

New options for stopping scoliosis curves in teens: Vertebral Stapling & Tethering

In a child or adolescent, where the bones are not fully formed as in an adult, wearing an external brace can sometimes be effective at stopping progression of the curve. When bracing fails to work or is not an option, there are now two new minimally invasive options that access the spine through tiny incisions near the ribs:

1. Vertebral Body Stapling uses a series of staples on one side of the vertebrae to correct

scoliosis like braces on teeth.

2. Vertebral Body Tethering uses a cable attached to one side of the vertebrae to correct and then control the curve.

Both techniques work on one side of the curve to prevent it from worsening during the adolescent growth spurt. Sometimes it may be the only surgery needed. A second benefit of both minimally invasive techniques is that they don't burn any bridges and more

traditional corrective instrumentation can be used later on if necessary.

Tethering applies mostly to adolescent spinal curves that are still in the growth spurt stage. Typically the teen needs to have 30% of their growth left (age 14 for girls and age 16 for boys). A candidate would have idiopathic scoliosis with curve less than 65 degrees who are generally flexible and whose bone structure is large enough to accept the installation of the screws and anchors into the vertebrae. The young patient should also have failed traditional bracing, or cannot tolerate wearing a brace.

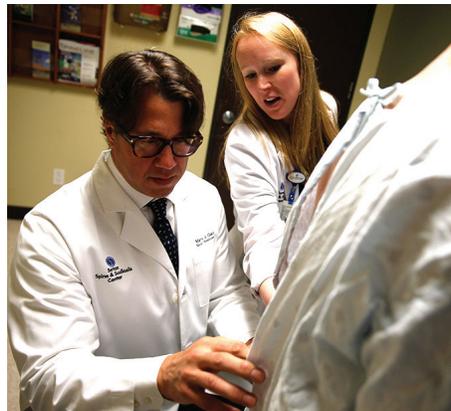
Vertebral Body Tethering involves the concept of bone growth modulation which is based off the Hueter-Volkman principle, which states that bone under more pressure will grow slower and denser than bone not under stress. So with bracing or tethering the bone on the inside part of the curve will grow slower and denser than the bone on the outer part of the curve which in turn creates a vertebrae more wedge shaped.

While wearing a brace stops the curve

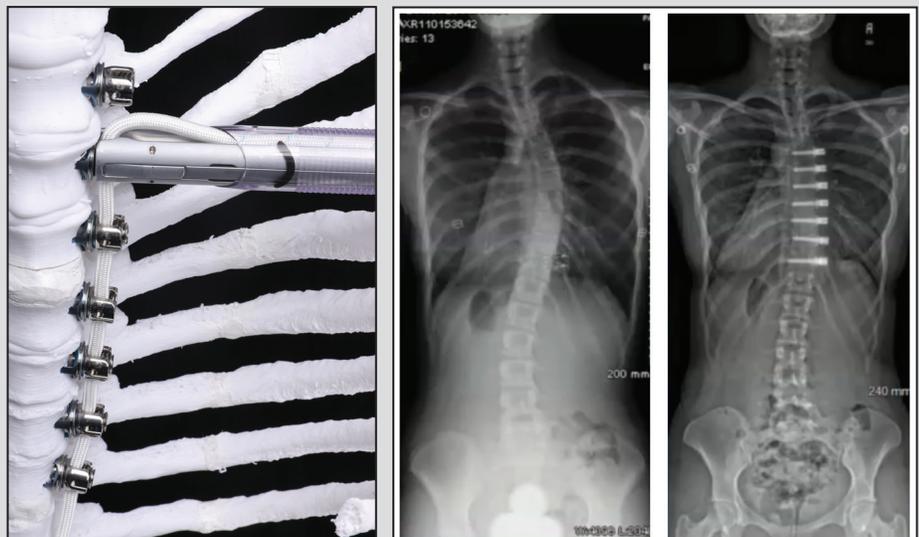
PEDIATRIC SCOLIOSIS

BRACING & WAITING

While bracing is ineffective for adult scoliosis, in half of cases a brace can stop a spinal curve from worsening in the adolescent who is still growing.



Vertebral tethering is a very new procedure available in a handful of scoliosis centers in the United States. Dr. Matthew Geck is one of few scoliosis specialists proficient in the surgical procedure. Tethering has been shown to be successful in arresting the curve without major surgery in many teens.



from worsening, tethering actually reverses the curve. With Vertebral Body Tethering, loading is applied directly to the spine with a surgical procedure, which creates bone growth modulation and attempts to provide some correction of the spinal curve — if the patient has young with more bone growth in the future. Benefits of Vertebral Body Tethering include:

- Less invasive than open scoliosis surgery
- Less surgical hardware is used
- More motion preservation than rods

Vertebral Body Tethering surgery

The Tethering System is made up of anchors, bone screws, cord and set screws. During surgery, the scoliosis surgeon places the anchor and bone screw into the patient's spine on the side of the spinal curve. The polymer cord is then secured to the bone screws using set screws. The surgeon then applies tension to the cord to partially reduce the curve in

the person's spine. The cord continues to straighten the spine as the patient continues to grow.

Recovery can be fairly quick with the young patient being released to return to activity and to athletics about a month to six weeks after surgery.

Vertebral Body Tethering Outcomes

According to Dr. Geck, preliminary research on tethering is exciting. "We're seeing in some cases a 30% to 40% degree correction with tethering," he notes. "The key issue is performing the procedure when the teen is young enough where they have at least a third of their growth spurt left. For girls that would mean doing the procedure before age 14 or 15, and for boys, before about age 16. Overall, this new scoliosis correction method is less invasive than using rods to de-rotate and straighten the curve. But again, there is a key window of time that we must adhere to."

SCOLIOSIS EXPERTISE

- Spinal Deformity
- Adult and pediatric scoliosis
- Previously Operated Scoliosis
- Spondylolisthesis
- Conservative treatment of spinal deformities
- Kyphosis
- Flatback Syndrome
- Nonsurgical care of adult & pediatric spinal deformities
- Adult and pediatric scoliosis surgery
- Adult and pediatric kyphosis surgery
- Care for previously operated scoliosis patients
- Brace treatments for scoliosis and kyphosis
- Growing rods for early onset scoliosis
- Titanium rib/VEPTR for early onset scoliosis
- Spinal osteotomies for complex scoliosis or kyphosis
- Complex spinal instrumentation
- Minimally invasive/Less invasive surgery for spinal deformities

PHYSICIAN BIO

MATTHEW GECK, MD

**Board-certified Orthopedic Surgeon • Fellowship-Trained in Adult and Pediatric Spine Surgery
Specializing in Scoliosis & Spinal Deformity**

Co-Chief, Ascension Texas Spine and Scoliosis Center, Austin Texas • Chief, Scoliosis and Complex Spine Program

Assistant Professor Dell Medical School Department of Surgery and Preoperative Care

Co-Founder, Co-Medical Director of SpineHope, a non-profit organization that transforms the lives of children with spinal deformities worldwide through surgery, education and research



Matthew J. Geck MD is a board-certified, fellowship-trained spine and scoliosis surgeon. Dr. Geck's practice is exclusively focused on the niche of spine and scoliosis surgery. This includes patients with adult and pediatric scoliosis, kyphosis, failed surgeries, spinal cord compression, flatback syndrome from Harrington Rods and other complex spinal problems. His specialty spine practice has been based in Austin since 2002. Over the past 20 years, Dr. Geck has performed over 2,500 spine surgeries. His scoliosis practice receives patients from across Texas, surrounding patients and Mexico. He also performs surgeries in South America through his non-profit foundation SpineHope.

Dr. Geck's focus is on pediatric and adult patients with scoliosis, kyphosis, spinal cord compression, failed previous surgeries, and other complex spinal problems. He is experienced in minimally invasive scoliosis surgery, spinal stapling and tethering (fusionless scoliosis surgery), complex spinal reconstruction, osteotomy surgery, and revision surgeries.

Dr. Geck was raised in Wisconsin. He performed his undergraduate work at the University of Wisconsin in the Medical Scholars program and graduated Phi Beta Kappa. He attended medical school at the University of Wisconsin School of Medicine and graduated Alpha Omega Alpha. Dr. Geck performed his orthopedic surgery residency at UCLA Medical Center. He then performed two spine fellowships in adult and pediatric spine surgery, the first at Jackson Memorial Hospital and a second in pediatric scoliosis and kyphosis surgery at Miami Children's Hospital. He moved to Austin, Texas in 2002 where he started his spine deformity practice.

Dr. Geck has authored more than 80 scientific papers, book chapters, and abstracts for the journals Spine, The Journal of Spinal Disorders, Orthopedic Clinics in North America, The Spine Journal, and the Journal of the Scoliosis Research Society: Spinal Deformity, and presentations at the Scoliosis Research Society, International Meeting for Advanced Spinal Techniques, North American Spine Society, Cervical Spine Research Society, the Society for Minimally Invasive Surgery of the Spine, and the American Academy of Orthopaedic Surgeons.

Dr. Geck was certified by the American Board of Orthopaedic Surgery in 2004 and is a Fellow of the American Orthopedic Association, the Scoliosis Research Society, North American Spine Society, and the American Academy of Orthopedic Surgeons, the Society for Minimally Invasive Surgery of the Spine, and the Cervical Spine Research Society.

Dr. Geck also contributes his time as Medical Director for SpineHope which performs free spine surgery for children in poverty-stricken countries across South America and elsewhere. Dr. Geck has traveled to more than 20 international locations, performing spinal deformity surgeries at various hospitals across South America. He has supervised or performed over 200 spine surgeries in these locales, and has seen over 1,000 children with severe or neglected spinal deformities. Through SpineHope, Dr. Geck provides advanced training to local spine surgeons at these hospitals in the specialty of spinal deformity and scoliosis. To learn more about this foundation, visit SpineHope.org.