The orthopaedic team continues to publish more research. Two recent studies are highlighted below.

**Study: Long-term results promising for Pavlik harness use in infants**

A new study in the *Journal of Pediatric Orthopaedics* confirms positive long-term results for the treatment of femur fractures in infants with the Pavlik harness. Previous research included only short-term follow up.

Researchers at Le Bonheur and Campbell Clinic reviewed the multi-year clinical and radiographic records for 10 children younger than the age of 6 months who were treated with a Pavlik harness for an isolated femoral shaft fracture at a Level 1 pediatric trauma center.

The average age of the patients at the time of injury was 2.2 months. The average duration of Pavlik harness treatment was 43 days (range, 31 to 54 days). The average age at final follow-up was 5.2 years (range, 2.6 to 7.3 years). At final follow-up, average angulation was 3 degrees valgus (range, 0 to 8 degrees) and 5 degrees procurvatum (range, 0 to 24 degrees). Only one patient had a measurable leg-length discrepancy of 7mm at final follow-up. There were no complications noted.

The research team wrote “pediatric patients have a significant potential for bone remodeling and that any angulation at the time of fracture union will remodel. Treatment with the Pavlik harness provides for excellent clinical outcomes with a minimal complication rate. ”

**Research Spotlight: Adolescent anxiety in idiopathic scoliosis undergoing posterior spinal fusion**

Anxiety is a significant concern in patients who have posterior spinal fusion. A Le Bonheur and Campbell Clinic research team completed a randomized, single-blind, prospective study to compare anxiety in two groups of patients with idiopathic scoliosis undergoing posterior spinal fusion. The first group received a pre-operative orientation/tour. The second group did not.

In analysis of patient anxiety scores, both groups had higher state anxiety (how they feel at this time) than trait (how they feel in general) at all intervals. The tour group had a measurable leg-length discrepancy of 7mm at final follow-up. There were no complications noted.

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The team has focused primarily on research that studies the efficacy of operative and non-operative treatments, as well as the safety and effectiveness of diagnostic tools, like EOS imaging.

**Research Spotlight: 2013**

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**To keep the momentum going for research, we make short-, mid- and long-term goals, so we always have a project in the works.**

Derek Kelly, MD

**Building a research team**

A first step in enhancing research efforts was the creation of a dedicated research team. In 2011, a new clinical research coordinator joined to focus on Institutional Review Board updates, follow-ups with patient subjects and overall coordination to keep researchers on task. The team has also added three medical editors and a grant writer in the past two years.
Residency elective allows for mission work, outreach

Rob Murphy, MD, a fifth-year resident with Campbell Clinic Orthopaedics, spent two weeks in Managua, Nicaragua, in May, as part of the residency program’s new International Service Elective. Funded by generous contributions to The Campbell Foundation, the new elective allows residents to travel for medical outreach and mission work.

“I was fortunate, that because of the excellent training I had received at Campbell Clinic as part of my residency program, I was able to make an impact during each and every clinical encounter. During every case in the operating room, I was asked, ‘How do they do this at Campbell Clinic?’ Campbell Clinic is still thought of as the worldwide leader in orthopaedic care, and I felt proud to bring that excellence in orthopaedics to other surgeons,’” Murphy said.

Murphy worked side by side with Nicaraguan orthopaedists, treating adults with open fractures and machete wounds and pediatric patients with tibial nonunions and hip dysplasia.

“During this trip, the teaching and learning was really a two-way street,” he said. “Not only did I teach the surgeons and residents state-of-the-art orthopaedic knowledge and technical skills, but they also taught me how to practice orthopaedics in an austere environment.”

Canale serves as editor for AAOS Now

Campbell Clinic Orthopaedic Surgeon S. Terry Canale, MD, is the current editor-in-chief for the American Academy of Orthopaedic Surgeon’s (AAOS) monthly publication, AAOS Now. Featuring timely issues and reviews in orthopaedic care, AAOS Now has a readership of 28,000 clinicians.

Canale is professor and chair for the University of Tennessee - Campbell Clinic Department of Orthopaedic Surgery. He has been with Campbell Clinic since 1974.

Warner completes Clinical Orthopaedic Society presidency

William Warner, MD, recently completed a one-year term as president of the Clinical Orthopaedic Society, a national organization founded in 1912. Warner has been with Campbell Clinic and Le Bonheur since 1989. He is also a professor with the University of Tennessee - Campbell Clinic Department of Orthopaedic Surgery.

Fellowship program prepares surgeons for career in orthopaedics

Dr. Laurie Hughes graduated program in 1994 and now serves as staff orthopaedic surgeon at the Central Arkansas Veteran’s Healthcare System in Little Rock, Ark. She practiced pediatric orthopaedics until 2009.

Hughes said she chose Campbell Clinic/Le Bonheur primarily because of Dr. Canale’s and Dr. Beaty’s reputations. She points to the expert guidance and instruction in pediatric orthopaedics, especially in trauma and clubfeet as program strengths.

“I got an excellent exposure to the care of children with all varieties of congenital and developmental problems, especially cerebral palsy. That turned out to be a big part of my pediatric practice later on. I also learned a lot from the multidisciplinary Spina Bifida Clinic – especially from Dr. Sanford, a neurosurgeon who taught me how to diagnose shunt problems and tethered cords in that population,” she said.

Dr. Kathleen Moen graduated from the program in 1998 and now leads the rebuilding of the pediatric orthopaedic enterprise at Swedish Medical Center in Seattle. After fellowship, she spent 14 years as an attending pediatric orthopaedist at Dartmouth Hitchcock Medical Center in Lebanon, N.H.

Moen says she chose to train in Memphis because of the opportunity to work with world-class leaders in pediatric orthopaedics and learn from them the wide spectrum of patient conditions.

“You get to see a mix of academic medicine and private practice and observe a range of practice and teaching styles. Having an intimate fellowship opportunity as the only pediatric orthopedic fellow was a great opportunity,” said Moen.

Dr. Jeffrey Sawyer graduated from the program in 1999. He worked at Rush University Medical Center in Chicago before returning to Campbell Clinic/Le Bonheur in 2005. He now leads the fellowship program.

“The Campbell Clinic fellowship prepared me well for a career in pediatric orthopaedics,” said Sawyer. “The fact that you are the only fellow allows you and the staff to customize the experience to fit your needs. In addition, the mentoring relationships developed in fellowship have led to lifelong friendships and collaboration. It is really true that once you are a fellow you are part of the ‘Campbell Family.’

The orthopaedic team has also garnered support through the Children’s Foundation Research Institute (CFRI) at Le Bonheur Children’s Hospital — a partnership of the University of Tennessee Health Science Center, Le Bonheur Children’s Hospital and the Children’s Foundation of Memphis. The CFRI provides infrastructure and resources for research and discovery, including a team of biostatisticians and biomedical informatics specialists. The Biomedical Informatics Core helps researchers with information databases and study planning. It also helps secure a controlled, HIPAA-compliant environment for researchers with firewall protection and data back-up and storage.

Within the CFRI, the Biostatistics Core helps investigators design high-impact, scientifically and ethically sound studies and also helps with data interpretation and reporting.

“Medical students, residents and fellows are encouraged to pursue research projects through the orthopaedic division and have full access to support through the program,” said Kelly. “Research provides an outlet for their intellectual curiosity.”

Support through infrastructure

Le Bonheur and Campbell Clinic have invested in software and information databases that allow for easier data review and quantification and help foster communication among clinical and translational investigators.

For instance, the Research Electronic Data Capture (REDCap), licensed by Vanderbilt University, provides secure, web-based applications through which users can intuitively enter data. The system also features study-specific data dictionaries, adaptive logic and real-time validation rules.

The Pediatric Research Database helps compile secondary data from electronic medical records for cohort discovery and allows researchers to build and test a hypothesis.

AAOS Now

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**Case Studies: Pavlik harness, posterior spinal fusion**

**Grace Tebbe: Pavlik harness**

Grace Tebbe of Collierville, Tenn., was diagnosed with congenital hip dysplasia shortly after birth. Doctors detected the condition in a routine newborn screening.

“They said, if left untreated, her hip dysplasia would eventually cause more serious issues, like joint problems or leg length discrepancy, later in her life. She would eventually need surgery,” said mom Krista.

The Tebbes were referred to Orthopaedic Surgeon James Beaty, MD, who recommended a Pavlik harness.

“The Pavlik harness has been a great treatment in newborn children and young infants with hip dysplasia,” said Beaty. “We are fortunate to have excellent screening programs to detect and treat children like Grace and hopefully avoid surgical intervention.”

Grace remained in a Pavlik harness for eight weeks to help her hip joints align and become stable.

Now 3, Grace has had no more issues with her hips. She still sees Beaty once each year to monitor her growth and progress.

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Grace Tebbe, 3

**Olivia: Posterior spinal fusion**

Fourteen-year-old Olivia, who lives in the Philippines with her parents and two siblings, had a spinal curvature of 84 degrees when she came to Le Bonheur Children’s Hospital. Her curvature had nearly doubled in nine months, and although she had been followed by a physician at home, she needed a surgery not available in the Philippines.

Childspring International, a faith-based organization that helps children from around the globe get the medical care they need, helped connect Olivia to Le Bonheur and Campbell Clinic Orthopaedic Surgeon William Warner, MD.

“Olivia’s scoliosis had continued to progress. Due to the size of the curve, she was at high risk for her curve to progress as an adult and cause significant back pain and respiratory restriction,” said Warner.

Olivia arrived in Memphis on Sept. 14 and underwent a posterior spinal fusion surgery 10 days later. Surgeons used metal rods and screws to correct the deformity as much as possible and then used bone graft to fuse the spine in its corrected position. The operation helped reduce her curvature to 25 degrees.

Olivia was discharged from the hospital on Sept. 28, noticeably taller.

“I am thrilled to report that Olivia was doing so well after surgery, that she was discharged on Saturday – two days earlier than expected,” wrote Christina Porter, program director for Childspring International, in an update to Olivia’s supporters.

“She is now home with the host family and continuing her recuperation from a wildly successful surgery.”

Olivia, 14, after surgery at Le Bonheur

**Ultrasound of hips at 1 month-old**

**Pelvis X-ray in 2013 showing stable hips**

**Pelvis X-ray in 2013 showing stable hips**

**Pelvis X-ray in 2013 showing stable hips**