

Research, skill define spine program

In 2010, the team of pediatric orthopaedic surgeons at Campbell Clinic and Le Bonheur Children's Hospital performed more than 100 spinal deformity surgeries, including anterior fusion, posterior fusion, spine stapling and VEPTR procedures. From spinal fusion to spine stapling, the surgeons established themselves as experts in the field while working to develop new treatments for these children.

Highlights of the Le Bonheur and Campbell Clinic spine program include:

- Orthopaedic Surgeon Jeffrey R. Sawyer is part of a multicenter study group aimed at studying early onset scoliosis and its treatments. In the study, leading U.S. centers submit patient data into a common database, allowing researchers to study large patient populations. The database includes 700 kids with early onset scoliosis, including 200 children who have undergone a VEPTR procedure.

The multi-center study group presented work recently at the Fourth International Congress on the Growing Spine, entitled "Does Rib-Based Distraction Control Curve Progression and Prevent Parasol Deformity of the Chest in Scoliosis Associated with Congenital Myopathy?" The work concluded "scoliosis associated with congenital myopathy can be

effectively managed in the growing child with growth-sparing instrumentation, avoiding early fusion."

In 2010, Le Bonheur and Campbell Clinic surgeons inserted 8 Vertical Expandable Prosthetic Titanium Rib (VEPTR) implants to address both chest wall and spine deformities. Surgeons also expanded VEPTR implants in 31 patients.

- For the past 20 years, Orthopaedic Surgeon William Warner of Campbell Clinic and Pediatric Neurosurgeon Michael Muhlbauer of Semmes Murphey Neurosurgery have cared for children with spinal tumors. The two serve as the referral resource for St. Jude Children's Research Hospital.
- Campbell Clinic and Le Bonheur surgeons have begun to offer spine stapling in selected patients, an option for children with scoliosis who were previously limited to bracing and spinal fusion surgery, depending on the severity of their curve.

The stapling procedure requires a multi-disciplinary team that uses a thoracoscope inside the patient's chest. Through three to four half-inch incisions in the chest wall, temperature-sensitive staples are placed into the spine to help it grow straight. The procedure requires a one-to two-day hospital stay, and children usually resume normal activities within several months. Treatment allows children to avoid bracing, and in some cases, fusion.



Case study: Evan Sanders, spinal osteosarcoma

Evan Sanders was a standout 12-year-old athlete: an all-star baseball player from central Louisiana who dabbled in a handful of other sports and suffered the normal aches and pains that came with them.

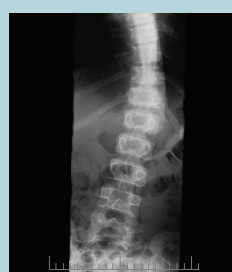
His parents assumed his back pain was muscular, until they had to start helping him out of bed. A trip to his pediatrician led to an emergency room visit with an orthopaedist and eventually a scan that revealed a bone tumor on his spine.

"It was very surreal, one of those things you just don't really believe," said Evan's dad, Richard.

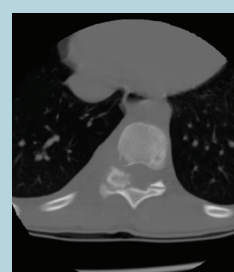
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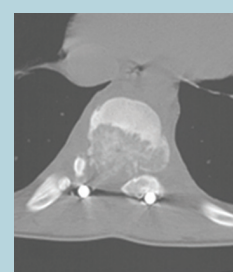
Evan Sanders



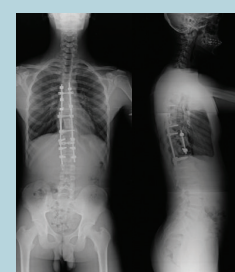
Initial presentation with painful scoliosis



CT scan of initial lesion.



CT scan of recurrent lesion



Radiographs 4 years post resection

osteoblastoma, Evan was sent to the surgical team of Orthopaedic Surgeon William Warner and Neurosurgeon Michael Muhlbauer. Warner, of Campbell Clinic, and Muhlbauer, of Semmes Murphey Neurosurgery, were able to extract Evan's tumor and reinforce his spine with two metal rods. But six months later, Evan returned to Memphis for a routine check-up – only to learn the mass had returned.

Tests revealed a large, malignant tumor, and physicians reclassified the growth as osteosarcoma. Warner and Muhlbauer returned to the OR to perform a 10.5-hour procedure,

where they removed the tumor and stabilized his spine a second time.

"We have nothing but praise for those two," Richard said. "We were extremely fortunate to have the resources in Memphis to care for Evan."

Today, Evan is a freshman at Louisiana Tech University with two triathlons and five half marathons under his belt and completed the 26.2-mile St. Jude Marathon in December. He and his family – and their extended family – return to Memphis each year to run the St. Jude Marathon, Half Marathon and Memphis Grizzlies House 5K.

"He's an amazing kid," Richard said of Evan. "He has that hard to beat, competitive spirit."

For nearly 60 years, Campbell Clinic Orthopaedics and Le Bonheur Children's Hospital have partnered to provide advanced pediatric orthopaedic care to children.

Since it opened in 1909, Campbell Clinic has been on the forefront of orthopaedic care, training and research. Founder, Willis C. Campbell organized the Department of Orthopaedic Surgery at The University of Tennessee, established one of the first orthopaedic residency programs in the United States, and co-founded The American Academy of Orthopaedic Surgeons.

Le Bonheur Children's Hospital first opened its doors in 1952, thanks to a women's sewing circle that believed children needed access to specialized medical care. Patients moved into a new facility in December 2010.

Today, Le Bonheur and Campbell Clinic work closely so that children are afforded cutting-edge orthopaedic care with support from top technology, surgeons, therapists, etc. Campbell's pediatric orthopaedists are:



Jim Beaty

Jim Beaty, MD, is immediate former chief of staff for the Campbell Clinic and a professor for the University of Tennessee-Campbell Clinic Department of Orthopaedic Surgery. He specializes in pediatric orthopaedics and pediatric trauma.

Beaty is a former president of the American Academy of Orthopaedic Surgeons, American Board of Orthopaedic Surgery, the Pediatric Orthopaedic Society of North America, the Mid-America Orthopaedic Association, Tennessee Orthopaedic Society and Orthopaedic Learning Center.



William Warner

William Warner, MD, is a professor in the University of Tennessee-Campbell Clinic Department of Orthopaedic Surgery. He also serves as division chief of Orthopaedics for St. Jude Children's Research Hospital and is chief of Orthopaedics for Mississippi Crippled Children's Services.

A former chief of surgery at Le Bonheur Children's Hospital, Warner has also served as president of the Tennessee Orthopaedic Society and as a board member and trauma committee member of the Pediatric Orthopaedic Society of North America.

He has served on the organizing committee for the International Pediatric Orthopaedic Symposium and the American Academy of Orthopaedic Surgeons Pediatric Update.

Warner is also a contributor to *Campbell's Operative Orthopaedics*.



Jeffrey R. Sawyer

Jeffrey R. Sawyer, MD, is director of the Pediatric Orthopaedic Fellowship program at the University of Tennessee-Campbell Clinic Department of Surgery, where he also serves as an assistant professor.

He serves as the American Academy of Orthopaedic Surgeons' spokesperson for all-terrain vehicle safety and sits on the group's Program Committee. He is also a member of the Vertical Expandable Prosthetic Titanium Rib (VEPTR) Study Group.

Sawyer is a former instructor and visiting professor in Enugu, Nigeria, Abu Dhabi, United Arab Emirates and Malawi, Africa. He is also a former recipient of the Pediatric Orthopaedic Society of North America/International Pediatric Orthopaedic Symposium Traveling Fellowship.

Sawyer also serves as a contributor to *Campbell's Operative Orthopaedics*.



Derek Kelly

Derek Kelly, MD, is a clinical instructor at the University of Tennessee-Campbell Clinic Department of Orthopaedic Surgery and serves as the primary physician for the Clubfoot Clinic at Le Bonheur Children's.

Kelly completed his orthopaedic fellowship at Texas Scottish Rite Hospital for Children in 2008 and is a member of the Pediatric Orthopaedic Society of North America, Scoliosis Research Society and American Academy of Orthopaedic Surgeons. He currently serves as a University of Tennessee's Surgical Subspecialty Orthopaedic Lecturer.

He is a contributor to American Academy of Orthopaedic Surgeons' *Orthopedic Knowledge Update: Foot and Ankle*.

Clubfoot research explores multidisciplinary approach

Le Bonheur and Campbell Clinic surgeons are investigating the outcomes of surgeons and physical therapists casting children with clubfoot. Children who are study candidates are randomly assigned to a study group through a weekly clubfoot clinic and then followed throughout their treatment.



Led by Orthopaedic Surgeon Derek Kelly, the study looks at treatment success, the number of casts that must be used to complete treatment, patient satisfaction and complications. Kelly expects to follow 250 patients for at least five years. To date, he has enrolled 25 patients in the study.

Kelly and his team treat clubfoot using the Ponseti method, and both physicians and physical therapists are trained to apply weekly casts. Though no data has been reported yet, Kelly has found, anecdotally, that physician and therapist casting results are similar.

The weekly clubfoot clinic is staffed by Kelly, orthopaedic surgical residents, nurse practitioners, therapists, child life specialists and educators. The clubfoot Ponseti treatment method calls for five to six weeks of weekly manipulations to a child's foot or feet, followed by plaster cast applications. At the end of the casting period, most children require a minor surgery to lengthen the heelcord before spending another three weeks in cast.

Giving families access to both doctors and therapists in one spot makes visits easier on patients and their families, Kelly says.

ACADEMIC, RESEARCH ENDEAVORS LEAVE LASTING MARKS

Campbell Clinic and Le Bonheur Children's are committed to furthering the field of pediatric orthopaedics by training future specialists, exploring research endeavors and speaking on various academic topics around the world.

Fellowship growth

Each year, Campbell and Le Bonheur train one pediatric orthopaedic fellow who has completed a residency in orthopaedic surgery. Led by Fellowship Director Jeffrey R. Sawyer, MD, the program has become increasingly competitive in the past few years. The program remains competitive at a national and international level.

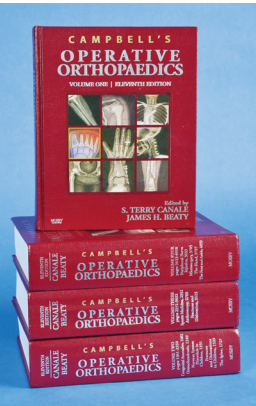
Fellows are exposed to various aspects of pediatric orthopaedics and learn about advanced techniques like VEPTR, Computer-Assisted Surgical Navigation (Stealth), Taylor Spatial Frame and surgical hip dislocation/reconstruction. The fellow supervises residents, assists staff surgeons and works at Campbell Clinic, Le Bonheur and St. Jude Children's Research Hospital.

Program fellows help oversee research conducted by medical students and residents, in addition to conducting their own research. In the past three years, fellows have conducted studies on age-related patterns of spine injury in children, complications of femur fractures and the genetic aspects of scoliosis in African American patients.

The program also supports up to three international observational fellows each year from countries like Brazil, Thailand and Argentina.

New edition: Campbell's Operative Orthopaedics

Campbell Clinic orthopaedic surgeons currently are working to revise and update the 12th edition of *Campbell's Operative Orthopaedics*, the definitive orthopaedic surgery reference.



The book has been updated every five to seven years by Campbell Clinic surgeons since it was first published in 1939 by Dr. Willis C. Campbell. *Campbell's Operative* is now a four-volume textbook that has been translated into seven languages. The book contains more than 4,000 pages with 1,800 descriptions of orthopaedic procedures and more than 9,000 illustrations. Pediatric orthopaedic surgeons Jim Beaty and Terry Canale serve as the book's co-editors.



Terry Canale, MD

Canale is also chairman of the University of Tennessee-Campbell Clinic Department of Orthopaedic Surgery, editor the American Academy of Orthopaedic Surgeons' *AAOS NOW* and chairman of the Orthopaedic Research and Education Foundation (OREF).

In addition to his academic work, Canale serves as chairman of the Campbell Foundation, supervises a fracture clinic at Le Bonheur Children's and has an active outpatient practice at Campbell Clinic.

Surgeons enhance trauma care with research, advocacy

Each year, Le Bonheur Children’s Hospital cares for 13,000 trauma cases and serves as the region’s only pediatric resource for these patients. Campbell Clinic surgeons provide orthopaedic care for those cases, treating everything from minor fractures to significant spinal injuries. With research and advocacy, the surgeons are enhancing the care they provide families – and working to ensure they are always at the cutting-edge of care.

A NATIONAL ADVOCATE

Orthopaedic Surgeon Jeffrey R. Sawyer, MD, serves as the American Academy of Orthopaedic Surgeons spokesperson on ATV safety. In 2010, he completed and published a nearly 10-year review of all-terrain accidents involving children across the United States. Published in *Orthopedics Today* and *The Journal of Pediatric Orthopaedics*, the review found the number of children injured in an ATV-related accident increased 240 percent from 1997 to 2006. The number of spinal injuries children suffered from those accidents increased 467 percent.

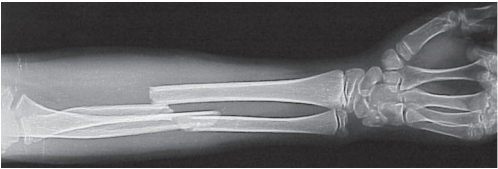
Sawyer also found that 70 percent of children who incurred a spine injury in an ATV-related incident were younger than 16, the minimum age recommended by the American Academies of Pediatrics and Orthopaedics.

His work also appeared in *Family Circle* and *Parents* magazines.

EMERGENCY DEPARTMENT RESEARCH

Sawyer and fellow Orthopaedic Surgeon Jim Beaty, MD, have studied orthopaedic trauma in the pediatric Emergency Department, publishing two recent articles on fracture reduction and sedation, respectively.

In the first, Sawyer partnered with a Le Bonheur pediatric emergency physician to study outcomes following forearm fracture reduction by pediatric emergency physicians versus orthopaedists. His study found there was no statistical difference in remanipulation



rates and healing between the two groups, and that the average facility charge and Emergency Department length of stay was lower in the group treated by pediatric emergency physicians. The work was presented at the 2008 Orthopedic Trauma Association meeting and has been accepted for publication in *Academic Emergency Medicine*.

In the second piece of research, Beaty published a study in the *Journal of Pediatric Orthopaedics* comparing procedural distress during manipulation of forearm fractures in children receiving either axillary (brachial plexus) block regional anesthesia or deep sedation with ketamine and midazolam. Using Children’s Hospital of Eastern Ontario Pain Scale (CHEOPS) to measure procedural distress during manipulation, the study found no statistically significant difference in the two approaches. No patient in either group experienced any adverse events.

ACS LEVEL 1 TRAUMA DESIGNATION

Le Bonheur Children’s is moving toward American College of Surgeons (ACS) Level 1 Trauma Center designation. With 13,000 trauma cases each year, Le Bonheur will be the only ACS Level 1 center in a three-state area.

- Orthopaedics will play a key role in the designation. To earn ACS Level 1 Trauma Center, hospitals must have:
- 24-hour coverage by pediatric trauma surgeons.
 - 24-hour in-house coverage by pediatric emergency medicine specialists.
 - 24-hour in-house coverage by anesthesiology and operating room personnel.
 - Prompt availability of care in specialties like orthopaedic surgery, neurosurgery and plastic surgery.
 - Immediate availability of the trauma intensive care unit and critical care physicians.
 - Comprehensive radiology, including interventional radiology.

Medical team sees 900 patients after Haitian earthquakes

A Le Bonheur Children’s medical mission team that traveled to Haiti in February 2010 has published a report analyzing future health care needs in Haiti. The team, which included Orthopaedic Surgeon Derek Kelly, had their work published in *Clinical Pediatrics* last month.

The analysis found that for those children directly injured by the earthquake, the most important needs are to control infections, improve functional outcomes with the use of prosthetics, physical and occupational therapy and improve limb function and sustain limb viability through plastic or reconstructive surgery.

Landing two weeks after Haiti’s catastrophic earthquakes in early 2010, Le Bonheur’s medical mission team served as the only pediatric team in Sacred Heart Hospital, a large private hospital in Port-au-Prince.

During the two-week mission, the team saw 900 patients and performed close to 100 surgeries. The team consisted of two orthopaedic surgeons, a trauma surgeon, critical care specialist, anesthesiologist, certified nurse anesthetist, paramedic and surgery technician.

Though part of Sacred Heart was deemed unsafe after the quake, the hospital’s five operating rooms remained intact – allowing international volunteer surgeons to care for Haitians. The team also saw patients at night at the Haiti Medical Missions of Memphis clinic in Croix des Bouquets near Port-au-Prince.



Case study: Brendan Eskin, trauma



Brendan Eskin

When 7-year-old Brendan Eskin arrived via helicopter to Le Bonheur Children’s Hospital, doctors weren’t sure he would make it through the night.

Hours earlier, Brendan was involved in an accident in his elementary school carpool line. His mom, Karen, found him face down in the road when she raced to school. He wasn’t moving, and paramedics wouldn’t let her near him.

Brendan arrived at Le Bonheur with a fractured skull, badly broken left femur, shattered clavicle and swelling in his brain. Orthopaedic Surgeon James Beaty, MD, inserted intramedullary rods in his femur within the first week of hospitalization.

For the next eight years, Brendan saw Beaty regularly, as the surgeon monitored the healing of his clavicle and femur fractures. When Brendan’s left leg began growing faster than his right, Beaty performed epiphysiodesis of the left distal femur. Beaty continues to follow the growth of Brendan’s femur bones. Beaty had previously



Flexible intramedullary nails used for fixation of femoral-shaft fracture.

published two articles on femur fractures in children: “Femoral Shaft Fractures in Children and Adolescents” in the *Journal of the American Academy of Orthopaedic Surgeons* 4:207-217, 1995, and “Interlocking Intramedullary Nailing of Femoral-Shaft Fractures in Adolescents: Preliminary Results and Complications” in the *Journal of Orthopaedics*, 1994 Mar-Apr: 14(2):178-83.

Brendan has few other lasting effects of the accident. Nerve damage to one of his eyes won’t allow it to track

out past midline, and he gets an occasional migraine.

Today, Brendan is a 15-year-old high school freshman who has started running cross country. He’s also started coaching a 12-year-old basketball team.

“He’s a very active teenager, loves to be outside, playing sports and hanging out with his friends,” said mom, Karen.

New building provides innovation, latest technology

The new Le Bonheur Children’s is a \$340 million, 255-bed facility that brings the hospital campus to more than 1 million square feet.

The new hospital features an operating suite with 15 operating rooms and two procedure rooms, along with a 3T intraoperative MRI. The fully integrated operating rooms include one 27 by 30 foot specialty OR dedicated to orthopaedics. Surgeons and staff will have advanced options to record each surgery and map it to a conference room, providing students the opportunity to observe. Voice and video conferencing between operating rooms and other locations like pathology allow the two to communicate at a moment’s notice. Staff also can adjust temperature and lighting from a central touch screen station in each OR.

A new 3T intraoperative MRI in the operating suite will provide high resolution images before, during and after an operation. By using the iMRI, surgeons can collect scans without moving the patient from the surgical table, reducing the amount of sedation and number of repeat surgeries. The iMRI also has live Web casting capabilities, enhancing the hospital’s teaching opportunities.

Hospital technology also includes a 320 slice CT scanner, computer-based nurse call system and six satellite pharmacies.

The hospital features a floor dedicated to caring for orthopaedic patients in private rooms. Those rooms are designed to accommodate comfortable sleeping space for two family members and playrooms and space for families to gather on every inpatient floor. A mini movie theater and play areas provide diversionary settings for inpatients, and the Le Bonheur Club Family Resource Center provides families access to learning materials, Internet and patient educators.



Research, Publications and Presentations

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

Publications

Warner Jr WC, Sawyer JR: Kyphosis *In* Lovell and Winter's Pediatric Orthopaedics 7th Edition. Submitted for Publication.

Rachel JN, Williams JB, Sawyer JR, Warner Jr WC, Kelly DM (2010) Is Radiographic Evaluation Necessary in Children with a Clinical Diagnosis of Calcaneal Apophysitis (Sever Disease)? Accepted for publication – Journal of Pediatric Orthopaedics.

Sawyer JR, Kelly DM, Beaty JH, Warner Jr. WC, Canale ST (2010) Use of a “Kickstand” For External Fixation of Lower Extremity Fractures in Children. Accepted for publication – Journal of Children's Orthopaedics.

Cross JD, Rush JK, Kelly DM, Warner Jr, WC, Sawyer JR (2010) The Treatment of Pediatric Lower Extremity Deformity Using the Taylor Spatial Frame. Accepted for publication – Current Orthopaedic Practice

Beaty, J.H. (2010). Fractures of the lateral humeral condyle are the second most frequent elbow fracture in children. *Journal of Orthopaedic Trauma*, 24(7):438. No abstract available. PMID: 2057707

Anand, K.J., Eubanks, J.W. 3rd, Kelly, D.M., Meier, J.W., Saltzman, J.A., Crisler, S.C., Kraus, G.J., Spentzas, T. & Chesney, R.W. (2010). Pediatric Patients Seen in Port-au-Prince, Haiti. *Clinical Pediatrics* (Phila). 2010 Aug 19. [Epub ahead of print]

Sawyer, J.R., Kellum, E.L., Creek, A.T. and Wood, G.W. 3rd. (2010) Acute compartment syndrome of the hand after a wasp sting: a case report. *Journal of Pediatric Orthopaedics*, 19(1):82-5.

Sawyer, J.R., Ivie, C.B., Huff, A.L., Wheeler, C., Kelly, D.M., Beaty, J.H. & Canale, S.T. (2010). Emergency room visits by pediatric fracture patients treated with cast immobilization. *Journal of Pediatric Orthopaedics*, 30(3):248-52.PMID: 20357591

Katz, D.E., Herring, J.A., Browne, R.H., Kelly, D.M. & Birch, J.G. (2010) Brace wear control of curve progression in adolescent idiopathic scoliosis. *Journal of Bone and Joint Surgery, American edition*, 92(6):1343-52.

Kelly, D.M., McCarthy, R.E., McCullough, F.L. & Kelly, H.R. (2010). Long-term outcomes of anterior spinal fusion with instrumentation for thoracolumbar and lumbar curves in adolescent idiopathic scoliosis. *Spine* (Philadelphia, Pa. 1976), 35(2):194-8.

Sawyer JR, Kellum EL, Kelly DM, Warner Jr WC (2009) Orthopaedic Aspects of All-Terrain Vehicle Accidents. Accepted for publication - Journal of the American Academy of Orthopaedic Surgeons

Lee, M.C., Kelly, D.M., Sucato, D.J. & Herring, J.A. (2009). Familial bilateral osteochondritis dissecans of the femoral head. A case series. *Journal of Bone and Joint Surgery, American edition*. 91(11):2700-7. No abstract available.

Sawyer JR, Ivie C, Huff A, Kelly DM, Warner Jr WC, Beaty JH, Canale ST: (2009) Unplanned Emergency Room Visits by Children Treated with Cast Immobilization. Journal of Pediatric Orthopaedics 30(3): 248-52.

Sawyer, J.R., Kapoor M, Gonzales M.H., Warner W.C Jr., Canale S.T. & Beaty J.H. (2009). Heterotopic ossification of the hip after non-accidental injury in a child: case report. *Journal of Pediatric Orthopaedics*, 29(8):865-7.PMID: 19934700

Beaty, J.H. (2009). The future of orthopedics. *Journal of Orthopaedic Science*, 14(3):245-7. Epub 2009 Jun 5. No abstract available. PMID: 19499288

Rhodes LN, Huff AL, Kelly DM, Warner WC, Sawyer JR. (2009) Pediatric Fracture Clinics: Current Status and Future Directions. Pediatric Health 3:439-444.

Sawyer, J.R. & Kapoor, M. (2009). The limping child: a systematic approach to diagnosis. *American Family Physician*, 79(3):215-24. Review.

Sawyer JR, Hicks J, Beaty JH, Canale ST, Warner Jr. WC, Beaty JH (2009) The Hammerlock Position for Treatment of Medial Epicondyle Fractures". Current Orthopaedic Practice 20(5):572-4.

Beebe MJ, Kelly DM, Warner Jr. WC, Sawyer JR (2009) Current Controversies in the Treatment of Pediatric Femur Fractures. Current Orthopaedic Practice 20(6):634-9.

Pershad, J., Williams, S., Wan J. & Sawyer, J.R. (2009). Pediatric distal radial fractures treated by emergency physicians. *The Journal of Emergency Medicine*, 37(3):341-4. Epub 2009 Feb 6.

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Heck R.K., Jr., Sawyer J.R., Warner W.C. & Beaty J.H. (2008). Progressive valgus deformity after curettage of benign lesions of the proximal tibia. *Journal of Pediatric Orthopaedics*, 28(7):757-60.PMID: 18812903

Beaty, J.H. (2008). Unusual doesn't mean unusable: why information about uncommon injuries or conditions is important. *American Journal of Orthopedics* (Belle Mead N.J.), Jun;37(6):E107, E119. No abstract available. PMID: 18716699

Kellum, E., Creek, A., Dawkins, R., Bernard, M. & Sawyer, J.R. (2008). Age-related patterns of injury in children involved in all-terrain vehicle accidents. *Journal of Pediatric Orthopaedics*, 28(8):854-8.

Richards, B.S., Beaty, J.H., Thompson, G.H., & Willis, R.B. (2008). Estimating the effectiveness of screening for scoliosis. *Pediatrics*, 121(6):1296-7; author reply 1297-8. No abstract available. PMID: 18519508

Babb, J.R., Ahn, J.I., Azar, F.M., Canale, S.T. and Beaty J.H. (2008). Transphyseal anterior cruciate ligament reconstruction using mesenchymal stem cells. *American Journal of Sports Medicine*, 36(6):1164-70. Epub 2008 Mar. 19.PMID: 18354144

Kapoor, M., Laham, S.G. & Sawyer, J.R. (2008). Children at risk identified in an urban scoliosis school screening program: a new model. *Journal of Pediatric Orthopaedics*, 17(6):281-7. 18.

Golden, D.W., Wojcikci, J.M., Jhee, J.T., Gilpin, S.L., Sawyer, J.R. & Heyman, M.B. (2008). Body mass index and elbow range of motion in a healthy pediatric population: a possible mechanism of overweight in children. *Journal of Pediatric Gastroenterol Nutrition*, 46(2):196-201.

Golden, D.W., Jhee, J.T., Gilpin, S.P. & Sawyer, J.R. (2007). Elbow range of motion and clinical carrying angle in a healthy pediatric population. *Journal of Pediatric Orthopaedics*, 16(2):144-9.

Arkader, A., Friedman, J.E., Warner, W.C. Jr & Wells, L. (2007). Complete distal femoral metaphyseal fractures: a harbinger of child abuse before walking age. *Journal of Pediatric Orthopaedics*, 27(7):751-3.

Arkader, A., Warner, W.C. Jr, Horn, B.D., Shaw, R.N. & Wells, L. (2007). Predicting the outcome of physeal fractures of the distal femur. *Journal of Pediatric Orthopaedics*, 27(6):703-8.

Beaty, J.H. (2007). Presidential address: “building the best . . . Lifelong learning”. *Journal of the American Academy of Orthopaedic Surgeons*, 15(9):515-8. No abstract available. PMID: 17761607

Abcarian, H., Gant, N.F., Beaty, J.H., Lewis, F.R. Jr. & Gardner, T.J. (2005). Ten specialty boards report accomplishments and plans: part II. *Bulletin of the American College of Surgeons*, 90(4):27-40. No abstract available. PMID: 18435122

Golden, D.W., Flik, K.R., Turner, D.A., Bach, B.R. Jr. & Sawyer, J.R. (2005). Acute compartment syndrome of the thigh in a high school soccer player: indications for expedient action. *The Physician and Sports Medicine*, 33(12):19-24.

Presentations

Jim Beaty, MD

Beaty, Jim. *The Orthopaedic Lecture*. Presented at the American Academy of Orthopaedic Surgeons, Annual Meeting, New Orleans, La., March 9-12, 2010.

Beaty, Jim. *Fractures of the Lower Extremity in Children – Straying out of Trouble*. Presented at the American Academy of Orthopaedic Surgeons, Annual Meeting, New Orleans, La., March 9-12, 2010.

Beaty, Jim. *Fractures of the Shoulder in the Adolescent Athlete*. Presented at the American Academy of Orthopaedic Surgeons, Annual Meeting, New Orleans, La., March 9-12, 2010.

Beaty, Jim. *Elbow Fractures in Children – What is Really New*. Visiting Professor, Presented at the Medical College of Georgia, Augusta, Ga., Nov. 19-22, 2009.

Beaty, Jim. *Musculoskeletal Infections in Children and Adolescents: Current Concepts*. Visiting Professor, Presented at the Medical College of Georgia, Augusta, Ga., Nov. 19-22, 2009.

Beaty, Jim. *Tarsal Coalition: Diagnosis and Treatment* Visiting Professor. Presented at the Medical College of Georgia, Augusta, Ga., Nov. 19-22, 2009.

Beaty, Jim. *Pediatric Fractures – What is Really New?* Visiting Professor, Presented at the Philadelphia Orthopaedic Society – Howard Steele, Philadelphia, Pa., Oct., 5, 2009.

Beaty, Jim. *Fractures of the Hip in Children and Adolescents*. Visiting Professor, Presented at the Drexel Department of Orthopaedics, Oct. 5, 2009.

Beaty, Jim. *Fractures About the Elbow in Children – Treatment and Complications 2009*. Visiting Professor, Presented at the Carolina's Medical Center, Charlotte, N.C., June 19, 2009.

Beaty, Jim. *Changes in the Academic and Private Practice Arena*. Presented at the American Academy of Orthopaedic Surgeons, Board of Directors, Rosemont, Ill., May 13-16, 2009.

Beaty, Jim. *The Asheville Forum Physician Perspective*. Presented at the American Academy of Orthopaedic Surgeons, Board of Directors, New York, NY, May 2009

Beaty, Jim. *Leadership Qualities and Initiatives*. Presented at the American Academy of Orthopaedic Surgeons, Rosemont, Ill, Oct. 15-17, 2009.

Beaty, Jim. *Pediatric Orthopaedic Trauma Now and the Future* Presented at the Pediatric Orthopaedic Society of North America Annual Meeting, Boston, Mass., April 29, 2009.

Beaty, Jim. *Pediatric Orthopaedic Trauma Now and the Future* Presented at the Pediatric Orthopaedic Society of North America Annual Meeting, Boston, Mass., April 29, 2009.

Beaty, Jim. *Elbow Fractures in Children. What have I learned?* Presented at the Montreal Hospital, Montreal, Canada, Nov. 19-21, 2008.

Beaty, Jim. *Femur and Hip Fractures in Children*. Presented at the Montreal Hospital, Montreal, Canada, Nov. 19-21, 2008.

Beaty, Jim. *Orthopaedic On-Call Crisis in the United States*. Presented at the Montreal Hospital, Montreal, Canada, Nov. 19-21, 2008.

Beaty, Jim. *Elbow Fractures in Children... What Have I Learned?* Visiting Professor, Presented at the University of Montreal, Canada, November 2008.

Beaty, Jim. *Femur and Hip Fractures in Children... Horses and Zebras*. Visiting Professor, Presented at the University of Montreal, Canada, November 2008.

Beaty, Jim. *SCFE. Current Treatment and Complications*. Visiting Professor, Presented at the University of Montreal, Canada, November 2008.

Beaty, Jim. *Orthopaedic On Call Crisis in the U.S.* Visiting Professor, Presented at the University of Montreal, Canada, November 2008.

Beaty, Jim. *AAOS Update*. Presented to the British Orthopaedic Association, Sept. 16-25, 2008.

Beaty, Jim. *Fractures in Children – Update of Techniques and Procedures*. Presented to the South African Orthopaedic Association, Cape Town, South Africa, Sept. 1-5, 2008.

Beaty, Jim. *American Academy of Orthopaedic Surgeons 2008 and Beyond*. Presented at the American Bone and Joint Surgeons Meeting, Jackson Hole, Wyo., June 2008.

Beaty, Jim. *Emergency Call issues*. Presented at the AOA Symposium: Current Pediatric Orthopaedic Issues – A Small Window into Global Orthopaedic Issues, June 11 2009.

Beaty, Jim. *The Future of Orthopaedics*. Presented at the Japanese Orthopaedic Association Meeting, Sapporo, Japan, May 2008.

Beaty, Jim. *Elbow Fractures in Children*. Visiting Professor, Presented at the Medical College of South Carolina, Charleston, S.C., April 24-27, 2008.

Beaty, Jim. *Fractures of the Hip and Femur*. Visiting Professor, Presented at the Medical College of South Carolina, Charleston, S.C., April 24-27, 2008.

Beaty, Jim. *AAOS update 2008*. Visiting Professor, Presented at the Medical College of South Carolina, Charleston, S.C., April 24-27, 2008.

Beaty, Jim. *Hip Dislocation and Dysplasia in the Neonate*. Presented at the Mid-South Seminar on Neonatal Care, Memphis, Tenn., 2008.

Beaty, Jim. *Hip Dislocation and Dysplasia*. Presented at the Mid-South Seminar on Neonatal Care, Methodist University Hospital, Memphis, Tenn., January 2008.

Beaty, Jim. *President's Address – American Academy of Orthopaedic Surgeons*. Presented at the The Atlanta Orthopaedic Society, Atlanta, Ga., October 2007.

Beaty, Jim. *Fractures about the Elbow in Children 2007 – Treatment and Complications – What's Really New*. Presented at Emory University, Atlanta, Ga., October 2007.

Beaty, Jim. *Emergency Department Management of Common Sports Injuries in Children and Adolescents*. Presented at the Le Bonheur Update in Acute and Emergency Care Pediatrics, October 2007.

Beaty, Jim. *President's Address – American Academy of Orthopaedic Surgeons*. Presented to the Scoliosis Research Society, Edinburgh, Scotland, September 2007.

Beaty, Jim. *The Top Ten Questions in Orthopaedics*. Presented at the Memphis Rotary Club, Memphis, Tenn., September 2007.

Beaty, Jim. *Selection and Election of Leaders in Orthopaedics – Who and How?* Presented at the Twentieth Century Orthopaedic Association Meeting, Brainerd, Minn., Aug. 15-18, 2007.

Beaty, Jim. *American Academy of Orthopaedic Surgeons, 2007*. Presented at the Twentieth Century Orthopaedic Association Meeting, Brainerd, Minn., Aug. 15-18, 2007.

Beaty, Jim. *Update – American Academy of Orthopaedic Surgeons*. Presented at the Chicago Trauma Symposium, Chicago, Ill., August 10, 2007.

Beaty, Jim. *Complications in Slipped Capital Femoral Epiphysis*. Presented at the International Pediatric Orthopaedic Symposium, Orlando, Fla.

Beaty, Jim. *Orthopaedics On Call – Issues and Solutions*. Presented at the American Orthopaedic Association Meeting, Asheville, N.C., June 2007.

Beaty, Jim. *Surgical Management of Femoral Shaft Fractures in Children and Adolescents*. Presented at the University of Texas, San Antonio, Texas, June 2007.

Beaty, Jim. *Complications of Elbow Fractures in Children and Adolescents*. Presented at the University of Texas, San Antonio, Texas, June 2007.

Beaty, Jim. *Zebras and Horses – Pediatric Fractures of the Hip and Femur*. Presented at the University of Texas, San Antonio, Texas, June 2007.

Beaty, Jim. *President's Update – American Academy of Orthopaedic Surgeons*. Presented at the University of Texas, San Antonio, Texas, June 2007.

Beaty, Jim. *American Academy of Orthopaedic Surgeons*. Presented at the National Association of Orthopaedic Nurses, St. Louis, Mo., May 2007.

Beaty, Jim. *Presidents Update American Academy of Orthopaedic Surgeons*. Presented at the National Orthopaedic Leadership Conference, Washington, DC, May 2007.

Beaty, Jim. *Neurovascular Injury with Supracondylar Humeral Fractures*. Presented at the Pediatric Orthopaedic Society Meeting, Fort Lauderdale, Fla., May 2007.

Beaty, Jim. *Fractures about the Elbow in Children*. Presented at the University of Wisconsin, Wis., April 26-28, 2007.

Beaty, Jim. *Orthopaedic Trauma On-Call. Controversy and Complexity*. Presented at the University of Wisconsin, Wis., April 26-28, 2007.

Beaty, Jim. *Surgical Management of Femoral Shaft Fractures in Children*. Presented at the University of Wisconsin, Wis., April 26-28, 2007.

Beaty, Jim. *Classics in Orthopaedics – Elbow Fractures in Children*. Presented at the Mid-America Orthopaedic Association Meeting, Palm Beach, Fla., April 11-14, 2007.

Beaty, Jim. *American Academy of Orthopaedic Surgeons Update State Society Presidents*. Presented at the Mid-America Orthopaedic Association Meeting, Palm Beach, Fla., April 11-14, 2007.

Beaty, Jim. *Supracondylar Fractures of the Humerus in Children – Treatment and Complications, What's Really New?* Presented at the American Academy of Orthopaedic Surgeons, San Diego, Calif., February 2007.

Beaty, Jim. *Femoral Shaft Fractures in Children and Adolescents*. Presented at the American Academy of Orthopaedic Surgeons, San Diego, Calif., February 2007.

Beaty, Jim. *Femur Fractures in Children and Adolescents*. Presented at the Argentina Association of Orthopaedics and Traumatology, Argentina, Dec. 3-6, 2006.

Beaty, Jim. *Fractures about the Knee in Children and Adolescents*. Presented at the Argentina Association of Orthopaedics and Traumatology, Argentina, Dec. 3-6, 2006.

Beaty, Jim. *The American Academy of Orthopaedic Surgeons*. Presented at the Argentina Association of Orthopaedics and Traumatology, Argentina, Dec. 3-6, 2006.

Beaty, Jim. *Elbow Fractures – Treatment and Complications*. Presented at the Argentina Association of Orthopaedics and Traumatology, Argentina, Dec. 3-6, 2006.

Beaty, Jim. *Hip Fractures in Children and Adolescents*. Presented at the Argentina Association of Orthopaedics and Traumatology, Argentina, Dec. 3-6, 2006.

William Warner, MD

Warner, William. *Medial epicondyle fracture*. Presented at POSNA annual meeting. Waikola Hawaii, 2010.

Warner, William. *MRSA update*. Presented at POSNA annual meeting. Albuquerque, N.M., 2008.

Warner, William. *Pediatric Hip. Orthopedic review course*. Presented at AAOS annual meeting, 2007.

Warner, William. *Instructional course lecture. Pediatric infection update*. Presented at AAOS, 2007.

Warner, William. *Predicting the outcome of distal femoral epiphyseal fractures*. Presented at POSNA, San Diego, Calif., 2006.

Warner, William. *Changing patterns of acute hematogenous osteomyelitis and septic arthritis: emergence of community acquired Methicillin resistance*. Presented at American Academy of Orthopaedic Surgeons. Chicago, Ill., 2006.

Warner, William. *Predicting the outcome of distal femoral epiphyseal fractures*. Presented at American Academy of Orthopaedic Surgeons. Chicago, Ill., 2006.

Warner, William. *Changing patterns of acute hematogenous ostepeylitis and septic arthritis: emergence of community acquired Methicillin resistance*. Presented at Mid America, San Antonio, Texas, 2006.

Warner, William. *OLC course, Trauma*. Presented at POSNA, Chicago, Ill., 2006.

Warner, William. *Office Orthopedics, congenital knee dislocation ad radiugraphic evaluation of musculoskeletal infections*. Presented at IP0S, Orlando, Fla., 2006.

Warner, William. *Instructional course lecture. Back pain*. Presented at AAOS, 2005.

Warner, William. *Instructional course lecture. Back pain*. Presented at AAOS, 2006.

Warner, William. *Office orthopedics and congenital knee and patella dislocations*. Presented at IP0S, Orlando, Fla., 2005.

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Jeffrey R. Sawyer, MD

Sawyer JR, Kelly DM, Warner Jr WC, Beaty JH, Canale ST (2011) The Kickstand Technique to Promote Elevation and Wound Care in Pediatric Lower Extremity Injuries. American Academy of Orthopaedic Surgeons.

Sawyer JR, Guevara B, Thompson N, Dawkins R, Kelly DM, Warner Jr WC (2011) High Prevalence of Associated Injuries in Children with Spinal Fractures. American Academy of Orthopaedic Surgeons.

Sawyer JR, Beebe M, Thompson N, Creek A, Kelly DM, Warner Jr. WC, Beaty JH (2011) "Age-Related Patterns of Spine Injuries Following ATV Accidents in Children". American Academy of Orthopaedic Surgeons

Rachel JN, Williams JB, Sawyer JR, Warner Jr WC, Kelly DM (2011) Is Radiographic Evaluation Necessary in Children with a Clinical Diagnosis of Calcaneal Apophysitis (Sever Disease)? American Academy of Orthopaedic Surgeons.

Sawyer JR, Bernard M, Kelly DM, Warner Jr WC, Beaty JH: (2010) "Trends in Spine Injury Cause by All-Terrain Vehide Accidents". Orthopaedic Trauma Association.

Sawyer JR, Beebe J, Shroeder J, Beaty JH, Kelly DM, Warner Jr, WC, Canale ST, Huff A. (2009) Unplanned Return to the Emergency Room Following Treatment in a Busy Fracture Clinic. Orthopaedic Trauma Association.

Sawyer JR, Bernard M, Kelly DM, Warner Jr WC, Beaty JH: (2010) "Trends in Spine Injury Caused by All-Terrain Vehicle Accidents". American Academy of Orthopaedic Surgeons.

Sawyer J, Pershad J, Williams S, Wan J. (2010) "Closed Manipulation and Cast Immobilization of Distal Radius Fractures by Pediatric Emergency Room Physicians. American Academy of Orthopaedic Surgeons.

Sawyer JR, Rhodes L, Beaty JH, Canale ST, Kelly DK, Warner Jr (2010) Diagnosis and Treatment of Perthes Disease. American Academy of Orthopaedics – National Association of Orthopaedic Nurses Section.

Sawyer JR, Bernard M, Kelly DM, Warner Jr WC, Beaty JH: (2010) "Trends in Spine Injury Cause by All-Terrain Vehicle Accidents". Pediatric Orthopaedic Society of North America.

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Sawyer JR, Beebe M, Thompson N, Creek A, Kelly DM, Warner Jr. WC, Beaty JH (2010) "Age-Related Patterns of Spine Injuries Following ATV Accidents in Children". Pediatric Orthopaedic Society of North America.

Sawyer JR, Rhodes LN, Kelly DM, Messman L, Warner Jr WC, (2010) Pediatric Fracture Clinics: Current Status and Future Directions. Pediatric Orthopaedic Practitioners Society.

Sawyer JR, Rhodes L, Beaty JH, Canale ST, Kelly DK, Warner Jr. WC (2010) Classification, Diagnosis and Treatment of Perthes Disease. Pediatric Orthopaedic Practitioners Society.



Sawyer JR, Smith JT, Wade J, D'Amato C, Campbell R, Vitale M (2010) Does Rib-Based Distraction Control Curve Progression and Prevent Parasol Deformity of the Chest in Scoliosis Associated with Congenital Myopathy? 4th International Congress on Early Onset Scoliosis.

Sawyer, Jeff. *The Preparticipation Physical*. Presented at Le Bonheur Children's Hospital: Pediatric Sports Medicine Update, October 2009.

Sawyer, Jeff. *Spine Injuries in the Pediatric Athlete*. Presented at Le Bonheur Children's Hospital: Pediatric Sports Medicine Update, October 2009.

Sawyer JR, Conoley J, Beaty JH, Warner Jr. WC, Canale ST (2009) "Surgically Treated Tibial Tuberosity Fractures in Adolescents". Pediatric Orthopaedic Society of North America.

Sawyer JR, Ivie C, Shroeder J, Beaty JH, Kelly DM, Warner Jr, WC, Canale ST, Huff A. (2009) Unplanned Return to the Emergency Room Following Treatment in a Busy Fracture Clinic. Pediatric Orthopaedic Society of North America.

Sawyer JR, Rudloff M, Shroeder J, Gehrig, J (2009) "Are Fracture Patterns Sustained by Children Involved in Motor Vehicle Accidents Affected by Age or Obesity?" Pediatric Orthopaedic Society of North America.

Sawyer JR, Younas S, Benz CA, Warner Jr, WC, Kelly DM, (2009) "Factors Influencing Blood Loss in Adolescent Idiopathic Scoliosis Patients Undergoing Posterior Spinal Fusion with Instrumentation. International Meeting of Advanced Spinal Techniques.

Sawyer JR, Crenshaw WC, Younas S, Kelly DM, Warner Jr WC, Muhlbauer MS (2009) "Characterization of Spine Injuries from a Regional Trauma Center" International Meeting of Advanced Spinal Techniques.

Sawyer JR, Bernard M, Kelly DM, Warner Jr WC, Beaty JH: (2009) "Trends in Spine Injury Caused by All-Terrain Vehicle Accidents 1997-2006". International Meeting for Advanced Spinal Techniques.

Sawyer JR, Conoley J, Beaty JH, Warner Jr. WC, Canale ST (2009) "Surgically Treated Tibial Tuberosity Fractures in Adolescents". Orthopaedic Trauma Association.

Sawyer, Jeff. *Thoracic Insufficiency Syndrome and Congenital Scoliosis*. Presented at Methodist University Hospital Pediatric Grand Rounds, November 2008.

Sawyer JR, Mayfield ME, Warner WC, Beaty JH: (2008) "Long-Term Follow-up of Congenital Hip Dislocations Treated with Open Reduction Through and Anterior Approach". Mid America Orthopaedic Society

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