

Research Keeps Motion Analysis Moving Forward

EVERY day, our hospitals treat children who have difficulty moving their limbs. These children with bone, joint or muscle problems find it challenging to walk, run, dance and play. Shriners Hospitals for Children leads the way in providing expert analysis of movement in our motion analysis laboratories. The labs, found in many of our orthopaedic hospitals, focus on improving the outcome of patients by analyzing movement before and after a treatment, like surgery.

But what if there was a way to predict what would happen after a treatment before any action is taken? Shriners Hospitals for Children — Erie is working toward that goal through research in predictive modeling.

“Right now, there is a lot of art to the science,” physical therapist **Kevin Cooney** said. “The patient has an exam where we collect data on movement, muscle function and forces within the body. We then interpret that data and create a treatment plan. Even though it’s a very evidence-based analysis, there is still some uncertainty in what will work best for each patient.”

Dustin Bruening, a biomechanical engineer in the lab, sees creating a patient-specific model as a way to greatly improve patient care in the future. “If we can simulate a treatment in the lab and see what the effect would be on the patient, we will be able to better gauge the child’s medical outcome,” said Bruening.

The obvious benefit for the patient is the possibility of avoiding unnecessary or potentially unsuccessful treatment.

Like all innovative projects at Shriners Hospitals, the hope is that this research will lead to better patient care and outcomes for children throughout the world.



KEVIN COONEY, physical therapist at the Erie Shriners Hospital, wraps electromyography (EMG) electrodes over the muscles of a child. Data collected from the electrodes will help Cooney understand limitations in movement and help in creating a treatment plan.

Jenna Finds Her Swing



IN June 1988, new parents **Ron** and **Jodi** were relieved to hear their newborn daughter was healthy. But the look on the doctor’s face told them something wasn’t right.

Ron’s gaze shifted from the doctor’s face to his beautiful new daughter. It didn’t take him long to discover the source of the commotion: his baby’s heel had grown into the back of her calf, and her toes were pointed at an awkward angle, in the shape of a “U,” toward her chin.

Diagnosed with clubfoot, a congenital orthopaedic condition, doctors told the family there wasn’t much they could do for baby **Jenna**. Their daughter was otherwise healthy, but she would probably never walk without assistance. That day, as luck would have it, a resident physician at Shriners Hospitals for Children — Portland was working at the hospital where Jenna was born. She examined Jenna during her rounds.

“She knew what the doctors had told us, but she didn’t agree,” said Jodi. “She suggested we bring her to Shriners Hospitals so they could take a look and see if they could help. It wasn’t a promise, but it was hope.”

Within a few weeks, Jenna was a patient at the Portland Shriners Hospital. She wore corrective casts until she was eight months old. **Michael Aiona**, M.D., now assistant chief of staff at the hospital, performed surgery to correct her foot.

“They gave our daughter something we once thought was impossible — the ability to walk,” Ron explained.


Although Jenna wore braces and casts for several years, nothing kept her from her love of sports. Her parents encouraged her, keeping in mind Dr. Aiona’s important advice.

“He told us that as she grows, she’ll know her own physical limits and we should let her do anything she wants to do,” said Jodi. “If she wants to try a sport, don’t make excuses for her.”


Jenna became hooked on golf when her father introduced her to the sport in middle school. Jenna was elected “Most Valuable Player” of her golf team all four years of high school and served two years as team captain. She has played with several PGA Tour players and golf legend **Arnold Palmer**, and was featured on the back of the General Mills Wheaties box in 2005.

“The Shriners have truly impacted my life,” Jenna said. “I would’ve never had the opportunity to walk, play golf or do any of the incredible things I’ve done if it wasn’t for them.”


Jenna’s talent earned her a golf scholarship to Fresno State last year. She studies communications and plans to pursue a career in the golf industry.



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