

Clinics offer new research, clinical diagnostics

Orthopaedists at Le Bonheur Children's are producing research in each of the hospital's specialized pediatric orthopaedic clinics. The research comes as the orthopaedic team moves into new, renovated space that allows them to provide comprehensive care to patients in one spot. That clinic research includes:

Scoliosis Clinic

In "Linkage Analysis and Gene Mapping of Familial Spinal Disorders," Le Bonheur serves as a leading center researching a genetic test that can predict progression of adolescent idiopathic scoliosis in African Americans. The project, sponsored by Axial Biotech, will study the spinal curvature progression of African-American adolescents who have completed treatment for scoliosis. The clinic is currently collecting sputum samples for this study.

Orthopaedic Surgeon Jeffrey R. Sawyer, MD is part of a multicenter study group aimed at studying early onset scoliosis and its treatment. The center currently has 27 patients who are



Le Bonheur's new EOS imaging system captures head-to-toe images of children in a standing, weight-bearing position. The system provides considerable reduction in radiation dosage – up to 89 percent less than computed radiography – and captures images in less than one minute.

receiving, or have received a Vertical Expandable Prosthetic Titanium Rib (VEPTR) implant.

Newborn Orthopaedic Clinic

In "Prospective Study: Comparison of Outcomes and Complications of the Ponseti Method of Clubfoot Treatment Between Orthopaedic Surgeons and Physical Therapists," researchers are investigating outcomes of cast treatment of clubfoot by surgeons versus physical therapists.

Pediatric Orthopaedic Clinic

Research evaluating the necessity of radiographic evaluation in children with calcaneal apophysitis, known also as Sever disease, found that routine lateral radiographs are justified. The findings were published in the *Journal of Pediatric Orthopaedics*, ("Is Radiographic Evaluation Necessary in Children With a Clinical Diagnosis of Calcaneal Apophysitis (Sever Disease)," 2011; 31:548-550.) Findings were also presented at 2011 annual meetings of the the American Academy of Orthopaedic Surgeons and Pediatric Orthopaedic Society of North America.

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Evonte Cathey: First VEPTR graduate

Born with congenital scoliosis and fused ribs, Evonte Cathey began treatment for his scoliosis at age 2 and ultimately underwent an attempted in-situ convex growth arrest in an effort to slow or correct his curvature at the age of 3. The operation successfully slowed the curve's progression, but his fused ribs and spine curvature made



Evonte Cathey

it difficult for his lungs to grow and expand. Doctors at Le Bonheur Children's Hospital began to look at other options.

In the March 2007, Evonte, then 9, underwent another operation, this time an expansion thoracotomy to release his rib fusions and expand his thoracic volume with the implantation of two Vertical Expandable Prosthetic Titanium Rib (VEPTR) devices. The device – a curved titanium rod that is attached to

the ribs near the spine – helps decrease the spine's curvature, while allowing the lungs to grow and develop.

The device is lengthened once every four to six months in a 45-minute outpatient surgical procedure, essentially growing as the child grows, said Pediatric Orthopaedic Surgeon Jeffrey R. Sawyer, MD. Without VEPTR, Evonte's curve would have continued to progress and his lungs would not be able to grow to their full capacity.

"For Evonte, having the option of VEPTR also made his fusion safer in terms of the fact that he started from a better cardiopulmonary standpoint and with less deformity," said Sawyer. "In addition, he would have had permanent pulmonary compromise without this device." The Campbell Clinic Spine Center at Le Bonheur Children's is one of the high-volume centers in the country that provide VEPTR implantation for pediatric scoliosis patients.

Evonte's device was removed this past year, making him the first VEPTR graduate of the Campbell Clinic Spine Center at Le Bonheur. Evonte will visit the spine center once every six months for a check-up, but his prognosis is promising. His curve is now stabilized at 40 degrees, and his lungs have reached maximal growth.

"He's actually looking like a normal 14-year-old," said Evonte's mom, Yolanda



Preoperative spinal X-ray



Preoperative spinal CT scan



Final VEPTR X-ray before fusion



Final X-ray

Cathey. "He's taller and straighter. You wouldn't be able to tell he has scoliosis." Now 14 years old, Evonte wants to run track someday, says his mom.

"I'm truly thankful for the VEPTR procedure," said Yolanda. "I was worried that it wouldn't work, but it has."

VEPTR research: A look at radiation exposure of children with early onset scoliosis undergoing VEPTR treatment and the role of VEPTR in the treatment of arthrogyryposis.

Researchers at Campbell Clinic and Le Bonheur are conducting two studies of children with Vertical Expandable Prosthetic Titanium Rib (VEPTR) devices in conjunction with the Chest Wall and Spinal Deformity Study Group.

The first was designed to quantitate the amount of radiation exposure received by children undergoing VEPTR treatment for early-onset scoliosis (EOS) and then use this information to develop strategies to decrease radiation exposure to children undergoing treatment for early onset scoliosis.

The study looked at 24 patients – 15 with congenital and nine with neuromuscular scoliosis. Their total treatment radiation exposure, from radiographs, CT scans and other ancillary studies

was measured. Preliminary analysis showed that patients with congenital scoliosis have more exposure from spine-related studies, where patients with neuromuscular scoliosis have more exposure from non-orthopaedic sources such as swallowing studies and VP shunt evaluations.

This information is now being used to develop radiation reducing strategies for these children, many of which are under treatment for 10 or more years. Le Bonheur recently installed a low-dose EOS imaging system, which will significantly reduce radiation exposure for scoliosis patients.

The second study, planned for 2012, will evaluate the efficacy of VEPTR in treating scoliosis in children with arthrogyryposis multiplex congenita (AMC), a group of 300 syndromes characterized by joint contractures. Investigators worked to evaluate the efficacy of VEPTR in patients with EOS secondary to AMC and compare these results to other conditions causing EOS to see if there are differences.

The study will review the Chest Wall and Spine Deformity Registry for patients with arthrogyryposis treated with VEPTR and will request similar cases not already in the database. Specifically, it will review primary diagnosis and demographics, spinal deformity parameters, VEPTR construct used, anchor issues and complications.

Le Bonheur and Campbell Clinic are part of the Chest Wall and Spine Deformity study group which is comprised of the leading VEPTR centers in North America. This study group maintains a common database of patients treated with VEPTR to help study EOS in rare conditions such as MAC. Both studies will be authored by Jeffrey R. Sawyer, MD; Nelson Astur Neto, MD; William C. Warner Jr., MD; and Derek M. Kelly, MD.



Fracture Clinic

In the *Journal of Pediatric Orthopaedics* study, "Trends in ATV-related Spine Injuries," researchers found that children continue to account for a disproportionate percentage of morbidity and mortality from ATV-related accidents – up 240 percent since 1997, according to data from the Kids' Inpatient Databases.

Similar research was published in "Orthopaedic Aspects of All Terrain Vehicle-Related Injuries" in the *Journal of American Academy of Orthopaedic Surgery*.

Orthopaedic Nurse Practitioner Clinic

Nurse practitioners are sharing research about fractures and slipped capital femoral epiphysis. Nurse practitioners Leslie Rhodes, PNP-BC, and Donna C. Scott, PNP-BC, presented at the 13th Annual Pre-Brandon Carrell Pediatric Orthopaedic Symposium at Texas Scottish Rite Hospital for Children. Scott presented "Pediatric Fracture Clinics: Current Status and Future Directions," which highlighted the essential components for a high-volume, multidisciplinary fracture clinic. Rhodes presented "Current Management of Slipped Capital Femoral Epiphysis." SCFE is often misdiagnosed because of initial presentation of knee pain and limping.



New clinic space at Le Bonheur Children's Hospital features nearly 6,000 square feet of space for a variety of pediatric orthopaedic clinics. The renovated space includes:

- 12 exam rooms
- 1 procedure room
- 5 cast rooms
- 3 X-ray rooms
- 1 EOS room
- 1 mini C-arm
- 1 PACS and reading room

MDA CLINIC MOVES TO LE BONHEUR CHILDREN'S

A new pediatric Muscular Dystrophy Association (MDA) clinic is moving to Le Bonheur Children's Hospital in 2012. The MDA-affiliated clinic will provide children with neuromuscular diseases one spot to receive multidisciplinary care.

The clinic will include Campbell Clinic and Le Bonheur orthopaedists, along with specialists from neurology, cardiology, pulmonology, physical therapy, respiratory therapy, social work and clinical nutrition.

"This hospital-based model will allow us to better care for patients with neuromuscular disorders by offering expertise in a variety of areas," said Orthopaedic Surgeon William C. Warner Jr., MD. "Having these services in one clinic will increase communication between the different services that are caring for these patients with neuromuscular disorders."

MDA clinics also serve as sites for clinical trials of the latest experimental therapies and drugs. MDA is the world's largest non-governmental sponsor of research seeking the causes of and effective treatments for neuromuscular diseases, sponsoring 330 research projects annually.

Le Bonheur earns ACS Level 1 Trauma designation

Le Bonheur Children's Hospital was named a Level 1 pediatric trauma center by the American College of Surgeons (ACS) in 2011. The hospital is the only Level 1 pediatric trauma center in a 400-mile radius. The trauma service includes experts in specialties like orthopaedics, general surgery, neurosurgery, anesthesia, critical care and emergency services.

As part of the trauma certification, Le Bonheur provides:

- In-house anesthesia coverage, 24/7
- Operating room team on standby for trauma patients, 24/7
- A trauma response team of 15 specialists, including pediatric surgeons and pediatric emergency medicine physicians, that helps revive and stabilize the most severely injured trauma patients
- CT and MRI tech availability
- Specialized transportation by Pedi-Flite ambulance or Hospital Wing helicopter
- Coordinated care team dedicated to helping expedite patient recovery through rehab services

"With our trauma service line, we strive to be more efficient and more coordinated, while using the ACS guidelines as our benchmark," said Le Bonheur Children's Trauma Director Trey Eubanks, MD. "These guidelines have focused our efforts on quality improvement, intensified research and outreach education."



Campbell Clinic pediatric fellowship brings great lessons

Ask Orthopaedic Surgeon Martin Herman, MD, about the greatest lessons he learned in his pediatric orthopaedic fellowship, and he'll list them quickly: Pay close attention to details, care about your patients and stay open to new discovery.

Herman, a pediatric orthopaedic fellow with Campbell Clinic and The University of Tennessee/Le Bonheur Children's Hospital in 1995-1996, now uses those lessons to teach his own fellows at St. Christopher's Hospital/Shriner's Hospital in Philadelphia.

"They don't teach in a strict lecture sense," Herman said of his Campbell Clinic mentors. "The method of teaching was like shadowing, and it's my method of teaching residents today: have them partner with you in caring for kids."

Herman completed his orthopaedic residency at the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School in 1995. When he began applying for his pediatric orthopaedic fellowship, he applied to six programs. The Campbell Clinic fellowship was his first choice.

"I mostly chose it because of *Campbell's Operative Orthopaedics* reference. Most of the residents used the book, and I thought, well, if co-editors Jim Beaty and Terry Canale are there, I should go."

Herman appreciated having a variety of experiences at Campbell Clinic - clinical and surgical work as well as education for residents and research. "It was such a nice place to work and really have all the resources I needed as a fellow."

The best part of his experience, he says, was getting to know Pediatric Orthopaedic Surgeons Jim Beaty, MD, Terry Canale, MD, and William C. Warner Jr., MD. Beaty helped him learn to pay close attention to details and understand how something worked. Warner taught him to be a great clinician, care for patients and really interact with them. Canale, meanwhile, brought the true academic background he was looking for.

Now the fellowship director at St. Christopher's Hospital/Shriner's Hospital, Herman has sent both a pediatric orthopaedic fellow and trauma fellow to the Memphis program.

In addition to his fellowship directorship, Herman also serves as an assistant professor of Orthopedic Surgery and Pediatrics at Drexel University College of Medicine and an attending physician at St. Christopher's Hospital for Children. He also serves as orthopedic director for the spina bifida program at St. Christopher's Hospital for Children.



Martin Herman, MD

Best practices fight post-fusion surgical site infections

Quality initiatives at Le Bonheur Children's have proven successful in fighting off surgical site infections in spinal fusion cases.

Since adopting a best practices strategy in 2009 - like appropriate prophylactic antibiotic use - the orthopaedic team has had one spinal fusion site infection in the past 33 months, a rate of .51 surgical site infections per 100 spinal fusion cases.

Best practices the hospital has adopted include:

- 100 percent compliance (September 2011 YTD) of prophylactic antibiotic administration within 60 minutes prior to incision for spinal fusion cases. Baseline data showed a 48 percent compliance before a new pre-op antibiotic administration process was implemented.
- 100 percent compliance (September 2011 YTD) of appropriate selection of pre-operative prophylaxis antibiotic in spinal fusion cases.
- Minimizing traffic in and out of the operating room during spinal fusion procedures.
- Addition of Vancomycin in preoperative antibiotic regimen due to high prevalence of methacillin-resistant staphylococcus aureus organisms in Memphis
- Skin preparation and normothermia.

In addition, the team is preparing, in conjunction with the Department of Pharmacy, for the use of Vancomycin in bone grafts during the fusion procedure.

"Our goal is to continue to establish best practices and work toward eliminating post-fusion infections altogether," said Orthopaedic Surgeon Jeffrey R. Sawyer, MD.



