The Brain-Bladder Connection

Erik and Salina Andersen were at wits’ end. Since the age of 3 ½, their son, Alek, suffered from torturous spasms. Sudden, intense pain in his bladder area would drop their son to his knees 20 to 30 times a day and trigger incontinence. “Alek called them ‘twisties,’” said Erik Andersen. “You could see the pain in his face.”

Their search for answers for Alek’s ‘twisties’ led the Chicago couple to multiple specialists, whose conflicting diagnoses offered no relief from the debilitating episodes. After 2½ years of endless frustration, the Andersons finally found the help they needed from Israel Franco, MD, Director of the Yale New Haven Children’s Bladder and Continence Program.

Throughout his three decades of leadership in pediatric incontinence, Dr. Franco has repeatedly revolutionized the field by championing the link between the brain and bladder in urinary incontinence and had sought non-invasive methods as a means—to reset the brain-bladder connection and restore his young patients’ continence and confidence. It now seems a bit ironic that Dr. Franco was an early adopter of laparoscopic and robotic advancements in medical technology. Dr. Franco concluded that Alek’s bladder spasms were caused by an inability to modulate signals from the bladder appropriate in his brain. He had already failed novel medical treatments that his urologist had tried at the suggestion of Dr. Franco. Instead of a continuing down a path of standard medications, Dr. Franco suggested they first try TENS. This non-invasive treatment is most often used for back pain, but Dr. Franco has incorporated its use in his treatment armamentarium with great success.

In TENS, a small battery-operated device transmits a low-voltage electric current through two electrodes adhered to the skin. For Alek and other pediatric urology patients, the electrodes are placed over the “dimples” on both sides of the lower spine, where the sacral nerve lies close to the surface. The treatment lasts 30 to 45 minutes each day. “It opened up the field by showing us what was going on in the brain,” he said. “It became clear that the sites of the brain associated with the voiding function were the same sites associated with what we call ‘syndrome mix,’ or executive-function disorders such as ADHD, OCD, anxiety, depression, etc. We started exploring whether there was a link between the two.”

Dr. Franco’s research into the mind-bladder connection marked a paradigm shift in the field of pediatric incontinence. “Prior to them, everything was the bladder, bladder, bladder,” he said. “But the bladder doesn’t stretch itself out if the brain doesn’t let it. In the end it’s an interplay of bladder physiology, neurophysiology, the gastrointestinal tract, and psychiatry. They are four points in a square that all come together. You need knowledge of all of them.”

The Yale New Haven Children’s Bladder and Continence Program helps children age 5 to 21, like Alek, gain bladder control. When families like the Andersons first arrive, Dr. Franco reviews an extensive questionnaire with them that enables him to quickly distinguish if the core issue is one of emptying, urgency, or sensation. “We were very grateful that Dr. Franco spent quite a bit of time with us,” Mr. Andersen said. “He was interested in really understanding Alek’s total history.”

Dr. Franco concluded that Alek’s bladder spasms were caused by an inability to modulate signals from the bladder appropriate in his brain. "It seems that those sites in the brain associated with the control of the urge to void are being activated," Dr. Franco explained. "Somehow, through neuroplasticity changes in the brain, we’re able to reset the sensation in their brain that allows the child to begin to stay dry or fix the way they urinate."

Typically, after eight weeks of TENS, parents will see a sudden, dramatic improvement in their child’s bladder control. But, Alek’s case was not typical. “In one week, our son was cured,” Mr. Andersen said. “Dr. Franco transformed our lives. Alek was cured just in time for first grade. He’s such an outgoing and friendly kid/boy, and he is finally able to engage in social activities in a way he was afraid to before.”

As Alek continues his daily at-home TENS treatment, Dr. Franco continues to explore the mind-bladder connection. “I was drawn to work at Yale because of the research potential here,” he said. “Yale has 13 MRI machines just for research. And we’ll be able to do genetic testing as well. I know Yale was the ideal place for me to be able to study these children. We are dedicated to taking care of these children.”