maclennan PA, Backstrom I, Creek A, Sawyer J. J Orthop Trauma. 2014 Apr 15. [Epub ahead of print]

Current State of Pediatric Orthopaedic Disaster Response. Kelly DM, Heyworth BE, Kruse RW, Edmonds EW, VanderHave K, Podeszwa DA, Talwalkar VR, Warner WC Jr, Gordon JE. J Pediatric Orthop.2014 Apr-May;34(3):231-8

Intra-observer and Inter-observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Young Children. Thompson NB, Kelly DM, Warner WC Jr, Rush JK, Moisan A, Hanna WR, Beaty JH, Spence DD, Sawyer JR. J Pediatr Orthop. 2013 Oct 29. [Epub ahead of print]

Current State of Pediatric Orthopaedic Disaster Response. Pediatric Orthopaedic Society of North America Trauma and Prevention Committee 2011-2012. Kelly DM, Heyworth BE, Kruse RW, Edmonds EW, VanderHave K, Podeszwa DA, Talwalkar VR, Warner WC Jr, Gordon JE; J Pediatric Orthop. 2013 Oct 29. [Epub ahead of print]

Characterization of Radiation Exposure in Early Onset Scoliosis Patients Treated With the Vertical Expandable Prosthetic Titanium Rib (VEPTR). Cannon TA, Astur N, Kelly DM, Warner WC Jr, Sawyer JR. J Pediatr Orthop. 2013 Oct 29. [Epub ahead of print]

Weight Gain During External Fixation. Culotta, B; Gilbert, SR; Sawyer, JR: Ruch, A; Sellers, T. Journal of Children's Orthopedics, March 2013, Volume 7, Issue 2, pp 147-150.

Pulseless Extremity Following an Apparently Non-displaced Proximal Humeral Physeal Fracture: A Case Report. Hall JM, Sawyer JR, Warner WC Jr., Moisan A, Kelly DM. JBJS Case Connector, 2013 Sep 11;3(3):e90 1-4

Medial Ulnar Collateral Ligament Origin in Children and Adolescents: An MRI Anatomic Study. Larsen N, Moisan A, Witte D, Ellzey A, Sawyer JR, Warner WC Jr, Beaty JH, Kelly DM. J Pediatr Orthop. 2013 Sep;33(6):664-6.

Treatment of Pediatric Femur Fractures with the Pavlik Harness: Multiyear Clinical and Radiographic Outcomes. Rush JK, Kelly DM, Sawyer JR, Beaty JH, Warner WC Jr. J Pediatr Orthop. 2013 Sep; 33(6):614-7

Atypical presentation of an osteoid osteoma in a child revisited. Sawyer JR. Am J Orthop (Belle Mead NJ). J Pediatr Orthop. 2013 Jan;42(1):19.

Associated injuries in children and adolescents with spinal trauma. Rush JK, Kelly DM, Astur N, Creek A, Dawkins R, Younas S, Warner WC Jr, Sawyer JR. J Pediatr Orthop. 2013 Jun;33(4):393-7. doi: 10.1097/BPO.0b013e318279c7cb.

An accessory limb with lipomyelomeningocele in a male. Murphy RF, Cohen BH, Muhlbauer MS, Eubanks JW 3rd, Sawyer JR, Moisan A, Kelly DM. Pediatr Surg Int. 2013 Jul;29(7):749-52. doi: 10.1007/s00383-013-3269-9. Epub 2013 Feb 8.

Grear B. J., Neumann J., Warner W.C., Sawyer J. R., Kelly D. M. Patient follow-up in pediatric orthopaedic retrospective call-back studies. *Current Orthopedic Practice.* 23(6):590–594, November/December 2012.

Warner W.C., Astur N., Klimo P. Jr, Muhlbauer M.S., Gabrick K. Occipitocervical fusion using a contoured rod and wire construct in children: a reappraisal of a vintage technique. *J Neurosurg Pediatr.* 2012 Nov 16. [Epub ahead of print]

Miller D.J., Kelly D.M., Spence D.D., Beaty J.H., Warner W.C. Jr, Sawyer J.R. Locked intramedullary nailing in the treatment of femoral shaft fractures in children younger than 12 years of age: indications and preliminary report of outcomes. *Journal of Pediatric Orthopaedics.* 2012 Dec;32(8):777-80. doi: 10.1097/BPO.0b013e31826bb0ba.

Grear B., Sawyer J.R., Warner W.C. Jr, Beaty J.H., Kelly D.M. Factors Affecting Research Subject Rate of Return in Pediatric Orthopedic Retrospective Review Studies. Current Orthopedic Practice. 23(6):590-594, Nov/Dec 2012. DOI: 10.1097/BCO.0B013e31826efee5.

Spence D., Shore B., Graham H.K. The Role of Hip Surveillance in Children with Cerebral Palsy. Curr Rev Musculoskelet Med: 5:126-134, 2012.

Sawyer, J.R., Beebe, M., Creek, A.T., Yantis, M., Kelly, D.M., Warner, W.C. Age-related Patterns of Spine Injury in Children Involved in All-Terrain Vehicle Accidents. *Journal of Pediatric Orthopaedics*. 2012 Jul;32(5):435-9. PMID: 22706455.

Backstrom, I.C.; Maclennan, P.A.; Sawyer, J.R.; Creek, A.T.; Rue, L.W. 3rd; Gilbert, S.T. Pediatric obesity and traumatic lower-extremity long-bone fracture outcomes. *J Trauma Acute Care Surg*. 2012 Aug 17 (Epub ahead of print)

Norton, B, Mulligan, R, Rush, J.K., Kelly, D.M., Warner, W.C., Sawyer, J.R. Proximal femoral fractures in children and adolescents:an update. *COP Volume 23 Number 5 September/October 2012 429-434*

Brey J.M., Conoley J., Canale S.T., Beaty J.H., Warner W.C. Jr, Kelly D.M., Sawyer J.R. Tibial tuberosity fractures in adolescents: is a posterior metaphyseal fracture component a predictor of complications? *Journal Pediatric Orthopaedics.* 2012 Sep; 32(6):561-6. PubMed PMID: 22892616.

Jaquith, B., Chase, A., Flinn, P., Warner, W., Sawyer, J., Freeman, B, Kelly, D. Screws versus hooks: implant cost and deformity correction in adolescent idiopathic scoliosis. (2012)

Journal of Children's Orthopaedics, Online First(TM), 23April2012 Arkader, Tolo,Warner, Sponseller, Skaggs. Pediatric chance fractures: a multicenter perspective: Journal of Pediatric Orthopaedics. 2011 Oct-Nov;31(7):741-4. PMID: 21926870

Larson AN, Sucato DJ, Herring JA, Adolfsen SE, Kelly DM, Martus JE, Lovejoy JF, Browne R, Delarocha A. A Prospective Multicenter Study of Legg-Calvé-Perthes Disease: Functional and Radiographic Outcomes of Nonoperative Treatment at a Mean Follow-up of Twenty Years. *J Bone Joint Surg Am.* 2012 Apr 4;94(7):584-92.

Sawyer JR, Beebe M, Creek AT, Yantis M, Kelly DM, Warner WC Jr. Age-related Patterns of Spine Injury in Children Involved in All-Terrain Vehicle Accidents. *J Pediatr Orthop.* 2012 Jul;32(5):435-9.

Presentations

Jim Beaty, MD

Cervical Spine Trauma Immobilization Protocols in Young Children. How Often Are These Protocols Followed? Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Weldy, Beaty, Spence, Kelly, Sawyer, Warner, Jr. OTA poster. San Diego, CA. Oct. 7-10, 2015.

Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Kutsikovich, Hopkins, Gannon III, Beaty, Warner, Sawyer, Spence, Kelly. ASSH eposter. Seattle, WA. Sept. 10-12, 2015; OTA podium. San Diego, CA. Oct. 7-10, 2015.

Beaty J, Bert, Biggers, Moisan, Sawyer, Warner, Kelly. Fracture of the Medial Humeral Epicondyle in Children: A Comparison of Operative and Nonoperative Management (accepted Podium). American Academy of Orthopaedic Surgeons, New Orleans, March 2014.

Beaty, Thompson, Kelly, Rush, Warner, Spence, Moisan, Sawyer. Intra and Inter-Observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Beaty James H. MD, Ryan Murphy BS, Derek M. Kelly MD, William C. Warner Jr. MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD, Jeffrey R. Sawyer MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children(poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Beaty James H. MD, Byron F. Stephens MD, Jeffrey R. Sawyer MD, William C. Warner MD, David D. Spence MD, Alice A. Moisan BSN and Derek M. Kelly MD Interleukin-6 in Pediatric Musculoskeletal Infection: A Pilot Study (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Beaty James H. MD, Sameer M. Naranje MD, Derek M. Kelly MD, Jeffrey R. Sawyer MD, Tamekia L. Jones PhD. Changes in the Treatment of Pediatric Femur Fractures: Trends from United States Kids' Inpatient Database (KID) (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Beaty James H, MD, Juan Pretell-Mazzini, MD, Vinayak Perake, MD; Derek M. Kelly, MD, Jeffrey R Sawyer, MD, Alice A Moisan, BSN, David D Spence, MD, William C Warner, Jr, MD. Outcomes And Complications Of Tibial Tubercle Fractures Within The Pediatric Population. A Systematic Review Of The Literature (e-poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

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Beaty James H. MD, Byron F. Stephens MD, Jeffrey R. Sawyer MD, William C. Warner MD, David D. Spence MD, Alice A. Moisan BSN and Derek M. Kelly MD. Interleukin-6 in Pediatric Musculoskeletal Infection: A Pilot Study accepted e poster. POSNA, Hollywood, Ca., April-May 2014.

Beaty, J. Advocacy for Orthopaedic Surgeons. IPOS. December 4-7, 2013. Lake Buena Vista, Fla.

Beaty, J. Case Presentations. IPOS. December 4-7, Lake Buena Vista, Fla.

Beaty, J. Slipped capital femoral epiphysis: Update. Pediatric Orthopaedics: Common Conditions and the Pediatric Hip, Le Bonheur, November 2, 2013.

Beaty, J. Frequently missed upper extremity fractures. Pediatric Orthopaedics: Common Conditions and the Pediatric Hip, Le Bonheur, November 2, 2013.

Beaty, J. Sports Injuries in Children and Adolescents: 2013 Update. Etteldorf Symposium 2013, Le Bonheur, May 2013.

Beaty, J. The Othopaedic Lecture: Basics. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J. The Orthopaedic Lecture: Effective Delivery. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J. Developing Leadership Through Orthopaedic Organizations. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J. The Kids You See on Call: Slipped Capital Femoral Epiphysis. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J. Child Abuse: Nonaccidental Injury. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J. Management of the Multiply Injured Child. AAOS Annual Meeting, Chicago, Ill. March 2013.

Beaty, J.H., Warner, W.C., Sawyer, J.R., Kelly, D.M., Larsen, Moisan, Witte, Elzey. *Medial Ulnar Collateral Ligament Origin on the Medial Epicondylar Apophysis in the Skeletally Immature Elbow*: An MRI Anatomical Study. Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

Beaty, J.H., Warner, W.C., Sawyer, J.R., Kelly, D.M., Larsen, Moisan, Witte, Elzey. *Medial Ulnar Collateral Ligament Origin on the Medial Epicondylar Apophysis in the Skeletally Immature Elbow*: An MRI Anatomical Study. Poster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

Beaty, J.H., Warner, W.C., Sawyer, J.R., Spence, D., Kelly, D.M., Pretell, Murphy, Moisan. *Surgical Treatment of Symptomatic Accessory Navicular in Children and Adolescent: Is Simple Excision Enough?* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

William C. Warner Jr., MD

Cervical Spine Trauma Immobilization Protocols in Young Children. How Often Are These Protocols Followed? Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Weldy, Beaty, Spence, Kelly, Sawyer, Warner, Jr. OTA poster. San Diego, CA. Oct. 7-10, 2015.

Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Kutsikovich, Hopkins, Gannon III, Beaty, Warner, Sawyer, Spence, Kelly. ASSH eposter. Seattle, WA. Sept. 10-12, 2015; OTA podium. San Diego, CA. Oct. 7-10, 2015.

Changing Trends in Pediatric Spine Surgery in The United States: 1997-2012. Kelly, Warner, Sawyer, Copley. SRS Podium. Minneapolis, MN. Sept. 30-Oct. 3, 2015.

Warner, Beaty J, Bert, Biggers, Moisan, Sawyer, Kelly. Fracture of the Medial Humeral Epicondyle in Children: A Comparison of Operative and Nonoperative Management (accepted Podium). American Academy of Orthopaedic Surgeons, New Orleans, March 2014.

Warner, Beaty, Thompson, Kelly, Rush, Spence, Moisan, Sawyer. Intra and Inter-Observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, Derek M. Kelly, MD, David D. Spence, MD, and Jeffrey R. Sawyer MD. Sub-axial Cervical Spine Injuries in Children and Adolescents (e poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Warner William C. Jr. MD, Beaty James H. MD, Ryan Murphy BS, Derek M. Kelly MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD, Jeffrey R. Sawyer MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children(poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

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Warner William C Jr, MD, Beaty James H, MD, Juan Pretell-Mazzini, MD, Vinayak Perake, MD; Derek M. Kelly, MD, Jeffrey R Sawyer, MD, Alice A Moisan, BSN, David D Spence, MD. Outcomes And Complications Of Tibial Tubercle Fractures Within The Pediatric Population. A Systematic Review Of The Literature (e-poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Warner William C. Jr. MD, Beaty James H. MD, Ryan Murphy BS, Derek M. Kelly MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD, Jeffrey R. Sawyer MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children accepted podium. POSNA, Hollywood, Ca., April-May 2014.

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Warner, Murphy, Moisan, Kelly, Sawyer. The Use of VEPTR for Treatment of Congenital Scoliosis without Fused Ribs (podium). ICEOS 2013, Nov 21-22, San Diego, CA.

Warner, W. Avulsion injuries about hip and pelvis: Update Pediatric Orthopedics: Common Conditions and Pediatric Hip, Le Bonheur, November 2, 2013.

Warner, Murphy, Moisan, Kelly, Sawyer The Use of VEPTR for Treatment of Congenital Scoliosis without Fused Ribs (podium). American Academy of Pediatrics 2013, Orlando, FL, Oct. 26-29, 2013.

Warner Jr. WC, Flynn JM, Ramirez N, Pretell JA, Kelly DM, Sawyer JR. Variability of Cobb Angle and Spine Height Measurements in Non-Ambulatory Myelodysplastic Children. Clinical Orthopaedic Society, Buffalo, NY, Sept. 19-21, 2013.

Warner Jr. WC, Perake V, Pretell JA, Mosian A, Kelly DM, Spence DS, Sawyer JR (2013) The Use of Tissue Expanders in Patients with Early Onset Scoliosis Treated with VEPTR. Clinical Orthopaedic Society,Buffalo, NY, Sept. 19-21, 2013.

Warner, Murphy, Moisan, Kelly, Sawyer. The Use of VEPTR for Treatment of Congenital Scoliosis without Fused Ribs (podium). SRS 2013 Lyon, France Sept 18-21.

Warner, W. Occipitocervical fusion using a contoured rod and wire construct in children: a reappraisal of a vintage technique. (podium) NASS 2013 Naples, FL July 31-Aug. 3.

Warner W. Pediatric Hip: Orthopedic review course. AAOS Annual Meeting, Chicago, ILL March 2013.

Warner, W.C., Sawyer, J.R., Kelly, D.M., Rush, Scott, S. *Magnetic Resonance and Computed Tomography Roles in Spondylolysis Diagnosis.* Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

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Warner, W.C., Astur, Klimo, Sawyer, Kelly, Muhlbauer. *Traumatic Atlanto-Occipital Dislocation in Children: Evaluation, Treatment and Outcomes.* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

Warner, W.C., Astur, N., Flynn, J.M., Glotzbecker, M., van Bosse, H.J., Hoashi, J.S., d'Amato, C.R., Moisan, A., Kelly, D.M., Sawyer, J.R. *The Efficacy of Rib-Based Distraction with VEPTR in Treatment of Early Onset Scoliosis in Patients with Arthrogryposis.* Presented at XIV Brazilian Spine Society, Florianópolis, SC, Brazil, April 27 – 30, 2013.

Warner, W.C., Klimo, P., Astur, N., Gabrick, K., Muhlbauer, M.S., *Occipitocervical fusion using a contoured rod and wire construct in children: a reappraisal of a vintage technique.* Presented at XIV Brazilian Spine Society, Florianópolis, SC, Brazil, April 27 – 30, 2013.

Warner, W.C., Cannon, Astur, Kelly, Sawyer. *Characterization of Radiation Exposure in Early Onset Scoliosis Patients Treated with the Vertical Expandable Prosthetic Titanium Rib.* ePoster presented at XIV Brazilian Spine Society, Florianópolis, SC, Brazil, April 27 – 30, 2013.

Jeffrey R. Sawyer, MD

Complications and Radiographic Outcomes of Posterior Spinal Fusion (PSF) in Patients with Spinal Muscular Atrophy (SMA) Following Growth Friendly Treatment. Sawyer, Mendoça, Murphy, Flournory, et al. ICEOS eposter. Boston, MA. Nov. 19-20, 2015.

Cervical Spine Trauma Immobilization Protocols in Young Children. How Often Are These Protocols Followed? Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Weldy, Beaty, Spence, Kelly, Sawyer, Warner, Jr. OTA poster. San Diego, CA. Oct. 7-10, 2015.

Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Kutsikovich, Hopkins, Gannon III, Beaty, Warner, Sawyer, Spence, Kelly. ASSH eposter. Seattle, WA. Sept. 10-12, 2015; OTA podium. San Diego, CA. Oct. 7-10, 2015.

A Supply and Demand Analysis of the Orthopaedic Trauma Surgeon Workforce in the United States. Sielatycki, Sawyer, Mir. OTA. San Diego, CA. Oct. 7-10, 2015.

Changing Trends in Pediatric Spine Surgery in The United States: 1997-2012. Kelly, Warner, Sawyer, Copley. SRS Podium. Minneapolis, MN. Sept. 30-Oct. 3, 2015.

The Evolving State of Acute Pediatric Septic Arthritis and Osteomyelitis. Franklin, Kelly, Sawyer. POSA eposter #46. Atlanta, GA. April 29-May 2, 2015.

Early Career Experience of Pediatric Orthopaedic Fellows: What to Expect and Need for Their Services. Glotzbecker, Shore, Fletcher, Larson, Hydorn, Sawyer. POSNA Podium. Atlanta, GA. April 29, 2015.

The Evolving State of Acute Pediatric Septic Arthiritis and Osteomyelitis. Franklin, Sawyer, Kelly. EPOS Poster. Marseille, France. April 15-18, 2015.

A 10-Year Multi-Center Review of Current Trends in the Treatment of Pediatric Femoral Shaft Fracture. Roaten, Sawyer, CHOP, UCLA. EPOS eposter #644, Marseille, France. April 15-18, 2015.

Sawyer, Warner, Beaty J, Bert, Biggers, Moisan, Kelly. Fracture of the Medial Humeral Epicondyle in Children: A Comparison of Operative and Nonoperative Management (accepted Podium). American Academy of Orthopaedic Surgeons, New Orleans, March 2014.

Sawyer, Beaty, Thompson, Kelly, Rush, Warner, Spence, Moisan. Intra and Inter-Observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, Derek M. Kelly, MD, David D. Spence, MD. Sub-axial Cervical Spine Injuries in Children and Adolescents (e poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD, Beaty James H. MD, Ryan Murphy BS, Derek M. Kelly MD, William C. Warner Jr. MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD.Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children(poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD, Beaty James H. MD, Byron F. Stephens MD, William C. Warner MD, David D. Spence MD, Alice A. Moisan BSN and Derek M. Kelly MD Interleukin-6 in Pediatric Musculoskeletal Infection: A Pilot Study (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD, Beaty James H. MD, Sameer M. Naranje MD, Derek M. Kelly MD, Tamekia L. Jones PhD. Changes in the Treatment of Pediatric Femur Fractures: Trends from United States Kids' Inpatient Database (KID) (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R, MD, Beaty James H, MD, Juan Pretell-Mazzini, MD, Vinayak Perake, MD; Derek M. Kelly, MD, Alice A Moisan, BSN, David D Spence, MD, William C Warner, Jr, MD. Outcomes And Complications Of Tibial Tubercle Fractures Within The Pediatric Population. A Systematic Review Of The Literature (e-poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD; Kody K. Barrett, BA; David L. Skaggs, MD; Lindsay Andras, MD; Alice Moisan, BSN, RN, CCRP; Christine Goodboy, BS; Jack Flynn, MD Supracondylar Fractures with Isolated Anterior Interosseous Nerve Injuries: Are they Urgent Cases? (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Sawyer Jeffrey R. MD Beaty James H. MD, Ryan Murphy BS, Derek M. Kelly MD, William C. Warner Jr. MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children accepted podium. POSNA, Hollywood, Ca., April-May 2014.

Sawyer Jeffrey R. MD, Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, Derek M. Kelly, MD, David D. Spence, MD. Sub-axial cervical spine injuries in children and adolescents accepted e poster. POSNA, Hollywood, Ca., April-May 2014.

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Sawyer, Jeffrey MD; Sumeet Garg, MD; Micaela Cyr, BA; Michael Glotzbecker, MD; Patrick Carry, BA; John Smith, MD; Joshua Pahys, MD; Scott Luhmann, MD; Jack Flynn, MD; Ron El-Hawary, MD; Michael Vitale, MD; Tricia St. Hilaire, MPH A Multicenter Retrospective Cohort Analysis of Infection Characteristics and Rates with VEPTR Surgery: 2007 to Present accepted eposter. POSNA, Hollywood, Ca., April-May 2014.

Sawyer JR, Tauchi R, Tshui R, Saito T, Nohara A, Imagama S, Joshi AP, Roye DP, Glotzbecker M, Helfin JA, Flynn JM, Smith JT, Ramirez N, Cahill P, El-Harway R, Kawkami N (2013) The Reliability Analysis of Plain Radiographs and 3D CT Images. International Congress on Early Onset Scoliosis, San Diego, Nov. 2013.

Sawyer JR, Garg S, LaGreca J, Gao D, St. Hilaire T, Glotzbecker M, Li Y, Smith JT, Flynn J, Vitale MG, El-Hawary, R, Flynn J (2013) Wound Complications of VEPTR Incisions. International Congress on Early Onset Scoliosis, San Diego, Nov. 2013.

Sawyer JR, Park HY, Matsumoto H, McCalla, D, Roye Jr D, Kanj W, Betz RR, Glotzbecker M, Luhmann SL, Garg S, Smith JT, Flynn JM (2013) The Classification for EOS (C-EOS) Predicts Timing of Anchor Failure. American Academy of Pediatrics, Orlando, Oct. 2013.

Sawyer JR , Flynn JM, Ramirez N, Pretell JA, Kelly DM, Warner Jr. WC. Variability of Cobb Angle and Spine Height Measurements in Non-Ambulatory Myelodysplastic Children. Clinical Orthopaedic Society, Buffalo, NY, Sept. 19-21, 2013.

Sawyer JR, Perake V, Pretell JA, Mosian A, Kelly DM, Warner Jr. WC, Spence DS (2013) The Use of Tissue Expanders in Patients with Early Onset Scoliosis Treated with VEPTR. Clinical Orthopaedic Society, Buffalo, NY, Sept. 19-21, 2013.

Sawyer JR, Yamaguchi Jr, KT, Borgella J, Lee C, Andras L, Myung K, D'Hemecourt P, Flynn J, Skaggs D (2103) Radiographic Healing of Spondylolysis Does Not Influence Pain or Return to Sports 8 Years Later. Scoliosis Research Society, Vancouver, July 10-13, 2013.

Sawyer JR, Murphy R, Mosian A, Kelly DM, Warner Jr. WC (2013) The Use of VEPTR in the Treatment of Early Onset Scoliosis due to Congenital Scoliosis Without Fused Ribs. Scoliosis Research Society, Vancouver, July 10-13, 2013.

Sawyer JR, Rhodes L, Nash C, Scott D, Barkoh K, Warner Jr. WC, Kelly DM.Do Pre-Op Hospital Tours Alleviate Anxiety in Posterior Spinal Fusion Patients? : A Prospective, Randomized Study. Scoliosis Research Society, Vancouver, July 10-13, 2013.

Sawyer JR Astur, NA, Kelly DM, Warner Jr WC . The Use of VEPTR in the Treatment of Early Onset Scoliosis Associated with Arthrogryposis Multiplex Congenita. XIV Brazilian Spine Society, Brazil, April 27-30, 2013.

Sawyer, J.R., Warner, W.C., Kelly, D.M., Rush, Scott, S. *Magnetic Resonance and Computed Tomography Roles in Spondylolysis Diagnosis.* Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

Sawyer, J.R., Warner, W.C., Kelly, D.M., Beaty, J.H., Larsen, Moisan, Witte, Elzey. *Medial Ulnar Collateral Ligament Origin on the Medial Epicondylar Apophysis in the Skeletally Immature Elbow: An MRI Anatomical Study.* Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

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Sawyer, Warner, W.C., Astur, Klimo, Kelly, Muhlbauer. *Traumatic Atlanto-Occipital Dislocation in Children: Evaluation, Treatment and Outcomes.* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

Sawyer, J.R., Warner, W.C., Astur, N., Flynn, J.M., Glotzbecker, M., van Bosse, H.J., Hoashi, J.S., d'Amato, C.R., Moisan, A., Kelly, D.M., *The Efficacy of Rib-Based Distraction with VEPTR in Treatment of Early Onset Scoliosis in Patients with Arthrogryposis.* Presented at XIV Brazilian Spine Society, Florianópolis, SC, Brazil, April 27 – 30, 2013.

Sawyer, Warner, W.C., Cannon, Astur, Kelly. *Characterization of Radiation Exposure in Early Onset Scoliosis Patients Treated with the Vertical Expandable Prosthetic Titanium Rib.* ePoster presented at XIV Brazilian Spine Society, Florianópolis, SC, Brazil, April 27 – 30, 2013.

Derek Kelly, MD

Cervical Spine Trauma Immobilization Protocols in Young Children. How Often Are These Protocols Followed? Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Weldy, Beaty, Spence, Kelly, Sawyer, Warner, Jr. OTA poster. San Diego, CA. Oct. 7-10, 2015.

Kutsikovich, Hopkins, Gannon III, Beaty, Warner, Sawyer, Spence, Kelly. ASSH eposter. Seattle, WA. Sept. 10-12, 2015; OTA podium. San Diego, CA. Oct. 7-10, 2015.

Changing Trends in Pediatric Spine Surgery in The United States: 1997-2012. Kelly, Warner, Sawyer, Copley. SRS Podium. Minneapolis, MN. Sept. 30-Oct. 3, 2015.

The Evolving State of Acute Pediatric Septic Arthritis and Osteomyelitis. Franklin, Kelly, Sawyer. POSNA eposter #46. Atlanta, GA. April 29-May2, 2015. EPOS Poster. Marseille, France. April 15-18, 2015.

Kelly, Sawyer, Warner, Beaty J, Bert, Biggers, Moisan. Fracture of the Medial Humeral Epicondyle in Children: A Comparison of Operative and Nonoperative Management (accepted Podium). American Academy of Orthopaedic Surgeons, New Orleans, March 2014.

Kelly, Beaty, Thompson, Rush, Warner, Spence, Moisan, Sawyer. Intra and Inter-Observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly, Derek M., MD, Sawyer Jeffrey R. MD Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, David D. Spence, MD. Sub-axial Cervical Spine Injuries in Children and Adolescents (e poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly Derek M. MD, Beaty James H. MD, Ryan Murphy BS, William C. Warner Jr. MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD, Jeffrey R. Sawyer MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly Derek M. MD, Beaty James H. MD, Byron F. Stephens MD, Jeffrey R. Sawyer MD, William C. Warner MD, David D. Spence MD, Alice A. Moisan BSN. Interleukin-6 in Pediatric Musculoskeletal Infection: A Pilot Study (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly Derek M. MD, Beaty James H. MD, Sameer M. Naranje MD, Jeffrey R. Sawyer MD, Tamekia L. Jones PhD. Changes in the Treatment of Pediatric Femur Fractures: Trends from United States Kids' Inpatient Database (KID) (Podium). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly Derek M., MD, Beaty James H, MD, Juan Pretell-Mazzini, MD, Vinayak Perake, MD; Jeffrey R Sawyer, MD, Alice A Moisan, BSN, David D Spence, MD, William C Warner, Jr, MD. Outcomes And Complications Of Tibial Tubercle Fractures Within The Pediatric Population. A Systematic Review Of The Literature (e-poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Kelly Derek M. MD, Beaty James H. MD, Ryan Murphy BS, William C. Warner Jr. MD, Alice Moisan RN, Norfleet Thompson MD, David D. Spence MD, Jeffrey R. Sawyer MD. Transverse Femoral Shaft Fractures are a Better Predictor of Non-Accidental Trauma than Spiral Fractures in Young Children accepted podium. POSNA, Hollywood, Ca., April-May 2014.

Kelly Derek M., MD, Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, David D. Spence, MD, and Jeffrey R. Sawyer MD. Sub-axial cervical spine injuries in children and adolescents accepted e poster. POSNA, Hollywood, Ca., April-May 2014.

Kelly Derek M. MD. Beaty James H. MD, Byron F. Stephens MD, Jeffrey R. Sawyer MD, William C. Warner MD, David D. Spence MD, Alice A. Moisan BSN. Interleukin-6 in Pediatric Musculoskeletal Infection: A Pilot Study accepted e poster. POSNA, Hollywood, Ca., April-May 2014.

Kelly DM, Larsen N, Moisan A, Sawyer JR, Warner WC, Beaty JH, . "Medial Ulnar Collateral Ligament Origin in Children and Adolescents: An MRI Anatomical Study." Poster. Lebonheur Children's Hospital Research Day, Nov. 2013.

Kelly DM, Naranje, S, Moisan A, Beaty JH, Sawyer JR. Poster. "Changes in the Treatment of Pediatric Femur Fractures: Trends from the United States Kids' Inpatient Database (KID)" Lebonheur Children's Hospital Research Day, Nov. 2013.

Kelly DM "Perthes: What We Know and Do Not Know". Pediatric Orthopedic Update. Lebonheur Children's Hospital. Memphis, TN. Nov 2, 1013.

Kelly DM. "Flatfoot: Newborn to Adolescent" Pediatric Orthopedic Update. Lebonheur Children's Hospital. Memphis, TN. Nov 2, 1013.

Kelly DM, Rhodes L, Nash C, Scott D, Barkoh K, Warner WC, Sawyer JR. "Do Pre-Operative Hospital Tours Alleviate Anxiety in Pediatric Posterior Spinal Fusion Patients? A Prospective Randomized Study." Scoliosis Research Society. E-poster. September 2013. Lyon, France.

Kelly DM, Murphy R, Moisan A, Warner WC, Sawyer JR. "The Use of VEPTR for Treatment of Congenital Scoliosis Without Fused Ribs." Scoliosis Research Society. E-poster. September 2013. Lyon, France.

Kelly DM, Pretell J, Flynn J, Ramirez, Warner WC, Sawyer JR. Poster. "Variability of Cobb Angle and Spinal Height Measurements in Non-ambulatory Myelodysplastic Children." Clinical Orthopedic Society. September, 2013. Buffalo, NY.

Kelly DM, Perake V, Warner WC, Sawyer JR. Poster. "Prevention and Treatment of Wound Complications with Tissue Expanders in Patients with Early Onset Scoliosis Treated with VEPTR." Clinical Orthopedic Society. September, 2013. Buffalo, NY.

Kelly DM, Biggers M, Bert TM, Moisan A, Spence DD, Warner WC Jr, Beaty JH, Sawyer JR. "Medial Humeral Epicondyle Fractures in Children. A Comparison of Operative and Non-operative Management." Brandon Carrell Visiting Professorship. June 2013. Texas Scottish Rite Hospital, Dallas, TX.

Kelly, D.M., Sawyer, J.R., Warner, W.C., Rush, Scott, S. *Magnetic Resonance and Computed Tomography Roles in Spondylolysis Diagnosis.* Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

Kelly, D.M., Sawyer, J.R., Warner, W.C., Beaty, J.H., Larsen, Moisan, Witte, Elzey. *Medial Ulnar Collateral Ligament Origin on the Medial Epicondylar Apophysis in the Skeletally Immature Elbow: An MRI Anatomical Study.* Presented at the American Academy of Orthopaedic Surgeons, Chicago, Ill., March 2013.

Kelly, D.M., Sawyer, J.R., Warner, W.C., Beaty, J.H., Larsen, Moisan, Witte, Elzey. *Medial Ulnar Collateral Ligament Origin on the Medial Epicondylar Apophysis in the Skeletally Immature Elbow: An MRI Anatomical Study.* Poster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

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Kelly, D.M., Sawyer, J.R., Warner, W.C., Spence, D., Beaty, J.H., Pretell, Murphy, Moisan. *Surgical Treatment of Symptomatic Accessory Navicular in Children and Adolescent: Is Simple Excision Enough?* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

Kelly, Sawyer, Warner, W.C., Astur, Klimo, Muhlbauer. *Traumatic Atlanto-Occipital Dislocation in Children: Evaluation, Treatment and Outcomes*. ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

David Spence, MD

Cervical Spine Trauma Immobilization Protocols in Young Children. How Often Are These Protocols Followed? Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Weldy, Beaty, Spence, Kelly, Sawyer, Warner, Jr. OTA poster. San Diego, CA. Oct. 7-10, 2015.

Factors that Predict Instability in Pediatric Diaphyseal Both Bone Forearm Fractures. Kutsikovich, Hopkins, Gannon III, Beaty, Warner, Sawyer, Spence, Kelly. ASSH eposter. Seattle, WA. Sept. 10-12, 2015; OTA podium. San Diego, CA. Oct. 7-10, 2015.

Spence, Beaty, Thompson, Kelly, Rush, Warner, Moisan, Sawyer. Intra and Inter-Observer Reliability and the Role of Fracture Morphology in Classifying Femoral Shaft Fractures in Children (poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

Spence David D., MD, Sawyer Jeffrey R. MD Warner William C. Jr, MD, Robert F. Murphy, MD, Austin R. Davidson, BS, Derek M. Kelly, MD. Sub-axial Cervical Spine Injuries in Children and Adolescents (e poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

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Spence David D, MD, Beaty James H, MD, Juan Pretell-Mazzini, MD, Vinayak Perake, MD; Derek M. Kelly, MD, Jeffrey R Sawyer, MD, Alice A Moisan, BSN, William C Warner, Jr, MD. Outcomes And Complications Of Tibial Tubercle Fractures Within The Pediatric Population. A Systematic Review Of The Literature (e-poster). European Pediatric Orthopaedic Society, Belgium, April 2014.

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Spence, D. Hip preservation in the young adolescent. Pediatric Orthopaedics: Common Conditions and the Pediatric Hip. Le Bonheur, Memphis, Tenn. Nov. 2, 2013.

Spence, D. Knee pain: Common and uncommon causes. Pediatric Orthopaedics: Common Conditions and the Pediatric Hip. Le Bonheur, Memphis, Tenn. Nov. 2, 2013

Spence, D. Torticollis: Diagnosis, treatment and evidence-based practice. TPTA, Memphis, Tenn. Sept. 27, 2013.

Spence, D., Kelly, D.M., Sawyer, J.R., Warner, W.C., Beaty, J.H., Pretell, Murphy, Moisan. *Surgical Treatment of Symptomatic Accessory Navicular in Children and Adolescent: Is Simple Excision Enough?* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.

David D. Spence, MD; Jon Paul DiMauro, MD; Patricia Miller, MS; Michael P. Glotzbecker, MD; Daniel Hedequist, MD; Benjamin J. Shore, MD. *Avascular Necrosis after Femoral Neck Fracture: Analysis of Risk Factors.* Presented at POSNA annual meeting, Toronto, Ontario, May 2013.

David D. Spence, MD; Jon Paul DiMauro, MD; Michael P. Glotzbecker, MD; Samantha A. Spencer, MD; Daniel Hedequist, MD; Benjamin J. Shore, MD, FRCSC. *External Fixation for Pediatric Diaphyseal Tibia Fractures: A Comparison between Taylor Spatial Frame and Uniplanar External Fixation.* ePoster presented at POSNA annual meeting, Toronto, Ontario, May 2013.